BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF APPLICATIONS FOR PERMIT 77-14377, 77-14378, 77-14379, APPLICATIONS FOR TRANSFER 85396, 85397, 85398, AND 85399, AND APPLICATION FOR EXCHANGE 85538 IN THE NAME OF PERPETUA RESOURCES OF IDAHO, INC.,

TRANSCRIPT OF THE HEARING
HELD ON THE 11TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 12TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 13TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 14TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 15TH DAY OF DECEMBER, 2023

BEFORE: MR. JAMES CEFALO, HEARING OFFICER

TRANSCRIBED BY: KEITH EVANS, RPR, WA & ID CSR NO. 655



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BE IT REMEMBERED that the above-entitled matter came on for hearing December 11, 2023, at the Idaho Department of Water Resources, City of Boise, County of Ada, State of Idaho.

(Thereupon the following oral proceedings were had as follows, to-wit:)

HEARING OFFICER: Good morning. My name is James Cefalo. I am the regional manager for the Idaho Department of Water Resources in the Eastern Regional Office. I have been designated as the hearing officer for this proceeding. Assisting me with the hearing today is Jean Hersley, who is the technical records specialist, in the main office of the Department.

The purpose of this hearing is to receive evidence and testimony in connection with applications for permit No. 77-14377, 77-14378, and 77-14379. Applications for transfer 85396, 85397, 85398, and 85399, and application for exchange 85538. These eight applications are being consolidated --

THE CLERK: Sorry, that's me.

HEARING OFFICER: These eight applications have been consolidated for the purpose of conducting an administrative hearing. The applications have been protested by the Nez Perce Tribe; Save the South Fork Salmon, Incorporated; and Idaho Conservation League.



This hearing is beginning on Monday, December 11th, 2023, at 9:15 a.m. in the IDWR State Office in Boise, Idaho. This hearing will be conducted in compliance with the applicable provisions of Chapters 2 and 17 of Title 42, Idaho Code; Chapter 52 of Title 67, Idaho Code; the Department's Water Appropriation Rules; and the Department's Rules of Procedure.

Present at the hearing we have attorneys Elijah Watkins and Wade Foster on behalf of the applicant Perpetua Resources of Idaho, Incorporated. We also have attorney, Julia Thrower, here on behalf of Save the South Fork Salmon, Incorporated, and Idaho Conservation League. And we have attorneys Amanda Rogerson and Michael Lopez here on behalf of the Nez Perce Tribe.

At this time I would like the parties to identify anyone else that may be here in attendance, and I recognize that that will change probably throughout the day and the course of the hearing, but for the people that we have here on-hand. Mr. Watkins, go ahead.

MR. WATKINS: Thank you, Mr. Cefalo. Seated at Counsel's table is Ms. Franolich assisting with the evidence presentation today. We have Mr. Michael Bogert, who is General Counsel at Perpetua. Mr. Alan Haslam, who's the vice president there. We have Dan Stanaway from Brown and Caldwell, and we have Mr. Terry Scanlan, who will be

testifying. And I saw earlier in the room today was Mr. Kevin Beaton, also from my office. He may be in and out throughout the hearing.

HEARING OFFICER: Okay. Thank you, Mr. Watkins. Ms. Thrower, maybe you, on behalf of all the Protestants, if you know who some of these people are, maybe not, go ahead.

MS. THROWER: Well, I'll just do my people.

HEARING OFFICER: That's correct.

MS. THROWER: (Inaudible.) We have on behalf of ICL Walt (inaudible), who is staff there.

HEARING OFFICER: Okay. Great.

MS. THROWER: And we will also have Mary Faurot, who is a board member of Save the South Fork Salmon (inaudible).

HEARING OFFICER: Thank you. Ms. Rogerson?

MS. ROGERSON: Yeah, thank you, Mr. Hearing Officer. This is Allison Lebeda. She works in the Nez Perce Tribe's office, Water Resources Department.

HEARING OFFICER: Excellent. Great. Thank you. So prior to hearing, the parties discussed the review criteria related to applications for permit and applications for transfer, and the parties have stipulated that certain criteria set forth in statute are not at issue in this contested case. Specifically, the criteria for an application for permit that says, will the proposed permit reduce the quantity of water under existing water rights,



and does the applicant have sufficient financial resources to complete the project? Those two criteria are not at issue for the Protestants in this particular case, and for the transfer applications the criteria related to injury and enlargement for the proposed change injury to system water rights -- will a proposed change result in enlargement of the transferred water rights? Those two criteria are also not at issue for the Protestants. Therefore, if the applicant can make a nominal showing on those matters, and we can move on and not spend a lot of time on those particular issues.

The parties have decided that for exhibits, we'll take exhibits one by one as they're offered in the flow of the proceedings and handle any objections to the admissibility of those exhibits as that may arise.

In addition to the testimony and exhibits that are admitted into the record during this hearing, I will take judicial notice of the Department's file -- files for the eight applications, past decisions and orders of the Department, and the Department's water right records.

With that, we will move into the presentation of witnesses and exhibits by the applicant Perpetua. So turn to Mr. Watkins and Mr. Foster, I don't know who will lead out, but you can call your first witness.

MR. WATKINS: Thank you, Officer Cefalo. Perpetua



calls Mr. Alan Haslam.

HEARING OFFICER: All right.

ALAN HASLAM

after having been first duly sworn,

was examined and testified as follows:

MR. HASLAM: Yes, sir.

HEARING OFFICER: Okay, you can have a seat. All the exhibits are lined up against the wall, and I have a copy here if they are needed. Go ahead, Mr. Watkins.

DIRECT EXAMINATION

BY MR. WATKINS:

Q. Mr. Haslam, good morning.

A. Good morning.

Q. Could you please state and spell your name for the record?

A. Alan Haslam, A-l-a-n H-a-s-l-a-m.

Q. Mr. Haslam, what is it that you do for a living?

A. I am currently employed by Perpetua Resources Idaho, Inc., as vice president of permitting.

Q. And in that role as vice president of permitting for Perpetua Inc., do you ever give presentations using a Power Point slide deck?

A. Yes, sir.

Q. And in using that Power Point slide deck, does it assist you in presenting information, you can present as



well as helping those who are following along follow what you're saying and your testimony?

A. Yes, sir.

Q. And did you prepare such a slide deck for today's presentation?

A. I did.

MR. WATKINS: Officer Cefalo, at this time we'd ask Ms. Hersley to allow Ms. Franolich to share her screen so we can show the Power Point. It's a demonstrative.

THE CLERK: I already did. She's a presenter.

HEARING OFFICER: Are we going to be able to do that?

THE CLERK: Yeah. I gave her (inaudible).

HEARING OFFICER: I apologize. I wish we had a bigger screen right behind me so that both could look forward. We've got a couple of screens scattered throughout the room, and they are all off to the side. So feel free to adjust your chairs if needed. Go ahead, Mr. Watkins.

Q. (By Mr. Watkins) Mr. Haslam, does this appear to be the Power Point presentation you were just mentioning?

A. Yes.

Q. Ms. Franolich, can you go to slide two, please? Mr. Haslam, what roles did you hold prior to joining Perpetua?

A. Prior to joining Perpetua I was director of mining for Agrium, and I looked after -- well, I -- I filled a

number of roles there, looking after exploration, mine planning, mine operations management, mine permitting, and recollection and restoration of historic mine sites.

Q. How long were you at Agrium?

A. 28-ish years.

Q. Did you ever work on any projects that were similar to some of the issues with this recent Perpetua project?

A. Yeah. So I was involved in permitting the North Rasmussen Ridge Mine, the South Rasmussen Ridge Mine, the Lance Creek Mine, and before I left Agrium I was leading the permitting on the Husky 1 North Dry Ridge project.

Q. Did any -- sorry.

A. Yeah, I was just going to say the Lance Creek Mine, although it was a smaller operation, it was -- it was done under the same -- same goals as what we have for Perpetua with the Stibnite Gold Project, or it was a -- it was for mediation and restoration of that -- it was a historic mine site, to do that through reestablishing the mining operations there.

Q. So the purpose was to find a site that had been mined out previously and restore it?

A. Yeah, it was partially mined. It hadn't been completely mined out, kind of similar to Stibnite Gold Project. And through -- through getting the mining operation going again, we were able to fund the cleanup of



that project site.

Q. How long have you been in this space?

A. I've been with Perpetua since January of 2017.

Q. And before Perpetua, how long have you been in kind of the mining permitting?

A. Oh, right about 35 years total.

Q. Let's talk about Perpetua a little bit. Ms. Franolich, next slide, please. Would you tell us about Perpetua Resources, please.

A. Yeah. So Perpetua, yeah, really the goal of our company is to take historic mining site, mining district, that's been heavily impacted by over a hundred years of previous mining, and through modern mining methods and transparency, working with the stakeholders, to take that site and clean it up, restore fish passage, improve the water quality, at the same time as providing a critical mineral that the Department of Defense needs, as well as supplying of production of gold.

Q. Where is Perpetua from, the company?

A. Idaho based company, publicly traded.

Q. Publicly trade on NASDAQ?

A. Yes, sir.

Q. And you mentioned it briefly, but I just want to maybe make a -- ask a more focused question. What is the goal or the purpose of Perpetua?



A. The purpose is to develop the Stibnite Gold Project, and the main purpose there is producing gold antimony, and restoring that site and cleaning it up.

Q. Does Perpetua have a local advisory committee?

A. Yes. We have reached out to the local counties and communities to form a local oversight committee where they can -- they can provide feedback. They can provide some oversight. One of the projects that they put in place is to partner with University of Idaho, and they come to the site and do quarterly water sampling along with this, and then they go and independently run those water samples just kind of -- just for transparency of what's going on with the site.

Q. Why would Perpetua create a local community advisory board?

A. It's the way that Perpetua has really operated, reaching out and wanting feedback from the public, and, you know, we have improved our mine plans and everything else through that kind of feedback and have made the plan and our direction better for it.

Q. Is this -- is this board kind of a feel-good board, just as a figurehead, or do you actually listen to them?

A. Oh, yeah, we absolutely listen to them. We listen to all of our public stakeholders.

Q. You mentioned this previously. You talked about



this Stibnite Gold Project. Is that sometimes called the SGP for short?

A. Yes.

Q. What is the Stibnite Gold Project or the SGP?

A. So the Stibnite Gold Project is -- it -- it's comprised of three different mining pits. Two of those have previously been mined, a tailing storage facility, a significant buttress against that facility, a mill site, truck shop, et cetera. It's kind of what the project is, but the plan behind the project is to reinitiate mining in those pits and through the funding of that mining to restore fish passage, which we can talk about some more now or --

Q. We can talk about it.

A. Which has been blocked off since the late 1930's. There's also some areas up in the Meadow Creek Drainage with legacy materials just kind of placed on the ground, spent ore and tailings, et cetera.

Q. Let me unpackage that a little bit. You said there's three pits?

A. Uh-huh (affirmative).

Q. Two of which have been mined before. First, what are the names of those three pits?

A. The Yellow Pine Pit and the West End Pit are the ones that have been previously mined, and then the Hangar Flats Pit is unmined, although there has been underground

mining in -- all throughout that area previously.

Q. So we're going to talk about the Yellow Pine Pit, the West End Pit, and the Hangar Flats Pit in just a little bit, but that helps us get us some bearing of what we're talking about today. Ms. Franolich, next slide, please. Where is the Stibnite Gold Project located?

A. So if you can see there, the star there, it's about 35 air miles east of McCall.

Q. How long does it take to get there from, say, Cascade?

A. It's three hours.

Q. Just going through --

A. Two to three hours, yeah. So to access -- current access, if you're coming from the south, you would go from Cascade. And in the summer months you would go north of Johnson Creek Road to Yellow Pine, and then follow the Stibnite Road into the project site.

Q. Ms. Franolich, can you blow up the map on the right?

A. In the winter the Johnson Creek route is blocked, and so access occurs going north on the South Fork Road and then over east to Yellow Pine, and then further east along the Stibnite Road to the project site.

Q. What's the closest community or, say, population center next to the Stibnite Gold Project?



A. It's kind of split between Cascade and McCall. I would say -- well, the closest community is Yellow Pine, but very small year-round population. And then McCall and Cascade would be kind of the split distance between those two.

Q. Going a little bit off script here, but what do you think the year-round population of Yellow Pine is?

A. Oh, I should know that. Under ten.

Q. Not a lot, okay. I want to talk a little bit about landownership. I'm going to hand you what has been previously marked as Exhibit 23. I'm going to ask you -- I'm going to ask you if you know what you're looking at.

A. Yeah, this is the feasibility study.

Q. And what is the feasibility study?

A. So it's a -- it's a study required by SEC, as well as some -- the Canadian Securities Commissions that have to detail all aspects of the project, resources, reserves. That it details out the estimated cost to construct a project and what the operating costs will be, what the mine plan is, what the reclamation plan is, et cetera. It's just kind of nuts to bolts of the project from start to finish.

Q. As a vice president at Perpetua, did you in any way assist or oversee the production of this feasibility study?

A. I didn't oversee the production of it. I was involved in reviewing portions of it.



Q. You reviewed and approved portions of it?

A. Yes.

Q. And is what you have in front of you, previously marked as Exhibit 23, does that look to be a fair and accurate copy of the feasibility study?

A. Yes, it does.

MR. WATKINS: Officer Cefalo, at this time we would move to admit Exhibit 23 into evidence.

HEARING OFFICER: Yeah, I'm concerned about the size of this exhibit. Are there sections that can be identified to simplify what's coming into the record? Is there a conclusion, a summary, an executive summary?

MR. WATKINS: If you look at page 6, we've added page numbers to the bottom of each one. That provides a summary. From 6 to -- I would say from page 6 to page 40 are -- yeah, page 6 to page 40 provides the summary of the feasibility review. Although, obviously, there's greater detail throughout the body of the work.

HEARING OFFICER: Sure. There are other documents, I believe, that provide better overview of the water use of the project because financial resources is not at issue in this contested case. I think minimizing the length of this exhibit will be critical. So I turn to the Protestants. Is there any objection to Exhibit 23 limited to pages 1 through 40?



MR. WATKINS: Officer Cefalo?

HEARING OFFICER: Go ahead, Mr. Watkins.

MR. WATKINS: We would also point you to page 539 which talks about the economic benefits of the project, and we would also point you to page 60 which talks about some of the landownership in the project.

HEARING OFFICER: 539 is outside of the local public interest review, local public interest is limited to the effect on water resources, so I don't know that we need 539. And you had said page 60?

MR. WATKINS: Yes, Officer.

HEARING OFFICER: Property description and location, they're all titled. So that section would be 60 through 65. So I turn to the Protestants and see if there are any objections to Exhibit 23, pages 1 through 40, and 60 through 65?

MS. THROWER: I don't believe so.

HEARING OFFICER: Okay. Hearing no objections, those pages are admitted into the record at this time.

Q. (By Mr. Watkins) Ms. Franolich, can you go to page 60, please? Put that to the side, and can you blow up the first two sentences on paragraph one. I'm going to read the first two sentences on paragraph one that will be blown up on the screen, if you would like to follow along. That's going to be on page 60. It

reads: Midas Gold's property -- let me stop there. Who or what is Midas Gold?

A. Midas Gold was the name of our company prior to changing to Perpetua Resources.

Q. Midas Gold and Perpetua were one in the same thing?

A. Yeah.

Q. Midas Gold Property Holdings consists of wholly owned patented lode mining claims, patented mill site claims, unpatented federal lode mining claims, and unpatented federal mill site claims, collectively claims, which cover approximately 29,340 acres as shown on figure 4.2. Additional patented lode claims containing approximately 487 acres adjacent to the SGP area to the east are subject to an option to purchase agreement. Did I read that correctly?

A. Yes, sir.

Q. Does that fairly and accurately describe the landownership of the SGP with respect to Perpetua?

A. Yes.

Q. Ms. Franolich, can you go back to the slide slow, please, and go ahead down to slide five and can you blow that up, please? What are we looking at on slide five?

A. The sentences that you just read, this is a map of those claims of various lode and mill site claims that are both privately owned, as well as other claims on forest



ground.

Q. What is it that Stibnite Gold Project will produce?

A. Will produce about 4.5 million ounces of gold and roughly a hundred -- just under 150 million pounds of antimony, as well as -- as well as some silver.

Q. So gold and antimony -- I know what gold is. What is antimony?

A. So antimony is -- it's considered a critical mineral by the U.S. Government. It's used in a variety of applications ranging from fire retardants. Utilized in -- we have an agreement with a company called Ambri to produce antimony in the future for them as part of a liquid metal battery that they are going to produce. And then most importantly, it's used in the -- in our national security as in making of ammunition, primers and ammunition.

Q. So I'm looking at that first bullet point. It says commonly found as the mineral -- as the mineral Stibnite, one of 50 critical minerals given the U.S. has no mined production. What does that mean?

A. Antimony currently is not mined domestically in the United States. The majority of it comes from China, Russia, and Tajikistan.

Q. And I think you said earlier that this has a defense purpose?

A. Yeah, for sure.



Q. For munitions?

A. Yeah.

Q. So currently if the United States needs antimony to procure munitions it needs to get it from Russia or China?

MR. LOPEZ: Judge, the question calls for an opinion or a conclusion, and Mr. Haslam is a fact witness.

HEARING OFFICER: Mr. Watkins?

MR. WATKINS: As the vice president of Perpetua with DOD funding for this very project, he's more than qualified to talk about where the United States is getting its antimony because that's the reason for this mine's existence.

HEARING OFFICER: Objection is sustained. Move onto the next question.

Q (By Mr. Watkins) Has -- does Perpetua have any sort of relationship with the Department of Defense?

A. Yes. The Department of Defense has awarded us two separate funds to assist us with permitting and construction readiness. So once permits are in place, that we can be sure and be ready for construction right away. The initial grant was for $24.8 million and, again, that covers -- it helps to cover the cost of some of our permitting construction readiness. The second grant was -- is for 15.5 million, and that is going towards some additional --



acquisition of additional materials to be analyzed and to design a pilot plant to process that antimony.

Q. Do you have an understanding as to -- what is Perpetua's understanding as to the reason for those grants?

A. DOD's interest in our project from -- they need antimony for production of ammunition. There hasn't been any domestic production of antimony really since the Stibnite Gold Project -- or, sorry, from Stibnite back in the 1940's and '50s where that project supplied antimony and tungsten to World War II and Korean War effort.

Q. Are you aware of any other place in the United States where antimony exists or can be mined?

A. There are other, you know, potential resources, but none of those are close to being able to be into production, and I'm not aware of, you know, how much other potential projects may hold, but there are some around the U.S.

Q. Ms. Franolich, can you take down the blow-up.

A. I would add, though, that DOD, since they had taken antimony from this site previously, that they know that this site will meet their spec in order to produce the ammunition that they need.

Q. Ms. Franolich, can you blow up the slide that says purpose, the first column there. Besides munitions, is there any other purpose for the Stibnite Gold Project?

A. Definitely. As I said earlier about the goal of

the company is to restore the site, it's -- from day one that's been part of our goal and part of our business model is to -- through the reintroduction of mining, to clean the site up and improve water quality. Early repair of a major sediment source in the drainage and in early construction phases reestablishing fish passage on the East Fork of the South Fork to 20 plus miles of upstream habitat that they haven't been able to get to since the late 1930's. Reprocessing historic tailings that have just been kind of placed on the ground. You know, back in the '30s and '40s there wasn't the regulations overseeing mining operations like there are today. So our plan is to pick those tailings and legacy materials up and place them in modern engineered facilities.

Q. And the last column, Ms. Franolich. Who runs Perpetua?

A. The majority of our management team is made up of women. We've got 30 plus employees. The majority of us are Idahoans, born and raised. Yeah.

Q. I want to talk a little -- we've hit on this. We can just go through this briefly, but I want to talk a little bit about the history of the site. You've alluded to it a couple times now. Next slide, Ms. Franolich. First off, why is it called Stibnite?

A. It's named after the historic town site of



Stibnite, and Stibnite is also the elemental name for antimony.

Q. Did Stibnite play any role in World War II?

A. Yeah. Like I had mentioned, the site -- the mining district supplied antimony and tungsten to the effort in World War II. Kind of small, but there's a little Western Union cable there from Eisenhower in 1943 to the employees of the Bradley Mining Company letting them know how important their role was in the -- as part of winning the kind of the war in Africa and kind of thanking them for their service through the mining operations.

Q. And there's that blue box there that says, in the opinion of the Munitions Board, the discovery of the Tungsten Mine at Stibnite, Idaho in 1942 shortened World War II by at least one year and saved the lives of a million American soldiers.

A. Yep.

Q. U.S. Senate Congressional Record, 1956. Did I read that correctly?

A. Yes, sir.

Q. What's your understanding of that quote?

A. Understanding is that through the supply of antimony and tungsten, that the Stibnite Mining District shortened the time of the World War II by at least a year and saved millions of American soldiers' lives through the



production of ammunition coming from the minerals from the site.

Q. So you alluded to this already, but big presence in World War II, really important to the military, but probably not the same sort of environmentally conscious mining efforts that we would like to see today; is that fair?

A. Definitely. There definitely were not the regulations in place back in those days.

Q. So I want to just quickly go through the history, then. It shows 1938 mining of the Yellow Pine Pit stops salmon migration upstream. What does that mean?

A. Yeah. So as the Bradley Mining Company was mining the Yellow Pine Pit, they cut off the East Fork of the South Fork of the Salmon River, which cut off any further salmon migration upstream of the Yellow Pine Pit. And at that point in time they put the river into just a small tunnel to run around the pit and keep it out of the way of their operations.

Q. Is that tunnel still working today?

A. The tunnel is still there, but the water does not go through the tunnel anymore. They abandoned that, and now the river just essentially runs over the high wall, the remaining high wall of the pit, and it's been that way since the late 1930's.

Q. So since the late 1930's salmon have been



physically unable to migrate upstream passed the Yellow Pine Pit; is that right?

A. That is correct.

Q. Go ahead and look at the 1960 bullet.

A. Yes. So in the late '60s there was an earthen dam up in what is now called Blow-Out Creek, but it's the East Fork of Meadow Creek. There was a reservoir up in there that fed power plants down below to help power part of the facility. In the late '60s that earthen dam failed and introduced a significant amount of sediments down in the river, and currently there's a big scarp there today that every spring it dumps a whole bunch of sediment into the river.

Q. And you said that's colloquially called Blow-Out Creek?

A. Blow-Out Creek.

Q. Because of this. And then the last bullet point I want to pull up is 1990 to 2000s.

A. So in the 1990s that was the last mining that took place at Stibnite, and then in the late '90s, early 2000's there was limited reclamation required by the original owners and operators, as well as the state and federal government had a hand in work that was done in the early 2000's.

Q. Okay. So since about the 2000's the mines

essentially sat dormant with the legacy environmental issues?

A. Correct.

Q. Let's talk about some of those specific legacy issues. Slide 10, please. What are we looking at on slide 10?

A. So there in the middle is kind of the yellow hashing is -- that's the legacy disturbance that's at the site. I think later on somewhere we have got a slide that overlays our proposed Stibnite Gold Project on top of that, but so that's the existing disturbance.

Q. All the yellow is back; is that fair to say?

A. Yeah.

Q. Okay.

A. It's been previously impacted.

Q. Okay. Ms. Franolich, can you blow up the picture that says tailings and -- the words tailings above it. I wanted to get your thoughts on what are we looking at here in that image.

A. So this is a historic picture of the construction of what we now call the SODA, or Spent Ore Disposal Area, and underneath that spent ore are legacy tailings that were just deposited in the valley, you know, in an unengineered way. Part of our project -- you know, we determined that this spent ore disposal area is a significant contributor to



degrading the water quality. The surface water quality throughout the site currently is above state water quality standards. Again, that's part of our project is to try to improve on that water quality. So our plan is to pick that -- clean that SODA, that spent ore rock that's on top of those tailings, to pull those off and use them as construction materials in the dam, and then we'll pick up all those historic tailings. Hopefully run those through our mill and place them in our engineered tailing storage facility for longterm storage.

Q. Just for the benefit of me, what is a tailing, or what are tailings?

A. Tailings is the byproduct from the milling operation, the milling process.

Q. Typically filled with pollutants?

A. Yeah. It's the leftover -- I was going to say non-mineralized, but there's still minerals in it. It's leftover material with some constituents that you're not after in the mining operation.

Q. Have you heard of Bradley tailings before?

A. Yes. These are Bradley tailings in this photo.

Q. Have you heard of a place called the Hecla heap?

A. Yes. So --

Q. What's the Hecla heap?

A. The Hecla heap, if you go back to the middle photo



there, it's kind of right there, almost in the center where the disturbance kind of takes a bend there. The Hecla heap is right -- it is right in there. See where the green line is crossing the purple, kind of if you go down to the bottom, the purple line there --

Q. Uh-huh (affirmative).

A. -- those purple lines are underground from previous workings, but right in the bottom of that is roughly where the Hecla heap is.

Q. And what is the Hecla heap?

A. It's another spent ore. Well, it is a historic heap leach pad that was constructed in the '90-ish timeframe.

Q. And what's a heap leach pad?

A. So that's where the type of ore that they were mining back then, they would put it on the pad, and then it's leached with cyanide and, you know, and then the gold comes down through its liner, and they extract the gold from -- the cyanide picks up the gold and brings it out for further processing.

Q. And so what do you do with the ore that is laced with cyanide that doesn't have gold in it?

A. That's it. That's the Hecla --

Q. That's the Hecla heap. Okay. So it's a pile of cyanide rock?



A. Yeah. It has had cyanide flushed through it, but the remaining rock that's left there, you know, it's going to be high in arsenic, high in antimony, similar to the spent ore disposal area that we just talked about.

Q. And is the goal of Perpetua to clean up the Hecla heap?

A. Absolutely, yeah.

Q. Can you blow up that Meadow Creek, one on the lower left, Ms. Franolich? What are we looking at here?

A. So that is -- that's a picture of the SODA area today. The previous one was this area being constructed, and that's what it looks like today. It has a rock-lined drainage which takes Meadow Creek around it. That was something that the agencies did back in the early 2000's to try to keep the water from coming into contact with the SODA and those tailings underneath. But there is still groundwater underneath there that is still in contact with those Bradley tailings, and that's -- we intend to clean all that up and restore the creek down through the valley.

Q. Ms. Franolich, could you view the fish passage image on this slide? We've talked about the Yellow Pine Pit a bit. Can you explain what we're looking at here?

A. Yeah. So that's where the East Fork of the South Fork of the Salmon is flowing over that remaining high wall from the Yellow Pine Pit, and then the light there is the

center of the pit. And the river flows out to kind of the top left of that photo.

Q. So previously that river would have been flat or flat-ish such that --

A. Yeah.

Q. -- salmon could go up it?

A. Yeah, absolutely. It would have taken a normal gradient that the salmon would have been able to go up.

Q. But due to mining operations it's essentially a waterfall, and the salmon can't get up it?

A. Correct.

Q. And they haven't been able to do that since the '30s?

A. That's right. Salmon still come up to the pit lake.

Q. Uh-huh (affirmative).

A. So we know that there are some returning, some spawn there at the outlet of the pit lake.

Q. But they just can't get up to the higher --

A. Can't go up further.

Q. And then we talked a little bit about Blow-Out Creek. Ms. Franolich, can you show the blow-out image there on the slide? And what are we looking at here?

A. Yeah. So this is kind of a picture of the sediment in the springtime coming out of that scarp from blowout.



Q. And that's when it gets deposited in East Fork, South Fork?

A. Yeah. So Meadow Creek -- this comes out of Blow-Out Creek or the East Fork of Meadow Creek into Meadow Creek. Meadow Creek goes down and joins with the East Fork and the South Fork just a little ways down gradient of this. And this cleanout is something that we have committed to do early on in construction, and this is actually, really, outside of our -- our project area. This is something that, we don't have to do this because we're doing the project. It's something that we have committed to do upfront to help improve water quality because of our project.

Q. Well, let me ask a follow-up question. Why would you do it if you don't have to do it?

A. Because, again, that's been our business model from day one is to improve water quality, make the site better, reestablish that salmon access.

Q. Mr. Haslam, we've just spent a bit of time going and talking about how mining operations historically at the Stibnite site have caused some pretty significant environmental damage. You represent Perpetua, which is a mining company. How can local communities or the Protestants have any faith that Perpetua is not going to just do the same thing; pull out the antimony they want and walk away?



A. Good question. So for, one, it's no longer the 1930's and 1940's. There's significant additional regulations on mining companies. The project will be permitted by a large number of federal and state agencies, and those agencies will have oversight and enforcement authority throughout the life of the project. Additionally, we've made improvements to our plan to try and insure that those things don't happen in the future. We've committed to put synthetic caps and covers on the Yellow Pine Pit. All of the Yellow Pine Pit backfill, all of the Hangar Flats Pit backfill, all on top of the tailings storage facility, and on top of the buttress against the facility, and those are all to limit future infiltration of water through those facilities. And that's -- like right now, the SODA and the Hecla heap and these other waste rock areas, they're out there just exposed with water going through them, picking contaminants up and taking them out either into the groundwater and into the surface water. And so we've tried to eliminate the possibility of going forward into the future, and additionally there will have to be financial assurance put in place by Perpetua prior to moving any -- any materials. And that financial assurance, we're still working with the multiple agencies that will require financial assurance, which there will be Forest Service, Idaho Department of Lands, Idaho Department of Water



Resources for the tailings storage facility, Army Corps. of Engineers for wetlands. And DEQ has a hand in that for the cyanide permit. So, working with lots of folks to figure out what that financial assurance will be, but it's most likely that it would be in excess of a hundred million dollars. And that financial assurance is -- would be there for, if, for whatever reason Perpetua went away, that that money would be available to go ahead and restore the site as per our original plans. So, it would reestablish fish passage across the Yellow Pine Pit. Fully backfill Yellow -- or fully backfill the Hangar Flats Pit, etc, and all of our original goals.

Q. I want to break that down a little bit. Are you saying that if Perpetua goes belly up year one into its mining operation, the financial assurances don't just bring this area back to the state it was in a year prior to you going belly up, but brings it back to the proposed full restoration at the end of the mining plan?

A. So year one, the materials might not be available to bring it back completely.

Q. Sure.

A. But if we -- if we went belly up just, say, in year four or five, where you're at maximum disturbance, then there would be material available in the tailings, the TSF buttress, to pick those materials back up, fully backfill

the Hangar Flats Pit and the Yellow Pine Pit.
Q. One other question, you said -- have you ever heard the phrase: Not in my backyard?
A. Yeah.
Q. You said the leaders of Perpetua, the employees, are all majority from Idaho?
A. Yeah.
Q. This is your backyard?
A. Absolutely.
Q. You mentioned a mine plan. Can we go to the next slide, Ms. Franolich? What is a mine plan?
A. So a mine plan details a proponents' plan of operations. What are the reserves, where will the materials be mined from, where will they be placed, how will they be mined, how will they be processed, where tailings will go, what are the designs of those facilities, what are the -- what are the synthetic caps and covers that will be installed, what are the liners under the TSF, et cetera, just --
Q. Does the mine plan --
A. -- it's the plan.
Q. The mine plan covers the whole operation?
A. Yes.
Q. Start to finish?
A. Yes.



Q. Okay. And that's called a plan of restoration?
A. So --
Q. Different --
A. So our -- when we submitted our initial plan of restoration and operations in September of 2016 -- normally when you submit to the agencies, you submit a plan of operations. We wanted to highlight the fact that we are committed to doing this restoration, and we called our plan a plan of restoration and operations.
Q. So it's not a mine plan of how to run the mine; it's a plan on how to restore the site, as well as mine the area?
A. Correct.
Q. And so is that plan of restoration sometimes called the pro?
A. Yes.
Q. And then have you ever modified that plan of restoration?
A. Yes.
Q. Is that called the ModPRO?
A. Yes, it is. The original ModPRO, we have -- we've -- again, we've always listened to stakeholders, and we've tried to improve our plan as we go. Any places that we get feedback that we can modify and improve our plans, that is what we've done.



Q. And so are you up to ModPRO2 now?
A. We are.
Q. And with each iteration has the environmental impact or the changes and the help that Perpetua is going to give to the environment in this area, has it improved or decreased?
A. It -- we've definitely decreased the projected environmental impacts from our project.
Q. The ModPRO2 is better than the original pro because it's getting more environmentally friendly as it goes along?
A. Significantly better.
Q. I want to show you a copy of ModPRO2. It's Exhibit 22. I'm going to hand it to you. I've placed in front of you what's been previously marked as Exhibit 22. Do you recognize it?
A. I do.
Q. And what is it?
A. It is our ModPRO2 mine plan. This is our latest modification that we did to our plan after the supplemental -- or, sorry, after the original draft EIS was published.
Q. And does the ModPRO2 fairly and accurately describe the entire mine project from the year one to the end of the mine project?
A. Yeah, from the mining reclamation and restoration



aspect. There is also a reclamation and closure plan that goes along with the ModPRO2, but, yeah, this is the ModPRO2.
Q. And does the ModPRO2 detail Perpetua's use of water resources in the area, as well as its restoration of various water resources throughout the area?
A. Yes.
Q. And is that conversation found throughout the entirety of the ModPRO?
A. Yeah.
MR. WATKINS: Your Honor -- or, Officer Cefalo, at this time we would move to admit ModPRO2, Exhibit 22.
HEARING OFFICER: Exhibit 22, any objections from Protestants on Exhibit 22? Hearing none, Exhibit 22 is admitted into the record.
Q. (By Mr. Watkins) We are going to put Exhibit 22 on the screen, and I'm just going to briefly run you through some sections of it so we can get a flavor of the type of information that's in here.
A. Okay.
Q. If you can go to page 14, Ms. Franolich. Page 14, in the middle there, has a section called tailings and arsenic management. Do you see that?
A. Yes.
Q. Does the ModPRO2 discuss what Perpetua is going to do with respect to managing tailings and arsenic in the

area?

A. Yes.

Q. Page 36, please. Page 36 has a timeline that shows the operation of the mine from -3 to 16. What does -3 represent?

A. -3 is the first year of construction. We predict roughly three years of construction to get the project up and running.

Q. And then one is when you actually start digging in the ground?

A. Yeah, year one would be the first year of actual production in the mill.

Q. And then 16 is the 16th year?

A. Yeah. So there's roughly 12 to 13 years of actual mining, and then there's one to two years of milling after mining ceases, and then we can start working into closure.

Q. And so does the ModPRO2 discuss the timing and the schedule of the mine plan?

A. Yes.

Q. Go to page 41, please. Does 41, in Section 3.7.9, talk about spent ore and legacy tailings removal in the Meadow Creek area?

A. Yep, and that's -- some of the slides that we've already looked at discussing that.

Q. And so this details how you're going to go about



removing those legacy tailings?

A. Yeah.

Q. Okay, and page 45, please. Does this detail the processing facilities, so if somebody wants to know what the mine will look like or operations will look like they can find it in the ModPRO2? Is that a yes?

A. Yes.

Q. And 50, please. Does page 50 address the tailing storage facility?

A. Yes.

Q. Now, we've -- you've referenced it a few times, but we'll have other witnesses talk about the tailings storage facility, or the TSF, in greater detail, but just generally what is your understanding of the tailing storage facility, or TSF, is?

A. So it's an engineered facility with a liner underneath it, and all the tailings material coming from the mill will be placed in that facility and over time you have to raise the dam to hold the tailings in place. At the same time as the dam is coming up, we have this significant buttress of about 80 million tons of material that butts right up against it. And they come up together, and water that's stored -- or when the tailings come to the TSF, they are placed, and it's kind of like a sand, finer than sand, but it's placed in there strategically and over time it's



dewatered. Those tailings coming in are roughly 50 percent solids, and water will come out of those tailings over time. And we recirculate all water coming back from the tailing storage facility, so about two-thirds of the water that we need to run the mill comes back from that TSF.

Q. So, to be clear, that's water that you're not pulling out of the East Fork, South Fork the Salmon River. You're getting two-thirds of the water you need from the tailing storage facility?

A. That's right.

Q. And that's discussed in ModPRO2?

A. Yes.

Q. Go ahead and look at page 62, please. What picture are we looking at here on page 62?

A. This is a picture of -- it shows the Yellow Pine Pit, and then it's kind of a cutaway. The blue line around the right-hand side of the pit is the tunnel that we're going to construct early in construction, and inside of that it's a heavily engineered tunnel inside of that. We're constructing a fishway, which will, you know, will put the East Fork of the South Fork into that tunnel, instead of coming over the high wall like it is right now, and inside of that tunnel will be a fishway which will immediately give passage to anadromous fish, all fish, going back up into. It opens up over 20 miles of habitat that they haven't been



able to access since the late '30s.

Q. And when does the fish tunnel come online?

A. It comes online in the first couple years of construction.

Q. And that's discussed here in the ModPRO2?

A. Yes.

Q. Go to page 83, please. This is titled closure and reclamation. Does the ModPRO2 discuss what happens to the Stibnite project after Perpetua closes the mine?

A. Yes.

Q. And that would include reclamation?

A. Yes.

Q. Page --

A. There are additional details in the reclamation closure plan.

Q. Okay. Page 100, please. This is called mitigation plans. ModPRO2 discusses the mitigation plans that you have in place?

A. Yeah. These are mitigation plans that we have proposed.

Q. Just briefly, very briefly, what are some of those mitigation plans that you've proposed?

A. We've talked about a number of them. You know, reconnecting the fish passage, that mitigation, improving water quality, improving water temperature, improving

habitat, fish habitat, et cetera.

Q. And then finally let's go back a little bit to page 88, and this says figure 3-24 post closure oblique view of Yellow Pine Pit area. Do you see that?

A. Yep.

Q. What are we looking at?

A. So this is a rendition of what the Yellow Pine Pit will look like in post closure, and coming from upstream on the right-hand side of the photo is the East Fork of the South Fork flowing down through the middle, over the top of the backfill, and others will be speaking to those stream designs later on. And then you can see a lake down there on the upper part of the photo, that's a lake that we've designed as part of the ModPRO2 modifications --

Q. Uh-huh (affirmative).

A. -- to replace the existing Yellow Pine Pit lake because there's -- bull trout use that for habitat, et cetera, and we felt like this was an improvement that should be made to the plan. And then the other drainages are coming from the upper right is Midnight Creek, and Hennessy and Fiddle Creek are coming down and joining with the East Fork of the South Fork there.

Q. Now, I know that you said that others will be talking about this in greater detail later on, but I just -- I'm trying to conceptually wrap my brain around this. You



have the Yellow Pine Pit, which is a big ol' hole?

A. Yeah.

Q. And right now you've got a river flowing down the side of that big ol' hole, and the fish can't get out it, right?

A. That's right.

Q. You're proposing that you're going to fill in that entire hole and so it's now level with the rest of the river and run a river across it, and that's after the mine?

A. That's correct.

Q. How big is that hole?

A. So we will mine it bigger once we're into operations. It will be roughly 600 feet deep when it's completed. We'll re-backfill that 600 feet back up to a proper gradient that the river can flow across, and the fish can swim back up.

Q. Would it be fair to say, Mr. Haslam, that just about anything someone could want to know about the Stibnite Gold Project can be found in the ModPRO2 as Exhibit 22?

A. Yes.

Q. How has the mine plan or ModPRO2 improved over time?

A. We've talked about a number of the things. Maybe I'll describe the main ones from the ModPRO to the ModPRO2.

Q. Sure.



A. So as part of the ModPRO2 we -- initially we reduced the overall footprint of the project. We made the Hangar Flats Pits smaller so we mine less material. Roughly 44 million tons of material that we will leave in the ground versus having to pull out and place somewhere else, and in doing that we were able to eliminate what was called the fill development rock storage area, which we had discovered through additional modeling and public feedback that fill was a potential -- could be potentially problematic for water quality. So we were able to eliminate -- eliminate Fiddle. And, again, further reduce the overall footprint of the project. Also as part of ModPRO2 we made a significant commitment of placing synthetic caps and covers on essentially all the facilities in order to limit infiltration in the future through those facilities. So on top of all the tailing storage facility, the TSF buttress, also as a modification for ModPRO2 we committed to fully backfill the Hangar Flats Pit, which previously was left as a pit lake and potentially having water quality problems from that, so we're fully backfilling the Hangar Flats Pit lake -- or the Hangar Flats Pit and placing synthetic cap and cover on that, as well as on the Yellow Pine Pit backfill. Those are some of the main ones, and I mentioned the lake that we reestablished, that was a change going into ModPRO2 to improve water temperatures.



Q. Would it be fair to say that when the community or other stakeholders have presented legitimate environmental concerns, Perpetua has been responsive?

A. Yes. We've always tried to be responsive. We've tried to take input and make modifications where possible.

Q. And that's reflected in the ModPRO2?

A. Absolutely.

Q. Going to slide 12, please. I wonder if you could tell us how is it we get to the site. I understand that access isn't a main issue here, so I just want to briefly show -- I understand there's two different ways to get up to the site, proposed ways to get up to the site?

A. Yeah. So our proposed access to the site in the ModPRO2 is the Burnt Log access, and that's the red and orange over on the right-hand side.

Q. Uh-huh (affirmative).

A. The darker red portions are -- those are -- that's the existing road that we will improve. And so roughly 20 miles of improved road and 15 miles of newly constructed road. And that access route -- it gets our access up and away from the major fishery of Johnson Creek. That's Johnson Creek and Stibnite Road is the other alternative that was analyzed in the supplemental draft EIS and is -- and those are carried forward into the final EIS. Our ModPRO2, as the Forest Service called it in the

supplemental, was the modified mine plan, and they had chose that as their preferred alternative. So those are the two -- the two potential accesses are proposed, and the Forest Service's preferred alternative is the Burnt Log route.

Q. Silly question, but between your proposed access and the Forest Service alternative access, does that change the water right need of the mine at all?

A. No. The mine plan for both of those alternatives is exactly the same. There's no -- it's strictly an access.

Q. And do these two alternatives change the reclamation efforts or the environmental commitments that Perpetua has made?

A. No, not on-site. It would just change what needs to be reclaimed as far as those roads coming in.

Q. Next slide, please. We've already hit this, so we don't need to belabor it. But we've talked about Yellow Pine Pit, correct?

A. Yep.

Q. And West End Pit?

A. Yep.

Q. And Hangar Flats and the tailing storage facility?

A. Yep.

Q. Are there any other notable mine features that Mr. Hearing officer needs to be aware of?

A. The only thing of note is the hatching on this one



is the proposed plan, that is the ModPRO2, and underneath that it's a little bit hard to see from here, but you can see the previously exposed -- or previously impacted areas in kind of tan color. So roughly 50 percent of our project area has already been impacted by mining in the past.

Q. Next slide, please. What is the mill -- we want to talk about the different facilities or buildings or words there you're putting on the site. What is the mill and stockpiles?

A. So in the ModPRO2 mine plan that zoom in that you showed was the mill area, and that's really kind of right there in the middle of that figure. And you can see coming in from the right -- or from the left you can see a dash line coming in. That's the power line coming in, and from the right, that red line coming in, is the Burnt Log Road. So the mill is right there centrally located, and all the ore stockpiles will be there. Ore will be fed from the stockpiles into crushing and grinding and then through the mill process.

Q. And what's the truck shop?

A. The truck shop is kind of between the mill and Hangar Flats Pit, so it's just upgrading where the East Fork and South Fork comes in. That's where all -- that will be our maintenance facilities.

Q. And how about, sounds self-explanatory, worker



housing?

A. Yeah, the worker housing facility is there in the bottom right corner of the blow-up, and that's really -- that's the facility where all of our folks will -- our folks will work, you know, like two weeks on, two weeks off kind of thing. So as remote as we are, we have to have a facility for them to live at.

Q. How many people do you anticipate being on-site?

A. During the operations between 5 and 600, and all of those folks won't necessarily be on-site at one time working shift work, right, but we'll employ 5 to 600 people during operations.

Q. And for the mill and storage, the truck shop, worker housing, and the other works at the mine, do you require water to do that?

A. For sure. So the mill is definitely the consumer of most of the water.

Q. I'm going to walk you through the mill here in a second.

A. Okay.

Q. So we got the mill. What is dewatering? That's what's coming out of the TSF?

A. No. So dewatering is in order for us to be able to mine, especially the Hangar Flats Pit but to some extent all the pits, we'll have to dewater around them in order to be



able to mine down and get the materials out without being flooded out.

Q. So essentially lowering the water table?

A. Yeah, directly around the pit itself.

Q. And dust control, what's that?

A. So dust control, we have lots of mine roads, et cetera, that we'll have to control the dust on, along with -- so we'll use water along with like a dust suppressant, like a magnesium chloride or something.

Q. And drilling, do you use water in your drilling efforts?

A. Yes. So the blast hole drills will have dust suppressers on them that will utilize water.

Q. And then domestic use, that's going to be your kitchen area, showers, things like that?

A. Yeah. So the mill, truck shop, the worker housing facility, and then away from the project site we have the logistics facility that's back towards Cascade that will have domestic water, as well as the Burnt Log Road maintenance facility, which is located along the Burnt Log Road.

Q. Next slide, Ms. Franolich. If you could, could you please, again, high level, briefly walk us through how the mine works? And if you could, as you're walking us through that, point out where water is used in that process.

A. Yeah. So water is used in almost all portions of the process coming into the mill. So mine the ore, stockpile it. Gets fed into crushing and grinding. From there if we're running an antimony run of ore, that will -- that will go over into an antimony floatation circuit. Again, there will be water in the crushing, grinding, water and floatation, et cetera. And then out of floatation will produce an antimony concentrate. And then depending on the gradient of that concentrate and what its future use is projected for, it will get trucked offsite to be further -- further refined in a variety of different ways depending on the product. If we're running gold, depending on the type of gold ore, the ore will either go directly to our gold leach tanks or it could go through floatation and then go through what's called a pressure oxidation circuit or an autoclave. And so that -- that speeds up the oxidation really and helps separate the gold, and then from there it will go into the gold leach tanks. And from there it will go through (inaudible), and then it will become a gold dore. So our -- earlier we talked about the Hecla heap and the other historic leach pads, our project will not have cyanide leach pads. All of our leaching is done in contained tanks within the mill area, so we won't have that. And then the tailings, in the tailing storage facility. Essentially all those have some water input into them, and that's where I



said all that water, two-thirds of what's required to run that mill will come from the tailings storage facility, and the other one-third will either come from the well filled around Hangar Flats Pit or from the point of diversion, that we've talked about, at the entrance to the tunnel.

Q. Next slide, please. You've mentioned this before, so I don't want to belabor the point, but this slide 16, does this show the overall timeline for the mine?

A. Yes, it does. It shows -- you know, you can see the three construction years and what's going on in there. We've talked about all of that. Reestablishing the fish passage with construction of the tunnel and stabilizing Blow-Out Creek sediments, shows operations. And then at the bottom there will be water treatment required during the project for treat and release of some waters. That's really kind of through the mining life of the project, and then going into closure of water treatment. And tailing storage facility is pretty much reclaimed and Meadow Creek restored across the top of it in about mining year 23. And then once the TSF is fully dewatered, we can do final closure of it and turn the water treatment off, and final reclaim in about year 40.

Q. So this is a 40-year project?

A. Yeah.

Q. Next slide. We've talked about the antimony



already. You can go to the next slide, and we've talked about the use of antimony already; is that correct?

A. Correct.

Q. So there is -- we've talked about military use, but there's other uses for antimony as well, right?

A. Yeah. A fire retardant, and then also I think I mentioned that we have an agreement with Ambri to supply them antimony for their liquid metal battery that they are developing. And that is for -- for high capacity storage of clean energy, like high enough capacity storage to supply electricity to multiple houses.

Q. Go to slide 21, please. Does slide 21 address that, the use of those Ambri batteries?

A. Yep.

Q. So these aren't batteries that go in cars?

A. No. These are significant batteries to power millions of homes.

Q. And antimony is critical for that?

A. Yes.

Q. So we talked about the use of antimony. I want to talk briefly about the economic benefits of the project. Can you go to slide 22, please? Next slide. The impact that this project has had on the local community, can you walk us through some of the things that this project has done for the local economy?



A. Yeah. So we've -- we've spent over a hundred million dollars in Idaho itself since about 2014 and, again, part of our business model is we've always tried to buy Idaho and buy local, anywhere possible. And that's kind of what that shows is some of the local vendors that we work with.

Q. Next slide. In terms of employment, how many people do you plan on employing during the construction phase?

A. Construction is similar to operation, so it would be between 5 to 600 folks, direct employees or contractors associated with construction.

Q. Now, when it says approximately two indirect jobs for every one job created by Perpetua. What does that mean?

A. So that means that outside of our project, other vendors, in order to support those 5 or 600 jobs, there will be roughly two jobs created outside of Perpetua to support us and support all those other folks.

Q. What's the average wage that Perpetua plans to pay these employees?

A. Roughly 70,000 a year.

Q. How does that compare to the local wages?

A. It's significantly higher.

Q. Let's go to slide 25. Next one, Ms. Franolich. I want to talk about some of the environmental benefits.

Slide 27, please, next one. So we've talked somewhat about the current state. Is there anything about this slide that we haven't already talked about in terms of sedimentation, metal leaching, or blocked fish migration?

A. No. I think there's a good depiction of that Blow-Out Creek on the far left. You can kind of see that scarp up in there and all that sediment coming out, the fan there at the bottom. I don't think we had a previous picture of that. That gives you a little better look at what's happening there.

Q. So what is the yellow sand color, the bottom right corner of the image that we're looking at?

A. Yeah, that's the -- that's all the sediment that has come out of -- out of that scarp. The other thing that I forgot to mention earlier is you can see up in that basin -- once -- so in year -- early in the construction, we're going to fill that scarp back in with rock and stabilize all that sediment and keep it from coming out every spring. But also we'll reestablish a -- we'll reestablish the water table up in that basin, because once that's scarp came in there and cut through and it dropped the water table and so it dried up all the wetlands up in that basin, and it's continuing to down cut its way up into the valley. So we'll fix that. We'll put a structure in place to back that groundwater back up and reestablish all



those wetlands back up in there. Again, this project in particular is outside of our project area.

Q. Next slide. Is this showing the fish passage?

A. Yeah, the fish barrier on the right-hand side of the water coming down.

Q. Do you believe that -- next slide, please. Do you believe that as a result of the fish tunnel that fish passage will be improved?

MR. LOPEZ: Objection, calls for speculation, conclusion.

HEARING OFFICER: Objection noted on the record. You can answer that question.

A. Certainly.

Q (By Mr. Watkins) Why do you believe that?

A. The passage, it will be put in place as soon as that tunnel is constructed, and it will allow fish passage, which is definitely not allowed right now.

Q. Is the fish habitat above Yellow Pine Pit, is that good fish habitat?

A. Yes, there is --

Q. How do you know that?

A. There's definitely portions of it that's good habitat. We know that. We've been -- we've been analyzing the area since 2009. And also, if any indication Nez Perce Tribe out plants fish up into the Meadow Creek drainage to



utilize some of that habitat.

Q. So currently fish can't get to the habitat where Nez Perce protestants are putting their own fish?

A. Correct.

Q. And the fish tunnel would allow fish to get to the Nez Perce fish grounds?

A. Correct.

Q. Slide 30, please. Is this showing the backfill that we saw -- computer --

A. Rendition of, yep.

Q. And so that's the lake that's going to get put in, as well as the two tributaries?

A. Yes, sir.

Q. Next slide, please. In what mine year does the -- does fish migration improve?

A. Well --

Q. Or is fish passage restored? Excuse me.

A. It would be restored essentially immediately in the first couple years of construction through the tunnel, and then final permanent restoration over the top of the Yellow Pine Pit backfill in year 10 to 11.

Q. Slide 32, please. What other benefits will the Stibnite Gold Project have for aquatic habitat as far as you're aware?

A. Improved water quality, improved water temperature.



In the Meadow Creek portion of the drainage we've reduced, as part of our plan, taking out the SODA, taking out Hecla heap, and the other legacy impacted facilities. We're reducing the predicted amount of arsenic and antimony in the streams by over 90 percent. Once you get down to here where the East Fork, at its confluence with Sugar Creek, that reduction is still in the reduction of arsenic and antimony over 40 percent, as the water is leaving the site. And also throughout our project -- and another improvement for the ModPRO2 is we increase the density and the height of the vegetation that we are planting along the streams to allow more shade to the streams. And between that and the addition of our redesigned lake, we're able to reduce the maximum -- the predicted maximum summer temperatures by about 5 degrees centigrade.

Q. Go to slide 34, please. Next one. Does slide 34 address the reduced temperature?

A. Yes.

Q. And how is that achieved?

A. Like I said, it's -- majority of it is from the increase density and height of the vegetation that we're planting, as well as installing that lake over the pit backfill, and that helps buffer those maximum temperatures.

Q. I want to discuss offsite mitigation efforts for a moment. Are you familiar with the Lemhi area?

A. Yes.

Q. Is there any offsite mitigation going on in Lemhi?

A. Yes. So the Lemhi Project is the -- is the offsite mitigation that we have proposed as part of our 404 permit, and so it's mitigating temporal losses of stream length within our project area. And the Lemhi Project is adding stream length and improving habitat on specific property among the Lemhi River.

Q. So where stream length might be impacted by the project, you're replacing that length of stream in the Lemhi River area?

A. So at the end of restoration on our project, we will have replaced -- we will have restored all of the stream length that we might have disturbed during the project, but per the Corps of Engineers, they want you to provide mitigation for temporal loss of the stream length so -- because it's not there for part of the time, but fully there at the end so for temporal losses of stream length at the project area, that's what the Lemhi Project is all about.

Q. And how about the Jones or the Morgan Creek area?

A. So the Jones property is a mitigation property that we have tied up under a purchase agreement, and it's mitigation specifically for our water rights. And it's -- it's situated right on the main Salmon, as well as having



Meadow Creek flow through it, both of which are fisheries. And our proposal is to, instead of utilizing the water rights on that property, is to essentially keep them in the river and the creek where it can be utilized by the fish and recreation.

Q. So right now on the Jones property, water is coming out of the river to service that property. With your option to purchase you would be putting that water -- or keeping that water in the river?

A. Correct.

Q. Do you know how that translates to the water right that's being requested in your permits?

A. Uh, it's -- it's more than what we've applied for in the application. I believe it's 10. something CFS on the Jones property versus our 9.6 CFS.

Q. So under your -- under the ModPRO2 you will be putting or keeping more water in the river than you're taking out under the applications?

A. Correct.

Q. Slide 35, please. Let's briefly go through the permitting process. Next slide. How does one get authorization for a project like this?

A. So for a project like this, significant effort. In our case for a federal project, have to have a lead federal agency. Ours happens to be the U.S. Forest Service. They



have a number of cooperating agencies that have signed on through an MOU to -- they're kind of interested agencies that can have a hand in the permitting. So those agencies are able to participate with the forest in development of the environmental documents and the analysis and the review and comment, et cetera, provide input. Those cooperators currently are the Corps of Engineers, EPA, Idaho Department of Lands, Idaho Department of Environmental Quality, Valley County, and the Governor's Office of Energy and Mineral Resources.

So the biggest part of the process is the NEPA process, and that's kind of what this slide is depicting is kind of where we're at in that. So you've got the overall NEPA process going on. You've got a significant number of other either federal permits or federal approvals that are needed, state, and county as well.

Q. Where does the Idaho Department of Water Resources factor into all of this?

A. So Department of Water Resources oversees the water rights permit that we are here about today, as well as the dam safety construction approval of the tailing storage facility, as well as some of the other major water source facilities that we have proposed on the site.

Q. What are some of the -- seem possibly small print, but just give me a flavor of some of the other significant



permits that are at issue here.

A. Yeah. So the main ones, the 404 permit through the Corps of Engineers, the Corps is utilizing the Forest Service's environmental documents to make their own future record of decision for the wetlands permit. So they're heavily engaged. They have our 404 application. They have gone through public comment period on that, and they're right now currently working on responding to those comments. Maybe I should back up just a little bit. For the Forest Service, they had published a supplemental draft EIS back in October of '22, and the comment period for that ended in October of '23 -- or, sorry, January of '23. And they have been working on responding to all those public comments since, and they're very close to publication of that final EIS and draft.

Q. You mentioned the supplemental draft EIS. What is the supplemental draft EIS, as far as you're aware?

A. It is the latest version of the Forest Service's environmental assessment of all the impacts that could take place on the site.

Q. And I think we discussed earlier that there was an alternative access route proposed in the supplemental. EIS concluded that that has no impact on your water right, correct?

A. That's correct.

Q. Was there a public comment component to the EIS process?

A. Yes, and like I said, it ran from October of '22 to January of '23.

Q. Has this process -- strike that. Has Perpetua, as far as you're concerned, been transparent with the public with its interest in the site, the impacts, and its goals?

A. Definitely.

Q. And why do you say that?

MS. ROGERSON: Objection, Mr. Hearing Officer. That's speculation or opinion.

THE COURT: Objection noted on the record. You can answer that.

Q. (By Mr. Watkins) And what's your basis for that belief?

A. We reach out to the public all the time. We've helped create the community board to provide oversight on us and provide comments to us. We hold -- we hold public events all the time for folks to learn more about the project and supply comments to us. We've listened to supplied public comments from the public scoping period back in 2017, to the original draft EIS that was done in 2020. We utilized those comment periods or public comments on the draft EIS to formulate our modifications to the ModPRO2, which once we did all those modifications to ModPRO2, the



forest decided that even though all those modifications were positive, we reduced the project footprint, we improved water quality, et cetera, they felt like they still had to go back out to the public and produce a supplemental document so that the public could review it again prior to moving onto the next step. And so we've listened to the public through each of those parts of the process and made improvements to our project through that public input.

Q. Fair to say that the interest of the local public are important to Perpetua?

A. Absolutely.

Q. And Perpetua responds to it?

A. Yes.

Q. Speaking of the supplemental draft EIS, specifically, or I should say of the draft EIS, have you reviewed the comments that came in from the public as part of that public comment process?

A. Yes.

Q. Approximately how many comments came in, as far as you're aware?

A. Around 30,000 comments.

Q. In general, what was the tenor of those 30,000 or so comments?

A. The majority of the comments were in support of the project.



Q. We're going to see some examples of those comments that were in paper here in a bit. Of the comments that were not in favor of the project, was there any sort of theme or string of thought that you saw running throughout them?

A. So I would say from the more substantive negative comments, in general the majority of them were focused around air quality, recreation, water quality, and fish.

Q. And has Perpetua been responsive to those comments in its different plans?

A. Yeah. You know, the forest has come to us and asked us in some cases to help respond to some of those comments. Since the ModPRO2, since the supplemental draft EIS, we haven't made any further modifications to our plan from there.

Q. Focusing on the comments that were positive, you said you've reviewed several of those, correct?

A. Yes.

Q. I'm going to hand you what's previously been marked as Exhibit 71, and I'll represent to you that Exhibit 71 is a collection of various comments that were received in favor of the project. Are you generally familiar with these?

A. Yes.

Q. And has Perpetua relied on these comments in proceeding and moving forward in its efforts with the project?



A. Yes.

Q. And do these comments appear to be fair and accurate copies of the comments that you've received in the past?

A. Yes, they are.

MR. WATKINS: Mr. Hearing Officer, move to admit Exhibit 71.

HEARING OFFICER: Any objections?

MS. ROGERSON: They are irrelevant, Mr. Hearing Officer, to this proceeding.

HEARING OFFICER: In what way, Ms. Rogerson?

MS. ROGERSON: Turn on your mic, I'm sorry. Mr. Hearing Officer, I just feel like we're here today to assess, you know, a water rights application, not to assess whether the public supports a proposed mining plan.

HEARING OFFICER: Mr. Watkins, Exhibit 71 wasn't identified prior to the disclosure deadline.

MR. WATKINS: If I may speak to that, Your Honor.

HEARING OFFICER: Go ahead.

MR. WATKINS: Exhibit 71 goes directly to the local public interest, which this hearing is about, and I believe it's the Protestant's primary objection to this water rights application, Exhibit 71 is in direct response to the Hearing Officer disclosing to the parties last Thursday, I believe, that there would be public comments coming in. We

anticipate that most of those will be comments that are negative or comments that are somehow aligned with protestants. I think in fairness, Your Honor, rather than seeing the minority of those public participants, as the Hearing Officer himself recognized, this is very rare. And so this is response to that, which is why these came just a day or so after the disclosure deadline.

HEARING OFFICER: Yeah, I think these should have been disclosed by the deadline, so I'm not going to admit Exhibit 71. Is it just Exhibit 71, or does it extend to 72? No, 72 is something different.

MR. WATKINS: Exhibit 72 is different.

HEARING OFFICER: Yeah. So with the objection and your response on the record, Exhibit 71 will not be admitted into the record.

MR. WATKINS: Thank you, Mr. Hearing Officer.

HEARING OFFICER: Go ahead.

Q (By Mr. Watkins) Mr. Haslam, do you have -- as a vice president of Perpetua, have you spoken, not just to local community members, but also local community leaders?

A. Yes.

Q. And those local community leaders, are you -- is Perpetua familiar with the mayor of Cascade?

A. Yes.



Q. And do you know if the mayor of Cascade is in support of the Perpetua mining project?

A. Yes.

Q. And how do you know that?

A. Through the letter that they submitted on the supplemental draft, as well as conversations that we've had directly with the mayor.

Q. And I think you testified earlier that Cascade was perhaps the closest population center to the site, major population center?

A. Yeah.

Q. Are you familiar with the mayor of Donnelly?

A. Yes.

Q. And as far as you're aware, is the mayor of Donnelly in support of the project?

A. Yes.

Q. And how do you know that?

A. Again, from submittal of their letter on the supplemental draft EIS and through conversations that they've had with our staff.

Q. Are you familiar with a school district called Council School District?

A. Yes.

Q. Is Council School District the school district in or around the McCall, Idaho area?



A. It's on the other side of the hill near the town of Council.

Q. Okay. And are you familiar with the superintendent of the Council School District?

A. I personally haven't spoken with the superintendent there.

Q. Whether you have spoken with the superintendent or not, have you, as the vice president of Perpetua, become aware of the opinions of the superintendent of Council School District with respect to the Stibnite Gold Project?

A. Yes.

Q. And what is that?

A. In support of our project.

Q. Does Perpetua do any work with the American Legion?

A. Yes.

Q. Do you know if Forest Griggs, the commander of American Legion Post 60, is in favor of the Stibnite Gold Project?

A. Yes.

Q. And how are you aware of that?

A. Through their letter.

Q. Do you know if the Idaho legislature has ever spoken to or addressed the Stibnite Gold Project?

A. Yes. A few years ago they voted on a joint resolution to show their support for the project. It was --



it kind of showed bipartisan support of our project.

Q. I'm going to hand you what's been marked as Exhibit 72. Exhibit 72, is that a copy of the bipartisan support that you were just referencing?

A. Yes.

Q. And as an official act of the Idaho State Legislature, is it your understanding that Exhibit 72 is part of the public record?

A. Yes.

MR. WATKINS: Mr. Hearing Officer, at this time we would move for official notice of Exhibit 72 as a document that cannot be credibly challenged as part of the official public record.

HEARING OFFICER: Any objections? Hearing none, we'll accept Exhibit 72 under that exhibit number. You're correct, Mr. Watkins, I can take official notice of this. We'll just accept it as an exhibit, and it's properly identified the date that that was enacted. Thank you.

MR. WATKINS: Ms. Franolich, can you show Exhibit 72, please.

HEARING OFFICER: So if I didn't say that, Exhibit 72 is admitted into the record.

Q (By Mr. Watkins) On Exhibit 72 it proceeds with a number of whereas clauses. Do you see that?

A. Yes.

Q. Is it your understanding of those whereas clauses essentially sets up the legislature's opinion as to the current status of the Stibnite Gold Project or the area up there?

A. That is correct.

Q. And if we go to the now therefore and be it further resolved clauses in the back, is it your understanding that that is representation of the position that both Houses of the Idaho State Legislature, both the House and the Senate, are taking?

A. Yes, it is.

Q. Can we blow up the first now therefore clause? I'm going to read that. I would like you to follow along: Now therefore be it resolved by the members of the second regular session of the 64th Idaho Legislature, the House of Representatives and the Senate concurring therein that the State of Idaho supports actions by the U.S. Forest Service and other federal agencies, in partnership with agencies of the great State of Idaho and Valley County to move forward to permit the redevelopment and restoration of the site. Did I read that correctly?

A. Yes.

Q. Is it your understanding that the Idaho legislature is in favor of state agencies approving and permitting redevelopment of the restoration site?



A. Yes.

Q. Go to the next clause, please. It says: Be it further resolved that we believe Midas Gold -- and I understand that's being Perpetua; is that correct?

A. That's correct.

Q. Be it further resolved that we believe Midas Gold, Idaho's commitment to mining in a way that restores and protects the environment will serve as a global template for responsible, sustainable, and successful mining practices. Did I read that correctly?

A. Yes.

Q. Next one.

HEARING OFFICER: I don't need you to read that, Mr. Watkins. If you've got a question for Mr. Haslam on this, it can be okay.

MR. WATKINS: Thank you, Mr. Hearing Officer.

Q (By Mr. Watkins) On the next bullet point down they ask that the federal government and NEPA and other laws and regulations complete their review as expeditiously as possible, while insuring compliance with those laws and regulations. Do you see that?

A. Yes.

Q. What is your understanding as to why this would need to be completed as expeditiously as possible?

A. First and foremost, to get the project underway.



And, like I said, early on in construction we reestablished fish passage, and we get going and overall improve water quality and water temperature at the project site. And then in addition to that, now with antimony, there's an expedited need by the federal government for that antimony.

Q. So fair to say the sooner the project gets approved and permitted, the faster those environmental positive changes can be made?

A. Yes.

Q. And the faster the federal government can get access to that critical mineral that's currently supplied by China and Russia?

A. Yes.

Q. You spoke briefly before about financial assurances, and I think you testified that was around a hundred million dollars; is that right?

A. Could be in excess of that.

Q. And that financial assurances that kick in if the project -- if Perpetua is not able to go with the project, those financial assurances would still restore that reach of the East Fork, South Fork of the Salmon River?

A. Yeah. If we -- if for whatever reason Perpetua went away after the project is underway, then that would be the case.

Q. What is the administrative settlement agreement and



order on consent or ASAOC?

A. It's a -- it's an agreement with EPA and the Forest Service that allowed us to do some cleanup work, cleanup and restoration work, ahead of getting the overall project approved. The work that's defined in the ASAOC is outside of the proposed Stibnite Gold Project. And we reached out to EPA, to the agencies, to try to get that in place to allow us to do that work. The initial work that was done -- the first years worth of work that was done under that ASAOC was mostly rerouteing live water around historic legacy waste rock with the idea to keep clean water clean and get it routed around where it's not coming around in contact with that waste rock.

The second year, this last summer's projects were more around removing waste rock and other historic tailings that had been deposited right adjacent or in some cases in the streams, and those are, you know, leaching contaminates into the surface water. So we removed over 300 million tons of material from -- from near the streams, and we placed it in an engineered repository on the site. And if the project doesn't go forward, the repository is designed to stay where it is. If we are approved and we move forward with the project, we'll relocate those materials into another -- other engineered storage facilities where it will stay.

Q. So I want to make sure I understand that. Prior to

Perpetua getting any approval to move forward with the project, Perpetua reached out to the EPA and asked for permission to start cleaning up the site on its own?

A. Yes.

Q. And how much money has Perpetua spent on cleaning up this site on its own?

A. Over 17 million.

Q. And, just to be clear, how many tons of waste rock are being moved and relocated?

A. 300,000.

Q. Do you know who Jess Largent is?

A. Yes.

Q. Who is Jess Largent?

A. She is Perpetua's CFO.

Q. As vice president of Perpetua, I assume you're on the executive team at Perpetua?

A. Yes.

Q. Do you work closely with Ms. Largent?

A. Yes.

Q. Handing you what's been marked as Exhibit 59. What is Exhibit 59?

A. This is Jess' expert report associated with our financials.

Q. And do you know if Exhibit 59 also includes a copy of Perpetua's 10K?



A. Yes.

Q. And as part of your role as vice president of Perpetua, are you familiar with Perpetua's 10K?

A. I am generally familiar with the 10K. As vice president I have to review and approve some portions of the 10K.

Q. And is it your understanding that Ms. Largent's report reflects the financial condition of Perpetua?

A. Yes, as of this 10K.

Q. And is it further your understanding that Protestants are not really challenging the financial condition of Perpetua --

A. Yes.

Q. -- in this proceeding?

A. Yes, that's what I understand.

MR. WATKINS: Mr. Hearing Officer, move to admit Exhibit 59.

HEARING OFFICER: Any objections to 59? Mr. Watkins, are there provisions of this Exhibit 59? I realize that the cover letter provides a summary. Are there specific pages of Exhibit 59 that you would draw my attention to? Is that something that you want to talk to Mr. Haslam about?

MR. WATKINS: Your Honor, our intention wasn't to walk Mr. Haslam through this. It's simply to make the showing that we have -- that Perpetua has sufficient financial



resources, and I think for completeness sake we would need to have the entire 10K and report in the record.

HEARING OFFICER: Exhibit 59 is admitted into the record at this time.

Q (By Mr. Watkins) What is your understanding of the total cost of the project?

A. The initial construction costs would be between 1.3 -- or, excuse me, 1.2 and 1.3 billion.

Q. And I think you testified earlier that Perpetua is a publicly traded company?

A. Yes.

Q. Is that a yes?

A. Yes.

Q. And does it have access to financial lending and the market?

A. Yes.

Q. Is it your understanding that projects of this size and magnitude typically seek permitting and get funding once a permit is clear?

A. That's correct.

Q. Does Perpetua also have access to DOD funding?

A. Yes. I mentioned earlier that we have gotten two previous grants from DOD, one for 24.8 million and one for 15.5 million.

Q. Mr. Haslam, we've been going for some time now, and



we've talked a lot about this Stibnite Gold Project. We've talked about Stibnite and the historical environmental impacts that have been caused by years of kind of mining and some unregulated cleanup and Perpetua's goal at reclaiming that area and restoring the site with modern mining practices, while being responsive and listening to the local public interest of those community members, which are on your leadership board, as well as a company run by Idahoans. I guess my question is: So, what? After all of this and that we've walked Hearing Officer Cefalo through, what is that you are asking this Hearing Officer to do as a result of your testimony today?

A. Yeah, I guess I would ask the Hearing Officer to take into consideration all the testimony throughout the upcoming week and come to the conclusion that what we have proposed within our applications is fully within the water rights regulations and fully within our right to receive the water rights permit and get us one step closer to getting this great project off the ground and begin realizing all the environmental benefits that will come from this project.

MR. WATKINS: Thank you, Mr. Haslam. I don't have further questions.

HEARING OFFICER: Okay, we will go ahead and take a five-minute break here. Be back in five minutes. We'll be back and start with cross-examination.

(Recess.)

(Reconvened.)

HEARING OFFICER: Okay, we are back on the record, and we'll allow the Protestants an opportunity here to cross-examine our first witness. Mr. Haslam, before we do that, as a Hearing Officer I'm also allowed to ask questions of you as you went through that initial testimony. I did have two.

EXAMINATION

BY THE HEARING OFFICER:

Q. One was: If the Burnt Log route is chosen, does dust abatement extend all along that route? I mean, maybe I should ask is it Perpetua's responsibility to maintain that road for dust abatement purposes?

A. Yes.

Q. Okay. And so water from the site will be hauled to --

A. Yeah, also from the Burnt Log maintenance facility that's stationed along the Burnt Log route would also supply water for that.

Q. That maintenance facility is covered under a separate water right application filing from the primary application associated with the site?

A. Right.

Q. Do you still have -- and I guess you don't need to



look at it -- exhibit, it's Exhibit 22, page 88, was a picture of the Yellow Pine Pit after reclamation is accomplished. And you had mentioned that that pit will be refilled. My question is: With what? Where do you find all of that fill material to -- that's a giant pit. Where does that come from?

A. Yeah. So there are -- there are three of the pits and so the Yellow Pine Pit will be mined first, and then the next one -- well, at times all three pits will be mined at the same time, just depending on, because they all have different types of ore in them, but the material to backfill that Yellow Pine Pit will come from those other two pits, the Hangar Flats and the West End Pit. And then the material to backfill the Hangar Flats Pit, the majority of it will come from the West End Pit. The West End Pit is proposed to remain open. The other two pits are fully backfilled.

Q. And will that backfill just be overburden?

A. Yes.

Q. Because I'm wondering why wouldn't that backfill have the same water quality issues with water percolating through as the other things, but it's not necessarily the ore, it's just overburden?

A. It is overburden, and then, you know, we've committed to put those synthetic caps and covers on top of



them to limit infiltration through them.

HEARING OFFICER: Okay. Thank you. So turning now to Protestants. Ms. Thrower, if you want to go first. Maybe come upfront, if you would. Might be able to better see the witness. Just clip that microphone on.

MS. THROWER: All right. Thank you. Can you hear me okay, Mr. Haslam?

A. Uh-huh (affirmative).

CROSS-EXAMINATION

BY MS. THROWER:

Q. I'd like to go back to your testimony where you testified about a local advisory committee.

A. Okay.

Q. And you testified that that advisory committee provides oversight of Perpetua; is that correct?

A. Yeah, oversight, input, yes.

Q. Okay. And are you aware of how that committee was created?

A. I'm generally aware, but I can't speak to details around it.

Q. Okay. Are you familiar with the community agreement?

A. Again, I'm generally aware of the community agreement.

Q. Okay. In your -- just your general knowledge, are



you aware that that advisory committee was created through that community agreement?

A. I believe so.

Q. Okay. Do you know who the signatories to that agreement are?

A. I don't off the top of my head, no.

Q. Do you know who was offered the opportunity to sign that community agreement?

A. Yes, the local communities and the counties.

Q. Okay. Can you name which -- what you know of which communities or counties?

A. Cascade, Donnelly, McCall, New Meadows, Council, Riggins.

Q. Do you know how -- just going back to this advisory committee, do you know how the board members are chosen for that advisory committee?

A. I couldn't speak to that level of detail.

Q. Are you aware of the Stibnite Foundation?

A. Again, generally aware, yes.

Q. Okay. What do you know about the Stibnite Foundation?

A. That the company provides some funding and potentially future funding for the group to decide on projects and donations through the -- to the communities.

Q. And by the company, you mean Perpetua?

A. Yes.
Q. And was that foundation established under that community agreement?
A. I believe so.
Q. And are you aware of how the Stibnite Foundation appoints board members?
A. Again, I couldn't speak to that detail.
Q. So, again, you testified that Perpetua provides funding for the Stibnite Foundation, correct?
A. Yes.
Q. And the foundation provides money for projects; is that correct?
A. Yes.
Q. Is that things like community projects?
A. Yes.
Q. Okay. And is funding tied to certain events happening?
A. There is -- future funding is possible once we get permits.
Q. So, for example, is funding tied to the record and decision being proofed?
A. I don't remember the exact milestones.
Q. Okay. Do you remember funding is tied to the start of construction?
A. Again, I don't remember the exact milestones.



Q. Okay. And so, again, you just said that local communities were given the opportunity to sign this. Are you aware that Cascade signed the agreement?
A. Yes.
Q. And Cascade submitted a letter of support to Perpetua for the mine?
A. Yes.
Q. And are you aware that Donnelly signed the agreement?
A. Yes.
Q. And you just testified that Donnelly had submitted a letter of support for the mines; is that correct?
A. Yes.
Q. And did Council sign the agreement?
A. I believe so.
Q. And you testified you got -- Council had submitted a letter of support for the mine; is that correct?
A. Yes, a school district.
Q. Okay. Are you aware if Valley County signed the agreement?
A. I don't know for a hundred percent certain. I don't believe that Valley County or McCall signed the agreement.
Q. Did Valley County submit a letter of support for the mine?



A. I do not remember.
Q. Did McCall submit a letter of support for the mine?
A. I do not remember.
Q. You testified that, you know, you reviewed -- you're in the process of reviewing comments for the mine proposal that were submitted under the Forest Service's NEPA process. Did you -- do you remember seeing a comment letter from McCall?
A. I do not know for sure. The forest is in the process of reviewing all the letters. I mean, we've -- our team has reviewed them as well, but I can't say for sure whether there was one specifically from McCall.
Q. Okay. So you would not know the nature of the comments from McCall?
A. No.
Q. Just switching topics a little bit here. When did the Idaho legislature pass a resolution that was identified as Exhibit 72?
A. I believe it was 2018.
Q. And does the Idaho legislature's resolution supporting redeveloping the site constitute explicit support of Perpetua's current mine, proposed mine plan?
A. I couldn't speak to explicit or not. In general, they said that they support the project.
Q. Okay. Was the Idaho legislature's resolution was



adopted prior to Perpetua's release of its current mine plan, correct?
A. That's correct.
MS. THROWER: Mr. Hearing Officer, I'll turn it over to the Nez Perce Tribe Counsel. Thank you, Mr. Haslam.
HEARING OFFICER: Okay. Thank you. Ms. Rogerson, go ahead.
MS. ROGERSON: Thank you, Mr. Hearing Officer. This microphone is on?
HEARING OFFICER: It is.

CROSS-EXAMINATION

BY MS. ROGERSON:
Q. I think I would first like to start with your testimony regarding the mine plan, Perpetua's mine plan. You testified at length about your mine plan. The Forest Service has not approved your current mine plan for the Stibnite Gold Project; is that correct?
A. That's correct.
Q. You testified at length to many of Perpetua's plan mine features. Is there any guarantee that the Forest Service will approval all the mine plans and mine features that you testified to here today?
A. There's no guarantee, but they have chosen it as their preferred alternative that's going forward in their analysis.

Q. And you testified that the company Perpetua will provide financial assurance for its mine; is that correct?
A. Correct.
Q. And has this financial assurance been approved?
A. No. We are still working with all the agencies to determine what the final level of that financial assurance will be.
Q. Okay. Could Perpetua use a corporate guarantee for its financial assurance?
A. No.
Q. When did you first submit a proposed plan for the Stibnite Gold Project to the Forest Service for approval?
A. September of 2016.
Q. And how many amended mine plans can you remind us have you submitted to the Forest Service since then?
A. Two.
Q. And can you remind us for which mine plan did the Forest Service issue a draft environmental impact statement?
A. The draft environmental impact statement looked at the original proposed action, the PRO. It also analyzed the original ModPRO and two other action alternatives.
Q. Okay. And why did you submit another amended mine plan after that draft environmental impact statement was issued by the Forest Service?
A. Based on the public feedback that we received and



concerns about project footprint and water quality and water temperature, we felt like we needed to go back and take another look at everything and make improvements where we could, which is all the ones that I had spoke to earlier.
Q. Could the latest round of public comments on the draft supplemental environmental impact statement prompt additional changes to your mine plan?
A. There is potential for that, but like I said, the Forest Service is at least currently continuing forward with the ModPRO2 as their selected alternative in the final EIS.
Q. Could the Forest Service change its environmental analysis of your current mine plan in its final environmental impact statement?
MR. WATKINS: Objection, calls for speculation.
HEARING OFFICER: Noted on the record. You can answer that question.
A. To answer it?
HEARING OFFICER: Uh-huh (affirmative).
A. There's potential, but highly unlikely. And even if they did, I doubt that there would be any impact or change to the water rights required. Our middle water needs are what the water needs are.
Q. (By Ms. Rogerson) Okay. I believe that you testified that your current draft mine will essentially double the disturbed footprint of the current historic



mine area; is that correct?
A. Yes.
Q. I believe you also testified that fish have not been able to access 20 miles of habitat above the fish passage barrier that's currently on the East Fork, South Fork Salmon River due to historic mining; is that correct?
A. Yes, anadromous fish, yes.
Q. Anadromous fish. Thank you. You also testified, however, the Nez Perce Tribe then -- I think there's just, you said, the Nez Perce Tribe has been moving fish around that fish passage barrier?
A. Yes.
Q. Do you know how long they've been doing that?
A. I do not know how many years. Since before I started in 2017.
Q. Great. It is -- you testified that it is Perpetua's opinion or assessment that the fish tunnel will pass fish; is that correct?
A. That's correct.
Q. Has that opinion or assessment been confirmed by the federal permitting agencies?
A. A final decision has not been made.
Q. Okay. When does Perpetua plan to have all the fish habitat restoration actions that are part of your mine plan completed?



A. Uhm, I think probably year 23, because that's when final restoration of the stream on top of the TSF would be completed.
Q. Okay. Do restoration actions result in sort of immediate habitat or is there a lag time?
A. Well, through the fish tunnel there would be immediate habitat access.
Q. I believe you also testified that Meadow Creek, which is what the fish tunnel, I believe, would provide access to for fish, currently has good fish habitat; is that correct?
A. Portions of it.
Q. Did you also testify that Meadow Creek won't be restored until mine year '23?
A. On top of the tailing storage facility. Down below the tailing storage facility, that restoration will take place fairly quickly. I don't recall the exact year timeframe, but it has to be moved. Portions of it have to be moved over in order to mine the Hangar Flats Pit, and so that restoration will happen fairly quickly in the mine life.
Q. Okay. But there may be some lag time between mine actions and restoration; is that fair to say?
A. I would say restoration of the stream channel would take place at the time of the stream channel. For the

complete habitat to take place need establishment of the vegetation along the stream channels.

Q. Okay. Are you aware of how many years it will take for water temperatures of the site, after, I don't know, mining, mine closure, to reach state and federal standards, state and federal criteria, for temperature?

A. I can't answer that one. Other experts can answer that one.

Q. We will ask them. Does the Forest Service include -- so the -- so -- can you -- so under the supplemental draft enviromental impact statement, the Forest Service has completed a draft evaluation of the mine -- of your mine plan; is that correct?

A. Yeah, two drafts.

Q. And does that evaluation cover your mine plans effects on fish habitat?

A. Yes.

Q. And does that evaluation cover all of your restoration actions sort of throughout that timeline that you've been discussing?

A. Yes.

Q. So -3 to year '23 or beyond?

A. Yes.

Q. Is it correct that Perpetua is going to use the full 9.6 cfs water right that it's applying for during the



first year of mining?

A. That's one I can't answer. Our other folks after me can certainly respond to that.

Q. Okay. Well, I had a follow-up question about that, but I will save that for someone else. I want to turn now to your testimony regarding the mine's production of antimony. Do you plan to process or smelt -- and I can't say that I fully understand the distinction -- all the antimony that you will be mining at the Stibnite site?

A. No. We will only be producing an antimony concentrate that will be shipped off to be processed somewhere else.

Q. Okay. And will that be processed within the United States?

A. I can't answer that. Those final plans have not been established.

Q. Okay. What percentage of your mine's profits will come from antimony?

A. I can't answer that.

Q. Okay. Can you give me a ballpark? I mean, is it the majority or less than the majority?

A. No, it is not the majority. The gold mining will fund, being able to mine and make antimony concentrate.

Q. Okay. I believe you testified that Perpetua has some sort of contract or agreement with something called



Ambri Energy; is that correct?

A. Yes.

Q. If Perpetua were not to produce antimony at the Stibnite site, do you believe that Ambri would be able to source their antimony from other sources?

A. I don't know the answer to that.

Q. Do you know if there's currently a shortage of antimony in the global supply chain?

A. There's a shortage domestically in the United States.

Q. Of domestically produced antimony, is that what you're saying?

A. Of antimony available to the United States.

Q. You do not believe that companies within the United States can procure antimony?

A. I don't believe that the -- like the Department of Defense, that they can get antimony from China or Russia or Tajikistan.

Q. Which is where you believe it's currently being produced?

A. Yes, but the Department of Defense isn't getting it from there.

Q. Where are they getting their antimony from?

A. They're not.

Q. So you are representing that the Department of



Defense is currently not able to access antimony?

A. Yeah.

Q. I'd currently like to turn your attention to, I guess, to mine regulations, since you are the permitting vice president for Perpetua, as I understand it. You noted during your testimony that previous mining was completed without modern mining regulations; is that correct?

A. Yes.

Q. When were these modern mining regulations that you're referencing enacted?

A. I believe the NEPA regulations came into play in the '70s.

Q. Okay. You mentioned during your testimony that limited reclamation was done by previous mining companies at the site in the '90s and the 2000's; is that correct? Why is that?

HEARING OFFICER: You have to say yes or no to the question?

A. Yes. Sorry. I do not know what their mine plan was or what -- or if they were required to have financial assurance in place for their operations or not. I can't answer beyond that.

Q. (By Ms. Rogerson) Okay, but the '90s and 2000's are after when you consider modern mining regulations were introduced?

A. I don't know when financial assurance regulations came into play.

Q. Okay. I was hoping to just get some clarity from you on the location of Perpetua's water treatment facility and discharge points from that facility. I don't know if we could use one of the demonstratives that you used previously, or, I mean, I can also pull up a map.

A. I don't know that we had any of the discharge points on our maps, and as far as water treatment and the discharge points, I mean, I can maybe speak to them at a general level, but I can't give details.

Q. Okay. Do you think that would be a better line of questioning for someone else?

A. I do.

MS. ROGERSON: Okay. That's fine. So now I would like to direct you to some of the Tribe's proposed exhibits if that's all right with the Hearing Officer. I note we have binders over there. I don't believe that we are currently hooked into the monitors, so I'm not sure that we can pull them up on the screens. Although, we could probably set that up if that would be helpful.

THE CLERK: I can pull them up if she'll quit sharing your screen.

MS. ROGERSON: Okay.

Q. (By Ms. Rogerson) So, Mr. Haslam, I was hoping



to direct your attention to the Tribe's proposed Exhibit 206, and I believe there are some binders over there but perhaps we'll just get it up here on the screen here. It should be in that first box. Okay, Mr. Haslam, so I think I'm just going to briefly walk you through what I believe you're seeing on the screen. So this is the Tribe's proposed Exhibit 206. On the page that we're currently looking at there's an August 2nd letter from 2022, and if you wouldn't mind just scrolling to the next page. I believe this letter is addressed to Hearing Officer Cefalo, and it is from the Idaho Department of Fish and Game and the Offices of Species Conservation. But I believe if you were to scroll to the next page, if you wouldn't mind, there is a letter dated June 27, 2022. It looks like it's addressed to George Lynch at the Governor's Office of Energy and Mineral Resources, and it appears that it was signed by you, Mr. Haslam; is that correct?

A. That's correct.

Q. Great. And could you now scroll to the next page, if you wouldn't mind. This next page appears to be a technical memo, and it also appears to be from you, Mr. Haslam, to the Idaho Department of Fish and Game and the Offices of Species Conservation; is that correct?

A. That's correct.



Q. Excellent. Can you just -- can you explain what this request for technical review is for what's contained in this memorandum that you sent to those agencies?

MR. WATKINS: Objection. Exhibit is not (inaudible). I didn't move to admit the exhibit.

MS. ROGERSON: Mr. Hearing Officer, I move to admit the exhibit.

HEARING OFFICER: Mr. Watkins, I believe that this was also an exhibit that was proposed by Perpetua identified as Exhibit No. 14, right? Were you -- do you have an objection to the admission of that as an exhibit in this case?

MR. WATKINS: No objection.

HEARING OFFICER: Okay.

MS. ROGERSON: I think he just wants me to move to admit the exhibit.

HEARING OFFICER: That's fine. So I guess question for the parties: Should we admit that as Exhibit 14 or should we admit it as 206? We're not going to take it in twice. I'm happy to take it in either way, so we can --

MS. ROGERSON: I don't have Exhibit 14 in front of me.

HEARING OFFICER: Okay.

MS. ROGERSON: Mr. Hearing Officer, assuming that they are identical, I have no problem.

HEARING OFFICER: I think they are identical.

MS. ROGERSON: I have no problem.



HEARING OFFICER: Let's take the one we have on the screen, so we'll admit Exhibit 206. I think that makes it simple rather than going and trying to compare those. Okay, proceed, Ms. Rogerson.

MS. ROGERSON: Thank you.

Q. (By Ms. Rogerson) Mr. Haslam, would you mind explaining what this tactical memo -- what this tactical memo is, I guess, that you sent to those two state agencies?

A. Okay. Again, I can speak to it at a really high level, but for details, we'll have to have other folks involved. At a high level, we were asking Department of Fish and Game and OSC for technical assistance in reviewing our plan around flows in the East Fork of the South Fork and looking for input from them.

Q. Okay. Since you're only able to speak to a high level, did you draft this technical memo?

A. I did not draft this personally.

Q. Do you know who did?

A. Our team did. A lot of it -- the input was done by Dan Stanaway with Brown and Caldwell and Gene Bosley with Perpetua.

Q. Okay. Did you review this request before it was sent to IDF&G and OSC?

A. Absolutely.

Q. Do you, as the vice president of permitting, vouch for its contents?

A. Yes.

Q. So it looks like -- if you wouldn't mind scrolling back up to the top of Exhibit 206. As I noted earlier, this exhibit includes the August 2nd, 2022, letter from IDF&G and OSC addressed to Hearing Officer Cefalo. Is Perpetua's July 27th, 2022, appended request for technical assistance review what OSC and IDF&G would have reviewed prior to sending that August 2nd letter?

A. Yes.

Q. Okay. Is it your understanding that IDF&G and OSC's letter to Officer Cefalo was based on the information provided in the appended July 27, 2022, request?

A. Ask me that again. Sorry.

Q. Is it your understanding that this August 2nd letter that was sent to Hearing Officer Cefalo by IDF&G and OSC, is it your understanding that the contents of that letter were based on that June 27, 2022, request for technical assistance, the information contained in that?

A. That's my understanding, yes.

Q. Okay. Great. Is it correct that IDF&G and OSC's letter asked for the development of conditions to insure fish passage that would be found there on that first page?

A. Yes.



Q. More specifically, it looks like IDF&G and OSC's letter gives an example of a condition. They state: Surface water diversions and infrastructure will not at any time impede the passage of any live stage of chinook salmon, steelhead, bull trout, or cutthroat trout from the confluence of the East Fork, South Fork, Salmon River, and Sugar Creek upstream passed the point of diversion. Does that look like what you see on the letter?

A. Yes.

Q. Do you understand this example to be recommending continuous upstream passage for these fish species?

A. Yes.

Q. Do you know if Perpetua has provided any further communications to Hearing Officer Cefalo about its technical memo?

A. As part of our -- the feedback that we got from Fish and Game from this technical assistance request, they had asked us to do some additional modeling and analysis, which we did. And I don't remember the date that that was submitted, but I believe that the results of that were submitted to the Hearing Officer earlier this year.

Q. Okay. I believe you may be referring to the July 11th, 2023, letter that I believe is proposed Exhibit 219. I want to get to that in a moment, but I note what you're saying. I think I first wanted to just address



what the July 27, 2022, request for technical assistance -- or review, excuse me, states about flow modeling. Do you recall what this -- what the -- excuse me, that should be June 27th. Do you recall what the June 27th, 2022, request states about Perpetua's flow modeling --

A. I don't.

Q. -- for passage? Okay. So that's not something you feel qualified to speak to?

A. No.

Q. Okay. Excellent. I'm sorry, I lost my spot. Just one moment. Since -- is it -- since you don't feel qualified to speak to flow modeling, I had a number of questions. I'm going to skip those and save those for someone else. I think it might be useful at this point to turn to that July 11, 2023, letter that I believe you referenced earlier. As I stated earlier, I believe that's proposed Exhibit 219.

FEMALE SPEAKER: Did you say July 11th?

MS. ROGERSON: Yes.

HEARING OFFICER: Are there two binders up there? I can't find one. Thank you.

Q. (By Ms. Rogerson) Mr. Haslam, have you been able to locate proposed Exhibit 219?

A. Yes.

Q. So I believe it's also up on the screen. I think



what we see here is a letter from Richard Stover -- excuse me, to Richard Stover at the Governor's Office of Energy and Mineral Resources, and could you scroll down on that page, if you wouldn't mind. I remember. So I believe at the very end of this document we'll find a signature line.

HEARING OFFICER: Page 10.

Q. (By Ms. Rogerson) There it is. Is that your signature, Mr. Haslam?

A. Yes, it is.

Q. Excellent. All right. I assume you're familiar with this letter; is that correct?

A. Yes.

Q. And did you draft this letter?

A. I was part of drafting it. Our technical team drafted it on my behalf.

Q. Did you review this letter before sending it --

A. Yes.

Q. -- to Mr. Stover? Excellent.

MS. ROGERSON: Mr. Hearing Officer, I would like to move to admit Exhibit 219 into the record.

MR. WATKINS: No objection.

HEARING OFFICER: Mr. Watkins?

MR. WATKINS: No objection.

HEARING OFFICER: Oh, no objection. Okay. I thought you were -- again, I had in my notes that this is the same

as what has been identified as Applicant's Exhibit 15. There are a lot of pages with this document, and that does concern me. However, the vast majority of them are tables. I mean, are spreadsheets and diagrams and tables and not dense with text, and so I will admit Exhibit 219. I will admit Exhibit 219 into the record at this time.

MS. ROGERSON: Excellent. Thank you, Mr. Hearing Officer.

Q. (By Ms. Rogerson) Mr. Haslam, do you, as the vice president of permitting, vouch for the contents of this letter?

A. Yes.

Q. Is it correct that this letter shares the results of Perpetua's updated modeling for passage of these fish passages in the East Fork, South Fork of the Salmon River?

A. Yes.

Q. And it looks like from that first page that this letter was sent to the Governor's Office of Energy and Mineral Resources; is that correct?

A. Yes.

Q. Did Perpetua also send this letter to the Office of Species Conservation or Idaho Department of Fish and Game?

A. Not directly, no. We sent it through the OSC -- or, sorry, OEMR.

Q. I believe that you testified earlier that you



believe that this letter had also been sent to Officer Cefalo?

A. Yeah, I think so. I thought that Mr. Stover had submitted it.

Q. Okay.

MS. ROGERSON: Hearing Officer Cefalo, I have not seen evidence that this letter was also sent to you.

A. I might be wrong.

MS. ROGERSON: That's not one of the proposed exhibits.

HEARING OFFICER: I don't know. I haven't seen a separate letter. That might be something that we can discuss between the attorneys. Thank you for noting that.

Q. (By Ms. Rogerson) Mr. Haslam, I want to direct your attention to the discussion in the letter of the tunnel fishway hydraulics. Please let me know if you do not feel qualified to speak to this.

A. I am not qualified to speak to tunnel fishway hydraulics.

Q. All right. Then I am not going to ask you those questions.

A. Thank you.

Q. I think my final set of questions has to do with your previous testimony regarding what we refer to as the ASAOC that Perpetua entered into with the U.S. Environmental



Protection Agency. I believe you previously testified that Perpetua entered into what -- I think the acronym stands for administrative agreement and order on consent for the removal of about 300,000 tons of tailing waste; is that correct? How did Perpetua decide on the 300,000 tons number?

A. That was worked out with EPA and the Forest Service.

Q. Okay. And do you know what percentage of the tailings waste that's currently at the mine site that constitutes?

A. I don't.

Q. Is it the majority of the tailing waste or the minority?

A. No. No, I would say the majority of the tailings waste is located underneath the spent ore disposal area, which is proposed B, removed as part of our overall Stibnite Gold Project.

Q. Okay. And that was not subject to the ASAOC; is that correct?

A. Correct.

Q. Is any component of the ASAOC that you entered into with the Environmental Protection Agency contingent on the mine being permanent?

A. There are potential future phases of the ASAOC that



could be extended if the mine is permanent.

Q. Okay. So at the moment you are simply implementing a phase of the ASAOC?

A. Yeah, I believe it's all in phase one.

Q. Okay. Do you know how many phases there are?

A. I don't remember.

Q. Okay. Do you know why those future phases are contingent on the mine being permanent?

A. I don't believe that funding would be available to execute on any of those other phases for either the government or the company without -- without the mine being operated.

Q. Okay.

A. And there wouldn't be any place to put any of that additional material.

MS. ROGERSON: Okay. Thank you. I believe those are all my questions, Mr. Hearing Officer.

HEARING OFFICER: Okay. Thank you. Mr. Watkins, any questions on redirect?

REDIRECT EXAMINATION

BY MR. WATKINS:

Q. Mr. Haslam, there was some questions about, I think it was called, the Stibnite company that was -- gives donations or puts money towards public works.

A. The Stibnite Foundation.

Q. The Stibnite Foundation. Excuse me, Stibnite Foundation. Is Perpetua buying votes?
A. No.
Q. Why not?
A. I don't know how to explain that. That funding is going directly to the foundation, and the foundation board makes the decisions of where and how money is spent.
Q. Out of those -- out of those 30,000 or so comments that we discussed earlier, you said that the majority of those were in favor of the Stibnite Gold Project; is that right?
A. That's right.
Q. Did Perpetua give some sort of consideration or funding to the vast majority of those 30,000 commenters to get their approval?
A. No.
Q. You understand those approvals that were given is your belief that they are genuine support for the project?
A. Correct.
Q. And would that include support by local community officials, such as mayors and superintendents?
A. Definitely.
Q. There was some discussion about the Idaho legislature resolution being issued before the current ModPRO2. Do you remember that testimony?



A. Yes.
Q. And I think you said that that resolution came out in 2018, correct?
A. Yes.
Q. Tell me, has the ModPRO2 -- or, excuse me, has the ModPRO improved, environmentally speaking, since 2018?
A. Yes.
Q. And so the Idaho legislature at the time were approving for lack of a better term a worst mine plan than the one that currently exists today?
A. Yes.
Q. This one is even better than that one?
A. Correct.
Q. There was some questioning about whether or not the ModPRO has been approved yet or not. Do you believe that the ModPRO will be eventually approved?
A. I do.
Q. Why is that?
A. The Forest Service has not come up with a different alternative at this point to be further analyzed and they're preparing to publish the final EIS and draft record decision fairly soon.
Q. Would any changes to -- or any alterations to the ModPRO, would that alter the water right being sought in your applications, or the amount sought in your



applications?
A. No.
Q. And why is that?
A. Because the mill requirements are what -- are as per our design, and so that is the water that we need to run that mill.
Q. Said another way: Nothing in the ModPRO2 or alterations to the ModPRO2 would alter the basic engineering of what it takes to run a mine of that size in terms of water?
A. I don't believe so.
Q. There was some conversation about whether or not fish could get up to the higher grounds that the Tribe currently deposits fish in. Do you recall that testimony?
A. Yes.
Q. And there was some questioning about how long the Tribes have been trucking fish from low regions up to that area. Do you recall that?
A. Yes.
Q. I recognize you're not a biologist, but is it your understanding that trucking fish from one part of a river upstream to a different part of a river is part of the natural migratory patterns of fish?
A. Ask me that again. Sorry.
Q. Is it natural or part of the natural migration of



fish to be trucked, put in the back of a truck, and driven up a road and put into a river?
MR. LOPEZ: Objection. The question calls for opinion or conclusion.
HEARING OFFICER: Sustained. We'll have other people that can testify to that. I don't need to hear that from Mr. Haslam.
Q (By Mr. Watkins) Putting in the fish tunnel, will that allow the fish to travel on their own volition up the river?
A. Yes.
Q. And ultimately reclaiming the Yellow Pine Pit and putting a natural river over top of the Yellow Pine Pit, will that allow fish to travel up on their own volition up the river?
A. Yes.
Q. And that would not require trucking them by the Tribes?
A. Correct.
Q. There was some discussion about a shortage of antimony in the United States. Do you remember that?
A. Yes.
Q. What is your understanding as to why there's a shortage of antimony in the United States?
A. There are no domestic antimony mines currently in

the United States.
Q. And I think you testified earlier that the Department of Defense requires antimony for munitions?
A. Yes.
Q. And where is that antimony held currently in the world? Who has that antimony?
A. Well, currently China, Russia, Tajikistan have antimony, but to my knowledge anyway Department of Defense cannot purchase antimony from those countries.
Q. Is it your understanding that the Perpetua -- strike that. Is it your understanding that the SGP is a strategic center for DOD to be able to make its own munitions and not rely on China and Russia?
A. That's correct.
Q. And is that your understanding as to why you've received Department of Defense funding?
A. Yes.
Q. There was a conversation about when the NEPA regulations came into effect. I believe you said they came into effect sometime around the 1970's?
A. Yes.
Q. And those are the modern mining regulations and practices you were referring to?
A. That's just the NEPA process. I mean, I had testified I don't know when, like, financial assurance



regulations came into play. I know Idaho just revised theirs in the last few years, yeah.
Q. When was the majority of the disturbance to the mine site? When did the majority of that occur?
A. In the '30s, '40s, '50s timeframe.
Q. So the '30s, '40s '50s, that would be before the NEPA process was put in place?
A. Correct.
Q. Is that your belief that was before financial assurances were required?
A. Correct.
Q. Is that -- strike that. Was that before modern mining practices and technology to treat some of these tailings were put into place?
A. Yes.
Q. Is it Perpetua's purpose to apply modern mining practices to environmental impacts that occurred in the '30s, '40s, and '50s?
A. Yes.
Q. And that's not just Perpetua's goal? Perpetua would actually be regulated by regulators to make sure that it did that; is that right?
A. Absolutely.
Q. There was some discussion about the ASAOC on your cross-examination. Do you remember talking about that?



A. Yes.
Q. Just to be clear, very clear, the ASAOC is done voluntarily by Perpetua, correct?
A. We had reached out to get an agreement with EPA and the Forest Service, yes.
Q. And that agreement was so that Perpetua could begin on its own dime cleaning up the site?
A. Yes.
Q. And Perpetua's put some $17 million towards that process?
A. Correct.
Q. We've talked about reclamation, and we've also mentioned the word restoration. In relation to the Yellow Pine Pit, is it your understanding that mining regulations requires Perpetua to backfill the entire Yellow Pine Pit and put a river over top of it, or is that something that Perpetua is doing above and beyond what's required?
A. That's something that Perpetua is doing above and beyond.
Q. And why is that?
A. Part of our business model again from the start was to restore the site and clean it up and improve water quality.
Q. And is the ASAOC work, is that just within the mine footprint, the mine set footprint?



A. It's outside of the proposed mine footprint.
Q. So that would be another example of going, I guess, above and beyond?
A. Correct.
MR. WATKINS: No further questions.
HEARING OFFICER: Okay. Okay. Any other questions on cross? Seeing none, we can move on. So, Mr. Watkins -- thank you, Mr. Haslam. So, Mr. Watkins, you can call your next witness or maybe we ought to have a discussion here. We can go off the record and possibly break for lunch here.
(Recess.)
(Reconvened.)
HEARING OFFICER: Okay, we are back on the record after a lunch break. Mr. Foster, go ahead. Call your next witness.
MR. FOSTER: Perpetua calls Terry Scanlan.
HEARING OFFICER: Excellent.
TERRY SCANLAN
after having been first duly sworn,
was examined and testified as follows:
MR. SCANLAN: I do.
HEARING OFFICER: Okay, have a seat. Mr. Foster, go ahead.

DIRECT EXAMINATION

BY MR. FOSTER:

Q. Mr. Scanlan, can you state and spell your full name for the record?

A. Yes. Terry Scanlan, T-e-r-r-y S-c-a-n-l-a-n.

Q. Thank you. How are you currently employed?

A. I'm a principal engineer with HDR Engineering in Boise.

Q. You were retained as an expert for Perpetua in this matter; is that correct?

A. Yes.

Q. And in what capacity have you provided support for Perpetua?

A. You know, for -- in this matter most of my services have been almost a technician level on water right applications. I supervise preparation of all the applications and just been providing some general consulting services related to water rights throughout this process.

Q. So is it fair to say that you're very familiar with all of the applications?

A. Yes.

Q. Okay. And what training and/or education do you have that qualifies you for this role?

A. I've got a Bachelor and Master's degrees from the University of Idaho in geological engineering. I've worked



as an engineer and hydrogeologist in Idaho since the mid-1980's. And as part of that, a lot of the work I've done has been in the water supply arena, lots of wells and pumps and pump stations and that sort of thing, water supplies for various projects, and they all -- not all, but a lot of them have water rights components. So kind of early on I kind of fell into this role of proving not only water supply but water rights, and as a result have prepared literally hundreds of water right applications, applications for permits and transfers. Back in the SRBA a lot of adjudication claims and was involved in a lot of just various water right matters associated with those.

Q. I'm going to hand you what's been marked as Exhibit 61. Is this a copy of the expert report you prepared in this matter?

A. Yes.

Q. And there's a co-author listed on that document; is that correct?

A. Yes, Dan Stanaway from Brown and Caldwell.

Q. What role did you play in preparing this report?

A. Well, we kind of co-wrote this. I would say I was the primary author of this particular document. I really just -- it talks about the process we went through to get to where we are now, you know, the water right applications, how do you prepare them. Well, you have to determine what



the water needs are. That was more of a Dan Stanaway thing. You'll hear is he did water modeling for the project site, like water balance, that sort of work, to determine what the water demands would be. So we determined what the water demands were for the various components of the project. Compared those to existing water right coverage to determine where we were short, and then developed water right applications off that, and then this report -- just kind of go through it, if that's okay.

MR. FOSTER: Before you do, I move to admit the report.

HEARING OFFICER: Any objections? This is the expert report Exhibit 61.

FEMALE SPEAKER: No.

HEARING OFFICER: Okay. Hearing no objections, Exhibit 61 is admitted into the record.

A. So, yeah, we looked at the existing water rights to prepare water right applications, and they were submitted. And this report also discusses some of the decision-making process that we went through to come up with those reports, or with those, come up with the applications. For example, you know, discusses that we included dewatering as a use and why we did that. What we could -- go ahead.

Q. (By Mr. Foster) Why did you include dewatering as a use?



A. Dewatering -- we had several discussions with the Department of Water Resources staff on dewatering wells, and so dewatering does not necessarily require a water right, but a well that is used for beneficial use purposes from the Department standpoint cannot also be used for dewatering. And so since a lot of dewatering water we were planning to produce would be beneficial used in the mill or for these other industrial uses, we decided that all the wells would be listed as points of diversion, and that dewatering would be a use. The Department noted that dewatering for mining projects is a recognized beneficial use, part of the project, and so just to be kind of inclusive on what we were -- everything we were pumping from these wells, we included it on the application.

Q. And was there a pre-application decision related to contact water as well?

A. Yes, and so on our main permit application for industrial use we listed a source of runoff. Runoff being precipitation that falls on the project facilities. And we refer to that particular type of water as contact water because it contacts the disturbed lands. It's a stormwater that has to be managed. It can't be just allowed to run off into the stream. It has to be captured, and if it is discharged it has to be treated first. And so we listed it as a component of the water right, knowing that -- that a

water right is not necessarily needed for capturing precipitation that doesn't reach a natural channel, but we wanted to be complete. It's part of our water balance, so we included it in the application. But that became a question that was asked early on, and there was an order issued that determined that the Department didn't need to issue a water right for that contact water for incident precipitation. It doesn't reach natural water source and, in fact, probably doesn't have the authority to do so.

Q. And I'm handing you Exhibit 5.

FEMALE SPEAKER: Terry, can you move the mic closer to you. Thank you.

MR. FOSTER: And, Mr. Cefalo, this Exhibit 5 is your interlocutory order deciding questions of law. Since it's already in the record I don't know that we need to admit it. I'm happy to --

HEARING OFFICER: I mean, sometimes it's helpful to have a number assigned to that. I don't know that there will be a lot of citations to it moving forward, but if you would like to admit it I would entertain that motion.

MR. FOSTER: Since it's already in the record I don't know that we need the witness to lay foundation for it, so I would move to admit it as Exhibit No. 5 to have it for record clarity.

HEARING OFFICER: So that interlocutory order, Exhibit



No. 5, any objections?

FEMALE SPEAKER: No.

HEARING OFFICER: None. Okay. It will be admitted, Exhibit No. 5.

Q. (By Mr. Foster) And, Mr. Scanlan, was this the order you were referring to when you were describing contact water?

A. Yes.

Q. And on the last page of that order is that the conclusion you were referring to, that contact water cannot be capped -- or water right is not required to capture contact water?

A. Yes.

Q. And what effect did that have -- I guess that was after the applications had been submitted. So what effect did that have on your thinking around these applications moving forward?

A. One of the concerns we had going into this whole process was the U.S. Forest Service Wild and Scenic water right on the main Salmon River. And it's subordinated to a certain amount of new uses that would fall under the subordination for, but explicitly is not subordinated to storage. And the water quality restrictions or regulations for the project required that we capture this stormwater, and when stormwater comes, as you can guess, it oftentimes



comes in large quantities, more than you can immediately treat and release. And so we had no -- no choice but to capture and store, temporarily store, contact water. And so this, by determining that contact water wasn't part of the water right, that made that process a lot easier because we didn't have -- we didn't necessarily have to mitigate for storage of contact water if it occurred at a time in the Wild and Scenic water right targets weren't being met.

Q. Thank you. And before we get any deeper, I'm going to give you what's been marked as Exhibit 1G. Are you familiar with that document?

A. Yes.

Q. What is that document?

A. This is the application for permit for industrial use for the project, for lack of a better description. It's application No. 77-14378.

Q. And does it appear to you that that document contains the entire application package that was submitted to the Department?

A. Yes, it does. It appears to be perhaps even a little bit repetitive. It seems like there's some documents that -- there may be more than one copy in here.

Q. And was there an amended application submitted or an amendment to the application submitted?

A. Yes.



Q. And what was the purpose of that amendment?

A. I think we had some mistakes on place of use descriptions. That's my recollection on that. That the legal descriptions didn't match the map, and we didn't catch that but the Department reviewing staff caught that.

Q. So is it possible that some of the duplication could be newer versions that were submitted with the amendment?

A. Yeah, could be, yeah.

MR. FOSTER: I would move to admit Exhibit 1G.

HEARING OFFICER: Exhibit 1G, which is the application 77-14378, any objections? Not hearing any, Exhibit 1G is admitted.

Q. (By Mr. Foster) And, Mr. Scanlan, I'm going to have you go to page 52 of Exhibit 1G. Are you familiar with this diversion rate and storage technical memorandum?

A. Yes.

Q. And did you assist in preparing this?

A. Yes.

Q. And can you describe what that technical memorandum tells us?

A. Well, the memo discusses water needs for the project, how that water would be utilized, and gives some of the basis for the quantities requested in the application.

Q. And what water rights does Perpetua currently hold at the site?

A. They hold four existing water rights. One for domestic purposes. And these are all in table two of this memo. The domestic water rights 77-7141, and then the other three are for mining related uses. 77-7122, which authorizes .33 cfs and 7.1-acre feet from the East Fork, South Fork Salmon River. There's 77-7285 authorizing .50 cfs and 30.2-acre feet annually for ground water. And 77-7293 authorizing .25 cfs 20-acre feet annually from an unnamed stream that kind of locally referred to as Hennessy Creek.

Q. Are these water rights sufficient for the Stibnite Gold Project?

A. No.

Q. I'm going to hand you what's previously been admitted as Exhibit 22, and ask Ms. Franolich to pull up page 19 on the screen. So and, Mr. Scanlan, if you go to page 19 there should be a map of the Stibnite Gold Project that I think we previously looked at. Would you -- so is it correct, then, that Perpetua submitted the Exhibit 1G, that application which proposes additional withdrawals beyond what's already been licensed at the site?

A. Yes.

Q. And would you walk us through on this map that



application's places of diversion, points of use, and then also any other places of diversion or points of use that Perpetua has applied for?

A. Yeah, actually --

Q. Generally -- generally speaking.

A. Generally speaking.

Q. Generally speaking. We'll drill down on the specific allocations.

A. Okay. Yeah, we will see when we look at the specific application maps that the points of diversion, place of use for the -- for the industrial mining purposes are all -- places of use are all pretty much the same. Groundwater will list -- on this application for permit lists numerous -- there's 50 points of diversion for groundwater, numerous dewatering wells, some supply wells, and some underdrains. And so there's some commonality for these industrial and binding uses. There's also two -- well, three domestic applications that we'll talk about, but one is an application for permit for the Man Camp, which is kind of on the right side of this image, and that's for domestic purposes there. There's also an application for transfer associated with that. And then there's an application for permit for domestic uses in the mill truck shop area where folks will be working, and you'll need some, you know, potable water supplies there.



Q. Okay. And are there -- Perpetua also submitted two applications that are not part of this hearing; is that correct?

A. That's correct.

Q. Can you briefly describe those applications?

A. I don't have the numbers right in front of me, but there's an application for permit for the logistics facility, which is just right outside of Cascade. So it's over in the Payette River Basin. It's for groundwater associated with that facility, domestic and commercial uses. It's, you know, office. They're going to have some various other uses in there. Then there's a domestic and industrial application for the Burnt Log Road maintenance facility, and that's a small facility where they can park trucks and that will be used for maintaining that road along Burnt Log Creek.

Q. Great. Let's talk about the domestics, and we'll get better maps going.

A. Okay.

Q. So I'm handing you what's been marked as Exhibit 1F and 1B. Do you recognize those documents?

A. Yes.

Q. Give you a minute to review both of them.

A. Yes.

Q. And what is Exhibit 1F?



A. 1F is application for permit 77-14377, and this is an application for domestic uses at the man camp at the general mine area. It proposes a diversion rate of .20 cfs from groundwater from up to four wells, and it's proposed to be in combination with the existing water rights 77-7141, which also authorizes .20 cfs.

Q. Will you look at Exhibit 1B real quick and tell me if that is exhibit -- or application 85399 relating to 7141?

A. Yeah. That's a transfer application for water rights 77-7141, and what that does is it changes the point of diversion to these four wells proposed at the man camp and the place of use to the man camp for that existing domestic water right.

MR. FOSTER: I move to admit Exhibits 1F and 1B.

HEARING OFFICER: Any objections? Okay, I note that there are -- as we get into these No. 1 series especially, there are a lot of duplication of reports and things that were attached to the application. I don't want to spend the time to try to parse that. So recognizing that there is a lot of duplication here, we'll accept Exhibit 1B and 1F. Go ahead, Mr. Foster.

MR. FOSTER: Understood, and to the extent there's duplication we intend to rely on 1G as our primarily set of exhibits.

Q. (By Mr. Foster) Now, Mr. Scanlan, you said

that they're going to be in combination. Can you explain what that means?

A. Yeah. The reason we did this new application of 77-14377 was that the existing water right 77-7141 did not have enough volume to -- on an annual basis to cover our anticipated use, and so we had enough diversion rate, but we didn't have enough volume. So we applied -- this additional application for permit really is just to get us more volume for that man camp area.

Q. And how was the amount of water required for the worker housing facility determined?

A. It was determined based just on an estimate of 50 gallons per person per day. So that was the standard maybe in the IDWR guidance, but it's typical use for a man camp type facility and based on the number of workers that might be there.

Q. And what's going to happen to that water after it's used?

A. Well, it's primarily non-consumptive, you know. It's like water use at home is when you take a shower or toilet facilities, cooking, it all goes back down the drain, gets treated, and in this case it's going to be discharged to the stream.

Q. I'm going to hand you Exhibit 1H, as soon as I can find it here, unless I already did.



HEARING OFFICER: Mr. Scanlan, will that wastewater be discharged there on-site near the camp or will it be somewhere else in the larger project?

A. I believe it's near the site, but to be honest with you, I don't know the exact location of that discharge, whether it's combined with the discharge of treated contact and dewater. Gene Bosley will be able to speak directly to that.

HEARING OFFICER: Okay. Thank you.

Q. (By Mr. Foster) All right. Exhibit 1H. Mr. Scanlan, do you recognize this document?

A. Yeah, this Exhibit 1H is application for permit 77-14379. It's an application for domestic purposes at the truck shop mill facilities.

MR. FOSTER: And I would move to admit Exhibit 1H.

HEARING OFFICER: Okay. Exhibit 1H, which is application 77-14379, any objections? Hearing none, Exhibit 1H is admitted into the record.

Q. (By Mr. Foster) And, Mr. Scanlan, what's the source of water for this application?

A. It's groundwater. There's an existing well that has been permitted in the past as a public drinking water system well, and so that would be the source for this application.

Q. And what's the diversion rate?



A. .06. The well has been tested at a higher rate than that. It seems to be 90 gallons per minute or something. .06 is 27 gallons per minute. That should be adequate to provide enough water for those facilities likely without it having to have temporary storage.

Q. And what will happen to this water after it's used?

A. Same thing. It will be treated and discharged to surface water under IPDES permit.

Q. We'll ask Mr. Bosley about where it's going to be discharged. What is your understanding of the effects of the withdrawals from these applications on surface water flows?

A. Well, they are going to be minimal because they are -- they're small applications. If you think about that -- think about the man camp, it's -- you know, it may be .20 cfs, but the daily volume at 50 gallons per person per day is not a lot. And they are relatively continuous uses because this is a 24/7, 365 operation. And so, you know, it may be pumped out of the ground one day and may take a couple of days to get back to the stream, but that's going to be a continuous sort of process. And so very little, essentially negligible impact on stream flows.

Q. Let's go back to Exhibit 1G. Talk about the industrial applications here. Will you provide us with a brief overview of the applications that are proposing mining



or industrial use as a proposed use?

A. Well, let's just start with this one, 1G, and then maybe you can feed me the transfers and the exchange.

Q. I will do the rest.

A. This one is really the meat of the whole thing because the application for permit 77-14378 will provide the bulk of the industrial water use for this project. The other existing water rights, I think they have, if I'm remembering correctly, a total volume of 57-acre feet whereas we're projecting an average annual pumping volume or diversion volume in excess of 2,000-acre feet. So this will cover the bulk of that. The application proposes a diversion rate of 9.6 cfs for industrial use and diversion to storage, and then it includes 600-acre feet of industrial and water quality improvement storage. The water quality improvement that was related to putting contact water in there so they could store it before it was either beneficial use or discharge, and they put in dewatering water and do that same thing, hold it, treat it, discharge it. So that's that water quality improvement piece. The industrial is kind of self-explanatory. It's for use in the mill or for other industrial uses like drilling and dust control. And then that dewatering that we talked about, excess dewatering that's not used for the other purposes but gets treated and discharged.

Q. And I think we've mentioned dewatering water and runoff. What other sources of supply are listed in this application?

A. Groundwater, which is -- which includes that dewatering source, and then East Fork, South Fork Salmon River.

Q. Let's look at Exhibit 1G at page 57. Let you put that on the screen. And we talked a little bit about runoff, but will runoff be detained at a constant rate throughout the life of the mine?

A. No. The volumes of runoff are going to vary from year to year based on the area of disturbance and probably more importantly just based on weather, climatic conditions. Some years you are going to see more runoff than you're going to see in dry years, rain and snow events you're going to get a lot of runoff, that sort of thing.

Q. And does that table on page 57 show us a projected runoff volume?

A. Yes. Based on a 50th and 95th percentile sort of climate predictions. And Dan Stanaway can talk to the modeling that came up with this much better, but I can at least talk to the overall magnitudes of this water. And so what it's saying is that the amount of contact water that's going to need to be captured and detained, which is in excess of kind of instantaneous industrial demands varies



between about, well, actually about zero towards the end of the mine life up to a little under 300-acre feet per year.

Q. And let's go back to page 14 of the application. Sorry to jump around here. You mentioned there's going to be surface water withdrawals. This should be the map. Will you walk us through both the surface water withdrawals and also the other points of diversion on this map?

A. Sure, sure. So we've got -- the map is a little bit busy, but you'll see that we've got in the -- in the explanatory material we show the different -- what the different symbols are for points of diversion and place of use. The place of use is the shaded area. It's really pretty much the entire mine area, whatever -- wherever we would have potential to utilize water for industrial purposes. The points of diversion, just kind of going down the list, the first two, which are -- they are underdrains.

Q. And where are those located on the map?

A. Well, they're located in sections, looks like near the south -- southwest of Section 15, kind of near the center of the map. So there's an outfall from the tailing storage facility and an outfall from the tailing storage facility buttress, both in the south half of Section 15. And so those are underdrains capturing groundwater from beneath these facilities, and they'll either be allowed to be discharged or it can be beneficial used for the



industrial purpose.

Then I think significantly, if you go up towards the north end of this map in Section 3 of the southeast quarter of Section 3, you'll see a square. That's the proposed point of diversion from East Fork, South Fork Salmon River. So that's really our -- that is our surface water point of diversion for the project.

Q. And, Mr. Scanlan, why was that location selected?

A. Well, it's at the head of the tunnel, so -- and so the thought was there -- and, again, Gene Bosley and Dan Stanaway and others can speak more to this, but in a general sense, it's at the lower end of the stream and so -- and at the head of the tunnel. The tunnel has an engineered fishway so fish passage can be engineered through there, but above that dewatering of the stream above that would have more impact. So they took it down as far as practical to right to the head of the tunnel to the head of the fishway.

Q. And then briefly will you walk us through the groundwater. I know there's a lot of points of diversion on the groundwater, but will you briefly walk us through those?

A. Right. You'll see there's lots of light blue dots. Those are wells that are -- their function is primarily dewatering, but any dewatering that we do is at a time when we have demand for industrial use, we're going to beneficially use that in the mill or for dust control, that



sort of thing. So those are those light blue dots.

Then if you get in the Hangar Flats area here again in the south half of Section 15, there's a (inaudible) aquifer there, and they're showing a number of supply wells. Gosh, I don't know, I can't recall exactly, maybe 13. Quite a few supply wells in there, and those wells would provide actual just straight groundwater supply, as opposed to being primarily for dewatering.

Q. And what effect will --

THE CLERK: If you can place his mic. They're having a hard time hearing him.

MR. FOSTER: We'll pause for a minute.

THE CLERK: Sorry.

Q. (By Mr. Foster) And how did you evaluate the effect of groundwater withdrawals on surface water in the area?

A. That wasn't me. I didn't do that.

Q. We'll ask Dan about that.

A. Yes.

Q. I'm going to show you Exhibit 206. Exhibit 206 has already been admitted. Are you familiar with this document?

A. Yes.

Q. And how are you familiar with this document?

A. Well, I kind of participated on the technical team that came up with this and particularly the water right

condition.

Q. And let's go to page 9 of Exhibit 206. Did Perpetua propose voluntary conditions in its request for technical assistance?

A. Yes.

Q. And did you assist in preparing those?

A. Yes.

Q. What are those conditions?

A. There was a proposed water right diversion limit condition, or essentially a low flow condition. And what it said was that when flows are less than 25 cfs below the confluence of the East Fork, South Fork Sugar Creek, that Perpetua would limit their diversions to less than 20 percent of the unimpaired stream flow. Unimpaired meaning essentially the natural flow plus any diversions.

Q. I want to break that apart a little bit because I've had trouble understanding this. So it's -- unimpaired stream flow is the natural flow less diversions. Does that include groundwater diversions?

A. Yes. Yeah, let me -- maybe I better -- better jump back in there. It's really the actual flow plus diversions, because the flow measured at the gauge is plus the diversions will equal, for the purposes of this, the unimpaired stream flow.

Q. Okay. What effect will these conditions have on



Perpetua's ability to withdraw water from the site?

A. Well, when -- when you get into the low flow period, it's going to reduce their ability to divert. So if you're below 25 percent, that flow's decline. The ability to divert is going to be limited to that 20 percent. So if it's, you know -- if it's 25 cfs, we can't divert more than 5 cfs.

Q. And do you know, is Perpetua still willing to accept these conditions?

A. Oh, yes.

Q. All right. Let's go back to Exhibit 1G, and let's go to page 52, again, the technical memo. Ms. Franolich, can you zoom in on the top table? So will you walk us through what the specific demands are for the mining and industrial uses?

A. Sure. So these are modeled water requirements using the site-wide water balance that Dan Stanaway can speak to, but going through this list, the first one is milled a minute. This is how much water is needed to operate the mill, and this is a combination of diverted water and reclaimed water that comes back from the tailings storage facility. Alan earlier talked about how that system works where the tails go as a slurry to the tailing storage facility. They settle out. Some of that water can be decantered off the top and returned back. And so, you know,



a large portion of that water in that circuit is just this reclaimed water. Perhaps somewhere around 80 percent, and so -- so that rate is 9.7 cfs.

Now, to get there, we see a peak diversion rate, based on the modeling, of 4.5 cfs to supply to the mill from freshwater sources. That doesn't mean that it's always going to be at four and a half. It's going to vary up to four and a half, but that's the calculated amount, with an annual volume of, on average, of 1438-acre feet. So that's the water that's used for the milling process.

Another industrial use on the site is dust control. So you can imagine that's going to be a seasonal use. We don't need a bunch of dust when there's -- dust control when there's snow on the ground, but you do in the summer. And so that model of the peak rate of .7 cfs, and an average volume of 186-acre feet. There is drilling water. That's water that's used in the drilling process. Small quantity .1 cfs and 40-acre feet. And then there's that excess dewatering component. We talked about it a little bit more, but it's worth talking about even a little bit more is it's estimated at up to 4.3 cfs and 608-acre feet annually on average. So that's water that comes out of these dewatering wells, but it's more water than we can use. So we got to treat it and discharge it under the IPDES permits. So the bottom here of this table, it sums the mill



diversion demand, the dust control, drilling water in excess, dewatering water, all summed at 9.6 cfs. That is really the basis for our application. But I got to give it a qualifier, too, is that's the basis for the application with the assumption that the reclaim system is operating. You know, you don't have some catastrophic failure on the reclaimed system that would not get down for a week or a day or something, you know, pump failure, multiple pump failures actually, to get there. So there could be times when the mill demand could be 9.7 cfs from non-reclaimed sources. So, and that could occur essentially at any time, and that water would come from dewatering, from the supply wells, from the East Fork, South Fork, or from storage, water that's been stored in the contact water storage.

Q. And these applications have been set up to give Perpetua some operational flexibility and how it addresses its water needs?

A. Yes, yeah, you've got to have that because any industrial processes, variations, seasonal variations, yeah. You got to have flexibility to make things work.

Q. And you just mentioned pump failure, but are these demands likely to all occur simultaneously?

A. The demands that sum up to 9.6 are not likely to occur simultaneously. They could, but they're unlikely. The mill diversion demand, that's kind of a continuous 365

day demand. See, we've got a graph in here, and it kind of shows that mill or the mill diversion or the mill demand, actually, not the mill diversion, the mill demand. You'll see that over the mine life, once the mill starts operating, it's relatively constant. It jumps around a little bit, plus or minus 1 cfs, but it's continuous. And then the other demands tend to fluctuate both seasonally and over the length of the mine.

Q. And Perpetua's requesting less water than it would need to meet that mill demand; is that correct?

A. Well, because of the reclaim, yes. The total amount at 9.7 cfs on an annual basis is somewhere around 7,000-acre feet. I would have to get my calculator out to figure out to give you that exactly. But we're anticipating a diversion demand for, on average, of 2272-acre feet of which 608-acre feet is this excess dewatering water that goes back to the stream. So it's really more like 1660 some acre feet annually, compared to that 7,000 that's running through the mill on an average period.

Q. And that's because Perpetua is going to be recycling water at the facility?

A. Right. And that -- you know, it just makes sense to do that. It's just a good way to do it.

Q. Based on the information you reviewed in preparing these applications, do you believe there's sufficient supply



to meet the needs you just discussed?

A. Yes.

Q. So we've talked through application 14378, 77-14378. Let's talk through the rest of the applications here. I'm going to hand you what's been marked as Exhibit 1D. And are you familiar with the application for exchange 85538?

A. Yes.

Q. And is that Exhibit 1D?

A. Yes.

Q. Will you describe the purpose of this application?

A. This is an application for exchange. It's kind of like an application for transfer. It moves a point of diversion, but it moves it upstream instead of to a different source rather than downstream. So this is for the Hennessy Creek, unnamed stream water right, and to move it to the point of diversion at the tunnel, head of the tunnel, the East Fork, South Fork pump station, that location is actually about 2000 feet upstream of the mouth -- the current mouth of Hennessy Creek. So to move the point of diversion upstream, we had to do an exchange. We originally thought we could do it just straight on the transfer because there were no intervening water rights there, but when you do drill down into the guidance, we needed an exchange. And IDWR staff brought that to our attention, so we put that



together.

MR. FOSTER: I would move to admit Exhibit 1D.

HEARING OFFICER: Exhibit 1D, any objections? That's exchange 85538. Hearing none, Exhibit 1D is admitted.

Q. (By Mr. Foster) And I think you touched on it already, but where is the point of diversion going to be for 85538?

A. It will be at the East Fork, South Fork Salmon River pump location. Same pump location as for the application for permit, at the head of the tunnel, head of the fishway.

Q. And there's only one surface water diversion in the application?

A. That's correct.

Q. Okay. I'm going to hand you Exhibit 1E, and are you familiar with application for transfer 85398?

A. Yes.

Q. And is Exhibit 1E that application?

A. Yes.

Q. And how does -- how does 855 -- sorry. I think I read the wrong number. No, you're right. How does application for transfer 85398 relate to the exchange we just talked about?

A. This is the same water right, and what this transfer application does is it changes the place of use.



So we needed the exchange to essentially change the point of diversion. This document or application changes the place of use to that commonplace of use that we looked at on the map earlier for the mine facilities that could use mining or industrial water.

MR. FOSTER: I move to admit Exhibit 1E.

HEARING OFFICER: Any objections to Exhibit 1E, transfer 85398? Hearing none, Exhibit 1D is admitted.

Q. (By Mr. Foster) And what's the total quantity of water under that current water right?

A. .25 cfs and 20-acre feet.

Q. And will that -- since I think there's been some confusion in the past. Will that expand in any way under that particular application with the exchange?

A. No.

Q. It stays the same?

A. Stays the same.

Q. Thank you.

A. It may end up with a condition that says, there's got to be .25 cfs available at the original point of diversion to allow .25 to be diverted at the new point of diversion. That would be a standard condition on an exchange, but rates and volumes aren't going to change. And as I'm looking at this right now, I do see a mistake on page 2 of this application. I just might as well point this

out. Under purpose of transfer it's checked as change point of diversion, but it really should have been change place of use. The rest of the document describes how the place of use is being changed.

HEARING OFFICER: Thank you for that clarification.

Q. (By Mr. Foster) All right. I'm going to hand you Exhibit 1C, and are you familiar with the application for transfer 85397?

A. Yes.

Q. And is that Exhibit 1C?

A. Yes.

Q. And what does this application do?

A. This application changes the place of use for water rights 77-7285 to that common industrial mining place of use that we've discussed. It also adds diversion points or changes diversion points to a number of groundwater wells, including an existing well that's currently authorized, I believe, under (inaudible) water right.

MR. FOSTER: I would move to admit Exhibit 1C.

HEARING OFFICER: Exhibit 1C, any objections? Also hearing none, it's our last application 85397, Exhibit 1C is admitted.

Q. (By Mr. Foster) And is this -- are the sources of supply in this application only the supply wells?

A. Yes.



Q. Why is that?

A. That's such a small quantity at .5 cfs, 30-acre feet that we thought there was no reason to include all those dewatering wells. That's really the only reason.

Q. All right. And I will hand you Exhibit 1A. Are you familiar with application for transfer 85396?

A. Yeah. This application proposes to change the place of use to point of diversion for water rights 77-7122. That's existing water right from the East Fork, South Fork Salmon River from .33 cfs and 7.1-acre feet. And so it proposes moving the point of diversion downstream to the common East Fork, South Fork pumping station for all of these applications there at the head of the tunnel. Changes the place of use to the common mining industrial place of use for the other applications.

MR. FOSTER: Okay. I would move to admit Exhibit 1A.

HEARING OFFICER: I apologize. This is our last application. So Exhibit 1A transfer 85396, any objections? Hearing none, Exhibit 1A is admitted also.

Q. (By Mr. Foster) All right. Mr. Scanlan, would you go back to page 59 of Exhibit 1G. And are you familiar with the mitigation plan for the Stibnite Gold Project?

A. Yes.

Q. Did you prepare this document?



A. Yes.

Q. Why was a mitigation plan prepared?

A. Mitigation plan allows us to divert water to storage at times when the Salmon River Wild and Scenic water right flow targets are not being met. So this water -- this plan provides water to offset such diversions.

Q. And given our discussion this morning, we'll speed this up, but is Perpetua -- is a mitigation plan necessary after the interlocutory (inaudible) questions of law?

A. Perpetua could change operations so that it wouldn't be necessary because they would now have the flexibility to not pump to storage at times when the Wild and Scenic water right targets aren't being met. However, it's for flexibility purposes and to utilize -- you know, be able to fill their storage at times when it's a good time to fill storage, such as during high flow periods. They wanted to maintain that flexibility, and that's why we're proceeding along with the mitigation plan.

Q. So it should be clear, Perpetua is still proposing to implement the mitigation plan?

A. Yes.

Q. All right. I'm handing you Exhibit 4. Are you familiar with this document?

A. Yes. This is a stipulation and joint motion to approve settlement and dismiss protest, U.S. Forest Service



and Perpetua.

Q. And were you involved in the negotiations around the conditions in this document? If you'll flip to page 7.

A. Yes.

Q. And will you just briefly describe what those conditions are?

A. Sure. Condition one will implement mitigation plan with mitigation water available from April 1st to October 31st. So what that's saying is that from April 31st to October 31st we won't divert this suite of water rights that are associated with the Jones property. Leave them in the river as mitigation.

MR. FOSTER: And I would move to admit Exhibit 4, even though it's --

HEARING OFFICER: Same thing. Same thing, this is like already in the record. It's nice to have an exhibit number assigned to that. So Exhibit 4, the stipulation between Perpetua and the Forest Service, any objections? Hearing none, that is admitted, Exhibit 4.

A. Second condition says that Perpetua would curtail its diversion to storage anytime between November 1st and March 31st. That's the non-irrigation season when the mitigation water isn't available. If the Wild and Scenic stream flow targets aren't being met at the point of compliance, which is the confluence of the main Salmon River

and the South Fork.

Q. (By Mr. Foster) Is there one more condition in there?

A. Yes. Condition No. 3 is that during the irrigation season, April 1st to October 31st, diversions to storage under all of the water rights won't exceed 10.75 cfs, at times when the Wild and Scenic isn't being met at the point of compliance. And then we would maintain an annual accounting of the volume of water that's diverted to storage during those times when the target isn't being met at the point of compliance and not exceed 347-acre feet. The 347-acre feet is based on the acreage of the Jones property. I think it's 138 and some acres at 2 1/2-acre feet per acre. That's the consumed consummative use at that location between Salmon and Challis for grass pasture crop or, actually, for any crops in that area.

Q. And so are these conditions, in your opinion based on the documents you've reviewed, are they protective of the Wild and Scenic River water rights?

A. Well, the Forest Service says they are, yes.

Q. And, Mr. Scanlan, did you prepare a supplemental disclosure that was filed in support of the water rights applications, the Rule 40 supplemental disclosure?

A. Yes.

Q. And will you flip to page 141 of Exhibit 1G?



A. I'm there.

Q. Is that the supplemental disclosure?

A. Yeah. So this is additional information required under IDAPA 37.03.08, Rule 40.05. It's just typically called the Rule 40 additional information.

Q. And will you go to page 142, and based on your analysis in this Rule 40 disclosure will there be any impairment of existing water rights from Perpetua's proposed water rights?

A. No, because there really are no other water rights in the immediate area of the project. There's no substantial water rights downstream except for minimum stream flow water rights, which are -- which are subordinated to industrial uses.

Q. Thank you. Now, earlier we talked about Perpetua reusing reclaimed water or recycling water. Are there other water management strategies at the Stibnite Gold Project that will assist in the conservation of water?

A. Well, they'll -- I think, yes. There's the ability to kind of adaptively manage how you divert to minimize impacts on stream flows.

Q. Let's look at page 3 -- or, sorry, page 143 of Exhibit 1G. Does that discuss some of the management techniques?

A. Yeah, and so it discusses water -- again, first the



reclaimed water will be the preferred source. The second source is contact water. Third source dewatering water. So you use all of those sources before you ever start to use freshwater from the supply wells or, lastly, direct diversions from the East Fork, South Fork Salmon River.

Q. And you mentioned contact water. We've talked about runoff, but would you -- what does contact water mean in this context?

A. Well, contact water, again, is water that contacts mine facilities, and it can be -- it's primarily runoff, but I guess it could also include dewatering water that has to be treated if it's going to be discharged. So it's runoff that's captured and either directly used or captured, stored to be dewatering water that's directly used or stored or treated and discharged.

Q. And what effect will these management strategies have on water quality at the project site?

A. Well, the whole idea is to protect water quality. There's no sense in discharging -- treating and discharging dirty water, and then pumping freshwater. Might as well use these impacted sources first before you ever touch any of the freshwater.

Q. And what impacts the water management practices are they going to have on stream flow or surface water sources at the site?



A. Well, they can have -- they can have impacts from, if, for example, during low flow periods the preferentially use water from storage or used water from storage to minimize diversions from groundwater or the East Fork, South Fork Salmon River.

Q. And are these practices that are in the disclosure, and you've just been discussing, consistent with the confirmation of water resources?

A. I think so.

Q. I'm going to hand you Protestant's Save the South Fork Salmon 318. And, Mr. Scanlan, what is Exhibit 318?

A. This is a technical memorandum to the Save the South Fork Salmon and Nez Perce Tribal Executive Committee from BAS Groundwater Consulting dated November 6, 2023.

Q. And are you familiar with this document?

A. Yes, I've reviewed it.

Q. And have you reviewed the summary and conclusions on page 9?

A. Yes.

Q. And just for clarity, you're prepared to respond to some of these conclusions, and then Mr. Stanaway will respond to others; is that correct?

A. Correct.

Q. All right. Let's go to page 9 of Exhibit 318. And have you reviewed conclusion No. 1?

A. Yes.

Q. And what is conclusion No. 1?

A. Well, it says: Perpetua has not demonstrated that it will need its requested water right of 9.6 cfs, let alone 11.14 cfs to operate the SGP.

Q. And do you agree with that conclusion?

A. No. They go on to say that our average annual water need is equal to 3.2 cfs, and that's correct, based on our modeling, but you don't necessarily divert on annual averages. You can't. You got to operate when the water is available and meeting project needs. And so as I previously said, the mill demand, if the reclaim is down, is 9.7 cfs. Actually, more than 9.6. In that case you would have to be taking water from storage to supplement that. The other times you would need -- 9.6 might be during the initial fill, the tailing storage facility. During year minus one, right before you start processing ore, you've got to fill the tailing storage facility to have enough water in it, and the projection is 428-acre feet. There could be a time when stream flows are high. Be a good time to be pumping 9.6 cfs to divert to storage. So there can be times when you need 9.6 cfs. True, our projections are an average of 3.2, but that doesn't mean that there would be times when you wouldn't want to divert 9.6 cfs, if you can do it in compliance with that low flow condition.



Q. Have you reviewed conclusion No. 3?

A. Yes.

Q. And what is conclusion No. 3?

A. It says: Perpetua could at any time divert its full 9.6 cfs water right from stream flow or groundwater sources.

Q. Do you agree with that conclusion?

A. Yes, with the caveat of the -- of the low flow condition. Can't do it during -- when flows are less than 25 cfs because you could go divert 25 percent of that available flow. The other thing is just, I mean, 9.6 cfs is 7,000-acre feet or less per year. We don't have any place to put it. You wouldn't do it. You just -- there's no place to go with it. So, yes, there are times when instantaneous rates could be 9.6, but it's not a typical operating scenario.

Q. Will Perpetua have enough storage on-site to store that much water?

A. No, no. There's a table in the applications that show projected storage volumes at around 500-acre feet. So, no. So we could store up to that, leaving enough room for runoff, because these are really stormwater ponds that we're talking about. So, you know, you could fill them on purpose. Divert to storage, say, after the main runoff event, main runoff occurs. So you've got -- retained enough



capacity for stormwater, but that's all the capacity you've got is 500-acre feet or less.

Q. So if Perpetua was diverting when no demand was otherwise met and storage was that capacity, where would that water go?

A. There's no place for it to go.

Q. Have you reviewed conclusion No. 6?

A. Yes.

Q. And what is conclusion No. 6?

A. It says: Perpetua double-counted its release of treated water by reducing its calculation of water use by the amount of treated water released in its proposed condition.

Q. Are you prepared to testify on that one?

A. Well, yeah. It's kind of simple math is we're looking at net impacts, net diversions. So if we are pumping 1 cfs out, and we're putting 1 cfs back in upstream, the net impact is zero cfs. It's not a double count. It's just how you would arrive at that net impact.

Q. And just for clarity of the record, was that conclusion No. 5 or No. 6?

A. That's No. 5. Did I say -- were you asking 6?

Q. I was, but thank you for the answer on 5. Were you prepared on No. 6?

A. Sure.



Q. And what is conclusion No. 6?

A. It says: Perpetua artificially decreased its projected impacts to stream flow in the East Fork, South Fork Salmon River by comparing SGP water use to stream flow in Sugar Creek rather than only to stream flow in East Fork, South Fork Salmon River above Sugar Creek in its proposed condition.

Q. And do you agree with that conclusion?

A. Well, I think it's misstated here. I think they are trying to say is East Fork, South Fork below Sugar Creek. Assuming that's what they were getting at is -- is we kicked around the point of compliance be above or below Sugar Creek? And Sugar Creek's, you know, approximately a third of the flow in the East Fork, South Fork below the confluence with the East Fork, South Fork. And I think Dan can speak more to the stream flow statistics on that. And we could have gone above, and then somebody would have said, well, you're not including -- you know, you are not taking into account your impacts to Sugar Creek, because there could be impacts to Sugar Creek because there is dewatering for the West End Pit that's in the Sugar Creek Drainage. So to be all-encompassing for the project, we went downstream in the project to make that our point of compliance. And so we're 20 percent of the combined Sugar Creek and East Fork, and that's what we picked. If we had been upstream, it

would have been a higher number. It would have been 25 or 30 percent, but it still gets us to the same place.

Q. And, Mr. Scanlan, after reviewing all this information, do you believe that there's sufficient water available for Perpetua's water rights applications?

A. Yes.

Q. And do you believe that Perpetua's water rights applications are consistent with the conservations water?

A. Yes.

MR. FOSTER: No further questions.

HEARING OFFICER: Thank you, Mr. Scanlan. Maybe I'll jump in and ask two questions that I had, as I listened to your direct testimony here.

EXAMINATION

BY HEARING OFFICER:

Q. Maybe turn back to Exhibit 1G again, if you would. It is back to that table on page 25. I mean, it's the same table that appears -- it's table one that appears in a lot of different places. Maybe I'll just leave this on. It's the same table that appears in a lot of different places throughout the application documents. I'm struggling to understand the 4.3 access dewatering rate. If I'm understanding your testimony correctly, what you're saying is that the dewatering wells are -- you can put yourself into a scenario. The dewatering wells are operating and



they're pumping 8.8 cfs. 4.5 of that is what would be considered what you have on here is the mill diversion demand, and that there's still so much water that really can't be used, but then 4.3 cfs would be treated and discharged into the river?

A. Yes.

Q. Okay. So that's why the 4.5 and the 4.3 aren't -- aren't the same water? They really are separate water -- should be considered, they can't be combined into a single, say, 4.5 because initially, as I'm looking at that, I think, well, why can't the excess dewatering water be used in the mill? But it's because, I guess, that whatever demand the mill has is kind of flow limited?

A. That's correct. And you can kind of see that on figure 1, which is on page 27. That's a graph of model flows, and you've got -- you know, it shows the mill diversion dam, and it shows the dewatering flows. And so you could -- it's hard to see in black and white. If you got a color copy it makes a little more sense. But you can see where there's times where you've got a lot more water being pumped than can be used, and so you have to discharge that. Treat it and discharge it, which is costly. So you don't want to do that if you can avoid it. We're not pumping it for fun, but that's how it works out.

Q. Thank you. Can you also turn to -- turn to



Exhibit 4 again. This is that stipulation between Perpetua and the Forest Service. And I wanted to look at this condition again. If I look at condition No. 2 it really is only limiting that storage component of the proposed water right. It's not limiting direct -- diversion for direct industrial use; is that correct?

A. That's correct, because they are within the 150 cfs subordination, that first 150 cfs subordination of the Wild and Scenic water right.

HEARING OFFICER: Okay. Good. Thank you. Those were the questions that I had. Thank you, Mr. Foster. We've been going for about an hour since we've come back from lunch. I feel like we can go for a little bit longer. So I don't know who wants to begin with cross-examination.

CROSS-EXAMINATION

BY MS. ROGERSON:

Q. All right. Mr. Scanlan, I believe this is on, correct? Okay. Mr. Scanlan, you mentioned in your testimony that Officer Cefalo's order clarifying that a water right is not needed for the capture of water; that is not natural water. So you testified to the existence of that order; that you don't need a water right for water that has not actually entered a natural water course in Idaho; is that correct?

A. That's correct.



Q. What evidence does Perpetua have that the runoff Perpetua is planning to capture has not entered a natural water course at the site?

A. You know, Gene Bosley will be able to address that better, but in a broad sense they've diverted any natural water courses that are uphill of their facilities around, so that they don't have to capture and treat that water. And they don't -- and so that's the short answer. Gene could probably give you details on that.

Q. Okay. So just to clarify, you said the natural water courses that have been identified at the site are being diverted around capture facilities?

A. Yes.

Q. For runoff?

A. Yeah.

Q. Okay. Can you remind us what the maximum amount of water Perpetua will need to operate their mine, their proposed mine?

A. Well, the application is for 9.6. The mill, when it's running, takes about 9.7. And as we discussed, a portion of that is freshwater makeup. The majority is reclaimed water from the tailing storage facility.

Q. Okay. And what is the amount, the total amount of water when you add in the domestic uses at the site and then the other water right applications?

A. Well, the water right applications sum up to somewhere around 11 cfs, but we're anticipating a 9.6 cfs for industrial mining uses. .2 for the -- for the man camp domestic water right, and .6 for the mill and truck shop domestic water rights. Sum those up 9.86.

Q. Okay. Great. Thank you. How often do you think you're going to need to pull that 9.86?

A. Not very often.

Q. I would like to explore that with you. What do you mean by not very often?

A. As I mentioned earlier, if the reclaim system were to go down, which is not -- that's not planned. It's planted to operate 365 days a year, but if you get in some sort of catastrophic failure you may have to turn 9.6 cfs if it's available with the low flow condition. So you have that scenario. You also have the scenario where all of those various rates, the four and a half cfs peak estimated mill diversion demand, .7 for dust control, .1 for drilling, and 4.3 for excess dewatering. Those could all line up under -- you know, under some scenario and need 9.6. But it's not a -- it's not a typical operating condition.

Q. Okay. I'm going to ask you to explore that a little bit more. Would you mind opening your expert report?

A. Remind me which exhibit that is.

Q. I believe it's Exhibit 61; is that correct?



A. Yes.

Q. Could you turn to page 3, please? Do you see No. 5 on that page?

A. Yes.

Q. Would you mind reading that paragraph?

A. The total diversion rate sought for industrial mining uses is the 9.6 cfs sum of the peak demand for freshwater diversion to the mill, dust control, exploration drilling water, and excess dewatering. Those all occurring simultaneously. Although the chances of simultaneously having peak demands for all uses is low, the full amount is sought for flexibility purposes.

Q. Right. And this is getting at the conversation we were just having. So that last sentence: Although the chances of simultaneously having peak demands for all uses is low, the full amount is sought for flexibility purposes. I think it's important for us to understand what that means, given that the full 9.6 could have significant flow impacts for various systems in the headwaters of the East Fork, South Fork Salmon River. So can you first walk me through the word chances. What are the chances of simultaneously having peak demands specifically at the mine site as you understand it?

A. I don't have -- I haven't quantified what the chance of that is or the -- how often that would occur. I



don't have an answer for that, but generally speaking, it's low. It's not a normal situation where those would all line up, but if they did, then you need 9.6 cfs on the water right to legally divert.

Q. Right. And that's based on sort of your predicted understanding of hydrologic conditions at the site and weather and mine operations as it's sort of been modeled and thought about, but it's not -- there could be a margin of error there; is that correct?

A. I suppose so. That would be a better question for Dan Stanaway who did the water levels.

Q. Given that this is in your expert report, can you tell me what you mean by the use of the word low in that last sentence?

A. Low, not high.

Q. Can you provide me with a percentage for what you mean by low? Like a percentage of the time.

A. Less than 10 percent.

Q. Okay.

A. And, again, that's a better question for Dan, but even I feel confident saying less than 10 percent.

Q. Okay. And what is that assessment based on?

A. Well, just looking at the graphs of projected water use, the descriptions we provided of those water uses, that's -- that's where that's coming from. It's not a



typical operating scenario to be at 9.6. It's all of those lining up, which is rare. It's, perhaps, the filling of the tailing storage facility during the year minus one, or it's during kind of a failure of the reclaim system, which is a failure. You don't -- you don't want failures.

Q. Right. But if there was a failure you might need to pull the full amount?

A. Yes.

Q. Can you help me understand what a failure would look like?

A. Yeah. Simultaneous failures -- failure of pumps. So and Gene Bosley can address this better, but you've got some redundancy built into any kind of mechanical system. If you have more failure than you have redundancy, that could be it. You could have a pipeline break, something like that that would require -- that would prevent the reclaim water come from coming back to the mill.

Q. Okay. If there was a pump failure, how long do you think that would take to fix?

A. I don't know. It depends on whether there's a pump on hand to replace it with or if there's parts on hand to replace it with, or if they have to order a new one. I would expect it would be -- the former scenario would be more likely. Again, they want to have these systems to operate. They don't want to have failures. It's not good

business.

Q. Right. No, I understand that. But assuming there was a pump failure, possible it could take days to get parts and get the pump fixed?

A. Sure.

Q. Does that seem reasonable to you?

A. Yeah, it could.

Q. Okay. What about a pipeline breach?

A. Pipeline breaks are probably easier to repair, but, yeah, that could be days, too.

Q. Okay. And there's nothing in the water right application right now that would prevent Perpetua from diverting 9.6 cfs 24 hours a day in that scenario while they attempted to fix their system?

A. Correct. If we can beneficially use the water right application would allow us to do it with keeping in mind that low flow constraint.

Q. Right. I understand that. Thank you. So it's my understanding that Perpetua's water right application 77-14378 is seeking 900 -- or, excuse me, 600-acre feet of storage and a continuous rate of 9.6 cfs; is that correct? Is that your understanding of that application?

A. It's seeking a diversion rate of 9.6 cfs, not necessarily continuous.

Q. But it could be continuous, as you've just --



A. For some period of time.

Q. For some period of time?

A. Yes.

Q. Okay. But it's also seeking 600-acre feet of storage?

A. Yes, and that 600-acre feet accounts for that 428-acre foot initial fill and your minus one, plus required contact water storage for that time period.

Q. Right. Is there an annual volume cap for diversions associated with that permit application?

A. No. That's a great question, though. So as -- you probably know this, but I'll just tell you. This is a permit, and so permits you don't have volume limits on the beneficial use. You establish that through beneficial use at licensing. So if we get a permit for 9.6 cfs, but we only divert 500-acre feet a year, then at the time of licensing down the road that's the peak use that we got out of that permit, we would get a 9.6 cfs water right, assuming we diverted up to that rate, at 500-acre feet. So the permit, as it matures into a license, it gets perfected. It will be licensed based on the actual peak volume diverted.

Q. Right. I understand that. And it sounds like you're fairly familiar with this process, so when are permits actually licensed typically? When does that occur sort of in the lifetime of the --



A. That can occur anytime during the permit development period. So you got a permit that's got a five-year development period with the potential for two extensions, and the permit holder can submit beneficial use at any time during that period.

Q. Okay.

A. And either request that the Department of Water Resources come and do a licensing exam or hire a private certified water right examiner to do it, and they would look at diversion records, all that evidence, to establish that volume.

Q. Okay. And are you aware of how long those extensions can be?

A. Yeah. It can be, for a permit of this size, could be up to two five-year extensions.

Q. So that would be a total of 15 years before the water right potentially could be licensed?

A. Yes. That would be the longest, yeah, from the time of when you start development, yeah.

Q. Right. So it sounds to me like it's possible, but there could be no volume cap for a large chunk of this mine's life on that 9.6 water right application?

A. I don't think it's possible. That's the way it is. This permit should be licensed without a volume cap because you establish that through the beneficial use process.



Q. Right. But I'm saying the beneficial use may not be established for at least -- there is a possibility it wouldn't be established for 15 years?

A. Correct.

Q. Which would be a significant amount of the mine life?

A. Yes.

Q. Okay. Is there anything in Perpetua's application, the application we're talking about, the 9.6 77-14378, that would prevent Perpetua from storing 600-acre feet during each year of the mine?

A. I don't think so beyond the physical limitations of having available capacity to store, but the permit application, that wouldn't restrict that.

Q. Okay. Thank you. So I'm curious about restrictions on where Perpetua can divert from. So with respect to this permit that we're discussing, there isn't anything in the water right that would prevent Perpetua from withdrawing water from one source; i.e., let's say groundwater, if surface water is unavailable or vice-versa, right? Does the source of water is not constrained in any way under the permit application?

A. Not by the -- yeah, not by the water right application. Just more by common sense and good operating -- good business sense of using your contaminated

water first before you go to a freshwater source.

Q. Right. But say you have unusual conditions at the site and there's very little surface flow, you might start pulling, especially if you have sort of an operational failure, you might start pulling the full water right from, say, groundwater?

A. That's a scenario, yes.

Q. Okay. It sounds like you have quite a bit of experience with water right applications. In your experience do applicants typically combine groundwater and surface water diversions without any distinction as to how much water can be pulled from either source?

A. Yes.

Q. Okay. So it's generally like basically a pot of water that you're --

A. Yes.

Q. -- sort of drawing from as you need it?

A. Yes.

Q. So just to clarify your testimony on direct. You testified that the 9.6 cfs application is sort of the sum of peak estimates that will be needed for each of sort of primary mine operation uses; is that correct?

A. Yes.

Q. Can you help us understand what you mean by peak estimates or peak demand?



A. Dan Stanaway can probably give you a better description of that from the (inaudible) water (inaudible), but that's where that number is coming from is that it said in this peak month we needed 4.5 cfs, that's where that come from. Could be the average of that year was 2 cfs, but for various reasons, operational or climatic, there's times that we need four and a half in that instance.

Q. All right. Okay. Thank you. And can you -- what is your estimate for the annual average total diversion demand for industrial water?

A. 2272, including the 608-acre feet of excess dewatering water.

Q. Okay. And did you convert that in your report to a continuous rate? Did you convert the volume to a continuous rate?

A. Not in the report.

Q. Do you know what that continuous rate might be?

A. Yeah, I think it's 3.2, approximately.

Q. Okay.

A. We could calculate, but I think it's around 3.2.

Q. And that's about a third of what Perpetua is actually seeking under the water right application?

A. Yes.

Q. Okay. I'd now like to turn your condition that Perpetua has proposed, the water right condition, if that



works for you. Perpetua's proposed condition applies to water -- as far as I can tell to four water right applications; is that correct? I'm seeing 77-7122, 77-7285, 77-7293, and 77-14378.

A. Yes.

Q. Those all sound correct to you?

A. I'm seeing three water rights: 77-14378, 07122, 7285. What was the third one?

Q. I believe it was 77-7293.

A. Oh, sorry. I'm looking at the wrong condition.

Q. No worries.

A. I was looking at the Forest Service.

Q. Please take your time. Okay.

A. Yes.

Q. So you think that the condition applies to four water rights?

A. The Fish and Game low flow condition, is this what we're talking about?

Q. The Perpetua proposed water right condition that Fish and Game has weighed in on?

A. Yes, yes.

Q. Yes.

A. Four water rights, all the mining and industrial water rights.

Q. Okay. And that condition, as far as I understand,



has this sort of 20 percent impact limitation when you are below 25 cfs? I believe you spoke to that earlier.

A. Yes.

Q. I'm wondering why it doesn't include the other water rights that Perpetua has applied for, and I'm thinking specifically of the water rights associated with worker housing facility and the truck shop and the ore processing facility.

A. The domestic water rights?

Q. Yeah.

A. Well, because they were considered to be essentially negligible in terms of impact.

Q. Do you know what those water rights add up to?

A. Well, there's .2 for workers' housing and in combination for the two of them .2 cfs, but that's instantaneous rate based on that 50 gallons per day per person. It's more like .05, .04 cfs average rate. The same with the truck shop. It's .06, which is 27 gallons per minute, but the average is probably going to be less -- maybe .01. So it's just a negligible amount on a daily diversion rate, average diversion rate. And it's essentially non-consumptive. So it wasn't worth including in that condition.

Q. So I understand that logic, but we're dealing with a system here that in the summer doesn't have much water in

it. And we are looking at potential impacts, at least from the Nez Perce Tribe's position on fish, where every drop might matter from the Nez Perce Tribe's perspective, and so would it have been problematic to include those water rights in the condition? I mean, sort of why not just go ahead and include them?

A. I don't know. Again, they were negligible, so we just didn't include them. Everyone is aware of those water rights, the existing water rights out there in the two permit applications. But we didn't feel like they were necessary to include. They weren't part of the mining and industrial use.

Q. Right. But Perpetua has acknowledged that there's some hydrologic connection between surface and groundwater flows at the site?

A. Yes.

Q. And so even though we're pulling water from groundwater wells, I think for the majority of those water rights there is at least the possibility that they could have an effect on surface flows even if it's low?

A. It's going to be very small because, again, we pull it out of the ground, it goes down the drain, it's treated, and it's discharged, so it comes back.

Q. But there's a lag before it comes back. There's a temporal lag before it comes back.



A. Well, there kind of is, but they're more or less continuous uses. So that lag catches up after the first couple days of operation and kind of goes away for the rest of the (inaudible).

Q. Is the point of discharge -- I guess, where is the point of discharge back into the system, though, relative to the point of diversion?

A. Point of discharge is well upstream of the East Fork, South Fork pump station, so it's upstream.

Q. But with those water rights you're potentially pulling water out of groundwater wells way up in the system as well out of groundwater wells near Meadow Creek, correct? At least for some of those wells, or farther up in the system on the East Fork, South Fork for the worker housing facility?

A. (Inaudible.)

Q. Okay. So the point of diversion for those water rights and the point of discharge after the water has been treated is not the same, necessarily?

A. That's true, and I don't know exactly where that point of discharge is other than it's up in -- kind of up towards the truck shop area.

Q. Right.

A. I think Gene or Dan can speak to that precisely.

Q. So just for the record, I calculated those water



right application as totaling 0.46 cfs; does that sound about right?

A. No.

Q. Okay.

A. On the face of them they tolled, but we're already committing to the two of them that are at .20 cfs being in combination. Meaning those two water rights combined cannot exceed .20 cfs. So that's the maximum diversion rate. Again, at that 50 gallons per person per day sort of use, that .2 is a peak, sort of like a peak hour use during the day. The average is going to be less.

Q. Right. But .2 is what you're committed to in the water rights applications?

A. That's -- we're committing to that for the maximum at the man camp under the new permit and the transferred water right.

Q. Okay. And just for clarity, what are you committing to for the truck shop and the ore processing facility?

A. It's .06, the face of the permit application.

Q. Okay. Thank you. So I just wanted to briefly address diversion monitoring with you. In your experience is it appropriate to have metering devices at each point of diversion?

A. Yes, when in a situation like this, yes.



Q. Okay.

A. Either at each point of diversion or where they combine. But it's, yeah, it's appropriate to have metering, because we have conditions that essentially require metering to keep -- to implement.

Q. Right. I understand that. Do you know if Perpetua's considered having metering devices at each point of diversion?

A. I don't.

Q. Okay. So you don't know if they are willing to?

A. I don't.

Q. Do you know if Perpetua's willing to have a third party monitor diversions?

A. I don't.

Q. And do you know if Perpetua is willing to report diversion amounts in realtime in some sort of public or nonpublic forum?

A. Realtime is a -- I know they are willing to report in a reasonable time period. Realtime is kind of a -- it's a --

Q. I'm sorry --

A. It's a tough one.

Q. Yeah. No, I'm thinking sort of like the U.S.G.S gauges right now where you can log onto a site and actually see what they're reporting out in essentially realtime?

A. Yeah, and you'll have to ask Perpetua about that.

Q. Okay. Yeah, I understand that. Thank you. So I was actually hoping that we could pull up the 9.6 application, which I believe was entered into the record as Exhibit 1G.

A. Okay. It's up.

Q. Oh, it's up. Thank you. Sorry, I couldn't see the top of it so I wasn't sure if that was what we still had up. Could you -- I believe there's a map on page 2265, bate stamp No. 2265. Could you scroll to that? Yeah, is it possible I wrote down the wrong --

HEARING OFFICER: Yeah, I'm not -- it doesn't seem to be the right series.

MS. ROGERSON: Yeah, sorry about that. I must have written down the wrong number when it was up earlier. Could you just scroll back up to the map that we saw a moment ago. I think that might be good enough. Yeah, that map should be fine. I was just hoping for a map of the site.

Q. (By Ms. Rogerson) So, Mr. Scanlan, I'm just trying to still understand where water is being discharged from the water treatment facility, and I was hoping that you could use this map to help us understand that.

A. You know, I think you're going to have to ask Gene or Dan about that because I don't know the exact location.

Q. Okay. I know you said earlier you didn't know the



location for the worker housing facility, but you don't feel equipped to speak to any -- to the discharge location?

A. Yes.

Q. Okay. That's fine. Then my remaining question for you is: Earlier I asked Mr. Haslam about the Nez Perce Tribe's Exhibit 206, and then I also asked about exhibit -- I believe it was 219. These were the -- these were the letters and the technical memos that he had signed that were appended both to the August 2nd, 2022, letter that IDF&G and OSC sent to Officer Cefalo and then to the follow-up letter that Mr. Haslam sent to the Office of Energy and Mineral Resources on July 11th of 2023. And I just wanted to know since Mr. Haslam said that he had not written some of the technical information in those documents, whether you had any hand in writing either of those technical memos?

A. I didn't write the technical memos, no.

Q. Okay. Well, then, thank you, Mr. Scanlan.

A. Okay.

HEARING OFFICER: Thank you.

MS. ROGERSON: Thank you.

HEARING OFFICER: Ms. Thrower, you may ask any questions you may have.

CROSS-EXAMINATION

BY MS. THROWER:

Q. Mr. Scanlan, I just have a couple of questions that



I just wanted to follow up with you about the low flow condition as you called it. If you had to, could you pull 9.6 cfs continuously and maintain that low flow condition?

A. No.

Q. Okay. So if flow varies, as you know, and this is where that question comes from in winter sometimes as streams freeze over, do you have a contingency plan if you're in a situation where you need that flexibility to pull 9.6 cfs and it's not there in the stream?

A. Well, storage is one of the -- one of the components, if our demands are higher than what we're allowed to pump freshwater or pump from under the water rights. Flow condition says we can only divert 4 cfs but we need 6, then we're going to have to take that from storage. And if we got to a situation where we didn't have enough storage to maintain that 6 cfs demand, then we're just going to have to start shutting down the mill and curtailing through.

Q. Okay. The low flow condition, does that just restrict Perpetua's ability to divert surface water when the stream flow conditions are met?

A. No, it's surface water and groundwater.

Q. And so Perpetua can continue to -- or will not be able to continue to restrict ground -- or, excuse me, strike that. So Perpetua will not be able to continue to divert



groundwater if stream flow decreases or gets to 25 cfs, and you've taken 20 percent of that stream flow already?

A. Yeah. Our net diversion at less than 25 cfs unimpaired stream flow, our net diversion can't be more than 20 percent of that. So keeping in mind that if we had dewatering and that was -- that excess dewatering doesn't count against that because we're putting it back in the stream, it's a net diversion.

Q. And this may be a question for someone else, but I'll ask it right now.

A. Okay.

Q. Have you modeled how hydrologically connected the groundwater is to the stream so that if you continued to pump groundwater you won't, you know, exceed that condition?

A. I have not.

Q. Will there be any monitoring of groundwater pumping to insure that you don't exceed that condition?

A. There will be monitoring of diversions, yes.

Q. Okay.

MS. THROWER: That's all I have. Thank you.

A. Thank you.

HEARING OFFICER: Thank you. Mr. Foster, any questions on redirect?

MR. FOSTER: Just a few.

REDIRECT EXAMINATION

BY MR. FOSTER:

Q. Mr. Scanlan, how many water rights applications have you assisted with in your career?

A. I don't know.

Q. Ballpark.

A. Well, I would say in 35 years, I don't know, 500, 1,000. I don't know. I mean, a lot because I'm in Southwest Idaho which is generally been open to appropriation so, and these range from tiny to very large.

Q. And in your experience when you're filling out a water rights application, do you apply for the average amount of water required for the project?

A. No. You have to hit the peak water requirement because that's what you're regulated on. You can't exceed your authorized diversion rate.

Q. And in this case the peak requirement, based on your review of the documents, is 9.6 cfs; is that correct?

A. Yeah. It actually could be a little bit higher because if, again, under that reclaim failure situation, we could have reclaim failure and dust control and that sort of stuff, but we're assuming that the balance of that would come from storage because it's just such a rarity. So 9.6 seems to be that's the right number.

Q. And do you recall your conversation about



operational flexibility?

A. Yes.

Q. And why is operational flexibility so important in the water rights application?

A. You've got to be able to -- you got to be able to operate on a realtime basis. You've got to be able to respond to whatever the needs are for the project. You know, it's just that's how these things work. Whether it's an irrigation or industrial or municipal, you have -- you have demand, demand variation. You've got to be able to meet the peak demand.

Q. And do you recall your conversation on the limits in the application on Perpetua's ability to withdraw water?

A. Yes.

Q. And although not in the application, what effect would the voluntary conditions that Perpetua proposed to the Office of Species Conservation, what effect would those have on Perpetua's ability to withdraw water?

A. Well, substantial, because that -- as I've turned it to low flow condition could reduce the amount of water available to less than the demand at times, and so, again, so at that those times you've got to bring that balance from storage. If you don't have the storage, then you've got to -- you've got to reduce operations to stay within your water right.



Q. And do you recall the conversation on the volume required for the Stibnite Gold Project?

A. Yes.

Q. And what's the difference between the diversion rate and the diversion volume?

A. Well, diversion rate is an instantaneous rate. So think about it like a speedometer on a car. You got a needle that says you're going 60 miles an hour, and you've also got an odometer that is racking up the miles. Rate's the miles per hour. The odometer is the total miles. And so it's just the rate times -- multiplied by time gives you volume, and so that's the difference.

Q. And the rate is stated in an instantaneous?

A. Instantaneous.

Q. Is that correct? All right. And volume, what's volume stated in?

A. It's acre feet per year.

Q. So it's an annual?

A. It's an annual, and just for clarification, on a permit there's not a -- there's not an annual volume, because it hasn't been established for beneficial use except for storage. You have a stored point. On our transfers, all those water rights have annual volumes.

Q. And speaking of annual volumes, when does that beneficial use determination typically occur in a licensing



process?

A. Well, it kind of depends on the permit holder. A lot of permit holders like to do it as soon as they've established that use and everything is clicking and they've got everything running so that when the examiner comes out they can see everything in good conditions. Other permit holders will wait until the -- until the last day after the final extension to submit their proof of beneficial use. So there's no real typical. In an instance like this, you would want to do it after you've seen the year where you think your maximum diversion volume occurred.

Q. And you had a conversation that that could potentially be extended to 15 years; is that correct?

A. Yes.

Q. And do you have any reason to believe that Perpetua would wait for 15 years to make that determination?

A. No. No, because as I recall our use graphs, it shows that their maximum volume will occur in the first few years.

MR. FOSTER: Thank you. No further questions.

HEARING OFFICER: Okay. Any other questions from the group of Protestants? Hearing none, thank you, Mr. Scanlan. Why don't we go ahead and take a five-minute break, and we're expecting Mr. Stanaway next, right?

MR. WATKINS: That's correct.

HEARING OFFICER: Okay.

(Recess.)

(Reconvened.)

HEARING OFFICER: Okay. We are back on the record. Mr. Foster, you can call your next witness.

MR. FOSTER: Perpetua calls Dan Stanaway.

HEARING OFFICER: Okay.

DAN STANAWAY

after having been first duly sworn,

was examined and testified as follows:

MR. STANAWAY: I do.

HEARING OFFICER: Okay. Have a seat. Go ahead, Mr. Foster.

DIRECT EXAMINATION

BY MR. FOSTER:

Q. Good afternoon, Mr. Stanaway. Will you please state and spell your full name for the record.

A. Daniel Stanaway, D-a-n-i-e-l S-t-a-n-a-w-a-y.

Q. And, Mr. Stanaway, what do you do for a living?

A. I'm a principal scientist from Caldwell. Do consulting work for mostly water-related projects and particularly with Perpetua Resources.

Q. And how long have you been in that role?

A. Going on five years now, a little over five years.

Q. And what did you do before that?



A. Before this I worked for the Department. I was technical hydrologist for the water rights accounting dealing with water rights accounting and prior to that I was with Brown and Caldwell again doing mining work taking mostly groundwater samples.

Q. And did you prepare an expert report in this matter?

A. I did.

Q. You actually -- you were involved in three of the expert reports; is that correct?

A. That is correct.

Q. And did you have a common role throughout those expert reports?

A. I did. My role through these expert reports was to mostly comment on the technical information that led to the development of the water identification.

Q. And I'm going to hand you Exhibit 61, and I believe Exhibit 61 has already been admitted through Mr. Scanlan. Mr. Stanaway, are you familiar with this particular expert report?

A. I am.

Q. And what role did you play in preparing this report?

A. Terry was the lead author on this, and I helped support that, provide information as needed, and then



provide a review of the document.

Q. And what kind of information did you provide to him?

A. Well, Terry and I, many of us working through this process all together and so starting from the background being able to review the aspects that are related to the development of the water right as it pertains to site water balance, and then working through some of the pre-application decisions and going through end route onto the water -- I guess it would be the post-application decisions describing the condition we have at -- the proposed condition with Fish and Game.

Q. And I'm going to hand you Exhibit 1G, and are you familiar with Exhibit 1G, which is application 77-14378?

A. I am.

Q. And how are you familiar with that application?

A. This is the application that -- the information, the analysis that Brown and Caldwell and Perpetua Resources put together. It's all encapsulated here in this application.

Q. And let's go to Exhibit 1G, page 48, and is that the rate and diversion technical memo?

A. It is.

Q. And did you assist with the preparation of this technical memo?



A. I did. I was lead author.

Q. And what's the purpose of this technical memo?

A. Well, as we're all aware, the application that we put forward, particularly the industrial use application, is complex, and it was the intent of this application to break that down to justify, rationalize, the diversion rate and to describe how the intent behind the water identification and how -- the needs for that water.

Q. And let's go to 1G, page 52, and were you involved in determining the total diversion rate required for this application?

A. I was.

Q. And how was the total diversion rate required determined?

A. Yeah, so this is a combination. Well, these values that you see here are a combination of output from the site water balance report and the Stibnite hydrologic site model. Between these two technical documents we were -- we were able to estimate what the water demand would be through time, and so it becomes a time series. And based upon that time series of water demand, as well as dewatering water, we were able to develop these estimates, these peak rates, and those are what formulated the overall diversion rate sought in the application.

Q. And will this diversion rate be required constantly

throughout the life of the mine?

A. It will not.

Q. And why is the diversion rate less than the total mill demand?

A. The diversion rate is less than the total mill demand because a primary source, predominantly that mill demand, is satisfied through reclaim water, and that reclaim water does not require water right to be put into the reclaimed circuit. Water that is -- that was originally diverted that goes into the TSF pool where the reclaim water is sourced from, had a initial diversion, but because this is one of the ways that Perpetua Resources conserves water, that water, then, is utilized to feed the mill and therefore reducing freshwater and other contact water diversion demands, or what we call make-up water. All water in excess of reclaimed water.

Q. And in that make-up water are there certain sources of make-up water that are prioritized over other sources?

A. There are. There are. So make-up water, we can divide that up into the mine impacted water or the freshwater, and freshwater we'll talk about that here in a minute, but the freshwater is the secondary -- the tertiary priority reclaimed being first, and then the water that is committed to mine operations, that being contact water, so be essentially runoff water that has been in contact with



the facility and can't run to a stream, has to be managed, that's a mine impacted water. And then dewatering water particularly at the site, because of the legacy impacts, the existing groundwater contamination, because of that existing chemistry it can't just be discharged into the stream, and therefore, it has to be managed. By utilizing these sources of water that are committed to the mining operations, then they would be generated not withstanding any water demand. We are able to utilize those, save cost by not treating and discharging them, and conserve the freshwater resources.

Q. And you testified earlier that the site-wide water balance was used to determine storage -- or diversion requirements, right, or --

A. That's correct.

Q. -- max diversion requirements?

A. Yes, yes.

Q. Was the site-wide water balance also used to determine the storage volume that would be required for the project?

A. Yes.

Q. So let's go to Exhibit 1G of 55. Does Exhibit 1G at 55 reflect the storage volumes as modeled by the site-wide water balance?

A. It does.

Q. And how were those determined?



A. Yeah. So the 428-acre feet, that's for the starter pool and TSF. That quantity of water is estimated based on what the initially build-out of the TSF would be and is needed to start that pool. The remaining -- well, the remaining water there, so about 170-acre feet or so, that was based on the contact water estimate in mine year negative one, I believe. And we put a contingency factor based on a third. The reason that contingency factor is utilized is because within this modeling that is used, we use an average climate scenario, and obviously averages are the expected outcome, but we fluctuate around that. And so we wanted to have a contingency in that value so that you could account for a wet year, such as we had this past year, and so forth.

Q. And, Mr. Stanaway, I'm going to hand you Exhibit 27A. Now, you've mentioned the site-wide water balance a couple of times. Is this the site-wide water balance report?

A. It is.

Q. And what role did you play in preparing this report?

A. This was one of many reports that within the project and the water modeling, I led the team of scientists and engineers that developed the site-wide water balance report, the Stibnite hydrologic site model, site water



chemistry, and water temperature modeling. This report I'm very familiar with because of its interaction with water rights process and the hydrologic modeling.

MR. FOSTER: I would move to admit Exhibit 27A.

HEARING OFFICER: Exhibit 27A, which is a site-wide water balance -- site-wide water balance from the attorneys representing the Protestants. Any objections to that exhibit being admitted?

MS. THROWER: No, Mr. Hearing officer.

HEARING OFFICER: Okay. Mr. Foster, do you plan on asking some follow-up questions from this exhibit?

MR. FOSTER: We're going to walk through it.

HEARING OFFICER: Okay. Exhibit 27A is admitted into the record at this time. Go ahead.

Q. (By Mr. Foster) Mr. Stanaway, can you describe for us the site-wide water balance model?

A. Yes, certainly. So to begin with, the site-wide water balance model is developed to account for, well, water at a site, and in this instance this is -- this describes the sources water generated and sources of water for industrial use, as well as the water that is -- the water for which management is required. So any water that comes -- that is utilized by the project or that comes into contact with the facilities at the project are accounted for in the site-wide water balance.

Q. And how -- how does this report relate to the model?

A. So this report describes the model. Describes the model development, the model inputs, and the model outputs.

Q. So was this report -- was the model used to determine the water rights needs for the project?

A. By and large, except for dewatering water, yes, this report, the model, was used for -- to develop that diversion demand.

Q. And what was used to determine the dewatering water?

A. The Stibnite hydrologic site model.

Q. And we'll get to that in a bit.

A. Yes.

Q. Was this the first water balance model prepared for the Stibnite Gold Project?

A. It was not. This is the second. The first was based on the PRO. So the original mine plan, a water balance was developed for that, and throughout the project maturity as the project matured and evolved, there became a need to develop a more enhanced and sophisticated water balance.

Q. And is that discussed on page 15 of the report?

A. It is.

Q. All right. And what changes are reflected in this



report as to previous water balance models?

A. Yeah, so the changes with the ModPRO2, the updates to the ModPRO2, those are all reflected. So removal of the federal DRSF, other improvements with the ModPRO2 as it relates to industrial water. The main -- really the most important update here is that we moved from an Excel version. I guess it was -- that was a very early one -- was in Excel and now we are into GoldSim model.

Q. And what is GoldSim?

A. GoldSim is -- it's a computing software. It's utilized most prominently so that you can run Monte Carlo, their data evaluations in a Monte Carlo approach. And that's important so you can start to understand probabilities, bounds, and it's used in this environmental assessment, as well as things like risk assessment, decision-making protocols, and so forth. So it's a very powerful tool.

Q. And is that discussed at page 37 of the report?

A. It is.

Q. All right. And you mentioned Monte Carlo. What is the -- how does that work?

A. Yeah. So Monte Carlo is a statistical technique that uses random numbers. Well, maybe not so much random numbers, but multiple simulations of an event, either through a random number generation or in the instance of



this, running through the 120-year climate series, so that values could be generated based on a wide range of conditions. So it's a, what do I want to say here? It's a sampling methodology that utilizes a large set of input values so that we have more information on the output.

Q. And is that GoldSim -- I guess I'll call it software -- is it widely used in the mining industry?

A. It is.

Q. Is it widely used for water balances?

A. It is.

Q. And is this water balance typical of other water balances that are used in the mining industry?

A. It is.

Q. Any reason to doubt the validity of this water balance?

A. No, sir.

Q. All right.

A. And if I could elaborate on that for a second?

Q. Sure.

A. You know, so we utilize this right here in our purposes with water rights, with our purposes in the environmental impacts with the combination site-wide water balance -- I'm sorry, to the Stibnite hydro site model. But this is also an operational tool. GoldSim water balances are used in operation so that decisions can be made, and it



asserts the validity of the information contained in it.

Q. So let's unpack that. How would you use a water balancing model in the operations of, let's say, the Stibnite Gold Project?

A. Well, we can take this report as an example. In our data that we have here to support water rights application, we have this -- it's what deterministic output, and that's what generates the time series and these peak values that we have. But that's one answer, based on one climate series input. One climate year over one phase of the mine. That doesn't give us a whole lot of information. What it does is deterministic output ties all of these inputs, variables, together into one relation, but where we can go with something along these lines is that we can look at what a mine year is over 120 years of a different time it signals and see what is that range of value. So we're able to underpin and understand what may be our maximum water demands and our minimum water demands, and be able to utilize that information in decision-making, such as we're doing right now, capital expenses, items -- various items that can be -- where that information becomes very handy.

Q. Let's go to page 23, and so this looks like a fairly complicated flow chart on page 23.

A. Yes, sir.

Q. And what is this flow chart, I'll call it?

A. So this flow chart, as it pertains specifically to modeling space, are all of the components of the facilities within the site-wide balance model, with the exception of these last couple at the very bottom of the diagram, the potable water supplies, sanitary wastewater treatment plan. Those are not included in the site-wide water balance.

Q. And why aren't those included?

A. Because this is what -- the intent of this report is to understand how the industrial components of the project relate to each other. The water generated from -- the water needed and generated from the various facilities and how the engineering, essentially, of all of these items go together, determining the size of the wastewater treatment plan, estimations of water demand for mill processing, are, you know, contained in all of these diagrams. And within the domestic and sanitary, those -- they're just not within the guise of the model. They're not within the scope of the model.

Q. So is it correct to say that if you change your domestic water and sanitary demands it wouldn't affect mill process operations?

A. That's correct.

Q. Is that why they're not included?

A. Yes.

Q. All right. And so looking at this diagram, with



the exception of the bottom flow, are all the rest of these elements included in the site-wide water balance model?

A. They are, yes. With a particular -- let's just go to this East Fork, South Fork intake. This is inground water supply wells, so that is grouped into a freshwater make-up demand. We've partitioned those out in the hydro model so that we could understand what each of those sources are. Really what we're talking about here is a conglomerate of what that freshwater make-up is.

Q. So the site-wide water balance doesn't distinguish between surface water from the East Fork, South Fork intake in the supply wells?

A. Essentially, yes. So that is a category of water. That's freshwater make-up.

Q. Does it account for the dewatering water?

A. It did account for dewatering water.

Q. And it also accounts for contact water runoff?

A. Yes.

Q. All right. How do you go about modeling all of these various elements with the climatological data that you were referencing?

A. Yeah. Most of these items -- where to begin? So most of these items are -- have mathematical representations. If we just start at the process circuit here, we know how much water -- we know what the ore



processing rate is, and we know what the incoming moisture content of that ore is. And we know what the outflow or the slurry water content is. And so now we know at a certain ore processing rate that a certain quantity of water must be added to the system, and they add in like evaporative losses, various other water uses, assumptive losses and so forth. We know, for instance, what the size of the Hangar Flats, if you are looking at various components here, Hangar Flats stockpiles, we understand what meteoric input will land on that. We understand how the water would travel through there. So, really, it's a complicated situation of many, many, many equations.

Q. And are those equations represented in Section 5.4, page 44?

A. Yes.

Q. And so Section 5.4 walks through the mathematical equations for each of those elements?

A. Yes. It would be described throughout the document, yes.

Q. So what -- let's go to page 38. Well, start on 37. What are the model inputs?

A. The major -- well, there's some factors, some variables, are described, like the tailings through put. That's a static (inaudible) but a defined variable. One of the major inputs that this model has is a meteoric water



balance, and that essentially is, you know, how much meteoric inputs, how much precipitation is going to fall at the site on a facility. And that's described thoroughly in the Stibnite hydrologic site model, as well as was calibrated within the hydro modeling process.

Q. And generally what is a meteoric water balance?

A. Meteoric water balance accounts for precipitation as it falls. Essentially the form of that precipitation and temperature of the two main inputs, and then based on the quantity of precipitation on the land area over which that precipitation falls and temperature, therefore, vapor transportation rates, it essentially accounts for the amount of water that would either run off a facility or recharge a facility -- recharge through a facility.

Q. And does your -- you mentioned earlier you've got 120 years of climate data. Does that inform your meteoric water balance?

A. It does.

Q. How are those two things related?

A. Well, so the raw data, the prison data set, is our set for precipitation and temperature, and then based on that, there's a series of equations that can be utilized to estimate the vapor transportation rate, soil storage, moisture, and so forth.

Q. All right. Let's go to page 39, and is dewatering

water, dewatering withdrawals, also an input into the model?
A. It is.
Q. And what do these graphs represent?
A. So these graphs are outputs from the Stibnite hydrologic site model, and they are the monthly time series that was estimated to be produced by dewatering for each of the three pits.
Q. So dewatering doesn't occur simultaneously?
A. Not (inaudible) no. The offsetting of the mining of each pit then offsets the dewatering produced by each pit. They can overlap, but it's not necessarily to occur simultaneously.
Q. Is it tied to which pit is being developed at the time?
A. It is.
Q. And then do you actually develop -- or did someone develop specific meteoric water balances for the mine features themselves?
A. We did. My team did that.
Q. And how do you do that?
A. Well, so the premise of the overall meteoric water balance is a wildlands meteoric water balance. Obviously when we get into mine features, those are no longer wildlands, but they're endopagenic (phonetic). You know, they're disturbed surfaces. And, therefore, the physical



and hydraulic properties of those manmade features changes.
Q. And maybe we can look at page 40. Does that discuss this process?
A. It does. It does, yes. And so what the intent was here was that we had -- we had a meteoric water balance, but we understood that that meteoric water balance wouldn't necessarily apply to the facilities that were relevant for mine planning, operations, runoff water, even contact water, and so forth. And so it was the intent here to take a close look at how the various parameters, shown in table 5-1, would change because --
Q. And that's on page 41?
A. Yes, it is. Thank you. Because of these disturbed features. And so what we were trying to do is get a more accurate representation of the contact water, primarily contact water, that would be generated by each of these facilities.
Q. And how does that meteoric water balance for the mine features determine contact water?
A. Oh, based on -- based on these inputs -- you know, you have your meteoric input, so the water coming into the system, and then based on these inputs essentially the system fills, and whatever is in excess of either -- so holding capacity or infiltration rate runs off, and that becomes our estimate of contact water.



Q. Let's go to page 44 and Section 5.3. What's the time step that was used in the model?
A. Yeah. All of our models are based on -- well, I should say not all of the models, but the site-wide water balance and the Stibnite hydrologic site model are both on a monthly time step.
Q. On a monthly time step? And is that -- that's how data is reported out --
A. Yes.
Q. -- in the models?
A. Yes.
Q. And speaking of outputs or data being reported out, let's go to page 54. Actually, let's go to page 56. No, no, 55. There we go. So when you're running one of these models, what kinds of outputs does the model provide?
A. The simple answer that's not very informative is whatever you want it to provide, but whereas our interest here is in, let's just stick to our water rights specific purposes, is essentially how much water do we need to operate at a given throughput. Based on all of the industrial -- the dewatering water -- I'm sorry, dust suppression, drilling water, and mill, mill demand.
Q. And when you said whatever you want it to provide, that's not that you could change the results necessarily, but change what you're looking for in the outputs?



A. Yeah, exactly. No, you -- no. The equations that are on the input side determine what the output is.
Q. All right. And do you get two different kinds of -- model runs is probably not the right term, but do you get two different data sets as outputs?
A. We do. You can -- deterministic is the data that we use predominantly here for water rights, and the reason that is is because you have these different water sources that are all related. You have dewatering water. You have your freshwater make-up. You have your reclaimed water, and in any one month those three sources are related to each other. So the deterministic output is what we needed to have so that we could understand how these different players all came together. What we see here in the figure on page 57, this is not a deterministic output. Stochastic output, and this is the data that's used that can be output by the model so that we understand that at any one month this is the amount of variation that we see based on the 120-year climate series.
Q. So is it fair to say that a stochastic output is in probabilities?
A. It is, very much so.
Q. Or risk?
A. Yes.
Q. And what is the deterministic output? Unit is

probably the wrong word, but what's the deterministic output in?

A. So what we used for the deterministic output, what any person would likely use, is the average condition. So the average meteoric condition. That's not averaging of the outputs, but it's a look at the climatic variables and what would be the expected, based on the climate history, what would be an expected year-to-year climate. And that's what's utilized. So you see in some of our other reports it says the average climate condition, and that's based on the -- it's based on the sequential years, but those years were selected to best represent the average condition. These, on the other hand, are -- break away from that and you can look at, you know, in a high, low, you know, anything in between, meteoric, or annual meteoric condition, how would the mine respond.

Q. All right. And let's look at page 56 real quick. So how are these outputs used? I think you started talking about this, but how are you able to use these outputs?

A. Yeah. If we can stick to our work here, what we see here is that within our deterministic output we have those values that were shown previously, the peak water demands, peak water rates. That doesn't necessarily tell the whole story. That tells the story of one condition, one situation. What tells a complete story is by looking at any



of these plots that have these air bands or uncertainty intervals. That's a best way to look at it, and that tells a story of how -- what the range may be. And so as we're thinking about how much water would be needed, what we expect to see is this, you know, 3 to 4 cfs on an average condition. But that doesn't describe what may be a peak monthly rate, and we're still resolved at the monthly time step, but we have more complete information as to what that upper bound and lower bound may be.

Q. So the water balance model was used to determine how much water was going to be needed for the project?

A. Yes.

Q. And the water balance model doesn't distinguish between the freshwater intake and the groundwater supply?

A. That's correct.

Q. But did the water balance model and does the water balance report -- let's go to page 81. Does it reflect the amount of freshwater make-up or make-up water that's going to be needed?

A. It does. It does. And the figure on page 81, this is all make-up water. So all water that is required for the mill, this process water make-up, it does control (inaudible) may be in here, too. I can't quite recall, but all of the industrial demand water that isn't satisfied through reclaim is encapsulated here in this plot. So as we



are looking at this, the dots are the outliers, and if we ignore those outliers, then our 95th percentile, which is the end of the whiskers, so, you know, I guess it would be the -- what is it, the 5 percent -- no, 95 percent intervals. So, you know, most -- the range of most foreseeable conditions for industrial water demand, this caps off. It's a little bit above this 3,000 GPM. That's about 7.25 GPM at a monthly rate. And so there is still daily variability that's not encapsulated here, but at a monthly rate you would expect to see the 7.25 max under operating conditions that are planned under the climate that we've seen, these would be that diversion rate or diversion demand.

Q. All right. And does the make-up water process, make-up water, what all would be included in that in terms of withdrawals or diversions?

A. Oh, yeah, yeah. So this would be contact water, dewatering water, and then freshwater. So the ground -- the East Fork, South Fork intake and the industrial wells.

Q. It wouldn't include TSF water?

A. No, no.

Q. And is that -- is the TSF water actually reflected on page 82?

A. It is.

Q. So you mentioned that this was monthly. If we



could go back to page 81. This fresh or make-up water is monthly, but there could be daily or instantaneous demand above and beyond this monthly?

A. There could be.

Q. And is the model on a daily or instantaneous basis?

A. No. The uncertain with the model like that is it would be so high that the daily modeling would be very little.

Q. And what are the primary drivers of make-up water demand in the model?

A. The primary drivers of make-up water demand, the amount of reclaim that is being put through the system, the amount of losses from that reclaim, and then the ore processing rate.

Q. And how does the ore processing rate affect the make-up water demand?

A. Yeah. Well, so it all plays into the overall mill demand, process water demand. So you have a certain ore processing rate, and then you just have this, you know, fairly good book, you have to get from a very low water content to a, you know, 50 percent solids water content. So you have to increase the -- you have to tear pulverized ore into a slurry, and as that water content that really drives the overall demand and then what is sourced reclaim would then -- that total demand minus reclaim, and you get make-up

water demand.
Q. All right. And what other water demands are reflected in the site-wide water balance?
A. Oh, drilling water, dust control.
Q. And is dust control reflected on page 83?
A. Yes, it is.
Q. I haven't seen drilling water in here, but do you know if drilling water is reflected?
A. You know, drilling water in a site water balance is set as -- it's not a constant, but it's set at a maximum of 0.1 and declined early through mine life, so it's programmed, but I doubt that it has a plot to describe it. It's just a set constant.
Q. So based on the site-wide water balance is diversion rate of 9.6 cfs water necessary for the project?
A. It is. It is. As we described, the modeling at this monthly time step is a 7.25 rate. It's foreseeable that on a daily basis that you could see an increase of that demand up to the 9.6.
Q. And would that demand be -- it would be less than a month; is that correct?
A. Yes, yes, by all means.
Q. And so how -- then you mentioned another model, the hydrologic site model.
A. Uh-huh (affirmative).



Q. How does a site-wide water balance interface with the hydrologic site model?
A. Yeah. It's a really good question, and really there's an iterative solution between both models. So looking at the first step is the development or the predictions and development of estimated dewatering water estimates. Those are paired with the diversion demand, and so you essentially say this quantity of diversion -- or mill demand would be met by dewatering water. And then there's still in times there's excess, and, of course, that has to be handled, but in times of deficit then an alternate source has to be found. Then that's our freshwater sources, and so then that freshwater demand is fed back into the hydro model so that diversions from the East Fork intake or the industrial supply wells can be accounted for and recognized in the hydro model, and you can do your index analysis.
Q. All right. I'm handing you Exhibit 25B, and is Exhibit 25B the hydrologic site model refined proposed action on PRO2 report?
A. It is.
Q. And does this reflect the hydrologic site model that you were just discussing?
A. It does.
Q. And what involvement did you have with this report?
A. I was a key team member in this report. As I



mentioned, I led the team. Also this is a Brown or Caldwell publication, and I worked very closely with the lead author and another senior member of our modeling team.
Q. And you reviewed the report before it was finalized?
A. I did, many times.
MR. FOSTER: All right. I would move to admit Exhibit 25B.
HEARING OFFICER: Mr. Stanaway, do you have a copy of that in front of you?
A. I do.
HEARING OFFICER: It appears that this is a gigantic stack of paper --
A. Uh-huh (affirmative).
HEARING OFFICER: -- that is being offered into the record here, but it appears to me that a fairly sizeable portion of this are tables in the back. What are all of these tables at the back meant to represent? Is that just the output?
A. It is. It is. So these tables are so enormous, is because we have the 40 years of operations of reclamation model, but the model actually goes out to 112 years so that the post-operating closure condition could be simulated. So much of these are -- really go into the -- when a site is -- when the active operations are done, the -- you know, all



the restoration and closure work is complete, and then what is the ongoing site condition. So if you see mining year 112, that's obviously very far in the future.
HEARING OFFICER: Okay. So the applicant proposes to admit Exhibit 25B. Is there any objection from the Protestants? Seeing none, although I'm hesitant to allow 700 pages into the record, I will admit Exhibit 25B into the record at this time.
Q. (By Mr. Foster) Mr. Stanaway, what is a hydrologic site model?
A. Yeah. So this -- a hydrologic site model is a paired model between a meteoric water balance and the meteoric model and a groundwater flow model. So essentially with the modeling that is described within this report we are able to take a comprehensive look at the effect of the hydrologic conditions, surface water, groundwater, at the site with and without the Stibnite Gold Project.
Q. So this compares the proposed action to the no action?
A. Yes, it does.
Q. And was this model created specifically for the Stibnite Gold Project?
A. It was.
Q. Is it similar to other hydrologic site models?
A. Yes, it is. The construct of it is. The site

specific information will be tailored to the conditions that we experience at the site.

Q. All right. And let's go to page 87, and so will you walk us through the purpose of this model and this model report and what it evaluates?

A. Yeah. So the purpose of the modeling report is to simply communicate the information or the modeling process and the information that was learned through development and use of the Stibnite hydrologic site model to understand the -- well, the hydrologic condition because of the Stibnite Gold Project. And so essentially, you know, you start with U.S.G.S. code that mod flow 6 is a U.S.G.S. base framework, and little by little, based on the information at hand, you can see the conceptual site model on page 86, based on this large quantity and the Perpetua Resources, based on the large quantity of information available on the hydrogeology, geology, you essentially construct a numerical representation of the physical world.

Q. And what is mod flow 6?

A. Mod flow 6 is -- it's -- well, I'm not finite -- different thing. It's a numerical model that essentially tracks water through a system.

Q. And it's a U.S.G.S. product model?

A. It is. It is. It has been developed by the U.S.G.S for years. Mod flow in itself -- I mean, this is



the sixth update, probably more, but mod flow itself has been around for a very long time.

Q. And what does U.S.G.S. stand for?

A. United States Geological Survey.

Q. And do they do a lot of water modeling?

A. They do. They are the definitive source for water models in the United States.

Q. All right. So let's look at page 86, and you describe this as the conceptual site model?

A. Yes.

Q. Would you take us through this conceptual site model and explain what we're seeing here.

A. Yeah, certainly. So this is from one end of the project site. AA prime as that's shown previously. So you're going from the southern end of the site near to the TSF. TSF would be all the way through to the end of the site at A prime. And based on the -- like I was saying, the large amount of hydrogeologic data that we have, geologic data from copious well boards, you're able to identify the various labiology statology (phonetic) (inaudible) you have, water levels and so forth. Contour obviously. Surface to surface levels and so forth, so that you can start to describe what you think would -- what is the site condition. Now, we have three different codes here in the subsurface. We have the pink that is bedrock. This brownish color that



is a transition zone. It's like a weathered -- highly weathered zone that separates the alluvium in the bedrock so more transmissive than what the bedrock is, but less transmissive than what the eluvium is. And then you have the alluvium which is just any consolidated materials by and large that is the yellow or the beige color. And with these three you get -- well, with the conceptual model implemented and the numerical model you can start to understand how the groundwater system will behave, will respond due to the project.

Q. And so let's go to page 124. How do you determine how well the model represents the site? How do you calibrate the model?

A. Yeah. That's another very good question. So there's -- before you get into the forecasting, and forecasting goes in both terms of simulating the project impacts, as well as simulating the future condition in the absence of the project. You would look at existing data, you know, what is the current condition. And so the model calibration is essentially a process by which input parameters or modeling parameters are set or tweaked so that you can represent the existing data set with a high level of confidence.

Q. At a high level, what's in that existing dataset?

A. The high level. We calibrated -- this model is



calibrated to base stream flows, so stream flows from November, December, January, February, from 2011 to 2019, and the available groundwater heads from all of the monitoring levels and the wells drilled on-site. The other information sources are all the hydraulic conductivity measurements that have been taken. It's been upwards of 80 independent measurements of hydrologic conductivity. And then what's the other one? Let's see here. And then we utilized some of the 2013 gastrin (phonetic) pumping test in the Hangar Flats area to locally calibrate within that region.

Q. And what's a gastrin pumping test?

A. The gastrium (phonetic) well is a well on a site that's been around for quite a while and an aquifer pumping test is pretty baseline hydro geo testing to understand what the physical properties of the aquifer are.

Q. Let's look at page 132. So does this graph represent the comparison of model calibration versus observed flows?

A. It does, yeah. So this is the simulated flow and the measured flow through this duration essentially. At the time of publication the entire record set at the Meadow Creek gauge and the blue line is after the calibration procedure. The blue line is what would be simulated given that time signal, and the black line is the monthly observed

flows.

Q. And let's go back to page 127 real quick. Ms. Franolich, can you zoom on that map? And will you walk us through the surface water gauges that were used to calibrate the model?

A. Yeah, certainly. So all of these gauges -- yeah, in fact, all of these gauges. The 850 is the Meadow Creek gauge. The 800 which is the East Fork above Meadow Creek --

Q. And you're working from the bottom of the map to the top of the map?

A. I am, yes.

Q. Okay.

A. And then the 1,000 gauge, which is what we refer to as the box culvert, so higher in the project area but still on the main East Fork. And then down below we have the 1250 gauge, which is still on the East Fork down below. And this is really where -- well, you can see from the topo the existing topography. So right around this 1250 gauge is the downgrading end of the project, Yellow Pine Pit area. And then the 1450 gauge is a gauge on Sugar Creek.

Q. So let's go back to 132. So where is that 850 gauge on the map?

A. It is the gauge highest up in the system on Meadow Creek.

Q. Okay. So on the south end of the map?



A. Yes.

Q. All right. And then let's go to 134. So is this -- what gauges are we looking at here?

A. Yeah. The upper flats, just for explanatory purposes. We have a linear and logarithmic showing. We elected to show the logarithmic so we can look at that bit to the base flows. That was really our primary concern. Well, the primary calibration target so we could look at those flows. You know, high flow (inaudible) but our target was really that base flow condition because it is more representative of the groundwater system. Then we've got the 1450 gauge, and that's on Sugar Creek.

Q. And in your experience with these types of models how does this particular model fit the observed flows?

A. It's very good. It's very good.

Q. So even though we're seeing some variation in the lines?

A. Yeah, yeah. It's an unrealistic expectation that you would trace an observed dataset to the T.

Q. All right. Does this model also -- did you also calibrate to groundwater drawdown levels?

A. For the gastrin well we did, but that was the only instance. Otherwise, it was in our groundwater calibration dataset was the groundwater head. So the groundwater level. What was a really outstanding thing about our calibration



procedure here was that we just weren't looking at one point in time and calibrating to that. We look at the transient conditions. So for a period of time 2011 to 2019 I believe, we looked at the -- well, what data was available for that, we looked at how groundwater levels changed through seasonally, and that became our calibration target, not just one single data -- not one single data point.

Q. And is that reflected on page 140?

A. Well, yes. So these are the -- this is the comparison of our heads to alluvium and bedrock. This does not show the transient situation. But what we do see here, and what's really quite astonishing, is our -- is the figure on the left here, this measured groundwater elevation for simulated groundwater elevation on a one-to-one line, and you can see that by and large the model results represent the height of your accuracy, the observed data points. That's a very -- that's a very good fit. If we go to the right-hand side, you are looking still at -- this is a residual plat and so how far was the difference. You can see that there is some high values, but we're really clustered around that positive 10 to negative 10 feet certainty elevation. That's quite outstanding.

Q. And what's a residual?

A. Well, a residual is the difference between the model and the simulated. I'm sorry, the difference between



the simulated and the observed.

Q. And in your opinion was the best available data used in the hydraulic site model?

A. Yes, sir.

Q. Was there any other data that could have been used in the site model?

A. No, not for purposes of the modeling objectives.

Q. In your opinion is the hydrologic site model well calibrated to the Stibnite Gold Project site?

A. Yes, it is.

Q. Irrespective of how well a model may be calibrated to the site, is there some level of uncertainty in the predictions of the model?

A. Always. Any model has that.

Q. All right. Let's go to page 44. Go back up to the front of the report and first I want to focus on footnote 4 on page 44.

A. Uh-huh (affirmative).

Q. And would you read the last sentence?

A. Certainly: Adaptive management may require adjustments to the diversion rate by source during operations.

Q. And what does that mean?

A. Yeah. So what we're looking at here, and just to give an example, the adaptive management is how is the

system going to be managed in realtime. So what are the operators -- what decision are they going to make on a day-to-day basis? And what we're looking at here is a monthly decision-making protocols based on a mine plan, based on the anticipated, you know, sequencing of events. So what may be the situation here, as to give an example, is that we've discussed prioritization of water sources. So reclaim, contact water, de-watering water, and then freshwater sources. So it may be that in some instance it's been a high flow and a runoff situation, when there's tons of surface water around, when there is more surface water than can be, you know, utilized for anything, just the peak of the hydrograph. You know, and may be advantageous to water resources and to the project that surface water be diverted, as opposed to contact water, so that contact water could be maintained in the ponds for use during the low flow periods. And so that would reflect an adaptive management approach and adaptive management decision. That would be taken for the betterment of operations than the betterment of the environmental resources.

Q. So does adaptive management allow you to deal with the uncertainty that's reflected in model outputs to some degree?

A. To a certain degree.

Q. So we had been talking about model calibration, but



what does the model tell you? What's the output of the model?

A. Yeah. The output of the model is, just in plain terms, is changes in groundwater elevation and changes in stream flow. And that's really what the hydrologic model is looking to tell us. It's what the overall condition of water resources is. And with this model, because we do a Noachian (phonetic) condition and we do a mine plan, we can compare those two, and we can say that this is the expected impact of the project.

Q. So impact of project versus no project at all?

A. Yes, to water resource.

Q. To water resources. All right. So what -- in coming up with those outputs what variables affect those outputs?

A. Yeah. Predominantly for hydrologic model you're looking at -- well, I guess it goes back a little bit more. So with the meteoric water balance, you know that meteoric, the model intakes is -- affects that output, right. How much water is available at the site. Another is hydraulic conductivity. So it's like what -- you know, how freely can water pass through the subsurface. That is a major control on hydrologic models. There's various other -- various other variables that can affect that output. Modeling decisions are being made. There's a whole slew of



decisions, variables that would affect that output. And where you come to terms with this freedom with this flexibility, free reign, if you will, is through that calibration procedure. You -- especially with the way that this model was built. It was again a Monte Carlo simulation. Very different than GoldSim, but still Monte Carlo, and so through an algorithm it was determined -- well, within a certain range of measured data, what the optimum parameters were. So the decision-making, the human decision-making, was to a certain extent withdrawn from that process, and we just let an algorithm determine what is the most appropriate parameters values for all of the parameters that were calibrated to.

Q. So let's break that down a little bit. So what's an example of one of the parameters that you would have let the algorithm decide or prioritize?

A. Yeah. I'm not sure what page it's on here, but there is a figure that shows all of the 77 at the time measurements of hydraulic conductivity. It's in Appendix A, so it's back there. So essentially what we were able to identify within that figure is measurements that come from alluvium, and you've got this range of values, right. And so you tell the model that you can pick ranges. You can pick a value from within this range of our observed data, and then you run a model, and then you run the air



(inaudible) and say this model performed better than -- this variable, this parameter value, performed better than this parameter value. And, therefore, you know, based on this very quantitative approach, you're able to identify which -- what parameter value best represents the system.

Q. All right.

A. I know it's a mouthful.

Q. Let's go to page 45. Did the model evaluate the effect of the supply wells?

A. It did.

Q. And does this table at the top of page 45 show -- what does that table or that graph show us?

A. Yeah. So the black line here is unmet middle demand, and this is for freshwater. So that value, that time series was an input to the hydro model from the site-wide water balance, and then the two freshwater supplies that we have are supply wells and the surface water supply. And so what this plot shows essentially is that freshwater make-up, the expected demand for freshwater make-up water. In this you can see that we have a -- there was -- it was a decision that was made that supply wells here would be limited to a 0.5 cfs. Let me back up a little bit. This is an important point. So originally before we had the East Fork intake, we were sourcing all of the unmet demand from supply wells in Meadow Creek Valley. When we

look at this, you know, like sub 4 cfs, when we pulled all that from the supply wells, the model crashed, the system tanked. And, therefore, it became evident that, you know, we needed to come up with an alternative strategy to get that water. And so that's when our surface water supply came through this iteration with the hydro model, utilizing that as a decision-making tool of what is a safe supply from groundwater yield and where else can we supply that surface water from -- or where else can we supply the rest of the unmet demand from. And then as Terry talked about, we set that down to the furthest to the down gradient end of the project site so you could limit the stream miles of depletion.

Q. And when you say the model crashed, when you didn't have the surface water withdrawal.

A. Uh-huh (affirmative).

Q. Did the model literally crash or did it --

A. The model literally crashed. It couldn't assimilate that.

Q. All right. So it was decided to add a surface water intake to, one, allow you to model the result, but two, to keep water in Meadow Creek; is that correct?

A. Yes.

Q. And let's go back to that .5 cfs number real quick.

A. Uh-huh (affirmative).



Q. So why is, then, the supply water limited to .5 cfs?

A. From the supply wells?

Q. From the supply wells.

A. An evaluation was conducted, and we tested what would be a safe yield from the supply wells, and it came out to be that that 0.5 cfs was an acceptable combination of stream flow impacts and reducing stream flow impacts and still obtaining a quantity of water that was needed by the project.

Q. All right. And then in the conversation about the site-wide water balance you mentioned that this model was used to determine dewatering rates?

A. Yeah.

Q. So let's go to page 50, and will you explain how this model determined dewatering rates, or how you determined dewatering rights of this well.

A. Yeah, certainly, certainly. So one of the inputs to the model is a year-by-year development, and so at every year we understand how the pit grows. And once you get down -- once that pit grows into regions that are saturated, then that change in surface elevation then produces a water output that would be dewatering water. So essentially how much water is in the pit shell, and that's what we were able to quantify here.



Q. And is this the expected dewatering rights on page 51?

A. It is.

Q. Actually, scratch that. Let's go to page 56. So you plug -- there we go. I think that's right. Yeah, so page 56. So you plug all the data in. You calibrate the model. You run the model, and does it tell you what effect the project is going to have on surface water stream flow?

A. It does.

Q. And what effect does the project have on stream flow?

A. You know, by and large it's pretty modest effect. There can be times that you see -- I believe that the 1250 gauge, I believe the one month biggest impacts about 40 percent depletion, but by and large it's much less than that, in the 20 percent range or less. And I will note that this modeling was conducted prior to the low flow diversion condition, so these modeling results would be an upper end of what we would expect to see with that water right condition in place.

Q. So let's go to page 58, and does this show -- do these graphs show us the expected effects absent the low flow condition at the various gauges in the site?

A. Yes, they do.

Q. All right. So what's that top graph?



A. So this is above the land section. So a part of the ModPRO2 mine plan is, you know, a flood plain minor in the Meadow Creek Valley, and that's really -- it was a design feature in the project to address stream flow depletions, and so we got a quantification point. This is a model grid square that's up above that line section, and so what we can see here is, really, as you see, very consistent modeled and, well, operations and no extra conditions, with the exception here of this mine year four, five, and into six. And that's a result of the water that is being -- the dewatering water that is being treated and discharged into that section, into the stream at Meadow Creek.

Q. And that's -- so the blue line in, say, mine year six is above the black line, so that's showing that it's expected that you're actually going to have more water than would otherwise be in the creek?

A. Yes, that's correct.

Q. And that's because of treatment and discharge of dewatering water?

A. Yes.

Q. Let's go to page 60, and does the top graph on page 60 represent the East Fork, South Fork expected conditions above Sugar Creek?

A. It does.

Q. Any notable elements here?

A. You know, here you can see some of the project-related stream flow depletions. Looking at the log scale, granted these can be a little hard to interpret, but, you know, we are looking at a handful of cfs depletion.

Q. And when are those primarily occurring?

A. Oh, well, the years are on January, so these are during the time of the year that the low flow water right condition would be in place.

Q. All right. So let's actually talk about that, the low flow condition, for a minute because there's been some questions about that condition. And I'm handing you what's been admitted as Exhibit 206.

A. Uh-huh (affirmative).

Q. And is that -- that low flow condition or the technical memo you were referring to?

A. It is not. This is a letter from DWR.

FEMALE SPEAKER: 206 is the OSC IDF&G letter to Officer Cefalo, I believe. The tactical memo should contain the water right condition, if that's what you are looking for.

Q. (By Mr. Foster) I think we disorganized our exhibits. Let's use this one.

A. Just tell me where to go.

Q. Okay, 206.

A. Yes, sir.



Q. All right. Is that Exhibit 206, is that the one that contains the low flow conditions?

A. Yes, it is.

Q. And how were you involved in creation of the technical memo that's attached to Exhibit 206?

A. Yeah, so if you turn to some of the latter pages, I wrote a good portion of this, and then there's a primary author in a good portion of this, and then the evaluation that I undertook to understand what these -- so starting in Section 4 was a data analysis exercise I overtook.

Q. And how did you conduct that data analysis exercise?

A. Yeah, so with this one, this is a compilation of site-wide water balance data. So figure 4 is from site-wide water balance, and what this demonstrates is that net diversion, so any water that is not reclaimed water, you can see the downward trend through mine life. So that's pretty much straight up output from site-wide water balance, but good to understand how water usage trends throughout mine life. And then what we did here to understand what potential impact stream flows would be resulting both from, well, the existing conditions and then the 20 percent reduction, so figure 5 is a hydrograph. This is the East Fork, South Fork downstream of Sugar, so a summation of the 1415, 1250 gauges. The gray lines is the historical record



for this data, which years are maybe in the 10 years. The blue line, the blue solid line is the average. The average of the hydrograph. And then going down to these dotted lines, that would be the expected stream flow with the low flow condition when flows are less than 25 cfs.

Q. And is footnote 4 on the previous page, which would be PRI4712, does footnote 4 describe what years are evaluated there?

A. It does, yeah, 2012 through 2021.

Q. So the trend on the previous page was done with a site-wide water balance, and then this graph that you were just discussing or these graphs that you were just discussing, was that an output from the hydrologic model?

A. It is not. This is observed data from the U.S.G.S. gauges.

Q. So how did this data inform the voluntary conditions that were proposed?

A. So what we were interested in understanding is really what would be that stream flow rate, primarily with the interest of being -- with this block, downstream of Sugar, what would be the overall stream flow impact with the low flow condition? Would there be a, you know, detrimental effect to fish downstream of where we're talking about? And so what we can see is that, you know, even with the low flow condition, that we are still within the normal -- well,



within the dataset seen within that 10-year period.

Q. So you're saying with the condition were within the dataset seen from that period evaluated?

A. Yeah. Yeah, in this, just to give a little bit more detail here, so this flow of 20 percent diversion is just a straight-up 20 percent diversion off the median. It is not -- it is not anticipated diversion rate or anything along those lines. It's a simple mathematical 20 percent of that average flow.

Q. All right. And so you said this is -- this is data for below the confluence of Sugar Creek?

A. Uh-huh (affirmative).

Q. And I believe Mr. Scanlan testified to this earlier, but why use below the confluence of Sugar Creek?

A. Yeah. There's a couple of reasons. Mr. Scanlan had stated the project footprint that does extend into the Sugar Creek Drainage, and then as well -- so, there's two other items here that I want to touch on, is that one is that we are very high in the drainage in that as you go downstream, you're opening up miles and miles and miles of drainage, of habitat, of streams, essentially. And so looking at, you know, what the -- what the project impact is offsite point of compliance approach DEQ for groundwater, like what would be the offsite project impacts and what is the project's impact to this, you know, miles and miles and

miles of stream flow? The other thing to consider is that with this, it's been identified that the reach between the tunnel and Sugar Creek, the most critical function is fish passage, and we're still maintaining that that function is maintained. And so while -- we're looking at an aggregate flow from the project area, we can still evaluate what the project impacts are from the last diversion on through where this point of modification is.

Q. So let's turn to -- from Ms. Franolich, let's go to page 9 of the exhibit, and that's Perpetua 4706 on the bates numbers.

A. 4706?

Q. Yes. And that should be the proposed conditions or the low flow conditions as we've been referring to them.

A. The map on 05?

Q. It should be 3.1.

A. Yep, yep, gotcha.

Q. All right. So we just walked through the expected effects in the hydro model. What effect would you expect to see with these conditions applied?

A. Relative to the hydro model, we would expect to see that the simulations in the hydro model over-predicted depletion because those are not limited to this 20 percent.

Q. So essentially where you see a depletion in well water situations, these conditions would reduce the amount



of that depletion?

A. When the depletion is greater than 20 percent, yes.

Q. And based on the modeling, what effect would these conditions have on Perpetua operating the Stibnite Gold Project?

A. So just in general terms, this would affect the throughput of the ore, and what that would mean is that you still have to reach your annual throughput objectives, and so it would be an offset in timing, whereas you could process more during higher flow periods. So your -- what we talked about before, the 7.25 maximum from the site-wide water balance, you would expect to see that increase during the higher flow periods because you have to have more water to process the stockpile of ore that was -- that you reduced to account for a lower water condition.

Q. And in your opinion would Perpetua still be able to meet its water demands even under these conditions?

A. I believe so.

Q. I'm going to hand you what's been marked Exhibit 63 and 64. Go ahead and take a look at those two real quick. Are those the other two expert reports you assisted in authoring in this matter?

A. Yes, sir.

Q. Is -- what is Exhibit 63?

A. 63 is rebuttal to the Nez Perce Tribe and Save the



South Fork Salmon Fisheries expert reports.

Q. And that is 63?

A. Oh, that's bad. We're all locked in here now. Talking too much. Yes, I've got the rebuttal for fisheries at 63.

Q. All right. And what is 64?

A. Is the rebuttal to the hydrology report to the Nez Perce Tribe hydrology report, expert report.

Q. And what role did you play in drafting these reports?

A. Yeah. Once again my team, in general, was primary authors of these reports. I had a role in drafting the technical aspects as related to the water right impacts on water -- on stream flow. Particularly in the fisheries report, the strictly fisheries content, fisheries commentary came from our fishery experts and not from me. It was my job to set the hydrology context, hydrological context.

Q. All right.

MR. FOSTER: I would move to admit Exhibit 63 and 64.

HEARING OFFICER: Any objection? Hearing -- hearing no objection, we will admit Exhibits 63 and 64 into the record at this time.

Q. (By Mr. Foster) And does Exhibit 64 respond to the report that Ms. Kaiser prepared for the Nez Perce Tribe?

A. It does.



Q. And does that report, Exhibit 64, also respond to comments made by BAS Groundwater Consulting that are attached to Ms. Kaiser's report?

A. It does.

Q. Although your Exhibit 64 was filed concurrently with BAS' Groundwater Consulting's rebuttal report to the water rights expert report, does the hydrology report in some ways also respond to that report?

A. It does.

Q. You heard Mr. Scanlan testify earlier about his opinion on the conclusions contained in the BAS groundwater rebuttal report, which is Exhibit 318. Let me hand you 318. Check my exhibit this time. And is that the rebuttal?

A. Yes.

Q. And have you also reviewed the conclusions of this report, if you go to page 9?

A. I have.

Q. And do you generally agree with Mr. Scanlan's evaluation of the conclusions?

A. I do.

Q. And then with regard to conclusion No. 2, have you reviewed conclusion No. 2?

A. I have.

Q. What is conclusion No. 2?

A. Conclusion No. 2 is: Perpetua did not determine

the impact to the East Fork, South Fork Salmon River stream flow from a diversion of 9.6 cfs with the Stibnite, HSSM, the Stibnite hydrologic site model.

Q. And do you agree with that conclusion?

A. I do agree with that conclusion, and for very good reason, is that the water demand, the water diversion, comes from the site-wide water balance and at no point in time is the expectation that there be a 9.6 diversion demand for a full month, and therefore, if the Stibnite hydrologic site model were to assess impacts of this rate, it would be an artificial simulation that would not be representative of expected conditions.

Q. Have you reviewed conclusion No. 4?

A. Yes, I have.

Q. And what is conclusion No. 4?

A. As stated: Perpetua did not evaluate impacts from the diversion of runoff, the volume of water that it caused could be potentially significant.

Q. And do you agree with that conclusion?

A. No, this statement is false.

Q. How so?

A. Because the Stibnite hydrologic site model explicitly accounted for runoff in the hydro model, and then this is also accounted for in the site-wide water balance. The way that this was handled was essentially the area of



features, the area of mine features, was withdrawn or taken out of the area by which precipitation could hit. So you have a drainage. You've got a fifth of that is covered by a mine facility. So if you have a hundred acres, then you only simulated runoff from 80 acres, and that 20 is managed.

Q. So, and in this specific context you're talking about freshwater, and I don't know if the conclusion is talking about freshwater. But when you're talking about removing mine features --

A. Well, this is capturing runoff at the Stibnite. So this is talking about contact water. This is what I'm talking about, that the hydro model specifically accounted for management of contact water by withdrawing that water from the system.

Q. So it withdrew the contact water from what would otherwise be accounted for in the surface water flows?

A. Yes.

Q. And remind me, did the site model then also account for water treatment and discharge?

A. It did.

Q. All right. Have you reviewed conclusion No. 5?

A. I have.

Q. And what is conclusion No. 5?

A. Perpetua double-counted its release of treated water by reducing its calculation of water use by the amount



of treated water released in its proposed condition.

Q. And do you agree with conclusion No. 5?

A. I do not.

Q. And why is that?

A. So the unimpaired flow which is akin to the natural flow calculation of water it's accounting essentially assesses what would be the stream flow, absence of any human influence. And so the way that calculation works is you have the flow at the end of the system. That's a measured quantity, and then you have your diversion rate and your treated water. And so this component, which is the human influence, the treated water is subtracted from that diversion rate, and therefore, when you add this to the observed flow, it is not double-counted. You have explicitly taken this treated water that is observed at the gauge and measure data out from the system.

Q. So you're removing the treated water from the unimpaired flow?

A. You are.

Q. Is that correct?

A. Yes, sir.

Q. But you're adding the diversion rate back into the unimpaired flow?

A. Yes.

Q. So does -- will unimpaired flow ultimately be



reflected at -- like, would you see this unimpaired flow and what's at the gauge is the same number?

A. No, you would not. The unimpaired flow would be a calculation of what would be at the gauge in the absence of the project.

Q. All right. And the unimpaired flow takes out everything that Perpetua is doing to affect the water?

A. It accounts for it, yes.

Q. So water treatment and diversions?

A. Yeah.

Q. Surface and groundwater diversions?

A. Yes, yes. The diversions will be -- you know, it's anticipated that diversions would be metered, so we'll have an idea of our diversion rate. We have an idea of treated discharge water, and we have an idea -- a stream gauge that records stream flow. All these values are just that, it's just a calculation to assess what the flow would be in the absence of the project.

Q. All right. Have you reviewed conclusion No. 6?

A. Yes, I have.

Q. And what is conclusion No. 6?

A. Perpetua artificially decreased its projected impacts to stream flow in the East Fork, South Fork by comparing SGP water use to stream flow on Sugar Creek rather than only stream flow East Fork, South Fork above Sugar

Creek in its proposed condition.

Q. And do you agree with conclusion No. 6?

A. I don't believe so, no. I don't agree with that.

Q. And why is that?

A. Because the impacts above Sugar Creek are easily calculated, and so that's some of the information that has been presented in a number of avenues, number of documents. What is -- what this is doing is essentially basing a diversion rate on a more representative value for the drainage, which is an important metric. So I do not believe this -- I do not believe this to be true.

Q. Do you have Exhibit No. 215 in that binder right in front of you?

A. I do.

Q. And what is Exhibit No. 215?

A. It is the Nez Perce Tribe's expert -- expert report. This is the hydrology report authored by Dr. Kendra Kaiser.

Q. And is this a report that your rebuttal reports that you have assisted in preparing responded to?

A. Yes, sir.

Q. All right. Let's go to the conclusions of this report, which are on page 15. And have you reviewed the first conclusion in this report?

A. I have.



Q. And what is that conclusion?

A. Perpetua's site-wide water balance model does not reflect the full potential effect of the proposed water rights on surface water because they never modeled a scenario under which they divert the maximum amount of water sought under their water applications. This means that instantaneous stream flows in the East Fork, South Fork Salmon River could be lower than shown in any of the figures provided in their reports to potentially be zero cfs, even without consideration of climate change effects.

Q. And this is similar to one of the conclusions that was in the BAS Groundwater Consulting report, correct?

A. It is. It is. It would be illogical or probably a better word, inappropriate, to represent that 9.6 cfs at the modeling time step because that would overflow the system.

Q. And could you model it on a daily basis?

A. Not in the current construct, not likely. It wouldn't really mean anything if you tried to, because you wouldn't have the resolution and the data and the modeling and the understanding of the operations to say that this would be what would happen.

Q. So even if you did model it daily, it wouldn't be a very reliable output?

A. That's right.

Q. All right. Have you reviewed the second



conclusion?

A. I would also say that another objection I have with this first bullet is that it could potentially be zero cfs. I do not agree with that because of our low flow condition. That by nature leaves 80 percent of stream flow in the system during low flows.

Q. Any other thoughts on this condition before I move on?

A. No, sir.

Q. All right. Have you reviewed the second condition, or the second conclusion?

A. Yes, I have.

Q. And what is that conclusion?

A. Perpetua's analysis and figures provide Stibnite hydrologic site model and site-wide water balance revised proposed ashin (phonetic) ModPRO2 report obscure the potential impacts of water diversions on East Fork, South Fork Salmon River.

Q. And do you agree with this conclusion?

A. I do not. This is hard to interpret. I'm not sure exactly obscure the potential impacts of water diversions. I'm not a hundred percent sure what this is eluding to. However, the justification paragraph or the rationale below suggests that not sufficient information was provided in the report. However, that November through February timeframe



is exactly our calibration target. That is a low flow period of the project, and so I believe that this comment is including to a potential criticism of the model that is not warranted.

Q. Is there -- would there be any other data you could have used to reliably update the model?

A. Not to -- not to simulate and predict this critical period, the low flow period and the modeling. And as I noted before here, is that because this is a groundwater model predominantly, this November through February is the most relevant period to calibrate to. So because it is the most -- it is the time of the year when the surface system is most dependent on the groundwater system.

Q. Can you break that down for me? So the surface system is most dependent on the groundwater system in November through February in the winter months?

A. In low flow periods, generally, because your system -- you don't have a surface water inflow or is negligible compared to what is being contributed by the alluvial groundwater system.

Q. So why is this the low flow period?

A. Well, based on hydrographs, it's just the lowest time. It's the lowest stream flow of the year.

Q. Thank you. Have you reviewed the third conclusion in the report?

A. I have.
Q. All right. What is that conclusion?
A. Perpetua's no actions Stibnite hydrologic site model output does not produce summary statistics similar to historic conditions during low flows. Rather produce low flows would be higher than flows actually observed at U.S.G.S. gauges.
Q. And do you agree with this one, this conclusion?
A. I do not. There's a couple of issues with this. I mean, as inferring from the information in the report: One is that this conclusion, I believe, was developed based on analysis of the 95th exceedance. That is an extremely low flow condition. A hydrologic model, a model that is designed to output the expected condition should not be expected to represent this exceedingly rare low flow condition. Secondarily, the evaluation, the data processing that is described in the report, is vague and incomplete as to what the actual processing was. I'm accustomed to the 95th percentiles for a monthly description being based on daily data. That's a typical conventional approach to it. However, with the Stibnite hydrologic site model we do not have daily information that can be utilized to develop a monthly 95th percent exceedance.
Q. So let's go back to Exhibit 25B, which should be the hydrologic site model. Let's go to page 132. Does this



reflect what you were describing?
A. It does. It does. You can see that we are over and under the measured flows depending on the year. Most blatantly we have an overestimation in latter part of 2015; however, leading into that we have an overestimation leading into 2013 pretty much the same, you know, a very well matched model going into 2014. 2015 we are actually underestimating observed flows. 2017 we are underestimating observed flows. 2018 is essentially a match to that line, at least the upper and lower ends of that. And 2019 we are a little bit above that. This variation, this deviation from the observed should be -- well, is expected and is certainly well within a high performing model range.
Q. And is this also reflected on page 134?
A. It is. In these -- yes, it is. It is.
Q. Which gauges are those?
A. The 800 gauge is the gauge that's up East Fork, South Fork above Meadow Creek, and then the 1,000 gauge is the East Fork, South Fork directly downstream of Meadow Creek.
Q. All right. And what about on page 134?
A. 1250 gauge is the East Fork, South Fork just above Sugar Creek, and the 1450 gauge is Sugar Creek.
Q. All right. Any other observations on conclusion -- on the third conclusion?



A. I'd have to -- no, I do not have any other.
Q. All right. So let's go back to Exhibit 215, page 15, yes. Have you reviewed the fourth conclusion of Dr. Kaiser's report?
A. I have.
Q. And what is that conclusion?
A. Due to Perpetua's failure to account for climate change there could be less water in the East Fork, South Fork Salmon River during low flows and less groundwater than Perpetua has predicted and it could have under-predicted the amount of time it would take for groundwater levels to rise.
Q. And do you agree with that conclusion?
A. I do agree that there could be less water than the period simulated. There could be more water than the period simulated. Climate change will likely have an impact on longterm water resources in the Northwest. What I would expect into the near term was that increased climate variability will lead to low stream flows, as well as high stream flows. The impact that Perpetua would have on the no actions, so climate change would affect the project area in the same way with or without the project, that the change in stream flows because of the project would likely remain the same. And that's supported with the site-wide balance analysis that showed that under a variety of climate conditions that diversion demand would not be largely



affected. Not be meaningfully affected. So the impact of the project would likely stay similarly under climate change scenario and (inaudible) climate change scenario.
Q. So let's break that down a little bit. You are saying that because the hydrologic site model measures essentially the level of deviation from the baseline or the impacts versus the no action alternative, climate change would feed into both of those scenarios, so you would expect to see in both of those scenarios and the Delta between those two scenarios wouldn't change?
A. Yes, that's correct.
Q. Is that right?
A. That's correct.
Q. All right. How long is the Stibnite Gold Project expected? What's the life of the mine expected to be?
A. 15 -- well, including the construction period, it would be about 18.25 years until reclamation begins, closure.
Q. And what expect -- or what effect do we expect climate change to have in that time period?
A. Yeah. You know, the effected and it's detailed in Kaiser's report, you know, there's examples in the 30-year history of lower peaks, peak no water equivalent in a nearby climate. You know, we are not immune. The project isn't immune to these impacts. It's inconclusive as to what

climate change will mean at a continual basis. There's not necessarily a downward trend or a significant downward trend in base flows, and so it's just hard to assess at this point in time what would the actual impacts of climate change be to the project site within the next 15 years.

Q. And the hydrologic site model, then the site-wide water balance are based on quite a bit of data; is that correct?

A. They are.

Q. Do you have enough climate change data to influence or recalibrate the models?

A. It would be difficult to calibrate the model with a climate change scenario. With a climate change model of predicted conditions. Because the meteoric water balance parameters in the meteoric water balance are calibrated with a hydro model, you have to be able to replicate the past condition before you can replicate the future. And because of this constraint, it would be difficult to have a reliable hydrologic model that would project the impacts of the Stibnite hydro project into the future. It should be noted that within site-wide water balance we do utilize 120-year period. That is the basis of the stochastic output, the basis of those probabilistic outputs, and within that time period I would have to imagine that conditions that we will encounter in the next 15 to 20 years would be represented



within that dataset.

Q. All right. Thank you. Have you reviewed the fifth conclusion of Dr. Kaiser's report?

A. Yes.

Q. And what is that conclusion?

A. If Perpetua's proposed conditions were implemented, i.e., leave 80 percent of stream flow remain below confluence of East Fork, South Fork Salmon River to (inaudible) drop below 25 cfs, East Fork, South Fork Salmon River at Stibnite would drop below 7 cfs from August through April (inaudible) flow is below the confluence of the East Fork, South Fork Salmon River and Sugar Creep drop below 17 cfs.

Q. And is this conclusion addressed in your expert report, your hydrology expert report, on page 25?

A. It is.

Q. Exhibit 64?

A. It is.

Q. So do you agree with this conclusion?

A. I agree that flows could drop below 7 cfs. I don't know that it would necessarily be dictated by a combined flow of 17 cfs.

Q. So will you walk me through your expert report response to this conclusion?

A. Yes, certainly.



Q. Exhibit 64 at 25.

A. So what this evaluation looked to do -- let me get to the page here, was to run a scenario analysis here. And so what we have here in figures 13 and 14 is essentially a low water year, which was 2015. It's the second lowest water year within the period of record that we have for the 1250 gauge. Yeah, well -- yeah, 1250 gauge. And then average water year, and on these plots -- we're going to get -- put up there so we can see.

Q. What did you want?

A. 25.

Q. Is it Exhibit 64 or Exhibit 63?

A. I'm in 63 right now.

Q. Okay, it's Exhibit 63.

A. Okay.

Q. That's why. I had the wrong number. Very good.

A. Yeah. So, again, now that we are all looking at this, the top plot is low water year. The bottom plot is average water year. The next page is a high water year. And what is shown on this plot in the gray line, excuse me, is the East Fork stream flow within for that year, that's the 1250 gauge. Plotted over this line is the expected diversion rate from the Stibnite -- or from the site-wide balance water model, and then the maximum allowable diversion rate it's either 9.6 or 20 percent of stream flow



-- 20 percent of the stream flow of the East Fork above Sugar and Sugar. So essentially what we have here is demonstrating the range of conditions between what's expected and the maximum diversion rate.

Q. Mr. Stanaway, will you just remind us where that 1250 gauge is?

A. 1250 gauge is on the East Fork above Sugar.

Q. Fairly close to the confluence, though?

A. Yes.

Q. Okay. Very good.

A. And so on this line -- on this plot also the solid black line is a line denoting 6.6 cfs for which hydraulic modeling in the reach below the tunnel was conducted for -- to insure passage of fishery of the three species of concern and then within the tunnel as well. So we have this as denotes, you know, this condition by which you -- by which (inaudible) chinook needing the most water could freely pass. And what we see here in 2015 in low water year is that, yes, with what is that blue? So expected diversion rate and by and large the maximum allowable diversion rate at the end of the season, those become pretty much the same thing. Is that we are hovering right around that 6.6 cfs rate. So while you can be less than 7, the function of that reach is maintained in this low water year. You can see that in these other plots, at least figure 14.

Q. And so figure 13 is the low water year, and then figure 14 is your average water year. So what is the difference between those two years or those two types of years?

A. Yeah. Essentially what that base flow level is that August through December timeline, and I would also note here is that we really see this -- this, where we get down to the lower flows, is in this October 1 through, you know, October 1 through the end of the year, let's just call it. And our sensitive species have passed the system by that point in time.

Q. So there's less need for that level of flow --

A. Yes.

Q. -- if the species have passed the system? Are there any other points on conclusion six?

A. No.

Q. Or, excuse me, conclusion -- the fifth conclusion. So have you reviewed the sixth conclusion?

A. I have.

Q. And what is that conclusion? And, again, that's Exhibit 215 at 15.

A. Perpetua's proposed conditions place proposed quantification for the water right condition below the confluence of Sugar Creek, this location makes it difficult to accurately determine the effects of Perpetua's proposed



water rights at the lowest in the East Fork, South Fork Salmon River.

Q. And do you agree with that conclusion?

A. No, I don't. It's easy to quantify the effects upstream and downstream of Sugar Creek, no matter where that point of quantification is.

Q. And how do you quantify those effects?

A. Of the -- I mean, it's described in the condition is the flow is estimated by summation of two gauges, the East Fork, South Fork 1250 gauge, the Sugar Creek 1450 gauge, and then you can look to see what that 20 percent is or 20 percent of that flow, and you can either propagate that upstream to the 1250 gauge or propagate it downstream to the sum of those flows. So the actual impact of that is very easy to determine.

Q. So even though your point of quantification is below the confluence of Sugar Creek, you can still see what's happening in the system?

A. Yes.

Q. All right. And then have you reviewed, I guess not the seventh conclusion, but the last bullet point in Dr. Kaiser's report that appears to be more of a recommendation?

A. I have.

Q. And do you agree with that one?

A. I do.



Q. Will you walk me through that?

A. Yeah. So as stated -- well, here, let me read it: In order to accurately and reliably monitor flows in the East Fork, South Fork Salmon River, I recommend that a monitoring location be set directly below the point of diversion on the East Fork, South Fork Salmon River above Perpetua's proposed fish passage tunnel so the affected diversion upstream of this point and at that point of stream flow can be directly quantified. I also recommend a current stream flow monitoring location should replace in place where possible to maintain a consistent hydrologic record. I agree that the water diversion should be monitored at all critical locations.

Q. All right. Mr. Stanaway, we've been through quite a bit in your testimony, and it's getting late. But just a couple more questions for you. So in reviewing the hydrologic site model, the site-wide water balance, is it possible to have a hundred percent certainty in either of those models?

A. Not a hundred percent certainty.

Q. And do you, in your opinion, do you believe that those models adequately account for uncertainty?

A. Yes, they do.

Q. And do you believe that those models adequately or accurately reflect the hydrologic conditions and the water



needs of the Stibnite Gold Project and at the site?

A. I do.

Q. And do you believe that Perpetua's, in its water management and its water management planning, do you believe that Perpetua's soft balance environmental protection with its need for water?

A. Yes.

Q. And in your opinion, based on everything we've just talked about, will there be sufficient water supply available to meet Perpetua's water needs at the site?

A. Yes, there will be.

MR. FOSTER: All right. No further questions.

HEARING OFFICER: Let's go off the record just a second.

(Recess.)

(Reconvened.)

HEARING OFFICER: Okay. Before we -- we are back on the record. Before we get into cross-examination, we'll probably put that off to day 2 of this hearing. I do have a couple questions for you, Mr. Stanaway.

EXAMINATION

BY HEARING OFFICER:

Q. So we talked about access dewatering flows that are coming from groundwater. Where will those access flows be injected back into a creek?

A. Yeah. There's two planned. One is near the truck shop or the mill site processing site, and so that's on the East Fork, South Fork near the -- you know, near the confluence of Meadow Creek. The other point is up on Meadow Creek that is near to Blow-Out Creek or the East Fork Meadow Creek comes in. And that was intentionally designed so that this water that would be treated and discharged could help to supplement Meadow Creek stream flow and stream flows throughout the system.

Q. There's some discussion in some of these exhibits about lining Meadow Creek, and can you talk me through what effect that has on the modeling and how you incorporated that idea of lining some section. I guess maybe you can start by explaining what section of Meadow Creek is proposed to be lined?

A. Yeah.

Q. And how that influences the model?

A. Yeah, certainly. So the section in the ModPRO2 that is intended to be lined is really the enhanced reach of Meadow Creek so that goes from just above Blow-Out Creek all the way through to near the confluence with the East Fork, South Fork. So it's a long section that's intend to be lined. Within the section we have our -- the Hangar Flats. Dewatering would be occurring, and the majority, if not all of the industrial supply groundwater would be sourced from



there. So any absence of this liner there would be fairly large stream flow depletions. But with this liner and through the restoration of the creek, you know, there needs to be some support for that, some engineering support for it. You know, the opportunity has presented itself to maintain stream flows throughout that reach through this engineered design feature. So in the modeling of (inaudible) up there, essentially the way that it was handled was -- I'm not sure if it was a no flow situation, but essentially that exchange of surface water and groundwater was -- I'm not sure if it was completely shut off or if it was significantly reduced. One or the other, but essentially it looked at making or cutting off the surface water from the groundwater. And so what we have there is that because of the engineering design and Rio's work with that, the intent is to have a natural channel that behaves. And so there is a significant repairing corridor that's over the (inaudible) liner and so forth. But what we do see because of that is that the groundwater to Meadow Creek from the regional groundwater system, the regional alluvial system, is restricted. And so you don't have the recharge coming into groundwater, but you also don't have those -- the cone depression from groundwater pumping affecting Meadow Creek to the same degree.

Q. Is the proposal to remove that liner at the end of



the project?

A. It is not.

Q. That liner would remain in place into perpetuity?

A. Yes, it will be, and the stream is intending to -- and (inaudible) can talk more about this upcoming, but is the intent that the restoration design will essentially provide for all of the stream function, the unused surface groundwater, the hydro exchange, so forth, that would be associated with an exchange system without a liner.

Q. So would you turn -- I know you've got a lot going on up there -- to Exhibit 27A.

A. Yes.

Q. Do you still have that?

A. Yeah, I've got it right here.

Q. Okay. And so I've got it as page 76. There are two paragraphs here that kind of touch on the same topic, and something that jumped out to me was this discussion. Maybe if you can just take a moment and read through especially that second paragraph. At some point there must have been some -- I mean, as part of the modeling, some intent to limit the diversions from that Meadow Creek or Hangar Flats area to .5 cfs. What am I supposed to make of this paragraph? Is Perpetua proposing that as some sort of limitation on diversions?

A. That should be a question for Perpetua. This is



not the intent to limit that. What was designed in the modeling was a -- was an approach that would limit those stream flow impacts. And really what should be taken from this is that the intent would be to utilize those flows to the extent reasonable to maintain stream flow conditions. And this 0.5 was showing the modeling. In reality that rate will be dependent on stream flows, the well field, capacity, and various other influences.

Q. So when the 0.5 cubic feet per second amount was modeled, was the intent to limit the impacts of groundwater diversions to gains in the stream, or how do I reconcile, I guess, this paragraph to what we just discussed with the liner and the modeling to not have an interaction between Meadow Creek and the groundwater?

A. Yeah. So even with the liner, a cone depression can extend up-gradient of that, and because the industrious supply wells are further up in the drainage then you can have that cone depression extend essentially up gradient of the head of that liner. And there is still losses to groundwater even with a liner there. So what it is, is -- yeah, I mean (inaudible) mitigation measure, but it's essentially attenuation of that impact, whereas you're pumping the alluvial groundwater that is, you know, in absence of that liner would have that direct connection to surface water. And so what we are doing now is, or what the

ramification of that liner is, is that the -- that the diversion rate from groundwater isn't manifest in the stream flow one to one. It's attenuated quite a bit.

Q. Is .5 cfs -- if I understand kind of how you constructed the model, that would be a monthly average diversion rate?

A. Uh-huh (affirmative).

Q. So .5 cfs diverted over an entire month?

A. Yes.

Q. That's high. That's not a peak rate, and so that's not what this paragraph is proposing is some peak instantaneous limit, but it's looking at a month long?

A. It is a monthly time step. The modeling that we have here in site-wide water balance and Stibnite hydrologic site model cannot quantify that instantaneous rate.

HEARING OFFICER: Okay. Those were the few questions that I had noted. We will wrap up there and go off the record. Thank you.

(Recess.)

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BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF APPLICATIONS FOR PERMIT 77-14377, 77-14378, 77-14379, APPLICATIONS FOR TRANSFER 85396, 85397, 85398, AND 85399, AND APPLICATION FOR EXCHANGE 85538 IN THE NAME OF PERPETUA RESOURCES OF IDAHO, INC.,

TRANSCRIPT OF THE HEARING
HELD ON THE 12TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 13TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 14TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 15TH DAY OF DECEMBER, 2023

BEFORE: MR. JAMES CEFALO, HEARING OFFICER

TRANSCRIBED BY: KEITH EVANS, RPR, WA & ID CSR NO. 655



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BE IT REMEMBERED that the above-entitled matter came on for hearing December 12, 2023, at the Idaho Department of Water Resources, City of Boise, County of Ada, State of Idaho.

(Thereupon the following oral proceedings were had as follows, to-wit:)

HEARING OFFICER: Okay, we are back on the record. This is the beginning of day two of the hearing, Tuesday morning. Mr. Stanaway, you're still on the stand, and I'll just remind you that you're still under oath in the testimony you're about to give. Who is going to go first for cross-examination?

MR. LOPEZ: I am, Officer Cefalo.

HEARING OFFICER: Mr. Lopez, if you would make your way up here. And I, actually, am going to ask just one more question while he's coming up and getting situated.

EXAMINATION

BY THE HEARING OFFICER:

Q. Mr. Stanaway, can you actually pull out, what is this, Exhibit 25B that's been admitted?

A. (Inaudible.)

Q. Okay. As we -- after our discussion yesterday at the end of the day, I just felt like maybe having a map and asking some of those same questions would help settle in my mind exactly what is going to happen with that Meadow Creek

area. And as I went through the record, I thought that maybe this 25B was a good place -- or it just provides a pretty good map.

A. It does.

Q. So maybe page 24. So these are a series of maps that show how the mine, I guess, will change over the course of the proposed lifespan of the mine. And I chose page 24 just because that's far enough in that a lot of those wells in the Meadow Creek area are already shown on the map or dewatering wells but also production wells.

A. Yeah.

Q. So as I'm looking at this map, I can see here on the south end the Blow-Out Creek headed north and where that comes in. I also see that there are manmade channels that are going to be constructed around the tailing storage facility, right?

A. Yes.

Q. And those are shown in pink?

A. Yeah.

Q. Are those manmade channels going to be lined?

A. These are -- that's a good question for Gene.

Q. Okay.

A. Yeah. Let's save that for Gene. I don't recall if they are lined or not. I believe that they are -- well, yeah, it is because you have the legend here says diversion



ditch line, so that's to collect and clean water coming off the hillside, the hillside runoff. So in the thread of keeping clean water clean.

Q. And then I believe that this stream, the green, is going to be the reconstructed portion of Meadow Creek, and I guess even part of Blow-Out Creek.

A. Uh-huh (affirmative).

Q. That begins there kind of in the SODA pond area and extends down to almost the confluence of the East Fork, South Fork. So -- and you had testified yesterday that that also -- those areas will be lined.

A. Uh-huh (affirmative).

Q. So where would the groundwater pumping -- as that cone of depression forms, where -- what streams, then, would be affected by that groundwater pumping?

A. Yeah. It's predominantly here with Meadow Creek, and you can see how as your supply wells extend, I guess, southwestward up above that line area, and so you've got a cone depression arising from those wells. And then you also have, right around the Hangar Flats Pit, you can see that the wells extend off the liner towards the Hangar Flats. Cone depression is right in there. And so with the dewatering, you know, the max dewatering rate, there is a 3.5 cfs, but the cone depression for associated with the dewatering of the Hangar Flats Pit is much larger than the



industrial supply wells. But the groundwater levels in that area are depressed because of those two -- those two withdrawals.

Q. Could that cone of depression extend, then, to affect flows in the East Fork, South Fork on the north end?

A. It doesn't go that far, no.

Q. Okay. Thank you. So, Mr. Lopez, you can proceed.

MR. LOPEZ: Thank you, Officer Cefalo.

CROSS-EXAMINATION

BY MR. LOPEZ:

Q. Mr. Stanaway, good morning.

A. Good morning.

Q. Yesterday I believe you testified that you modeled .5 cfs groundwater pumping from the supply wells around Meadow Creek would occur under the 9.6 water right application; is that correct?

A. Yes, sir.

Q. And that pumping would occur even under low flow conditions; is that correct?

A. It could, yes.

Q. You also testified that the modeling exercise caused your model to crash. Did I get that word right?

A. It did, yeah. There was a numerical imbalance. So to back up there, not at the 0.5 cfs. The 0.5 was an evaluation after an evaluation. Previous to development of



that threshold, we did not have the surface water intake, and so all of that additional water sums to be about 4 cfs, give or take, maximum peak came from those wells, and with that -- with the industrial wells that are above the liner, there was -- they had numerical instabilities. And so the model crashed itself, but it also related to eventually sucking the system dry.

Q. So you refer to numerical instabilities. Is that why the model crashed?

A. Yeah.

Q. Any other reasons why the model crashed?

A. Well, the model couldn't -- so the instability is because the model can't find solution because there's essentially no more water there and relating to that, like bringing that numerical world into the physical world, that would relate to essentially the groundwater and streams going dry.

Q. And just to make sure I understand. The model crashed if you put in any amount of pumping from wells around Meadow Creek above 25 cfs?

A. No, no, not -- no. It was only at that maximum rate. The additional water needed, the model crashed.

Q. And your modeling indicated that 9.6 cfs would dry up Meadow Creek; is that correct?

A. No. 9.6 cfs was never simulated to be withdrawn

from Meadow Creek. That is an unlikely scenario. We have -- right now as the plan is outlined, 0.5 industrial wells, and then from the Hangar Flats area (inaudible) dewatering so just about slightly under 3.5 cfs. And it should be noted that while Hangar Flats is being dewatered, the industrial wells are largely inactive.

Q. So just to clarify, the modeling indicated the withdrawing 9.6 cfs from the groundwater would dry up Meadow Creek? Am I not getting that right?

A. No, no. 9.6 was never simulated to be withdrawn from groundwater in one location or overlapping.

Q. So is it fair and accurate to say that you were unable to model the effects of 9.6 cfs water right on Meadow Creek?

A. If we tried to pull 9.6 cfs from groundwater diversions from Meadow Creek, we would be unable to model that. The model wouldn't handle that situation.

Q. Give me a second here. So would it be fair and accurate to conclude based on the modeling results that you did perform, Mr. Stanaway, that should there be a condition on Perpetua's water rights leaving groundwater supply well diversions around Meadow Creek to .5 cfs to prevent drying up the creek?

A. That's a policy question that Perpetua would have to answer. I will note, however, that is not -- anything



above 0.5 wouldn't dry up the creek. It was when that full freshwater demand was taken. So that's four to four and a half, somewhere in that ballpark for the peak. That was a situation that would essentially lead to the stream drying up.

Q. But you indicated that's a policy question for Perpetua?

A. It is.

Q. I'm going to refer you to Exhibit 25. Now can we please pull that up?

A. 25B?

Q. Yes, and it's admitted, Exhibit 25B. This is the final hydrologic site model proposed action report.

A. Yes, sir.

Q. Looking at figure 4.4.

A. Which page?

Q. Let's see, I think it's bates No. 2521.

A. Almost there.

Q. Okay.

A. Yes, sir.

Q. Great. Looking at figure 4.4, Mr. Stanaway, what is the uncertainty or percent difference of the surface water or model predictions to the observed values for Meadow Creek during the low flow periods?

A. You know, I haven't calculated a percent difference



based on these flows, and I don't know. It could be in this report, but I'm not (inaudible) what the percent difference is. We have our -- well, I guess (inaudible) in the tables on the previous page, the description of actual cfs should be tabulated. So at the 850 gauge -- you know, it looks like a maximum in November of 1.23 cfs depletion. I'm reading this quickly. I may not be interpreting this correctly, but apparently that is what it looks like.

Q. So is it hard to interpret the model performance at low flows from those figures provided?

A. No, it is not. It would take a moment to read through this. I'm just glancing at this table. And with my background information, making conclusions based on this, but I haven't read this text recently.

Q. Okay. Very well, then. Let's now look at table 4.6. That's page 131.

A. Okay. Yes, sir, and then that's what I was referring to.

Q. Okay. Can you please take the range of the minimum residual error for the East Fork, South Fork above Sugar Creek?

A. The minimum residual is at negative point -- well, I guess it ranges from a negative 1.1 cfs to a negative 1.88 cfs.

Q. One point -- can you please repeat those ranges?



A. Yeah. For the East Fork, South Fork above Meadow Creek --

Q. Above Sugar Creek.

A. Oh, above Sugar Creek. I'm sorry. Yeah, so minimum residual is -- it ranges from a negative 3.23 to a negative 4.96.

Q. Thank you. So this is stating that when the East Fork, South Fork Salmon River is in a low flow period, let's say the model predicts 11 cfs, the actual stream flow could be as low as 6 cfs; is that correct?

A. Moving forward, so that is the calibrated. So, yes, at the minimum -- while at the greatest underestimation here, that would be the case.

Q. Thank you. Were stream flow model calculations statistics calculated for each month in ModPRO2?

A. No, they were not. Only the calibration period, November through February.

Q. Is it fair and accurate to say that common hydrologic practice includes reporting moderate calibration statistics for the entire model period?

A. For every month that is (inaudible) a calibration target.

Q. In ModPRO2 you only reported the model calibration statistics for November through February; is that correct?

A. Yes, sir. Yes, sir.

Q. Okay. But that's not the only time of year when stream flows are low enough that the proposed low flow water right conditions would be in effect; is that correct?

A. That's correct.

Q. And why were those model statistics not reported?

A. Because they weren't -- the model was not calibrated to, I guess, be August, September, and October, and so if you can't have a calibration statistic if you don't calibrate your model to those targets.

Q. Why didn't you calibrate your model for those targets?

A. Because the absolute lowest period in stream flow in the system is November through February, and our base flows are the target because those are most strongly influenced by the groundwater. And this is a groundwater model.

Q. In your testimony yesterday was, Mr. Stanaway, you stated that the models accurately account for uncertainty; is that correct?

A. I did.

Q. So how can an external review confirm this without complete model calibration statistics?

A. We have provided complete model calibration statistics.

Q. Okay. You also testified yesterday that the model



calibration is very good; is that a fair --

A. Yes, sir.

Q. -- characterization of what you said? Is there a bias in the model calibration in how well groundwater elevations are matched in certain areas?

A. That's a very good question. There is a figure that describes that. At this time I haven't had an opportunity to review that. I'm not sure what that bias is. I would note, however, that it's not a uniform bias. So throughout the system is not consistently over or underestimating groundwater heads, but it's a spatial bias.

Q. So I'm going to refer you to figure 4-15 in Exhibit 25B.

A. Page number, please?

Q. Let's see what page is that figure? Figure 4-15 --

HEARING OFFICER: 141 is what I show.

MR. LOPEZ: Thank you, Officer Cefalo.

HEARING OFFICER: Okay, thank you.

A. Okay. Yes, sir.

Q. (By Mr. Lopez) So that figure shows groundwater model calibration residuals, correct?

A. Uh-huh (affirmative). Yes.

Q. What do those blue symbols represent?

A. Greater than simulated.

Q. And what do the red symbols represent?



A. That the observed is less than simulated.

Q. So figure 4.15 shows that there is a bias in the model calibration toward water levels that are too low near the Yellow Pine Pit, correct?

A. That appears to be so.

Q. So is it fair to say that the model is less accurate in the area of the Yellow Pine Pit and the fish tunnel that in project areas upstream of the fish tunnel?

A. So the basis of this is that to look at a specific area, such as you're suggesting, is really a misapplication of the model. We have a model that is developed and calibrated on a site scale, and the calibration that we had to do took into account all data points throughout the entire site from the southern end to the northern end. Groundwater and surface water were equally weighted. And so, therefore, you cannot prioritize a calibration in one area over another and sacrifice overall model performance. The overall model performance is very well at site scale is the intent of the modeling.

Q. So what is the average calibration error in your groundwater model, Mr. Stanaway?

A. The figure on this figure 4-14 on the previous page, page 140, demonstrates that we have a clustering of values surrounding that negative 10 to 10 feet. And so we assumed that there was that uncertainty with ground measured



groundwater heads is about a 10-foot uncertainty.

Q. So it's about 10 feet; is that correct?

A. Yes, sir, at maximum.

Q. So is it fair to say that Perpetua could drawdown the water table up to 9.9 feet?

A. I'm not following.

Q. Well, I'm just trying to understand the contours of the calibration error. Somebody said it's up to about 10 feet. You said it's about 10 feet, right?

A. Uh-huh (affirmative).

Q. And that's important because you only show groundwater drawdown contours of 10 feet and above, right?

A. Right.

Q. So my question is: Could Perpetua drawdown the water table up to 9.9 feet and, for example, Fiddle Creek or Hennessy Creek in that area?

A. Without the model demonstrating that is a drawdown?

Q. Yes.

A. No, sir, and let me take a moment here to explain. Because this model is a -- the way that this is modeled is that we have a no action condition and a moderate two condition, or the alternative condition, right. And so what we're looking at here is the same model that simulates both of those conditions. And so what we see here with your groundwater elevations is that deviation from the project

impact from the no action condition, and therefore, because the same model was used with the same uncertainty, that is an absolute, that residual should be interpreted as the quantity of drawdown that we would expect to see based on -- or in a relative nature to the existing conditions -- not existing conditions. The no action simulation. I'm sorry.

Q. What do you mean by, in a relative nature?

A. Well, because models are exactly that. You build a model airplane, it's not going to fly, right. It's a representation of reality, and what this -- what a groundwater model does is incorporates all of the best available data to say we have a understanding of the system. It's a conceptual model. Leads into a numerical model. When we say that it's a relative nature, the important thing here to recognize is that when we look at our no action condition, we shouldn't expect to see that no action condition will be the condition out there in year three, because the climate scenario could be different. There's other drivers that may force a deviation from what that condition may be. Well, the important thing with this model is that we are able to understand what the project impacts are relative to a no action simulation, so we need to look at this within a numerical framework.

Q. Okay. Thank you. Let's segue now to Perpetua's proposed water right condition. Excuse me. Mr. Stanaway,



what is the purpose of Perpetua's proposed condition?

A. The purpose of the condition is to limit diversions when stream flows are low. You know, the time of the year most critical to number of fish species, so that stream flow is maintained in the stream and the function of the system is maintained for those fish species.

Q. Thank you. Is it fair and accurate, then, to say that an important purpose of the condition is to protect this passage in the East Fork, South Fork Salmon River?

A. It is.

Q. I'd like to now review with you admitted Exhibit 63, please, if you could pull that up, which is your rebuttal fisheries report.

A. Uh-huh (affirmative).

Q. Section 3.3 of that report contains scenarios of stream flows in Meadow Creek and the East Fork, South Fork Salmon River using anticipated and maximum diversion rates; is that correct?

A. Yes, sir. Can we flip to a page -- can you get a page number for me?

Q. Sure. I'm just about to get there.

A. Okay.

Q. And this is your analysis, correct?

A. It is.

Q. So looking at figure 10.



A. Yes, sir.

Q. Okay. Can you please identify what the maximum percent depletion and stream flow in Meadow Creek is based on the Stibnite hydrologic site model or SHSM simulation?

A. Yes, sir. So in this plot it's a depletion of 40 percent. I will note, however, that this data comes from the Stibnite hydrologic site model, and the agreement and the condition that is proposed for low flow condition was agreed to after this modeling was done. So this situation demonstrates what a potential stream flow impact could be in absence of the low flow condition.

Q. In absence of the low flow condition?

A. In absence of low flow condition. You would expect to see in these periods -- or do see this depletion. These are late in the year. You would expect that that is a 25 cfs condition, and this would be no more than that 20 percent.

Q. Okay.

A. Pardon me. Pardon me. I'm sorry. This is -- this is not below. I'm sorry. The point still is there that the model -- Stibnite hydrologic site model does not recognize the low flow condition.

Q. So let's turn to figure 12 on page 3-15.

A. Yes, sir.

Q. So looking at figure 12, please identify what the



maximum percent depletion and stream flow in the East Fork, South Fork above Sugar Creek is, based on the SHSM simulation.

A. It's a negative 30 percent.

Q. So is it fair and accurate to say that the maximum percent depletion of stream flow gets higher as you go higher in the system?

A. These plots suggest that, as a percentage, not as an absolute value.

Q. So is it also fair and accurate to say that the impact of the mine decreases as you go downstream?

A. There's more stream flow. So as a percentage it proportionally less flow impact.

Q. So isn't it true, then, that having a threshold of 20 percent at the point of quantification will not capture the true impact of the mine higher up in the system where the percent depletion is higher?

A. I'm not sure what you mean by capture the full impact.

Q. Well, let me clarify, Mr. Stanaway. Will it reflect the full impact?

A. There could be more stream flow impact based on percentage in Meadow Creek than at the point of quantification.

Q. And what about the East Fork, South Fork Salmon

River?
A. Yes, sir.
Q. Now let's turn to figure 13 on page 3-17.
A. Yes, sir.
Q. Do you have that in front of you?
A. Yes.
Q. What is the title of that figure?
A. It is range of diversion rates and potential stream flow impacts in low water year.
Q. And this figure uses data from 2015; is that correct?
A. That is correct.
Q. And you testified yesterday that 2015 is the second lowest water year on record for the East Fork, South Fork Salmon River above Sugar Creek.
A. For the gauges that we have. It's 2012 to 2000. Now it's 2023 period of record.
Q. Why did you use the second lowest rather than the lowest year if you're trying to assess stream flow impacts from the proposed water condition in a low water year?
A. Yeah. It's a good point. The values, to my recollection, were very similar based on annual yield. So the amount of water use basin in calendar year or water year, whichever you prefer, 2015 was the data that we had simulated with the site-wide water balance so that we could



assess what these expected diversion would be with the stream flow condition. And at the time that modeling had taken place, the lowest water year -- and I can't recall which that is -- had not occurred yet, or was (inaudible). It was 2021, perhaps. And so there was essentially a situation of looking at this as a representative water year. And you can see that it doesn't say the lowest water year. It says a low water year, which is certainly accurate, and we had the data at hand to run this analysis.
Q. So looking at figure 13 again, I'd like to focus on the blue line.
A. Uh-huh (affirmative).
Q. What does that blue line represent?
A. It is the (inaudible) flow at the gauge with the diversion rate -- expected diversion rate, so the orange line subtracted out of it.
Q. Thank you. And the black line on that graph, that lowest straight line, what does that line represent?
A. Yeah. It's titled fish flow criteria, and that's probably a very poor legend labeling. However, what that is is the 6.6 cfs for which the tunnel and (inaudible) of the East Fork, South Fork between the tunnel outlet and Sugar Creek was (inaudible) and was deemed to be passable by all fish species in the period that they -- in their occupancy periods.



Q. Thank you. So my understanding of this figure, Mr. Stanaway, is that when the date when the blue line initially intersects the black line, that intersection represents when flows in the East Fork, South Fork Salmon River drop to the minimum flow criteria for fish passage as you've described it; is that correct?
A. Largely. It should be caveated, though, that the 6.6 is for Chinook. Gene will have to confirm that, which requires the greatest flow depth of the three species in consideration right now. And so even though we had a 6.6 it's -- well, other species could still pass, and it's reasonable to expect that at 6.6 and with flows less than that, that fish passage would still be available for all species.
Q. Thank you. So, again, referring to figure 13, can you please identify for us on that figure the date when the blue line initially intersects the black line?
A. It looks to be late August. I can't tell exactly what date.
Q. About late August?
A. Yes, sir.
Q. So yesterday, Mr. Stanaway, you testified that -- I believe you testified that the point when fish passage would no longer be viable was in October after the fish passage requirement was no longer necessary; is that correct?



A. Yes, I believe I stated that. Well, fish passage is through September 30.
Q. But you said that by October the fish would already be through the system and, therefore, there wouldn't be any concern regarding those -- those flows at that time; is that correct?
A. The comment was made in relation to a conclusion that at 17 cfs when the combined flow is 17 cfs, that the East Fork, South Fork drops below 7, and that occurrence is generally occurs later in the year in October, is what I stated.
Q. You said in October, correct?
A. Yes, sir.
Q. But according to your graph, it looks like the intersection is actually late August. So what's the difference between October and late August? Can you explain that discrepancy for us, please?
A. Well, it's a month and a half, a month and a week.
Q. But that's a very important time for fish passage during that stretch; is that correct?
A. That is correct.
Q. Is it fair and accurate to conclude from your graph, then, that the point at which water diversions in the East Fork, South Fork become too low for viable fish passage would occur by late August and not in October?

A. This plat doesn't suggest that.
Q. Why not?
A. Because we are hovering at the line. Your fish passage is viable -- well, optimal conditions, let's just call them, are optimal at 6.6, and we are hovering at that line through the entire year or above.
Q. But fish are still in the system in late August and September; is that correct?
A. I believe so. I'm not a fisheries biologist.
Q. Well, yesterday you testified in your expert capacity that they wouldn't be there in October. You said that they would already be through the system, I thought --
A. Excuse me.
Q. -- in October?
A. The fish passage window that has been described is through September 30.
Q. The fish passage window as described is through September 30.
A. Yes, sir.
Q. So but your graph shows that the viable fish passage window really -- that -- that start -- that -- basically that intersection point is in late August. Starts in late August, right?
A. Yes. And when we're intersecting the line, fish passage is still at the optimal condition, sir.



Q. So what do you mean by, at optimal condition?
A. So I don't know the NMFS NOAA criteria that was utilized. We have fisheries experts coming up later today that would describe that. I understand from the modeling review that at 6.6 flow conditions are sufficient for fish passage of all the species evaluated.
Q. But it looks like as of late August, beginning late August where that intersection point is, fish passage conditions are no longer viable.
A. Sir, I'm looking at this plot, and I see that that line generally over-sects within any reasonable assessment.
Q. It generally --
A. It overlaps. I mean, we're talking about a pittance of cfs there.
Q. A pittance of cfs? Okay. Thank you. Mr. Stanaway, if you model the stream flow impacts in the lowest flow year on record, you mentioned that this was based on the second lowest flow year on record.
A. Yeah.
Q. Would it be fair and accurate to conclude that the blue and black lines would intersect earlier in the year? Possibly earlier in August?
A. I can't make that assessment. And the reason why is because what we're talking about here is base flow condition, and base flows are relatively consistent year



after year. If there is a large deviation, then -- well, let me phrase that. Potentially not, because of the way the low flow condition is structured, because the scales would flow. And so a lower flow condition would mean -- a lower flow situation in the East Fork would mean that less water would be diverted, and so you would be subtracting off less flow than what you would see in this plot. And so it's too much conjecture. It's too much speculation to assume one way or the other.
Q. Okay. So you just -- you don't know?
A. No, that's not what I said. I said that without looking at data, we cannot make that assessment.
Q. Okay. Fair enough. Let's turn to figure 15 of page 3-18, please.
A. Yes, sir.
Q. This figure represents a high flow year, correct?
A. It does.
Q. Let's focus on the dashed yellow line.
A. Uh-huh (affirmative).
Q. What does that dashed yellow line represent?
A. It is the East Fork, South Fork Salmon River less maximum allowable diversion rate.
Q. Does the maximum allowable diversion rate go below the black line?
A. The East Fork, South Fork stream flow does, yes.



Q. So according to that figure, Mr. Stanaway, the condition does not protect the fish passage criteria in September even in high flow years; is that correct?
A. I would not make that assessment.
Q. What assessment would you make?
A. The interpretation here is that between the orange line and the expected diversion rate and the dashed maximum allowable diversion rate, the diversions would be within that window. This is again monthly data, monthly data for our operations, and it is not expected. We've established this fact that 9.6 cfs is not a diversion rate for an entire month, and so there could be times in that window that you would have a 9.6. But what's depicted here is a maximum allowable diversion rate is the consistent constant diversion of 9.6 cfs, we've established that condition will never occur on-site.
Q. That condition would never occur on-site; is that correct?
A. The continuous 9.6 cfs diversion will not occur.
Q. What about an instantaneous 9.6 diversion rate?
A. Instantaneous 9.6 diversion rate may occur.
Q. And if, for example, you -- Perpetua needed the flexibility to keep the operations going at full capacity, how would an instantaneous diversion rate affect those conditions?

A. You would expect to see a similar magnitude of impact, but not the duration.

Q. Could a similar magnitude potentially have impact or effects?

A. I believe so. Once again, I'm not a fisheries biologist to make an assessment on that.

Q. Thank you. Let's focus now on the gray line of that figure, which shows unimpacted flow in the East Fork, South Fork Salmon River. Is that an accurate characterization of the gray line?

A. It is, yes. It's gauge flow.

Q. This line shows that on September 1 the flow is in the East Fork, South Fork is about 15 cfs. Is that a correct --

A. Yes, sir.

Q. -- characterization? Thank you. Mr. Stanaway, what would be the flow at Perpetua's proposed point of quantification for its proposed water right condition? What would that be at that time?

A. Just making a rough assessment, be about 20 cfs.

Q. You said --

A. Is that right? It's about -- so two-thirds comes from the East Fork above, and one third comes from Sugar Creek. So you're at 15. Yeah, it would be about 20 cfs.

Q. And you said that's an estimate, correct?



A. Well, yes, sir. I don't have the data in front of me.

Q. Yesterday in your testimony I believe you testified that it would be, I think you said, easy -- easy to quantify the impacts above or below Sugar Creek; is that correct?

A. I did.

Q. Then how does a percent threshold at the point of quantification for Perpetua's proposed water right condition protect flows in the East Fork, South Fork when associated contributions are estimates or variable throughout the year?

A. Could you restate another way? I'm not following.

Q. Sure, I'm happy to. So how does a percent threshold --

A. Uh-huh (affirmative).

Q. -- in this case the 20 percent at the point of quantification for Perpetua's proposed condition, protect flows in the East Fork, South Fork when the associated flow contributions are estimates or variable? They're not consistent, correct?

A. Well, that's correct, and that's the -- that was the intent with the local condition that diversions with scale with stream flow.

Q. So you testified yesterday that it's appropriate to monitor diversions as close to the point of diversion as possible; is that correct?



A. Diversions should be monitored, yes, sir.

Q. So if that's the case, why not have multiple points of quantification for any water right conditions that are specific to different streams? For example, one from Sugar Creek, one from Meadow Creek, and one for the East Fork, South Fork Salmon River upstream of the Sugar Creek, so that impacts to each stream could be evaluated directly?

A. There is an administrative burden that would be quite onerous with an approach such as that. By and large we are looking at the project site as a whole and the impacts to the East Fork, South Fork system, and therefore, a point of quantification below the impacted area would be the most applicable metric to assess impacts to the East Fork, South Fork Drainage as a whole.

Q. What do you mean by an administrative burden?

A. There has to be reporting. There has to be response to data. So, therefore, if you have multiple points of quantification (inaudible) the line, they are telling you diversion things, you have a system that is untenable both from a DWR monitoring perspective, what I would assume, as well as from an operational perspective.

Q. Well, it might be a burden, but it's not necessarily untenable; is that correct, Mr. Stanaway?

A. It would be very hard for regulatory agencies and the regulated entity to monitor and maintain massive amounts



of quantification. In fact, we do -- there are -- there is diversion. There's monitoring on diversion rates, and that is one area that we understand what the overall project impact is.

Q. So can you help me understand when you monitor diversion rates how that's less of a burden than monitoring the point of quantification?

A. Point of quantification has the -- well, they all have regulatory impacts. The point of quantification -- can you -- well, let me -- so, you're suggesting -- sorry. I shouldn't ask you a question. Multiple points of quantification would not be a feasible situation.

Q. Why wouldn't it be a feasible situation?

A. It would not be a feasible situation because there could be limitations, subbasin limitations from one diversion to another that cannot be -- well, not necessarily can be adhered to. Any regulation can be adhered to, but cannot be reasonably expected to be accommodated within an operational system.

Q. Okay. Thank you, Mr. Stanaway. Let's turn to Exhibit 64, please, which is your hydrology rebuttal report, if you could please pull that up. Thank you. On pages 2 and 3, just to orient you, Mr. Stanaway, you state that: As Yellow Pine and West End Pit dewatering and contact water management may affect stream flows between the tunnel inlet

and the point of quantification --

A. I'm sorry, what page are we on?

Q. Is it 2-3.

A. There we go.

Q. My apologies. I misspoke. 2-3, not 2 and 3.

A. Very good.

Q. So I'll repeat my statement. On pages -- on page 2-3 you state that: As Yellow Pine and West End Pit dewatering and contact water management may affect stream flows between the tunnel inlet and the point of quantification, the proposed point of quantification below Sugar Creek provides the most comprehensive measurement. Did I quote that accurately?

A. I'm going to take your word for it. I'm not seeing where that is stated, but I believe so.

MALE SPEAKER: The last sentence I believe. So it's a sentence that begins with however.

A. Yes. Yes. Okay.

Q. (By Mr. Lopez) Thank you. On that same page --

UNKNOWN PERSON: If Mr. Cefalo can we get the question read back?

MALE SPEAKER: That's fine. Go ahead, Mr. Lopez, if you would. I think he was not quite there yet. If you can have him review that again and ask that question.



MR. LOPEZ: Of course, Officer Cefalo. Thank you.

Q. (By Mr. Lopez) So on page 2-3 you state that, quote: As Yellow Pine and West End Pit dewatering and contact water management may affect stream flows between the tunnel inlet and the point of quantification, the proposed point of quantification below Sugar Creek provides the most comprehensive measurement point; is that correct?

A. Yes, sir.

Q. Thank you. However, you also state on that same page that, quote: Yellow Pine Pit and West End Pit dewatering are a marginal contribution to overall water supply.

A. It's true.

Q. Can you please reconcile those two statements?

A. There's no reconciliation that's required. Yellow Pine Pit is a max at 1.5 cfs diversion rate. West End Pit is similarly small and occurs for a very limited time. However, there are stream flow impacts that result from those, and so there's no reconciliation required.

Q. But if Yellow Pine Pit and West End Pit are marginal contribution to overall water supply, marginal is the word, contribution to overall water supply, then why is it important to capture that marginal contribution at the point of quantification below Sugar Creek?

A. The project impact should be assessed at the



downgrading end of the project. That is the project scale impact, and therefore, because do you have diversions, diversion rates, water withdrawals that are occurring at the downstream end of the project site, it makes sense. It's logical that a point of quantification would be situated such that the entirety of the project impacts are encapsulated.

Q. And can you please remind me, why we can't quantify impacts to Sugar Creek and the East Fork, South Fork separately?

A. Well, I suppose you could. However, if you are looking at those independently, you're not looking at the system as a whole.

Q. When will Yellow Pine Pit and West End Pit dewatering begin?

A. Oh, Yellow Pine Pit begins relatively early in mine life. We do have those figures in the hydrology rebuttal, but I don't recall exactly when. But it goes from early in the mine life through mid-mine life, and the West End Pit is predominantly in the very tail end.

Q. So is it fair to say that the dewatering would begin approximately not until the last two years?

A. Yes. There is other water management features that would -- that are in the Sugar Drainage, the West End Drainage.



Q. So we're capturing a marginal impact that may not occur until the end of the mine life; is that correct?

A. Capturing a marginal impact may not occur until the end of the mine life? From the dewatering in the West End Pit, it would be marginal impact at the end of mine life.

Q. Thank you. Mr. Stanaway, I want to shift gears now and ask you some questions about what Perpetua's June 27, 2022, request states about flow monitoring. Can you please refer to Exhibit 206?

A. Thank you very much.

Q. Is Exhibit 206 in front of you, Mr. Stanaway?

A. Yes, sir.

Q. Are you familiar with admitted Exhibit 206?

A. I am.

Q. Are you familiar with both documents in the exhibit; the first is the June 27, 2022, request for technical assistance?

A. Uh-huh (affirmative).

Q. And the second is the August 2, 2022, response letter Idaho Department of Fish and Game and Office of Species Conservation.

A. Yes, I'm familiar with both.

Q. Mr. Haslam testified yesterday that you were involved in the drafting of the June 27, '22, request; is that true?

A. Yes, that's correct.
Q. Can you please describe your role in drafting the June 27, 2022, request?
A. Yeah, certainly. I believe we discussed this yesterday. My role was primarily with the evaluation. It's in Section 4, I believe. Yes, the stream flow and diversion rate. This is an evaluation that I undertook and the section that I wrote and also contributed to the text in other sections of the memo.
Q. Thank you. And can you vouch for the accuracy of the June 27, 2022, request?
A. Yes, it is accurate.
Q. I would like now to direct your attention to the third paragraph on page 4703 of that exhibit.
A. Uh-huh (affirmative).
Q. Which discusses the design of the East Fork, South Fork Salmon River tunnel design.
A. Yes, sir.
Q. Have you reviewed this paragraph?
A. I'm familiar with it, yes.
Q. This paragraph begins, and I quote: The current tunnel design is based on the flow durations statistics, begin parentheses, 5 percent and 95 percent exceedant flows, end parentheses, from the last 25 years of gauge records per the National Marine Fisheries Service guidelines, citing



NMFS 2011, end quote. Is that an accurate recitation of the excerpt?
A. It is.
Q. This sentence refers to the, quote, current tunnel design, end quote, in June 2022.
A. Uh-huh (affirmative).
Q. This is the same tunnel design proposed now, correct?
A. I believe so. However, we should ask Gene about that, Mr. Bosley.
Q. The National Marine Fisheries Service provides passage criteria for anadromous fish in passage facilities, correct?
A. Yeah, I believe so. I don't -- I'm not a hundred percent familiar with National Marine's Service.
Q. Okay. Thank you. Are the passage criteria here specific to the same type of water course the tunnel provides?
A. You know, I do not know tunnel hydraulics. I'm not situated to answer that question.
Q. Okay. Thank you. The water course is a weird type fish ladder, correct?
A. That's my understanding.
Q. And further down the paragraph states that, quote: The present design accommodates adult upstream passage for



flows down to 8 cfs and likely lower, though 8 cfs was the lowest flow range model, end quote.
A. Uh-huh (affirmative).
Q. Is that a correct recitation?
A. I believe so.
Q. To confirm, at this time in June 2022, 8 cfs was the lowest flow range modeled; is that correct?
A. Apparently.
Q. And modeling showed that adult Chinook Salmon could volitionally pass up the tunnel at 8 cfs?
A. Yes, that's what the paragraph states.
Q. And the same was true for adult Bull Trout and Steelhead?
A. If it says so, then, yes, yes.
Q. And was the modeling conducted in the McMillen Jacobs 2018 report?
A. I do not know that.
Q. The July 27, 2022, request discusses Perpetua's plans for additional hydrologic modeling, correct?
A. Yes, sir.
Q. And now I want to direct your attention to Section 3.2, which begins on page 4708. Just let me when you have found that, Mr. Stanaway.
A. I'm there, yep.
Q. Okay. This section discusses anticipated future



modeling to understand fish passage of low flows, correct?
A. Uh-huh (affirmative). Yes, sir.
Q. Thank you.
A. Sorry.
Q. The impetus for more modeling was to understand water usage and stream flows under ModPRO2, correct?
A. Yes, sir.
Q. And was there a reason that Perpetua committed to more modeling to understand if adult Chinook and other fish species could pass up the proposed tunnel at flows lower than 8 cfs?
A. Yes, sir. We agreed with Fish and Game to conduct that modeling.
Q. And why did you agree to conduct that modeling with Fish and Game?
A. It was requested that additional modeling be conducted so that we could further quantify the efficacy of our -- of the local condition.
Q. And to confirm, Fish and Game asked you to conduct that modeling at flows lower than 8 cfs?
A. I am not aware if that was -- if it was requested at flows lower than 8 cfs. I'm not -- I'm not a hundred percent sure.
Q. I guess I'm not understanding correctly, Mr. Stanaway. You said that this -- that that request was done

based on your -- based on Perpetua's discussions with Idaho Fish and Game; is that correct?

A. That's correct. It wasn't -- it was not requested from Fish and Game that we model a reduced stream flow, to my recollection. That we model a lower stream flow, but it was more along the lines of, to look at updated information and possibly flows and understand what the tunnel flow's impacts would be to the fisheries.

Q. So is it fair to say that that updated modeling you did was something Perpetua did on its own and not at Idaho Fish and Game's request?

A. It was a part of the agreement that we had with Fish and Game.

Q. What was the agreement that you had with Fish and Game?

A. It states here in the report. I'm not sure which page, but that additional modeling would be conducted to further understand the system, essentially. That's not a direct quote.

Q. And that further modeling would include modeling flows lower than 8 cfs; is that correct?

A. Yes. Yes, sir.

Q. Has Perpetua completed this modeling?

A. Yes, sir.

Q. I'm going to direct your attention now to the



August 2, 2022, letter from Idaho Fish and Game and Office of Species Conservation.

A. Yes, sir.

Q. It begins at the top of Exhibit 206.

A. Uh-huh (affirmative).

Q. You're familiar with this letter?

A. I am.

Q. Mr. Haslam testified yesterday that this letter was based on and responding to Perpetua's June 27, 2022, request.

A. Yes, sir.

Q. That's your understanding as well?

A. Yes, sir.

Q. I want to turn to IDF&G and OSC's first bulleted recommendation, which is on the first page of Exhibit 206.

A. Uh-huh (affirmative).

Q. It mentions Chinook Salmon, Steelhead, Bull Trout, and Cutthroat Trout; is that correct?

A. Yes, sir.

Q. Are you familiar with this recommendation?

A. I am.

Q. Is it your understanding, Mr. Stanaway, that Idaho Department of Fish and Game and Office of Species Conservation are recommending volitional passage for all life stages of these species from the East Fork, South Fork



Salmon River and Sugar Creek confluence upstream of the East Fork, South Fork Salmon River passed Perpetua's surface water point of diversion?

A. What I am aware of is that the Idaho Fish and Game reviewed the proposed condition and felt that it would be feasible for -- to maintain fisheries and fish passage within the tunnel and downstream of the outlet to Sugar Creek.

Q. Is it also your understanding that both of those agencies were recommending volitional passage for all life stages of these species?

A. That is the statement in the paragraph.

Q. Thank you.

A. I will reiterate that this is an agreement that was -- it was a condition that was worked through with, and I can't say supported by, but it was reviewed by the IDFG, then so they must have felt that conditions were appropriately protective of these fish species.

Q. Thank you. This would include volitional passage up the tunnel, correct?

A. Yes, sir.

Q. And is it fair to understand your testimony as saying that Perpetua's proposed water right with conditions will provide for year-round volitional passage for all life stages of these fish species from the confluence of Sugar



Creek passed the point of diversion?

A. I cannot unequivocally say that. There could be a condition where flows could be lower.

Q. Thank you. I want to direct your attention now to the July 11, 2023, letter from Perpetua to the Governor's Office of Energy and Mineral Resources, which is introduced as Exhibit 219.

A. This goes through 210, I believe. Thank you, Officer Cefalo.

Q. (By Mr. Lopez) Can you please take a moment to skim Exhibit 219 down to page 10.

A. To page 10?

Q. Yes.

A. I'm familiar with this memo.

Q. You're familiar with the letter?

A. I am familiar with this. I did not write this, nor conduct any of the modeling or do any in-depth review of the modeling.

Q. I believe Mr. Haslam testified yesterday that you had a part in drafting the letter; is that correct?

A. I had a part drafting the original. This letter was drafted -- the summary was drafted predominantly by Gene Bosley. I reviewed just for a water rights perspective, but the technical information from the modeling, the hydraulic modeling, I did not have a hand in drafting that.

Q. The July 11, 2023, letter shares the results of Perpetua's updated modeling, correct?
A. Yes, sir.
Q. This includes updated hydraulic modeling of the proposed fish passage tunnel, correct?
A. Yes, sir.
Q. I see Exhibit 219 contains four attachments which are listed as enclosures at the bottom of page 10.
A. Yes, sir.
Q. Is that correct?
A. Yes, sir.
Q. According to the enclosure list, attachment A is a technical memorandum from bio-analysts to Perpetua dated October 13, 2022; is that correct?
A. It appears to be so, yes.
Q. Attachment B is a technical memorandum titled, quote, Stibnite Gold Project updated fish passage flows, end quote, from Rio ASE to Perpetua dated March 21, 2023; is that correct?
A. It is.
Q. And attachment C is a technical memorandum titled, quote, Stibnite Gold Project fish passage evaluation, end quote, from Rio ASE to Perpetua dated March 21, 2023; is that correct?
A. Yes, sir.



Q. And attachment D is a technical memorandum titled, quote, supplemental tunnel hydraulic modeling, end quote, from McMillen Jacobs to Perpetua dated December 9, 2022. And that's correct?
A. Yes, sir.
Q. This July 11, 2023, letter discusses fish passage criteria for adult Chinook Salmon and other species, a 6.6 cfs -- excuse me, at 6.6 cfs, as opposed to the 8.0 cfs criteria we discussed earlier from the June 2022 request that Perpetua sent to Idaho Department of Fish and Game and Office of Species Conservation, correct?
A. Yes, sir.
Q. Do these attachments form the bases for the new 6.6 cfs passage criteria?
A. Yes, sir.
Q. Thank you. Mr. Stanaway, I want to return to the graphs in your expert rebuttal report, figures 13, 14, and 15 and admitted Exhibit 63. I'll just wait for you to find those, please. We discussed them earlier. They begin on page 3-17.
A. Yep. Yes, sir.
Q. You've already discussed that these features -- excuse me. We've already discussed that these figures show a range of modeled East Fork, South Fork Salmon River diversion rates relative to a fish flow criteria of 6.6 cfs,



correct?
A. Yes, sir.
Q. I want to direct your attention now to page 3-18 of Exhibit 63.
A. Yes, sir.
Q. The second paragraph draws two assertions from the figures above. The first assertion is that, quote: The figures demonstrate that stream flows are anticipated to be maintained above or very near to the 6.6 cfs rate that is demonstrated to be sufficient for fish passage in the hydraulic modeling of the tunnel and for fish habitat in the reach from the tunnel outlet to Sugar Creek, end quote.
A. Yes, sir.
Q. And it includes citation to McMillen 2022 Rio 2023A and Rio 2023B; is that correct?
A. It looks like Rio 2022B.
Q. Yeah, I believe that looks like a typo. Is that --
A. It could be. Let's take a look at the references. There are a number of reports before then in their evaluations. Yes, it is a typo.
Q. Thank you for that clarification, Mr. Stanaway. So do you agree with this first assertion --
A. I do.
Q. -- that I quoted?
A. Yep.



Q. Does this assertion include upstream passage of the four species Idaho Department of Fish and Game and Office of Species Conservation expressed concern for, adult Chinook Salmon, Bull Trout, Steelhead, and Cutthroat Trout?
A. Yes, sir.
Q. And you're talking about volitional upstream passage, not trapping a hall or similar measures; is that correct?
A. That's correct.
Q. And you understand the McMillen 2022 Rio ASE 2023A and Rio ASE 2023B support this assertion?
A. Yes, sir.
Q. Thank you. The second assertion is that 6.6 cfs flow rate, quote: Provides sufficient depth and velocities for adult and juvenile Chinook Salmon, Steelhead, and Bull Trout and passage is expected to be feasible at lower flows, end quote. Do you agree with this assertion?
A. I do.
Q. Thank you. I'd like to turn now to Exhibit 254. I believe this is the September 11, 2023, report that you authored. It's been admitted as Exhibit 61.
A. I will need 61. Thank you.
Q. Do you have that in front of you?
A. Yes, I do.
Q. In that report you conclude that the chances of

simultaneously having peak demands for all uses is low; is that correct?

A. It is correct.

Q. But you didn't include any modeling supporting your conclusion in that report, did you?

A. No, sir, not in this expert report. The justification information for that is in the -- I don't know what exhibit it is, but it's the SGP diversion rate and storage justification, something along those lines. It was submitted with the water application to the Department of Water Resources.

Q. Thank you. Focusing on the word chances --

A. Uh-huh (affirmative).

Q. -- can you please explain what you mean by that word?

A. Yeah. Chances, the likelihood of the peak diversion for each of the various project aspects of water management diversion rate is not looking to occur simultaneously.

Q. Thank you. Yesterday Mr. Scanlan testified that in his opinion there was maybe a less than 10 percent chance of that -- of that prospect; is that correct?

A. I wouldn't put a number to it, but I believe it would be very low.

Q. So you don't necessarily agree that it would be



less than 10 percent?

A. I think less than 10 percent is very low.

Q. What would be very low in your opinion, assigning a percentage less than 10 percent?

A. Certainly. Sure.

Q. Do you anticipate that you will have to adjust to unanticipated hydrologic conditions when running your mine such as less dewatering water than anticipated or less rainfall than anticipated?

A. That is a scenario that could occur. I will say that, however, with less rainfall than anticipated there -- the quantity of runoff that is generated, captured as contact water is a (inaudible) occurrence, and therefore, later on the mine life would have less of an impact in the annual precipitation.

Q. So is it fair to say that available water may fluctuate from year to year causing more pumping or more East Fork, South Fork diversions?

A. Yes, sir.

Q. How do you anticipate Perpetua may adjust?

A. The application is structured such that if one source is unavailable, then another source may be utilized.

Q. Then why didn't you model the effects of different operational scenarios on groundwater and surface water flows?



A. Well, the prioritization of the site-wide water balance takes this conservation -- water conservation approach. Maybe want to utilize the impact or the water that's already in process. Water that's a part of the mine plan, and so those two -- those three sources are likely to be, when feasible, the highest priority sources that would remain, then, our groundwater -- freshwater groundwater diversions and East Fork, South Fork diversions as reasonable areas that we get offset. And in this situation it was stated that we take a 0.5 cfs from groundwater, and the remainder would come from the East Fork.

Q. And Perpetua couldn't pump greater than .5 cfs from groundwater supply well; is that correct?

A. That is not regulated.

Q. What do you mean by, not regulated?

A. There's no limitation on groundwater diversions up to the 9.6.

Q. So is it also fair to say that you didn't simulate taking a lot of water up to 9.6 cfs from the East Fork, South Fork, from groundwater supply wells?

A. Yes, that's correct.

Q. Yesterday you testified that you thought your groundwater model adequately addressed uncertainties; is that correct?

A. Yes, sir.



Q. Wouldn't different operational scenarios that affect where water is removed be part of uncertainties that should be addressed?

A. That's an operational procedure. That is not necessarily a uncertainty in the hydro model. That's really referred to as the quality of the predictions.

Q. So you wouldn't be able to capture or model that operational uncertainty; is that correct?

A. It could be modeled.

Q. But you didn't model it?

A. No.

Q. Did you model planned withdrawals of groundwater and surface water for dust control, drilling water, and domestic water use in the groundwater model to evaluate effects?

A. Yes.

Q. Is it fair to say that you only modeled unmet mill demand?

A. For diversion rate, yes, sir. The other water is a part of -- it's the reclaimed circuit, so it's site water balance.

Q. So at what diversion rates did you model planned withdrawals of groundwater and surface water for dust control, drilling water, and domestic water use in the groundwater model to evaluate effects?

A. No. Pardon me. We did not do domestic water.
Q. Okay.
A. The other waters are a part of the contact water, either sourced from contact water, that being site water balance. Otherwise, it's in the overall industrial demand.
Q. Thank you. Please clarify how you included removing contact runoff from the site hydrologic model?
A. Yes, sir. So this, as I mentioned yesterday, the modeling, the hydrologic model, consists of two paired models, coupled models. One is the meteoric water balance and that predicts runoff and recharge, and then the groundwater model takes what is the recharge while -- the surface water runoff is (inaudible) to the streams. What is recharged becomes input to the groundwater model. Within the meteoric water balance, you have a delineation of various features on-site, and within that is a land area by which an area would accept precipitation. Precipitation would fall on a land area. Contact water, managed contact water, is recognized in the groundwater model by removal of the area of a managed facility from the area of available degenerate contact water.
Q. Did you --
A. I'm sorry. Not to generate contact water, to generate diffuse runoff that would be -- that would go to a stream of clean water.



Q. Thank you for that clarification.
A. Yeah. I'm sorry.
Q. Did you simulate continuous diversions of 9.6 cfs in the groundwater model?
A. No, sir.
Q. And why didn't you simulate that?
A. The reason is, is because the overall diversion demand is (inaudible) industrial demand is supplied from the site water balance. The premise of fundamental principle of a site-wide water balance is that water has to be balanced. That means the demand has to be balanced with supply. That's the exact situation as was modeled. If we were to artificially inflate the supply side to be multiple, you know, multitude factors greater than the demand side, you would have a situation where you would have, you know, essentially a TSF overflowing. Contact water ponds would be overflowing, being nothing to do with that quantity of water. And, therefore, bringing that into the hydro model would provide a simulation of a situation that is not -- has no representation of reality.
Q. So what would be a representation in reality? Is that the 3.2 cfs average industrial water need you referred to yesterday?
A. I believe so. The industrial supply is in the expert water, the expressed water demand, and that's a 2015



estimation.
Q. Thank you. So I'm going to refer now to Exhibit 264. That's the Tribe's Exhibit 264.
A. I don't believe I have it in front of me.
Q. I can grab it.
A. Thank you, Officer Cefalo. Yes, sir. It's in front of me.
Q. So I'm going to refer you to Section 3.1.
A. Do you have a page number?
Q. Paragraph Section 3.1, paragraph one, last sentence.
A. So page number would be helpful.
THE CLERK: 24, 25.
A. 24, 25.
Q. (By Mr. Lopez) Thank you.
A. Yes, sir.
Q. Thank you. You used meteoric water balance inputs from 2004 to 2017 in simulations for the mine operations period to represent historical climatic averages; is that correct?
A. Yes, sir.
Q. Yesterday you testified that you have about 120 years of climatic data for input to the meteoric water balance model; is that correct?
A. Yes, sir.



Q. How do the climatic conditions for your chosen period, that is 2004 to 2017, compare to the historic record?
A. In that they are the -- they are near to the average or the median of the historic record, and that's why they are selected to base an expected condition on.
Q. How did you decide on this period of 2004 to 2017 for the model simulation?
A. That had occurred prior to my involvement with the modeling. My understanding of that was that the precipitation was evaluated within that period and comparison to the overall historic record.
Q. Did you have any concerns about the period chosen for the model simulation?
A. I did not.
Q. But they were -- that preexisted your involvement; is that what I heard you say?
A. It was, yes. So this was -- the simulation period was a part of the PRO modeling, and I was largely uninvolved with that modeling.
Q. But you don't really know why that particular period was chosen?
A. My understanding was that because it most closely matched the historical average.
Q. Thank you. I'm going to shift gears a little now.

Mr. Scanlan testified yesterday that the worker housing facility domestic water right was calculated assuming 50 gallons per day per person; is that correct?

A. Yes, sir.

Q. Are you aware that the U.S. Geological survey estimates domestic use at 80 to 100 gallons per day per person?

A. I am not.

Q. Do you have an opinion on why there would be a discrepancy between the chosen 50 gallons per day and the U.S. Geological survey estimate of 80 to 100 gallons?

A. I do not.

Q. Thank you. Mr. Stanaway, you testified yesterday that you were previously employed at the Idaho Department of Water Resources; is that correct?

A. Yes, sir.

Q. And how long were you employed there?

A. Just short of five years.

Q. And what was your position?

A. I was a technical hydrologist.

Q. So given your experience working for the IDWR, I assume you're fairly familiar with IDWR rules?

A. Yes, sir.

Q. Thank you. Are you familiar with IDAPA 37.03.0840.05 CII effects on existing rights?



A. Yes, sir.

Q. That rule states, and I quote: For applications appropriating groundwater, a plat shall be submitted locating the proposed well relative to all existing wells and springs and permitted wells within a half mile radius of the proposed well, end quote. Does that sound correct to you?

A. Yes, sir.

Q. To your knowledge, did Perpetua submit a plat showing the location of proposed wells and all existing springs within a half mile?

A. I would believe so. I don't directly recall if a plat was submitted or not.

Q. I would like to turn your attention to Exhibit 1G, which I believe is the water rights application. It was admitted. Thank you.

A. The exhibit is in front of me.

Q. Okay, thank you.

A. I'll get better at that as the day goes on.

Q. Why were no existing springs identified within a half mile of Perpetua's proposed wells on this exhibit?

A. Can you provide a page number, please?

Q. Just looking at the application. We were unable to identify any springs identified anywhere in the application.

HEARING OFFICER: Mr. Lopez, I think the response from



Perpetua on Rule 4005 begins at page 116.

MR. LOPEZ: Okay. Thank you, Officer Cefalo.

Q. (By Mr. Lopez) Referring to page 116 does that help assist your response, Mr. Stanaway?

A. Yes, sir. I would have to flip to where we are --

HEARING OFFICER: It appears that there's a map on page 129.

A. Ah, yes, here we go. So this appears to be a U.S.G.S. quadrangle (inaudible) potentially, not a quad, but essentially a topo map.

Q. Thank you, Mr. Stanaway. Reviewing that map are you able to identify any existing springs within a half mile of Perpetua's proposed wells on that exhibit?

A. I'm unsure what these red dots may be. They're not identified in the legend. Those potentially could be springs that are dotted throughout the landscape.

Q. So you're unable to --

A. Definitively, yes, I'm not able to identify --

Q. Okay.

A. Yes.

Q. Thank you. I'm going to shift gears again.

A. Oh, pardon me. Pardon me. So the title of the map is actually existing wells and springs within half mile of proposed wells. Presumably the springs are represented on the map. May be an omission in the legend.



Q. Are there any springs identified on that map?

A. Without confirmation of what the red dots are and without further review, I cannot definitively say if springs are identified on the map.

Q. Thank you. Let's turn to a different exhibit now, please. This is Exhibit 204. It's also Perpetua's proposed Exhibit 18.

A. I'll just use this. 204?

Q. Yes.

A. Yes, sir. Groundwater hydrology baseline study.

Q. Are you familiar with this document?

A. Not intimately. I am aware of it.

Q. Have you reviewed it?

A. Oh, not in any great detail.

MR. LOPEZ: Officer Cefalo, I would like to move to admit Perpetua's proposed Exhibit 18 into the record.

HEARING OFFICER: So as far as I can tell, that's another area of duplication, 18 and 204, right? Both are groundwater hydrology baseline study. Any objection to that from Perpetua's Counsel?

MR. WATKINS: We don't have any objection. We just note that Mr. Stanaway hasn't reviewed it in detail, and I don't know that he can testify to it.

HEARING OFFICER: For what purpose are you proposing to offer that into the record, Mr. Lopez?

MR. LOPEZ: There are some particular -- a few -- there is one excerpt -- well, excuse me. The document we propose to move it into evidence to support the presence of springs found in the area, and there's an associated quote in the document. So it's for springs identification purposes, Officer Cefalo.

HEARING OFFICER: Was Perpetua planning on having a future witness speak to this exhibit?

MALE SPEAKER: No, we were not.

HEARING OFFICER: Why don't you go ahead, Mr. Lopez, and proceed with your questions, and we'll take up the question of admission here in a minute.

MR. LOPEZ: Thank you, Officer Cefalo.

Q. (By Mr. Lopez) So, Mr. Stanaway, I'd like to direct you to pdf pages 21, 24, and 56.

A. The pages are not marked on -- in this copy.

HEARING OFFICER: Not on this copy. What is the tag at the very bottom, PR7657?

MR. LOPEZ: Which of those? Have a pdf that's marked now.

HEARING OFFICER: Okay.

THE CLERK: I think you need to go to the pdf page up at the top. 21, I think that might get us where we want to go.

MR. LOPEZ: Thank you.



HEARING OFFICER: Thank you.

Q. (By Mr. Lopez) So page 21 it's titled Section 2.3 hydrogeology.

A. Yes, sir. Yes, sir.

Q. Let's see, the next page is page 24 pdf, please.

A. Yes, sir, I'm there.

Q. And the last page is pdf page 56, please, if you can turn to that. Thank you. With respect to page 56 --

A. Uh-huh (affirmative).

Q. -- I'd like to direct your attention to the second bullet --

A. Yes, sir.

Q. -- in the middle of the pages there.

A. Uh-huh (affirmative).

Q. It says, quote: Springs and seeps were found in the lower Meadow Creek Drainage around the spent ore disposal area, end quote. Have you seen that bullet, Mr. Stanaway?

A. I have not previously reviewed that in detail, but I see it now.

Q. And based on that representation on page 56 of that report, is it fair to say that springs and seeps should be or should have been documented in Perpetua's water right application in the lower Meadow Creek Drainage around the spent ore disposal area?



A. There are springs in the area. I'm not going to consent that those were not represented in the document.

Q. Okay.

MR. LOPEZ: That's all the questions I have, Officer Cefalo.

HEARING OFFICER: Thank you. We will not admit Exhibit 18 at this time. If there's something more that comes up within the hearing and we want to take that up again, I just didn't see that there was much value there in my decision-making. Go ahead, Mr. Lopez.

MR. LOPEZ: Thank you, Officer Cefalo.

Q. (By Mr. Lopez) So I would like to turn you back -- turn your attention back to your hydrology expert rebuttal report, Exhibit 64 admitted, please.

A. Yes, sir. In front of me.

Q. Thank you. You state in your rebuttal report on page 2-2 final paragraph that, quote: The low flows statistic used in assessment of model performance is the 95 percent exceedance, a very rare occurrence with the vast majority of flows exceeding this value, end quote. Is that correct?

A. Yes, sir.

Q. Is it not true that the 95 percent exceedance is a commonly used statistic in low flow scenarios?

A. To describe the low flow scenarios it is.



Q. If you were to model effects on the East Fork, South Fork Salmon River stream flows by applying Perpetua's water right condition to their full water right applications, using a point of quantification below Sugar Creek and the East Fork, South Fork, how would you do so?

A. I believe in the way that I did do so in the fisheries report utilizing existing stream --

Q. Yeah.

A. We would need to have a numeric model to describe that is how I would approach it.

Q. Thank you. I'm going to turn to Perpetua's proposed water right condition again. Ms. Rogerson previously asked Mr. Scanlan what evidence Perpetua has that the runoff Perpetua's planning to capture has not entered a natural water course. He suggested that we ask you.

A. Yes. This would also be a good question to follow-up with Mr. Bosley on. The runoff that is -- Perpetua is part of the water conservation credo strives to keep clean water clean and manage utilized dirty water, quote, unquote. Much of the water that is captured from catchment areas that are not in -- that are not on or downstream directly on the facility, jog around and discharged to the stream. Within the facility and the contact water manage -- or the areas by which contact the facilities by which contact water is managed is not a

natural stream. Mapping shows that. Topography shows that. We do not capture contact water or stormwater runoff from natural drainages to be beneficially used.

Q. What proof do you have that Perpetua accurately cataloged all natural water courses in their proposed project area?

A. We have fairly extensive mapping that has been produced to demonstrate the capture areas and where natural streams are.

Q. Where can those maps be found, Mr. Stanaway?

A. We had produced -- I do not know where they are at this current time.

Q. Thank you. Ms. Rogerson also asked Mr. Scanlan yesterday about Perpetua's treatment water discharge point.

A. Yes, sir.

Q. Mr. Scanlan testified that you could speak to this proposed mine feature.

A. Uh-huh (affirmative).

Q. Can you speak to the discharge location for Perpetua's water treatment facility?

A. Yeah. For the industrial water treatment facility there's actually two. One is -- it is by the plant shop, so on the East Fork, South Fork, rather upstream in the system. The other that was intentionally placed is just upstream of log creek at the head of the streamliner, and it was



intentionally located there so that treated water could be rather upstream discharged into the creek, and therefore, supplementing stream flows that would otherwise have impact because of groundwater diversion.

Q. Thank you. So can we please pull up, again, Exhibit No. 1G and please refer to page 14 of Exhibit No. 1G.

A. Yes, sir.

THE CLERK: I believe it's pdf page 14.

Q. (By Mr. Lopez) Pdf page 14. My apologies.

A. The map that we're looking at? Yes, sir.

Q. So although you may be continuously discharging diverted treated water back into the East Fork, South Fork system, the water diverted may not be discharged to the surface area from which it was removed or back in the groundwater; is that correct?

A. That potential outcome could occur. However, I will state that the vast majority of treated water, of industrial treated water, originates from the Hangar Flats Pit during peak Hangar dewatering, mine years about four through 7, four through six, somewhere in there. And because that is coincidentally the time when stream flows show the most impact because of groundwater pumping in the Meadow Creek Valley, that it actually is located back to the source of its origin. I mean, grantedly speaking, from a



surface water groundwater perspective of maximal geographically.

Q. But you state that the potential outcome could occur, that water diverted may not be discharged to the surface area from which it was removed or back into groundwater; is that correct?

A. It could. I will state that with the treated (inaudible) particularly when water is discharged up into Meadow Creek, that is the top of the system. So that water would eventually encounter any point of diversion down gradient of that discharge point.

Q. Thank you. Are these discharge locations finalized and permitted?

A. The IPDES permit has been submitted, to my understanding. I am not the best person to speak to about that.

Q. If you discharge treated water at the locations on upper Meadow Creek, where will that water go?

A. It will go downstream.

Q. Could the water be discharged into a line section of Meadow Creek so that it will flow downstream?

A. That is the intent.

Q. If that is the intent, then is it fair to say that treated outfall in this area won't attenuate groundwater drawdown which will propagate impacts out away from the



mine?

A. It will not attenuate groundwater impacts.

Q. And what's your reasoning for that?

A. Because the water is discharged onto the streamliner. If there is a lose in reach of the stream in East Fork, South Fork below the streamliner, it very well could recharge the alluvial system. Where there is streamliners the connection between the regional groundwater and surface water is disconnected.

Q. So treated outfall could infiltrate downstream of the line section; is that correct?

A. Yes, sir.

Q. So based on that statement, can treated outfall be subtracted from the net water use in the 20 percent condition?

A. It can.

Q. Can you walk me through that calculation or that reasoning?

A. We discussed this yesterday. We have a measured stream flow. We have diversions that take water out of the system. We have a treatment outfall that puts water into the system. If you want to get back to the water that would be in the system in the absence of interference of disturbance of the project, then water that is added to the system must be subtracted out, while the subtracted from the

system must be added in.

Q. Thank you. What effect will lining a portion of Meadow Creek have on the interaction between groundwater and stream flow in this area?

A. Yeah. (Inaudible) speak to the (inaudible) liner and design of that for (inaudible) flow and stream interactions with that. When we talk about the regional groundwater for the alluvial system, bedrock system, the liners will by and large negate that interaction. So the overall impact of that is that stream flows -- that water stays in the streams. And, you know, groundwater does not receive the recharge from, that would otherwise if it is a lose stream, that would otherwise enter the groundwater system.

Q. Thank you. Groundwater pumping from the Meadow Creek area will be ongoing after the creek is lined, correct?

A. It will be.

Q. From the supply wells and the dewatering for Hangar Flats Pit, correct?

A. Yes, sir.

Q. Is it fair to say that drawdown of groundwater levels will be exaggerated in this area due to ongoing pumping and a lack of recharge from the stream?

A. Exaggerated to by what metric?



Q. By -- I don't have a specific metric.

A. In the absence of a -- in a condition of streamliner versus no streamliner, yes, it will be more drawdown in the alluvial system particularly because of the streamliner.

Q. Thank you. How far out from the immediate mine area do your models predict groundwater drawdown impacts will extend?

A. Oh, I would have to look at the report. I don't have that in front of me -- off the top of my head, I mean.

Q. What impacts do you believe this will have on springs, seeps, wetlands, and base fall and other streams, not the East Fork, South Fork?

A. Yeah. Near surface may have an effect. I will say, however, that much of the seeps and springs do receive their contributions. They are running during those spring (inaudible) when water is plenty, and they would still likely be receiving that flow and would likely maintain much of the function as they have now.

Q. Thank you.

MR. LOPEZ: Officer Cefalo, I don't believe I have any further questions for the witness.

HEARING OFFICER: Okay. Thank you.

MR. LOPEZ: Thank you.

HEARING OFFICER: Ms. Thrower?



MS. THROWER: I think Mr. Lopez covered everything. Thank you.

HEARING OFFICER: Okay. Thank you.

EXAMINATION

BY HEARING OFFICER:

Q. Mr. Stanaway, early in your testimony you talked about the different gauges, existing U.S.G.S. stream gauges within this site area. There isn't an existing U.S.G.S. gauge for Meadow Creek. Based on the maps it looks like that gauge site, current gauge site, will be under the TSF facility.

A. Yes, sir.

Q. Do you have any idea -- and if you're not the right person, that's okay. What will happen to that U.S.G.S. gauge after construction begins?

A. I don't know what will -- how -- what will happen to that. The record will be transferred down, but it is anticipated that there will be a replacement gauge that gauges Meadow Creek stream flow once that is decommissioned.

Q. Somewhere below the TSF?

A. Yes, sir.

HEARING OFFICER: Okay. Thank you. We are at -- you know, we've been at this for two hours. We can take a break. Mr. Foster, it looks like you were coming up.

MR. FOSTER: I can be fairly quick, and then we can



take a break.

HEARING OFFICER: Okay, let's do that. Come on up. Questions on redirect, Mr. Foster.

REDIRECT EXAMINATION

BY MR. FOSTER:

Q. Good morning, Mr. Stanaway.

A. Good morning.

Q. Just have a few questions for you here. Mr. Stanaway, do you remember your discussion about the modeling of the fish tunnel?

A. Yes, sir.

Q. And did you perform that modeling?

A. I did not.

Q. And are you the best person to testify about that modeling?

A. No, I'm not.

Q. All right. And do you remember your discussions about impacts to fisheries and fish passage?

A. Yes.

Q. Are you a fisheries biologist?

A. I am not.

Q. And did you perform the evaluations that were attached to that OSC letter that was referenced?

A. Not the most recent one, no, I did not.

Q. All right. And there is someone else who would be

better to testify to that?
A. Yes, sir.
Q. All right. Thank you. So let's go to Exhibit 63 at page 25. Do you still have that in front of you?
A. Yes.
Q. And what are these graphs showing?
A. The --
Q. I may have wrote it down wrong. 63, should be page 25 or 63?
A. Yes, sir.
Q. All right. What are these graphs showing?
A. Oh, these graphs depict the recorded or the measured data at the East Fork, South Fork 1250 gauge, so the East Fork, South Fork right above Sugar Creek. And what we have here is the observed data, which is the gray line. We also have an orange line which is the expected diversion rate from the site-wide water balance. And a dashed darker orange line, that is the maximum allowable diversion rate. And then we have two evaluations of what the impact to stream flow would be in both instances of the expected and maximum diversion rates.
Q. And is that top graph a low water year?
A. It is.
Q. And is the bottom graph the average water year?
A. Yes, sir.



Q. So are the expected impacts in the low water year an average scenario at the mine site?
A. No, these are not. They would be based on the low water year.
Q. And how often -- if you know, how often do low water years occur?
A. I don't know how to answer that question.
Q. And you testified earlier that the project will have impacts on both Sugar Creek and the East Fork, South Fork; is that correct?
A. Yes, sir.
Q. And there was some discussion about where the point of quantification should be located; is that correct?
A. Yes.
Q. And I believe there was a conversation about having multiple points of quantification yielding conflicting results; is that correct?
A. Potentially, or at least conflicting operational response because of results.
Q. And let's pick that apart. What would happen if you had multiple points of quantification? How would those results conflict?
A. Potentially, let's say that Meadow Creek is point of quantification has flow but the East Fork, South Fork is below a threshold, then what do you do because Meadow Creek



runs into the East Fork, South Fork.
Q. So stated another way, if you were meeting your point of quantification at Meadow Creek but not meeting it down below?
A. Yes.
Q. What would you do down below?
A. Right.
Q. If you put -- if you base your point of quantification directly below the surface water diversion --
A. Uh-huh (affirmative).
Q. -- would you capture effects from the whole project?
A. You would not. There's operations that are occurring in the West End Creek drainage.
Q. Would you also miss the Yellow Pine Pit?
A. There is some, yes, some impacts from the Yellow Pine Pit.
Q. All right.
A. Majority, actually.
Q. Does hydrologic site model, model both existing and proposed conditions?
A. It does.
Q. And in your experience with other hydrologic models, is it valid to compare modeled existing conditions with modeled proposed conditions?



A. No. You do not want to do the existing conditions to proposed. What you want to do is a no extra condition to proposed, and that's a similar -- that's a tried and true approach.
Q. And is that what the hydrologic model does?
A. It does.
Q. Is the fact that there's a level of error associated with the hydrologic site model unique to this model?
A. No, sir.
Q. Do all hydrologic site models have a level of error?
A. Yes, sir.
Q. And then is there an uncertainty -- is there a difference between uncertainty in the model calibration and uncertainty in the modeled effect?
A. Yes.
Q. And what is that difference?
A. Uncertainty in the model calibration is essentially, you know, how did we mimic these past years, and then you can utilize that to bring forth into the future predictions. So it's a little bit of a different beast there.
Q. All right. And do you remember your conversation about modeling effects of different operational scenarios?

A. Yes, sir.
Q. And how were the operational scenarios -- were those evaluated in the site-wide water balance?
A. Yes, yes.
Q. And does the site-wide water balance rely on a long climate record?
A. Yes.
Q. So is it fair to say that the site-wide water balance evaluates a lot of potential climatic scenarios?
A. In its stochastic output it is.
Q. And was that range of scenarios reflected in the site -- the site hydrologic model?
A. No, it wasn't. The difference is because you cannot take those stochastic output from site-wide water balance that gives probabilities and bring it into the deterministic model that is the hydro model. And so the only (inaudible) condition that was modeled in the Stibnite hydrologic site model is the 2014, 2017, the average climate condition.
Q. And you testified about the streamliner in Meadow Creek.
A. Uh-huh (affirmative).
Q. Are you aware of the purpose of that streamliner?
A. The purpose is that I am aware of -- I'm sure there's other -- is to increase, to maintain stream flows in



Meadow Creek.
MR. FOSTER: All right. No further questions.
HEARING OFFICER: Thank you. Any other questions from Protestants? Hearing none, thank you, Mr. Stanaway. We will go ahead and go off the record and take a break at this point.

(Recess.)

(Reconvened.)

HEARING OFFICER: All right. We are back on the record. Mr. Watkins, you're going to lead off on this one?
MR. WATKINS: Yes, Your Honor.
HEARING OFFICER: Okay. Who would you like to call?
MR. WATKINS: Perpetua calls Gene Bosley to the stand.
HEARING OFFICER: Great.

GENE BOSLEY

after having been first duly sworn,
was examined and testified as follows:

MR. BOSLEY: I do.
HEARING OFFICER: Okay. Good luck wrangling all these exhibit binders.
A. (Inaudible.)

DIRECT EXAMINATION

BY MR. WATKINS:

Q. Mr. Bosley, welcome. Could you please state and spell your name for the record?



A. Yeah, I go by Gene, G-e-n-e. My full legal name is Eugene K. Bosley, II. It's E-u-g-e-n-e. Bosley is B-o-s-l-e-y.
Q. Mr. Bosley, what is it that you do for a living?
A. I'm senior engineer at Perpetua Resources Idaho, Incorporated.
Q. And how long have you been doing that?
A. I've been there since 2016.
Q. Can you walk us through your background that qualifies you for that position?
A. Well, I have about now 25 plus years of experience in civil and hydraulic engineering. A Bachelor's with a minor -- Bachelor's civil minor environmental engineering and a Master's in civil engineering with a hydro systems focus.
Q. Can you walk us through your work history?
A. Sure. So prior to my tenure at Perpetua, I was actually with one of their consultants, Sierra Group International, which is a tailings design consultancy. Started there, I guess it was 2012, and started on this project actually in 2013 as a consultant working on tailings and water management for the then Midas Gold for the Stibnite project and came over onto the owner's side in 2016. Prior to that I was with a number of civil and environmental consulting firms. First off, I'll jump to the



back, out of school was Parsons Brinkerhauff where I worked in their water group doing bridge scour modeling and analysis and stream restoration and highway hydraulics. Went on to a firm called Rumble Clupper and Call. They are Baltimore based. I was back there then, doing similar work, more on the stream restoration, less on the modeling, and then onto move west and worked for Tetra Tech for a number of years in mining so.
Q. Is there anything in your work history that has particular relevance to the work that you're now doing with Perpetua?
A. Yeah, I would say the tailings design, of course, the stream restoration, and fish passage work, as well as the modeling. So back from the beginning of my career did some what was then high-end two dimensional modeling. Of course, now we've graduated to three dimensions having better computers than we had then 20 plus years ago so.
Q. As the chief engineer for Perpetua, what sort of responsibilities do you have?
A. So I direct all the infrastructure and really all the engineering designs, and I don't design them generally. I lead the consultants that are designing all those, and I assist the permitting team by reviewing all of the modeling that goes out the door. So all the modeling reports that Dan Stanaway testified to earlier, I generally review all of

those.

Q. So Dan and his team make the reports. You review and sign off on those reports?

A. Yeah. Nobody signs anything. I sign off on the water balance. That's my stamp on that, but I didn't -- there's no signature. But, yes, I review and broadly approve those.

Q. Good. Good. Do you have any oversight of any sort of team?

A. Internally we have ad hoc teams internally. We're relatively a small company of 31 people, many of which just work at site. That's the site team. So I don't have an official team at the moment. I'm -- it's all consultants and, again, ad hoc internal teams.

Q. And overseeing those consultants in those groups?

A. Yeah, and I oversaw the fish tunnel design. I lead that, the tailings design, and a bunch of other designs that are less relevant here, like the access road and things like that.

Q. So you oversaw the fish tunnel design. You oversaw the tailing storage facility or TSF design; is that right?

A. That's right.

Q. Do you have any oversight or input into water management at the site?

A. Yes. Yeah, I oversee water management, water



treatment, stream restoration formerly. Stream restoration has been handed off to our restoration manager as of a few years ago, but we got kicked off with Rob's team under me back when we started with his team on the project.

Q. Just broadly speaking, we are just getting general background right now. Why is the fish tunnel needed?

A. Well, to restore fish passage. There hasn't been any since 1938, which I think Alan has covered well enough. Since '38 there's been no fish passage, and part of the project vision since before I was even on the project was leave it better than you found it, and this is a component of that.

Q. Why is the tailing storage facility necessary?

A. Well, one, to protect water quality, right. You can't -- you know, there are some unfortunate past practices of tailings management, including out of sight where we know the tailings are likely to lead to metals loading, if we were to discharge them uncontrolled. So the tailings facility is, first, a water quality protection measure and that's why it's lined. The other thing is the tailings facility is an integral part of ore processing. You have to store the tailings produced by ore processing. You also need to recover water, and tailings is really a water recovery facility for the ore process. It provides 80 percent or so of our water.



Q. And we'll break down the engineering on how that actually works a little bit later on. Why is water management important or needed at the facility?

A. Well, somewhat to do with what I just said about tailings, right, is we need to protect water quality, protect the water that's there, not, you know -- both by keeping it clean in the case of, you know, surface water diversions, as well as managing our own water so that we don't discharge dirty water, and then we have to furnish water for ore processing needs.

Q. And finally I think you said that you had some oversight over stream restoration design. Why is that an important part of this project?

A. Again, part of the restoration vision of the project is to restore and enhance treatments where we can. Some of that is repair legacy impact, and so that is restitution for what we will inevitably impact on our own but for our unavoidable impacts under 404.

Q. I'm going to hand you what has been marked as Exhibit 60. Do you recognize Exhibit 60?

A. Yes.

Q. What is it?

A. That's my expert report.

Q. You prepared an expert report in this case?

A. I did.



MR. WATKINS: Move to admit Exhibit 60.

HEARING OFFICER: Any objections? Hearing none, Exhibit 60 is admitted.

Q (By Mr. Watkins) We're not going to have to go through and read all of Exhibit 60, but I just wanted to point out what looked to be two different conclusions in this. Number one in bold it says: Water management at the SGP will conserve water resources while fulfilling the purpose of the SGP. Did you see that?

A. Uh-huh (affirmative).

Q. Do you -- as you sit here today, is that still your opinion and belief?

A. Yes.

Q. And are you prepared today to talk about water management?

A. Yeah, absolutely.

Q. The second conclusion that you reach in your expert opinion is No. 2: The freshwater intake and diversion tunnel are protected of fisheries resources while allowing Perpetua to divert water to beneficial use. Did I read that correctly?

A. You did.

Q. And is that still your opinion as of today?

A. It is.

Q. And are you prepared to dive into and talk about that today?

A. Yes, sir.

Q. Perfect, and let's do it. Let's talk first about that .2 on fish tunnel. When was the current version of the fish tunnel that we're talking about today, when was that first designed?

A. 2018 McMillen Jacobs -- and I should note it's now McMillen. The firms have split, so you'll see references both ways. But then McMillen Jacobs designed it under my leadership back in -- concluding in November of '18, and then, you know, since then we've done more modeling and examined how to improve the fish passage of which was already quite good.

Q. And so there's been different iterations of it or improvements of it?

A. The tunnel design has been the way it was since 2018. We did the analysis for Fish and Game to see what would happen under lower low flows than were originally modeled. We did not modify design documents. As a result of that when we will do so but there was little point in modifying -- a reissuing that entire design report and all those design drawings and all that cad work, there was no point in reissuing that to simply change the weir dimension -- it went from 24 inches to 15 inches wide,



right. There's no point in doing that now, knowing that we'll see this again in Section 7 consultation and NIPS might have their own thoughts on the details of the weir. So it was just wasted cad time to change it now when we are this far out from construction and yet to go through Section 7 consultation.

Q. Let me give you a document in front of you. Are you familiar with the fishway operations and management plan?

A. Yes.

Q. I've handed you Exhibit 34. What is it?

A. Looks to be the fishway operations and management plan.

Q. And what is the fishway operations and management plan?

A. Well, that is a set of procedures. It first explains how the tunnel fishway works, but it's also a set of procedures on how we'll build, how we'll salvage fish, and how we'll operate that, and how, if we have to, we'll revert to trap (inaudible). I believe that's in there, too.

Q. So it covers the design of the fish tunnel, as well as how to use the fish tunnel and how to handle fish?

A. More how to use and how the design operates. It's the design documentation is McMillen Jacobs design documentation report, and that talks about, hey, here is why



this is this much rebar support here, there, this much (inaudible), those details. But how it operates from the perspective of fish passage is this document.

Q. How is it that you are familiar with the fishway operations plan?

A. I've reviewed quite a bit of it, and I was in charge of all the documents that feed it, you know. It comes from the McMillen Jacobs work that I led.

MR. WATKINS: I move to admit Exhibit 34.

HEARING OFFICER: How much time, Mr. Watkins, do you think we'll spend reviewing this document?

MR. WATKINS: Quite a bit. We'll be discussing it through out his testimony.

HEARING OFFICER: Okay. Are there any objections from the Protestants on Exhibit 34? Hearing none, Exhibit 34 is admitted.

Q (By Mr. Watkins) If you could turn with me to page 29 of Exhibit 34, the fishway operations management plan.

A. I'm there.

Q. And if you'll notice on page 29 there's a section 2.3 south portal, and then there's an image. Do you see that image?

A. I do.

Q. What are we looking at there?



A. So -- and if we could blow that up, that would be great. All right. So that's an image of, again, the south -- as stated, it's the south portal of the tunnel, and the south portal is the upstream portal. So this is the direction water enters and ascending fish will exit.

Q. So there's the -- at the very front of that image something that says bed load sediment collection. Do you see that?

A. Uh-huh (affirmative).

Q. What's that?

A. So that is a sediment trap, so that is a, you know, nearly vertical sided pit in the riverbed or in the -- you know, right as the river diverges from its natural course towards the tunnel. Right there is a pit that will drop out all the large bed load, because we would not -- we don't want boulders, large cobbles going down into the rest of the headwork. So this is a measure to protect the tunnel and all the appertinent structures, as well as to enable to place that stuff to be collected in one place where we can reach it with an excavator from that. You see an access road there?

Q. Uh-huh (affirmative).

A. You take an excavator along that access way and you reach down, and you clean that out of sediment annually or as needed.

Q. How is that different than the debris barrier that's also listed there?

A. The debris barrier is for floating -- for large floating debris.

Q. Logs?

A. So logs, yeah, and we don't have -- you know, the East Fork up here is relatively small. We don't see a lot of logs like you see on the East Fork closer down towards the town of Yellow Pine where there are very large log jams as a consequence of some of those avalanches. Up here we don't see that, but we see enough that it is warranted to protect the rest of the structure.

Q. Could you walk me some through some of these other boxes on this 2.3 diagram?

A. Sure. So, and I should also note the debris barrier space for Chinook, so there's a bar spacing associated with adult Chinook, and that's the criterion we used for sizing the bars. It's got vertical bars to catch the logs, and they are gapped big enough for an adult Chinook to pass.

Q. Why Chinook? Why not some other species?

A. They're the largest. They're the largest of the four fish concerned here.

Q. And what are those four fish?

A. The Chinook Salmon, Steelhead, Bull Trout, and West



Slope Cutthroats.

Q. So if a Chinook could fit through, then a West Slope Cutthroat could fit through?

A. Yeah. If the Chinook get through, and that goes for flow depth as well, and we'll see that in a minute. Chinook need about nine-tenths flow depth. If the depth is enough for Chinook, it's enough for everything else.

Q. If you could proceed walking through the South Fork.

A. Okay. So as we go down here, so there is a -- and not shown here is this next four bay right below the debris barrier. That's actually where the intake screenings will be. This document predates the design of that. But the intake screens which are cones NMFS type cone screens for our water intake are right there in that four bay.

Q. And what do those do?

A. That's the intake. They keep the fish from being impinged on the screen when the pump is operating, and I think we probably will cover those in more detail later. But that four bay is where those will be located. The other thing that happens there is you'll see it says control weir with pickets. The control weir is really why this tunnel fishway operates as well as it does over such a wide flow range. We are a run of the river tunnel. We take whatever the river sends us. There's nothing -- we don't have --



this isn't a reservoir fishway like you see down on the Lower Snake or something. So we have to take whatever the river sends. Where we descended all down the fishway, the fishway velocities would become impassable at really high flows. This control weir -- and you see it's quite long, right, so this control weir allows the head in that four bay, that is the water depth in the four bay, to remain relatively constant over a relatively wide range of river flows and send all flows up to about 25 cfs down the fishway. And then once the river is flowing at above 25, 80 percent of the incremental additional flow goes down the access way. And so what it means is that at the river -- the river could be 200, and the fishway may only see 50 cfs. I don't know the exact ratio, but it's something on that order where the fishway goes from low flow up to 25. Everything down the fishway from 25 and up, it only gets up to about 50, 54 cfs at the high Steelhead design flow, which is the highest fish design flow considered.

And so then next up is the fishway exit, which is the water entrance to the fishway. That's just the weir that controls the fishway itself. So that interacts with that control weir, that long control weir, so that we have the right depth and flow in the fishway again over a range of approaching river flows.

Q. What's the resting or orientation pool?



A. And that's kind of gravy, honestly, because really in the fishway the velocities are so low that every bay between every weir is a self-resting orientation full of sorts anyway. This is kind of just extra, but it's there. We need the four bay to operate the weir and operate the intake, so there it is. But it's likely not necessary because, again, the velocity are so low everywhere in the system that the fish probably don't need that resting pool right there.

Q. So it sounds like the south portal is over engineered?

A. In that case, yeah, from a fish resting perspective it is.

Q. Okay.

A. And you want it overengineered. What you don't want is any of that debris, any of that sediment, entering the tunnel itself because you don't -- everything is a lot harder to clean out once it's underground.

Q. Let's go ahead and flip to the next page.

A. And before we flip, I wanted to note the access way, right. It says tunnel access. That's just a road. The fishway and the access way are parallel inside the tunnel. That access way is also a floodway. That's the function of that control weir is those high flows in the river, they end up in the access way. The access way is not

fish passable at all. It will be very swift water, but we'll get to once we get to the lower portal how we keep the fish from even trying.

Q. Okay. Let's go to the next page, and what are we -- what is the graphic or image on page 30 that we're looking at?

A. That's just a cad-based drawing. So that's the detail drawing that was clipped out of McMillen Jacobs plan set of that sediment dropout zone and sediment trap. So I should have noted previously, the sediment trap is a vertical sided knockout to draw out the big stuff. Downstream of that sediment trap we have an extremely flat piece of channel before the debris screen. It's about, I don't know, a tenth of a percent gradient, and that's to catch all the finer things that don't necessarily drop out right away. So this is going to catch down the pea gravel, and we may see little pea gravel size go through, but catches whatever doesn't get caught in the trap for the most part.

Q. Let's go ahead to page 32, and there's another graphic on 32.

A. Okay. That's just the debris screen. That's the detail view. This, again, is out of McMillen Jacobs plan set.

Q. Uh-huh (affirmative).



A. And that shows you your bar spacing, which as you see also does vary with height.

Q. And this is, again, large enough for a Chinook to get through?

A. Yeah, yeah, the bars are sized for Chinook, and it's inclined. You'll see in the plan it's a little easier to see. You see there's angles there to enable you to reach with an excavator, pull off the debris. So you don't put -- we do not put equipment in the river as far as driving in the river. Everything is reached from the access way.

Q. Off the side?

A. With a boom, yeah.

Q. Page 34.

A. That's just an overhead view of the same. You see the angling.

Q. This is the weir?

A. That's just an overhead view of the weir, overhead view of also the debris screen.

Q. And then 35?

A. 35 is just a -- that's one of the picket panels on the control weir. You'll see they're quite a bit smaller. The intention of those picket panels is not to pass fish. It's to keep the fish from going over the falls down the access way, and those are sized and the sweeping velocity is designed so that juvenile fish are not impinged on the



pickets and are swept into the fishway.

Q. So what are these vertical lines spaced every five feet or so?

A. Those are the posts.

Q. Okay.

A. So the panels are -- the panels slide in and out, so those are just H piles.

Q. Okay.

A. Or similar, right. So those are just posts with slots in them so you can pull the panels out to clean them.

Q. Okay.

A. And they will, because they're fine, they are meant to prevent juvenile fish from going down, so the hole spacing is small. They're going to catch leaves and pinecones, things like that. You have to pull them out and clean them periodically.

Q. Can you look at the crossed section on the same page 35 down at the bottom of page 35?

A. Yeah, that's a cross-section within the tunnel, and that is right at a fishway weir. That's a little -- the thing that's shaped like a flipped State of Utah is the weir section, and so you see there's the weir wall overall is two feet high and it's got a 2x2 square notch. Again, that notch is going to probably end up 15 inches wide to make it work better at the lowest low flows. And then you've got a



partition wall in the middle giving you about a nine-foot wide access way and about a five-foot wide fishway weir pool. So in between every one of these weirs that you see here is a pool that is for the steep part of the tunnel it's 22 feet long, the direction of flow, and five feet wide.

Q. This steep part of the tunnel, are there different grades?

A. Yeah, there are two. The tunnel overall is about four percent gradient, which in its own right is not terribly challenging to design a fishway for. I mean, they make them go much steeper up dams in the Northwest, but it's overall about four percent but because of some bad ground conditions, so some -- a case near the downstream end where bedrock was relatively short distance overhead of the tunnel --

Q. Uh-huh (affirmative).

A. -- envelope, we elected to flatten the lower part of the tunnel to get under that to get into better rock for tunneling conditions, just for tunnel support purposes. So we flattened the lower end, which means steepening the upper end, and so you've got one and a half percent low and then four and a half percent high. The majority being on the high side, and the weir spacing just -- all the hydraulics are identical from one to the next because it's controlled by the weirs. The only thing that's different is just like

you'd size a check dam for stormwater, you change the weir spacing according to gradient. And steep side it's 22 feet apart. Flat side it's 66 feet apart. So the pool is either 66 or 22 feet long in between each weir.

Q. How long is the tunnel in total?

A. Nine-tenths of a mile.

Q. Nine-tenths of a mile. And it's 15 feet tall, 15 feet wide?

A. Yeah, that's right.

Q. You could drive a truck through it?

A. Be tight with a truck. We'll have more specialized smaller equipment.

Q. Okay.

A. But, yes, and we don't show the ventilation here, but it will be ventilated, too, so we can -- we will leave the construction ventilation in place in all likelihood.

Q. Uh-huh (affirmative).

A. No point installing new.

Q. Would be lit?

A. It will be lit, yeah.

Q. Why would it be lit?

A. Well, it will be lit. The most essential part of the light, I'll say, is the portal, right. Fish do not like, given to understand, they do not like rapid, sudden transitions in lighting conditions. So you can't go from



broad daylight to a dark tunnel and expect them to not hang up in that spot. So making that transition work is the most important part, but then we plan to light the rest of the tunnel and cycle it, you know, light to dark to match normal daylight patterns.

Q. So if it's night out it's dark in the tunnel?

A. Yeah.

Q. If it's daytime out, the lights will brighten the tunnel?

A. Yeah.

Q. So it's not disalarming to the fish?

A. Yeah.

Q. Let's go ahead and look at 37.

A. Okay. Yep, that's the north portal. So this is the other end. This is the water exit and the ascending fish entrance side. This is the section where begins the reach of river that we've been talking about all week is from here down to Sugar Creek. But this is the exit of the tunnel that begins that river reach of concern. So first thing coming out portal structure, you know, same as the other end, wall, the fishway here is at 1.5 percent gradient. The access way comes down around. Again, not much exciting there. The key parts down here are down at the lower end because you have the access way coming down parallel to the fishway and it's, again, quite steep and not



really ascendable by fish. But that doesn't mean they won't try, and so there's a fish exclusion barrier there. And that is a finer bar screen spacing. That is a bar screen spacing that would let a juvenile, should any accidentally go down the access way, you know, if the pickets are over choppy or whatever might happen, right, so that will let a juvenile out, you know, but it will not let anything in. So any juvenile that comes down, there won't be a Bull Trout waiting in the orientation pool to eat it.

Q. Well, that was going to be my question. Why does this matter?

A. It matters because Bull Trout like to eat baby Chinook.

Q. Okay.

A. And they'll eat anything but, you know, particularly of concern here the baby Chinook. So that's a bit of a juvenile orientation pool. There's another adult -- again, a bonus resting pool, probably not necessary, but we -- some of these were conceived before we had done all that hydraulics yet and improved the rest of the whole tunnel was more or less a resting pool. So we've got some resting pools here. Again, we've got that exclusion. That exclusion keeps any juveniles that get swept down from immediate predation, but it also keeps the adults trying to ascend from attempting to ascend the access



way. If they were to try to ascend the access way when it's flowing, right, it might be -- might only be a few cfs, but it will be 10 feet per second or more. It's not ascendable by the fish. And what they'll do is they'll exhaust themselves in the attempt, and so we want to keep them out of there. And that's, again, the primary purpose of that barrier is.

Q. So we want the fish going in the same direction, not going back the direction they came?

A. Yeah.

Q. We want to control --

A. Yeah, we want the adults to swim up the fishway.

Q. And what is the end result of all of this? What is the benefit of the fish tunnel?

A. Is that we now have volitional passage for the first time since 1938.

Q. Fish can get from point A to point B?

A. Yeah.

Q. On their own?

A. Yeah.

Q. Let's go to page 18.

A. 18. Backwards, okay.

Q. And what are we looking at on page 18?

A. That's a construction operation timeline.

Q. So I've noticed the very first thing listed on the

construction and operation timeline is tunnel construction. Do you see that?

A. That's right.

Q. And so remind us again what does negative three represent?

A. So, and there's -- I should note there's no zero on the timeline, right. So negative three is the first year of project construction. In negative three mostly the site itself is as it sits today. In negative three, the principal construction activities are on the Burnt Log access road and power line, and so at site there will be very little going on at minus three. On-site construction gets really serious in minus two and minus one. So that's a three-year construction period to build the overall project. About two years of heavy work on-site.

Q. And so -- once second. Could you let Paul Leonard in?

THE CLERK: I did.

Q (By Mr. Watkins) So year three it sounds like just some earth moving and whatnot and maybe access road issues but nothing really on-site?

A. Yeah, not much.

Q. Real construction begins on --

A. Camp construction will probably start, too, so we have a man camp to expand but, again, yeah, not a lot. No



mining, nothing big, until minus two.

Q. And minus two I notice that the very first thing listed, and really the only thing listed here at negative two, is tunnel construction. Why is tunnel construction the very first thing that Perpetua intends to do?

A. Well, this is the tunnel timeline, right. So this is focused on the tunnel anyway. There are other things happening that year, tailing facility among them, but the tunnel needs to go in to establish fish at the outset. You know, we could, and many would, wait until that third row to restore across the backfill, right. Putting this tunnel in was, again, part of the vision to improve the site, and part of that was reestablish fish passage early in operations rather than -- and we've done it on other reclamation fronts, too, where we are doing current reclamation rather than waiting until the end. And this is another one of those.

Q. So you could have waited until the Yellow Pine Pit was completely filled up years in the future and then put a river across the top like you're planning, but instead you're doing the tunnel at the front end?

A. Yeah.

Q. What is the estimated cost of the tunnel, do you know?

A. The tunnel is maybe 40 million in the aggregate.



The fishway components are a few million just for the fishway. So the tunnel is necessary anyway for mining to -- I mean, you could do a surface diversion, too, but the tunnel is still the winner to facilitate mining Yellow Pine Pit, which comes first. But putting fish in it was extra added cost and, again, supports the restoration for the project.

Q. Do you know what a computational fluid dynamic model is?

A. Yes, I do.

Q. What is a CFD?

A. Well, it's now -- it's the state of practice, really, for analyzing complex hydraulic problems, so it is what it says. It's computational fluid dynamics. It uses numerical solutions to solve the fundamental equations of fluid flow, and in the case of the tunnel in three dimensions, there are also two dimensional ones which is what I started my career working on, you know, back when computers really -- then we didn't do 3D. Computers in the day couldn't handle it very well. Now computers have advanced, and it's enabled 3D CFD to really become the standard for any complex hydraulics problem. We still use, down to 1D models for lots of things, but when something gets complex like this, then when the answer matters more, then you're into 3D.



Q. And did you do a 3D CFD model for the fish tunnel?

A. Yes. McMillen Jacobs did that.

Q. And did you oversee the work McMillen did?

A. I did.

Q. And what was the result or the takeaway from that modeling?

A. Well, the takeaway -- and I should back up a second. Well, how does one evaluate the results of this model? Well, we've got four species of interest. We've got -- we know something about their swimming abilities and their body size, right, so a fish -- it's two feet long, weighs five pounds. It can swim 20 feet per second or whatever it might be, and those numbers are kind of reflective of Steelhead. So you have to design your facilities so that the hydraulic conditions are adverse to the fish swimming up through them, and in the case of Chinook and Steelhead, they are very good swimmers, they're also very good leapers, we don't want leaping, however. So they're good swimmers and leapers, and you want to make sure that you've got sufficient flow depth for their body size. They're rather large fish, and you want to make sure you have sufficiently slow velocities that they're not incapable of swimming against those velocities, and ideally that they're not stressed out by swimming against those velocities, and so we have a number of velocities we look

at. And we look at one that's called burst speed or darting speed, right. That's what sounds like, right, that's their high, that's their top speed. They can only sustain it over short distances. If you make them sustain it over long distances, they're going to fatigue and Salmon that have come a long way are ready, they can't afford energetically to be that fatigued, right. So you've got a burst speed, but you've also got lower speeds among them, sustained speed, so they can swim like that for quite a while, right. Now, what we did is we evaluated the tunnel velocities with the CFD model and the flow depths, and we checked those flow depths and velocities against body size criteria, body size base criteria, the fish. For again Chinook it's nine-tenths of a foot of depth. For the other species progressively less. Only a third of a foot for the Cutthroats, and we checked the velocities at the key spots against their swim speeds. And what we see there, and we've got some of these later on in the document here in some full color images. And I can't remember where, if you want to turn to those. But what we did is we saw that, you know, the maximum velocity here, right through that weir, so there's a jet that goes through the weir, through that notch. That's about 6.5 feet per second. And the burst speed of a Bull Trout is 6.6. So it just works through the Bull Trout. As expected, Bull Trout are relatively slow. The Chinook and



the Steelhead have sustained speeds of 10 and 20 feet per second or so, so even the fastest velocity in the tunnel fishway is half or a third or a quarter of the sustained speed of the two better swimming species. And then Cutthroats are kind of in between. It's no challenge to them, either, but this is -- by the numbers, by the CFD results, the tunnel fishway is no challenge to really any of the species, and especially not for the Chinook or the Steelhead.

Q. Can we go to page 116 in this document? Does 116 show some of that velocity information you were talking about in that modeling?

A. This might -- that might be -- yes, the colors on the bottom -- the colors on top are not terribly instructive. That's mostly demonstrative of where the water is and how deep it is.

Q. Okay.

A. What this is, this is a high flow case. 54 cfs is, I believe, the highest high for Bull Trout and Chinook.

Q. Okay.

A. And you see there's a little bit of water headed down the access way at that point, right, so there's -- you know, there would be probably 30 in the fishway and the other 20 is probably going down that access way.

Q. Okay.



A. So there's probably 30 cfs in the fishway, and 54 in the river overall. The weirs are starting to become over top there, right. This is the top end flow, so the small notch is starting to become overtopped. And you look at the jet, and I can't -- it's hard to read for me here, but I can tell you it's 6.5.

Q. Can you blow up this --

A. We have more detailed sections of those that actually pull the detail results. I believe there's a table. Yeah, there's a table. Table 2 has that in there, too.

Q. On what page are you on?

A. 108. And what page are you on?

Q. 116.

A. 116, and I think there's some -- yeah, there's some more images on the subsequent pages that might show up better as well.

Q. So let's first go to the next -- which page would you like on those images?

A. We can step through them.

Q. Okay. Can you go to the next page, 117? What do we see on page 117?

A. So 117 is just another -- the top image is another view of the previous one at 54 cfs, and the one I would focus on, the middle weir, is the one to look at here. The



tail end weir is not a valid numerical result because that's at the boundary condition. It's not where you look for results. But you look at that middle weir and you're right in there in the six -- six and change range of velocities. That next one down is the very same image as figure A1, but it's at 120 cfs. So you see again just more water everywhere, but especially in the access way because the access way is taking on 80 percent of all the additional flow between those two benchmarks.

Q. Let me just stop you really fast. When you say the middle weir on the top image is right around six or so --

A. Yeah. So the model here, this is -- we don't model the whole tunnel, right.

Q. Yeah.

A. It's a repeating sequence, so you only model a cycle of two or three or four weirs.

Q. Uh-huh (affirmative).

A. Downstream most is affected. It has no tail water on it. There's no weir below it to backwater it, and so velocities on the downstream one of the model aren't real, all right. They may show up high, right. That's why the thing contoured up to 12, right. You see that there. That's not a real result because there's actually a weir below it and below it and below it, all the way down.

Q. Which would be changing --

A. It's just weirs all the way to the end of the tunnel, and that means that every single one of those weirs is tail watered by the one below it. And that's what controls the velocities as well as, importantly, keeps the flow depths high. If you were to have -- if these weirs went much deeper and didn't backwater each other, you would have trouble with flow depth with Chinook at the lower flows.

Q. If Chinook is kind of all, I'll call it the target species, because if Chinook can do it, all the other species can do it, what's the magic number that we're looking for around these weirs for Chinook?

A. For Chinook, the numbers for Chinook are body size number, right. Point nine-tenths of a foot of depth in the throat of the weir, basically, is the Chinook number. For velocity it's the Bull Trout. They're much slower swimmers. The Chinook can sustain, I think it's 11 feet per second. The Chinook can sustain 11. The Steelhead can sustain the 22 or something. The Bull Trout burst is 6.6. So the Bull Trout are the ones that the velocities really control.

Q. Okay. And so what's the Bull Trout number that we want to see on these models to know that this will work for Bull Trout?

A. Anything less than 6.6.

Q. Anything less than 6.6?



A. And, again, there's -- as I said before, there's ample resting in every one of these bays. Every one of these bays has net downstream velocities of one, and big eddies in which I think we have some images further on as well.

Q. Let's go to the next page, page 118.

A. 118, just more of the same. Different view of kind of the same information.

Q. With a different cfs?

A. Yeah. This is the 120, and I want to say that's the -- that's either a middle Steelhead or an upper Steelhead flow. So this is -- while it does achieve six and a half, because of that control weir we tend to achieve six and a half velocity for, again, a very wide range of river flows, but these upper end flows, like 120, well, Bull Trout aren't moving at that time of year. This is the spring melt. 120 cfs is a Steelhead flow. Bull Trout aren't present yet. Well, the local ones are, but the big Bull Trout that migrate up in July along with the Chinook, they're not here yet when these kind of flows are on the table.

Q. That's an interesting point, and so as velocity changes on the river, it's not -- it's not fair modeling to say you need to have this certain number for the entire year because there's different fish present at different times of



the year. So you need to match the velocity based off of what fish are present at the time?

A. That's right. And in the case of the fishway, the fishway flow is somewhat decoupled from the river flow because of that control weir at the head. You know, that moderates the fishway, and that's more of a high flow question than a low flow question, but it is notable that the fishway weir or the control weir moderates the flow in the fishway. That's what let's it work for Bull Trout even when it's -- even when the river is raging and the Bull Trout wouldn't try, it would still work if you could put a Bull Trout at the tunnel tail, it could theoretically based on velocity get up, even though the river itself might not be something they would want to do.

Q. They could still do it?

A. They're not there anyway generally. They're not moving up at that time of year.

Q. 119.

A. So that's 239. That is the -- that's got to be the biggest Steelhead flow right there. You see a lot of flow in the access way, and you see, again, six and a half. It's hard to see on these. The color ramp is not helpful here. We have detailed output of these where we actually cut a section through the model, extract the numerical output from the model output and text files, or however they do it these



days, but we have detailed output here. These color ramps are just demonstrative.

Q. Sure.

A. But we don't rely on interpolating this little color ramp here. We do get the detail out of the model.

Q. What sort of conditions would be present in the real world what would be going on to get a 239 cfs?

A. Peak spring runoff.

Q. Okay.

A. Big runoff, you know.

Q. And do you know which fish are around during that time?

A. I mean, the resident fish are around, so there's resident Bulls. There's resident West Slope Cutthroat that will be present. There are juvenile fish, right. The juveniles, you know, the emerging juvenile Chinook aren't necessarily trying to ascend the tunnel.

Q. Okay.

A. They may be able to, but what can happen there is you've got resident fish that if it's really ripping, they're not going to want to move around anyway. But, again, they can. You know, they largely will, especially the larger fish, but then you have juvenile fish out migrating. Some of those juvenile fish ride runoff out to sea, essentially, and that's why the pickets, right. That's

because in a flow condition like this, a juvenile fish coming down through that four way -- four bay without those pickets would probably go over the falls rather than go down the fishway. And it's not a case of -- it's not necessarily a case of swimming ability at this point. Again, they're riding the current down. There's no swimming ability criteria here. It's about physical protection for them is don't send them down fast rough water when you can send them down the more calm, you know, fishway side.

Q. Let's jump back to 108 and look at that chart that you showed, that you pointed to earlier.

A. Yeah, so that's some --

Q. This is table 2 tunnel access way slope transition hydraulics. What is this?

A. Yeah, that's just one of -- just some examples of the more detailed output, and that's the access way, so that's -- that's where your -- like I said, your 10 and 20 feet per second in the access way, that's the number. That's why we don't want them in the access way. It's shallow flow. They can't ascend. Exhaust themselves in the attempt.

Q. Uh-huh (affirmative).

A. Now, I've seen Steelhead get up stuff like that. I'm seen them swim on their sides up things like that. They're capable, but not for nine-tenths of a mile.



Q. Yeah.

A. And in the attempt would exhaust themselves, and that's why we want -- you know, we don't want the juveniles getting banged up in fast, rough water. Hence, the pickets at the top. We don't want the adults attempting to ascend. Hence, the screen at the bottom.

Q. You mentioned earlier McMillen Jacobs, and now it's just McMillen or Jacobs because they split.

A. Yeah, just McMillen. Just McMillen is the side that did the tunnel hydrodynamics. Jacobs side did the structural design.

Q. And did McMillen Jacobs prepare technical memos for you describing the tunnel design, as well as CFD?

A. Yes. Yeah, there are a series of technical memos that are appended to their 2018 design report, and there were at least two subsequent technical memos with additional hydraulic modeling in them.

Q. I've handed you what's been marked as Exhibits 46 and 47. Do you see those?

A. I do, and might need help getting this right. Two hands. Thank you. All right. So, yeah, so 46 those look like the memos that were -- at least one of them that was -- that were part of the design documentation report. So this is the initial pass at tunnel CFD back when we designed it back in 2018 with the flow rates from 2018 which were 8 cfs



on the low end and 54 on the high end for passage. And I don't think we evaluated Steelhead at that time. And then we have also evaluated, I want to say, 720 which is the 500-year flow.

Q. So there was some discussion -- I think you were here for the testimony or the cross-examination of Mr. Stanaway, and I think --

A. I was here for cross, but I missed the direct. Missed direct of his testimony.

Q. During the cross there was some questioning about the appropriate number for flow, and there was some argumentation or some questioning around the No. 8, but it sounds like you're saying the number should be closer to 6?

A. Yes. So this document here, right, this was done in 2018.

Q. Exhibit 46?

A. Yeah, Exhibit 46 was from 2018 design. That was the feasibility study design. Now, the feasibility study was initiated in '17. Wasn't completed until 2020. Published, and the technical report went out in early 2021. That was when the ModPRO2 was, right. But we had already initiated some of the design. We knew it was coming. But the thing is we hadn't finished all of the NEPA impact modeling as of 2018, right. So this thing was designed for the last 25 years of record per NMFS guidelines. Based on



flow exceedance for the previous 25 years of flow records.

Q. Uh-huh (affirmative).

A. As of 2017 or '16, whenever we had to cut it off somewhere so you could proceed with design. So we had the -- we had the flow record. We had a nice gauge record, but we didn't have an assessment of project impact. So these were essentially designed for the flow without the project, not knowing yet just how low those might go, right. And so what we've done since and what was part of the Fish and Game analysis that was talked about earlier, was we took this tunnel design and looked at, well, how will it perform at the flows with project? So deplete the flow from what was in here, and we also updated the record, right. We now have the benefit of records through, again, wherever we cut it off in 2021, I don't know, I can't remember where it cut off, but it was a longer stream flow record on-site than this had. And then we took those record flows, or the calculated exceedance flows from them, adjusted them downward according to the predicted project flow depletions from Dane's model, not even from the model, really, with that Fish and Game condition, and then reran everything and looked to see how it performed and what might we have to do to make it form if it didn't. And, you know, the key thing being take that weir that's two feet wide and make it 15 inches wide. 15 inches was just because that's the

minimum for Chinook. That's the body size based width for fishway weirs per NMFS guidelines for a fish the size of a Chinook. So we took a 15-inch wide and evaluated that one knowing that we really didn't want to go any smaller than 15. And that's where we came -- that's where we backed into that 6.6 is the project depletions take it down to no less than 6.6, it will meet all the criteria, including size criteria for Chinook.

Q. As well as the velocity for --

A. As well as the velocity for Bull Trout, yeah.

Q. So is Exhibit 47 the updated version or the more current dataset as compared to Exhibit 46?

A. Yes. Yeah, that's the updated one. And there was one other that isn't really relevant. We did in between because it was based on the old work but NMFS wanted more flow range and more output in more places when we were doing informal consultation several years ago. So there is one out there on that that, I guess, isn't maybe in evidence, but it's superseded by 47 in any case.

Q. 47 is the --

A. 47 is the latest greatest. 47 is where we're headed. Again, we have not redesigned the tunnel because there's no point in spending the engineer time and cad hours to change dimensions of that weir wall, knowing that this still we're going to see comments from NMFS anyway.



Q. And 47 is addressed to you, correct?

A. Yes.

MR. WATKINS: Move to admit Exhibit 47.

HEARING OFFICER: Any objections? Hearing none, Exhibit 47 is admitted.

Q (By Mr. Watkins) If you'll go to page 2 of Exhibit 47, and I'm looking at the second to last paragraph that starts with the tunnel would. Do you see that?

A. Uh-huh (affirmative). Yep.

Q. I'm going to read through it and ask you some questions along the way. It says: The tunnel would be designed to convey the at least 500-year flow of the EFSFSR, which is approximately 721 cfs at the anticipated downstream tunnel portal location. First off, what is a 500-year flow of the East Fork, South Fork? What does that mean?

A. That is the flow that on average would occur once in 500 years, but really it means it's got a 1 in 500 chance of occurring in any given year.

Q. And so why are you designing it based off of a 1 in 500 chance flow?

A. Well, to have the tunnel back up, right, to have that tunnel be under capacity and as a result back up would mean that you could see floodwater in the Yellow Pine Pit with man and equipment in the pit, as well as what would



happen you would have, you know -- you would wash out -- there's a crossing immediately below it that would likely be washed out. And you would then inundate the pit when you had men at work, so that was a safety question first and foremost is we needed to be sure that tunnel could function even at very high flows. It turns out not to control. The 500 year is -- the tunnel is far in excess of that capacity.

Q. Uh-huh (affirmative).

A. The dimensions of that tunnel being 15 feet were confirmed as working through the 500 year, but we did not make it 15 feet for the 500 year. We made it 15 feet for economical mining with a drill jumbo, and because we wanted to have space for a sufficiently wide functional fishway, as well as the parallel access way. We could have gone to 12 by 12, and the 500 year would have passed. 12 by 12 turns out to be slower, more expensive, than a slightly larger because of the equipment involved in mining it, as well as a 12 by 12 would give us a very tiny access way requiring specialized equipment and a lot more time and manpower to maintain.

Q. Let's look at page 3, and I'm interested at the paragraph right above 1.2.16. It's the second paragraph down.

A. I don't see a 16.

Q. I'm sorry, 1.2.1.



A. Okay. Yeah, got you.

Q. And it reads: Because of the possibility of flow depletions in the East Fork, South Fork as a result of both pit dewatering and surface and groundwater withdrawals for process to make up water during low flow periods, the low fish passage design flow could be reduced from the current 95 percent exceedance flow of 8.2 cfs. What does that mean?

A. Well, that means that, you know, if one calculates -- and this is the updated calculation without the project. So this is the calculation, which is why it's different than 8.0. This is the calculation with the updated fish arrival windows, which I think changed by all of about a week, right. So this is calculated during the period of fish movement, with the most recent 25 years of record. So five additional years -- five additional years on the back end and five fewer on the front end than what was done in 2018. So this is a slight update to the 95 percent exceedance calculation, based on the gauging record we have, right. So this is without project 95 percent exceedance as of the best available information to-date. And this, if you were designing a fishway alone, there weren't flow depletions, would be the low flow design flow for Chinook Salmon and Bull Trout because that's the window in question that we used for this one.

Q. Moving to page 15, please.

A. Okay.

Q. And I'm interested in the summary and conclusions. Did the technical memo from McMillen and Jacobs conclude that as designed the tunnel would have appropriate depth and velocity flow to allow for proper fish passage?

A. Yes, it did.

Q. How did McMillen and Jacobs' conclusion that the tunnel will work, how did that impact Perpetua's work on the Stibnite Gold Project and its decision to move forward with the construction of the tunnel, if permits are secured?

A. Well, yeah, I mean, it's -- it was confirmation of what we knew would be done. Had they concluded it wouldn't work, we would have told them to redesign it, because we knew we were not -- we weren't on the bubble here. We knew it was going to work. If it hadn't come up to work, we'd just change, lather, rinse, repeat on the analysis and design iteration process.

Q. Go back to the drawing board?

A. We would have had to redesign the fishway so that it worked. And there are other things one can do because you can still adjust any number of weir dimensions, right. I mean, we went with square. Square is simple to form in concrete. Square is not the only shape of a fishway weir. There are some exceedingly complicated ones out there in the world. So we could have gone those additional steps and



gone way more complex on the weirs or gone variable on the weir dimensions. You know, allow them to adjust, and we can still adjust that control weir at the headworks. And so there were a lot of things yet to be done that we could have done had they been necessary to make this work at a different flow range, but it turned out they didn't. They worked, and we don't have to redesign anything other than, again, changing just a weir dimension. And, again, more might come out of Section 7. There could be smaller tweaks, and that's why we haven't updated the design quite yet.

Q. Currently are there any anadromous fish that are passing through this area?

A. Nothing gets -- nothing gets passed Yellow Pine Pit in the upstream direction, and nothing coming down, probably has a fun time of it but lots of fish come down. It's just -- it's unknown to what extent they -- what level of mortality or injury might have happened going down the waterfall.

Q. So lacking this project there won't be any fish passage; is that right?

A. That's correct.

Q. If there's currently no fish passage and there won't be any fish passage without the project, do you know why some have concern about a fish passage going in?

A. I am not certain. I do not know.



Q. And we've talked about the flow rates. We've talked about modeling; is that right?

A. Yeah.

Q. Was this flow modeling necessary for you to secure water right permitting?

A. No.

Q. Is it needed from NEPA?

A. The tunnel fishway modeling is needed for NEPA to assess the impact and/or benefit of the tunnel.

Q. So would questioning or issues about modeling -- strike that. Are you familiar with the overall permitting process?

A. Yes.

Q. What process determines whether impacts to fish are acceptable?

A. Twofold. So we've got the NEPA process under which the Forest Service, you know, reviews our plan of operation and all the impact assessments, under which the Forest Service may apply or request additional mitigation measures be applied to reduce or minimize impacts, and then there is the Native Species Act Section 7 process, which somewhat runs in parallel and it really can't -- we can't have one without the other. They both need to conclude for us to proceed. So the Endangered Species Act Section 7 consultation process is where the agencies in charge of the



various species get their go at the modeling and the impacts. And that in this case would be National Marine Fisheries Service for the anadromous fish and the U.S. Fish and Wildlife Service for the Bull Trout. They do not address West Slope Cutthroat. Those are a Forest Service species of concern, and those aren't really going to be part of ESA as far as I understand it.

Q. As far as you're aware, does the Idaho Department of Water Resources get any guidance in terms of fish passage or fish permitting?

A. None that I'm aware of.

Q. Now, if the Idaho Department of Water Resources doesn't require the stream flow modeling for fish passage or anything like that, why is it being talked about in this hearing, as far as you know?

A. I believe it's because the -- the -- not the Plaintiffs. What do we call --

Q. The Protestants?

A. The Protestants, yeah, have brought it up.

Q. If you -- if you get permitted with your water right, though, you'll be able to fill that fish passage and have fish move on their own volition from point A to point B, right?

A. Yeah. Yeah, and it will be -- it may predate the use of the water right by a little bit, too, as the tunnel

goes in early.

Q. You might get fish moving even before the --

A. We might get fish before we pour our first ounce of gold, yeah.

Q. We talked a little bit just now about permitting with IDWR. Are you familiar with any other permits that Perpetua has currently secured as part of this process?

A. Yes. We have a number of both federal and state permits either secure or in the process.

Q. Can you name some of those?

A. We recently got our air permit to construct, and that being a state permit but, you know, overall federal oversight under the Clean Air Act. The state point of compliance was issued with conditions, and I don't know that it's final. I'm not the permit expert. Just permit modeling, so state point of compliance you've got the 404 permit, you know, in process. That being the Corps of Engineers wetland and Waters of the U.S. permit. What else we got? We've got our IPDES permit, so that's our water -- our industrial water discharge permit. That has been in process in DEQ for a while now. We haven't heard back yet on that one. We've got our state cyanide permit, so the ore processing by cyanidation IDAPA rule that's administered by DEQ. That permit was submitted middle of this year. We're working through completeness and accuracy and protective



comments on that one right now, and then we've got conditional approval of our state dam safety permit for the tailings from this agency, different portion of DWR from state to state dam safety.

Q. Let's jump back to Exhibit 34.

A. Oh, there it is.

Q. And on Exhibit 34, let's look at page 122.

A. 122?

Q. Yes, sir.

A. There we go.

Q. And do you know what the raw water intake design criteria is?

A. Yes.

Q. What is that?

A. That is this document. It's a technical memo as much of a design documentation as it is (inaudible) document, but that's what they titled it. It is both, and this documents what McMillen -- then McMillen Jacobs did in their design of raw water intake that I directed them to engage in.

Q. And generally walk me through. I mean, what is the raw water intake?

A. So that's our surface water point of diversion to be located at the tunnel headworks. In that four bay. Again, that old figure predates this by a year or so -- so



the raw water intake is where we will get our surface water supply whenever we don't have sufficient water coming from tailings reclaim, stored contact water, contact stormwater we've collected off of our facilities, or dewatering water that we're compelled to pump anyway, right. If all those supply sources fall short and, you know, we still -- the industrial supply, too. If all those supply sources fall short, your two remaining sources are the industrial supply wells up in the Meadow Creek Valley and this surface water intake.

Q. So where will that surface water be taken from?

A. It will be at the headworks of the tunnel.

Q. And why there?

A. Well, because if we were to pull that same amount of water further up in the system, we would have a stream flow depletion over whatever number of stream miles there are between some alternative notional point of diversion and the tunnel headworks. Having the offtake be at the tunnel headworks minimizes the number of stream miles over which a flow depletion occurs.

Q. And do you anticipate regularly taking that raw water intake out and having to, as you just described, or was this one of those once in the 500 --

A. It's a lot more than once in a lifetime. It will not be 9.6 as folks have been talking about. It's only



sized for four and a half, running at four and a half would be pretty uncommon, but running at all, it will be pretty common if the first, say, four years when you see we have make-up needs in the first four or so years of operations. Once you get past the first four years or so it runs very seldom at all.

Q. Why do you have it more so in the first four years and then less in the preceding years?

A. Because of the -- because of the amount of water available in those alternative sources. So in the first couple of years of operations we are dewatering Yellow Pine Pit. Yellow Pine Pit is principally a bedrock pit. We don't dewater a lot of alluvium for Yellow Pine. That's not the case later on. Hangar Flats Pit has 100 or more feet of alluvium in the high wall starting year four, right, and so Hangar Flats Pit we have a lot of dewatering water and so therefore a lot of excess dewatering that we can use and actually enough excess that we are always treating and discharging when Hangar Flats is going on. That's mid-mine life. Early days Yellow Pine is it for the first three years. Yellow Pine, again, is bedrock pit with relatively low dewatering yield. Yellow Pine Pit is also, you know, as far as disturbance surface area goes at site, Yellow Pine is only one of the pits. The TSF buttress is not yet very large. It grows -- it maxes out in year five or so, but

it's not big at that point. So from a standpoint of open disturbance area from which we can receive contact water, we don't have a lot of it in the first few years, you know. The mill and the truck shop are there, and they stay the same forever for the duration of operations. Pits come and go, you know. The buttress just comes. It doesn't go, but all these things are relatively small in those few years. They expand later, so you've got relatively small acreage from which to get some contact water. You've got a relatively low water yielding pit, West End being even lower which I'll get to in a minute, and then you've got a tailing facility that's about 200 acres. It will ultimately be closer to 400. So you have that lined footprint of tailing facility. That will collect meteoric water that falls on it, but it's only 100 or 200 acres of footprint. And couple that with the tailings deposition has just begun, so tailings, when they first enter the tailings facility, come in at a very low density. The more tailings are piled upon the old tailings, the old tailings compress, they yield back the water that they were transported with. It's all, you know, a slurry deposition where you're pumping at 50 percent solids. The other half weight by weight being water.

Q. Uh-huh (affirmative).

A. So the tailings come in at a low density. So the early tailing facility has got pretty low density tailings



and doesn't make as much reclaim water for reuse as it does later. Later in mine life the tailing facility is large. It's got 50, 80 million tons of tailings in it. Those have a latent amount of water in them yet to come out due to consolidation. And that's a lot of water later. But early days it's just not a lot. It's not coming out fast and, therefore, all of our alternative sources, or all our primary sources are at their lowest in the first year, and they're a little bit better the next year, next year, year after that it gets better. The first year is kind of the critical lowest year, and, therefore, needs the most make-up water.

Q. Jumping back just a little bit. Could we go to page 130 of Exhibit 34? Can you blow up that image, Ms. Franolich? This shows approximate proposed intake location. Do you see that?

A. Yes.

Q. And is this the front of the headwater like you were talking about?

A. Yeah, that's the four bay of the tunnel. So that's where the resting pool. That's where the control weir is, and where pickets are, and right there at the end of the arrow is where the screens, the screened intakes will be. So that's where the water enters that raw water intake.

Q. And remind us why that location is preferable as



opposed to some other area to do intake.

A. I am going to assume you mean physically that location within this local area? I mean, the overall location is because it minimizes and stream miles affected, right, you know.

Q. (Inaudible) so yes?

A. So most operators would put that intake right next to the plant. That's where you go. Why make a pipeline (inaudible)? That's how most folks would do it if they weren't trying to minimize stream impacts. Normal operators right out the back door of the plant is where that intake would be. You know, here we've moved it downstream by a mile from there and two miles from Meadow Creek to minimize stream length affected. So that's why it's broadly where it is. Why it's specifically where it is in that four bay is this puts it downstream of all the sediment and debris control features of the tunnel, so it's protected from logs, protected from boulders, protected from gravel. Most of what gets down to there might be some sand, right. And in being in that four bay it's downstream of all those protective features, but it's upstream of a flow control, a depth control. You know, you don't want to have an intake screen in a river that might drop to six inches of flow depth, right. You want the screen to be wet full height. Well, there's always at least two feet of water -- if the



flow of the river were zero, there would be two feet of water here because that's the height of the first fishway weir controlling the fishway flow.

Q. Uh-huh (affirmative).

A. And there's really always at least three feet because the weir's two feet and the minimum Chinook depth is about a foot. So even at the lowest lows, you have three feet of water there on these screens, so you don't ever dry out the top of the screen.

Q. And so is there a fish screen on it?

A. Yeah. It is a cone screen. So these are big -- these are broad cones. I mean, they look like a -- they're really not very acute. They're not a stack. They are real flat.

Q. And I think we talked earlier about why a fish screen would be necessary. You don't want fish getting --

A. Yeah, we don't want to impinge juvenile fish, in particular, on the screens when we pump.

Q. Was the screen designed per NMFS specifications?

A. Yeah. It's a standard NMFS specifications screen. And I should note McMillen's -- they're not just tunnel engineers. They are fishway and fish hatchery and fish passage engineers, so these guys are used to this kind of thing.

Q. Can we go to 139?

A. Got you. There you go.
Q. What is 139 showing us?
A. It's a picture of a cone screen.
Q. And so this is the cone screen that you would see over that intake valve?
A. Yes, and this all, I should note also, shows the low flow elevations and the weir -- and the controlling weir elevations and demonstrates the screen is inundated at the low flows.
Q. Even at low flows the screen is covered with water?
A. Yeah, yeah. And the reason for that, right, is if you have a screen that's designed, the screen has a certain surface area. The velocity, you know, pulling through that screen is proportion to that surface area for a given flow rate. If you dewater part of that screen, now you're sucking the same amount of water through less surface area and the velocities are higher, and then you can impinge the fish if you were on the bubble to begin with.
Q. Uh-huh (affirmative). Once the water goes into this intake through this fish screen, where does it go next?
A. Just goes through a pipe underneath the control weir, and then onwards into a wet well. And so a wet well is just a -- it's just a sump and above it is a floor, you know, or it can be a grate. It can be a concrete floor, but it's basically how one operates a pumping station which has



a vertical turbine pump.
Q. Uh-huh (affirmative).
A. These are common in municipal water and wastewater as well. So you've got a pump that you don't want -- it's not a submersible pump and it's protected should there be a flood, but the pump's up here on a platform. The pump suction drops into the wet well, and the wet well is where the water is actually withdrawn. So you go from screen through a pipe. The pipe enters a square or wet well.
Q. Uh-huh (affirmative).
A. Could be round, square, whichever, but it's a concrete vault, and that's just to give sufficient suction head for the pump to operate properly.
Q. Now, yesterday there was some questioning about what happens if a pipe breaks, what happens if a pump goes down, how long does it take to fix it, and what's happening to the water in the interim when that's getting fixed. First question, if a pump goes down or a pipe breaks, how long does it take to fix it?
A. Probably one work shift.
Q. Why then?
A. Depends on what breaks, right, but we have warehouse spares for any number of parts, and in the case of this pump, I don't recall if we have an installed spare, but one of the other ones I know the question was the tailing



reclaim system. So the tailings reclaim is from a pump barge, barge floating on the pool offshore of an access ramp. That barge has two installed pumps, and only one of them operates. If the first one breaks, you can just turn on the other one while you're fixing the first one. And that's the operating velocity for all the critical pumps. This one, I can't recall where we settled on this one as to operating spares. I know we have a spare screen because that's what's more likely to be damaged, right. Vertical turbines are nice and reliable, but you could have a screen still be damaged by mishap of equipment or if something happened with the various protective measures for debris. So I know we have redundant screens here. I can't remember if we have a redundant pump here, but again, most critical pumps have some scheme of having an installed spare or if it's a bank of five pumps maybe there are two installed spares. Not all five will break. And that's a philosophy throughout build design, any industrial pump and pipe design is going to do that.
Q. Why?
A. Because you don't want to be down for an extended period waiting for a part.
Q. Why?
A. Because, well, in our case, we pour a million dollars a day worth of gold, and we're not doing that if



we're down because of a pump going down.
Q. So you have a financial interest to make sure this works and gets fixed fast?
A. Yeah, absolutely. And in the case of something -- and in the case of anything that could, as a consequence, shut the mill down, right, here again -- again, I don't know how we took it because there are alternative water supplies and the likelihood of this in a reclaim being down at the same time is very slim, right. But when it's critical to the mill, the other consequence it's not just a matter of you're down for the duration of the pump going down. If you shut down that mill, all of the tanks and pipes in the mill have water and tailings in them or water and ore, depending on where you are in the process, so all those pipes could sand up.
Q. What does that mean?
A. It means the sand settles out of the pipes and plugs -- settles within a pipe that's stopped moving and plugs that pipe, which then you have to unplug to get started again. And so to make any of that work out, you need an orderly shut down, right, flushing pipes, keeping tanks agitated, keeping the agitators turning on a tank even though it's not getting through flow anymore. You need to keep tanks agitated. You need to flush pipes. That's an involved process. That's many days or week, right. That's

serious down time if you actually have to go from full production down to zero. You don't just turn it off. You have to do all those things. Otherwise, on the back end to restart it, now you have to unplug everything that's settled out, and that's quite an undertaking.

Q. And so to avoid that, Perpetua is going to have backup spares and pumps and --

A. Backup spares, installed spares next to the, right, installed in line or right beside a surface pump where all you have to do is switch a valve, turn a valve to select the other pump and turn it on, and then warehouse spares for some of the entire assemblies. And always things like seals, impellers, all the smaller parts that are wear parts, you got a budget of warehouse spares right on-site for all of those.

Q. This could be fixed within one work shift. How long is a work shift?

A. 12-hour shift, and perhaps less, right, but, you know, we don't resolve these questions down to finer points than a work shift, but lots of these things are a matter of, you know, bringing something -- bringing a hoist, you know, to lift heavy parts, unbolting one thing, bolting on another, so --

Q. There was some questioning of Mr. Stanaway as to why there are not multiple points of quantification used. I



think Mr. Stanaway talked about that could be administratively burdensome. Do you remember that?

A. Yeah, I recall.

Q. What's your thoughts as to why there's not multiple points of quantification used?

A. Well, I think he made a right point about quantifying total take, right, because you've got the Yellow Pine dewatering system some of it downstream in the tunnel headworks. And it will have an effect, albeit again it's a bedrock pit like we've said before, Yellow Pine is not a large effect, but it's an effect. It's a water right question. Well, it's in every drop question we've been through this already with the previous discussions way back about the Snake River Adjudication and the Salmon in stream flow, right. Well, if our effect on the Salmon matters in any water rights context, I don't know why our effect from Yellow Pine Pit down to the confluence doesn't matter. So if it's an every drop question, you have to be down there, right.

Q. Good modeling, good science, good management is you take your reading at the end and you are going to account for every drop until you get to that end?

A. Yeah, yeah, and if it's an every drop -- again, if it's an every drop of impact question, you got to be down there, so -- and then administratively, too, right, you can



have multiple -- you can gauge multiple (inaudible), right, but you have to pick a hierarchy of which one is the decider because stream gauging is accurate to within plus or minus several percents, right. It's 15 percent on end stream gauge. We're going to do a lot better at the tunnel headworks, right, because it's an engineered concrete structure. We'll have a very precise rating curve for there, and we'll measure -- you know, we'll have inline flow meters in all our own water offtakes, right. Maybe not all of them, but in the aggregate we will at the manifold and the case of a well-footed field. So we are measuring all these things at pretty good accuracy, but if you start talking about measuring instream flow where you need a rating curve and it needs to work seasonally all the time and now you've got multiple points where you are doing that, right, they all have accuracy. Well, if one is up 10 percent and one is down 10 percent due to accuracy issues with a rating curve, well, then what? Which one do you use to decide on your curtailment or not -- or non-curtailment?

Q. So you need a main or a lead --

A. Yeah, you need a definitive point, and for us the definitive point seems to be, put it down there where the total impact occurs.

Q. So when we talk about being administratively burdensome, this isn't just a situation of Perpetua being



lazy, not wanting to look at a bunch of gauges? It's better science, better management --

A. Yeah, it's better management.

Q. -- to have one definitive point?

A. And we're going to have -- I think we're going to have all the gauges discussed anyway. I think that's probably in the flop here about where we will monitor within and around the tunnel. So we have lots of gauges and intend lots of gauges. I think -- I believe we're going to replace that Meadow Creek gauge somewhere or other, but, yeah, it's not any opposition to gauging for its opposition to coming up with an overly complicated scheme based on a bunch of gauges with no clear priority.

Q. I want to transition to the tailing storage facility. Now, this has been referenced by a couple of people. You've mentioned it a couple of times. I'd like to get a clearer understanding of what the tailings storage facility is, how it works, and what role it plays in the overall scheme of the mine. So first off, what is the tailing storage facility?

A. Tailing storage facility is, in our case -- there are other methods, but in our case it's -- it's formed by two principle structures as a rock-filled dam, and that dam impounds part of the valley and that portion of the impoundment is then lined with geo-synthetic --

geo-composite liner.

Q. Can you explain the liner really fast?

A. So the liner is a water quality protection measure. You know, obviously, it's a cyanide gold facility, and there will be cyanide in the tailings, albeit relatively low levels, and there will be leachable metals and metals in solution and we do not want to have that process water enter the environment. So basil liner on the tailings facility. That liner is -- of course, you do subgrade preparation, right. Make sure the subgrade is firm, and it doesn't have any protruding sharp particles. First layer of that liner, then, is what's called a geo-synthetic clay liner, and that's just two pieces of geo-synthetic fabric so they're permeable fabric, needle punched through, encapsulating a layer of bed nite clay powder. So you've got a layer of essentially a clay liner, but it's a clay liner that one can have delivered to a site that has no native clay and roll out, you know, unroll to cover the impoundment subgrade.

Q. So it's like a quilt that instead of being filled with cotton --

A. Yeah.

Q. -- or down, it's clay?

A. Yeah, exactly. It's a quilt full of clay and bed nite which once wet hydrates and swells up. So what that does is that conforms to the subgrade very well. Smooths



the subgrade if you have missed any rocks in your subgrade quality control, and then you put your geo-membrane on top of that. So it provides an excellent bedding layer for the geo-membrane which is the primary liner. That geo-membrane in our case is a 60 mill think, so it's mill a inch, so 60 mill inch thick linear low density polyethylene, and it's textured to make it hold on slopes. So that goes down on top of the GCL and, again, what the GCL does is it makes sure there is great contact between the subgrade, the GCL, and then between the GCL and the overlying membrane liner. It also has the benefit if there should be a leak in the primary, the bed nite swells, and it self-seals the leak. And that is the state of the practice in tailings liner design today.

Q. And so then what goes on top of that liner once you put that liner in?

A. So for part of the impound, for the floor of the impound, you put in what's called an overliner drain, and that starts with two layers of geo-synthetic, just like the -- or, you know, geo-textile, just like the GCL does, but in between those is not clay. Between those are one inch diameter perforated pipes, and the purpose of that is we put that down on the floor of the facility, the purpose of that is to reduce the head, hydraulic head on the underlying liner, and assist in dewatering the tailings. So



that will be the thing you see when you see the impoundment before tailings go in. Tailings will then be deposited on top of that. And I mentioned earlier, consolidation water, right. Well, consolidation water can go two directions, right. If it's got a drainable condition at the base, it can go down as well as up, right. If it could go two directions, the tailings will consolidate faster and to a lower -- or a higher (inaudible) density and lower terminal permeability, right. So that overliner drain will let some water from the tailings go down to that drain. Those drain tubes all report to a sump that we pump up. We pump that dry as the water arrives, and so what that will do is that will just accelerate tailings consolidation over what it would be where they're just a lined bathtub with no drain underneath. And what that does is while it's being pumped and while it works, it approaches the consolidation performance of an unlined facility. Now, it won't nearly get to that level, but it makes it a lot less like a full bathtub than it would otherwise be. And I'll note that in our modeling, we do not take credit for that in our planning, in our raised planning, in our restoration planning, we are not taking any credit for the presence of that drain layer. It's extra. It's belt suspenders effort. We don't take credit for early consolidation induced by that. We are actually modeling the single drain upward only



condition when we schedule -- when we schedule our dam raises, right. So scheduling of dam raises will matter one of these other responses I think we'll get to. But, you know, we plan that tailings dam does not get built to 480 feet high day one. It gets built to hold the first two or three years of tailings in day one, and then you just raise it every three years or so. So it's not like a water dam.

Q. The dam is getting built along with the tailings?

A. Yeah, yeah. So you always stay ahead with the dam.

Q. Uh-huh (affirmative).

A. But you don't build it all at once. It's uneconomic and not even feasible. You don't have the rocks to build it with from the outset because it's built with the overburden from the pits.

Q. So conceptually as you put heavy, wet mud on top of other heavy wet mud, it presses it down and squeezes the water out?

A. It does.

Q. And the water either goes up or gets sucked out of the bottom?

A. Yeah.

Q. Basically a big straw?

A. Yeah, two places it can go, up or down. And what happens is -- you know, we're running -- first year I think

we rise 80 feet. Subsequent years it's tens of feet. It gets less as you go because the facility just gets wider as it's taller, right. That's the fundamental of a contour map, right. It's wider, so it doesn't rise as fast later, but the early years it rises quite fast. And when you bury all that water in there and that is excess pour pressure, and that's why, you know, if one would sink a well into the middle of the tailings, not forever, but during operations. You sink a well in the middle of those tailings, likely it's artisan. Water will come out of that well at the surface. But that's what drives that upward migration of water. So you've got trapped ore pressures down there because of that overburden load induced by the new tailings squeezing water, pumping floor pressures so the water has -- pressure goes from high to low, right. Well, the low pressure is actually the surface.

Q. Uh-huh (affirmative).

A. And that's the direction water is going to go, and again, absent a drain. In this case, well, it goes both directions from somewhere in the middle.

Q. So as the tailings facility gets built, the pressure goes down, the water comes out. What do you do with the water that comes out of the tailing facility?

A. That's our principle water for ore processing. That's what we term as reclaimed water to the mill. You'll



see some different water definitions here and there or contact water this, you know, mine impact water that, but to the mill manager there's two kinds of water. There's reclaimed water, which is what comes back from tailings, and there's make-up water, which is all the water you get from somewhere else.

Q. So what percentage of mill operations will be due to reclaimed water?

A. It's about 80, and that's just counting tailings. It's much higher if you count internal recycle. We reclaim water throughout the process, including the tailings thickener. We send the tailings at 50 percent solids. Well, they go into the thickener at 35 percent, so that water is reclaimed internal to the mill. That's not part of that stat. That stat puts you at 96 percent or something, if you look at the mill itself, but from a standpoint of mill and tailings only, or tailings only it's about 80 percent coming back from tailings.

Q. And then eventually how long does it take to fill up that tailing storage facility such that you would then finish --

A. 14 and a quarter years.

Q. That's the --

A. It's dialed to the mine plan, yeah. It's 14 years plus one quarter is the mine plan, and the tailings facility



is sized to basically just meet that with freeboard, right. So we have access freeboard. We don't top it off. We never run the tailings to within a meter of the edge of the liner anyway, but that's when it tops off while still maintaining freeboard for the probable maximum flood plus the wind waves effect.

Q. So then when you -- 14 and a quarter years passed, you've got a meter from the top of the tailings pile to the top of the dam. What do you do with the rest of that space?

A. And it's more than that at the dam. So, again, we have flood free. We have flood storage freeboard. Well, that space is there as reserve storage for flood storage, right.

Q. Okay.

A. Should we get a flood. And, again, it's sized as if the diversions don't exist, right. So it's sized for the entire six square miles of Meadow Creek Drainage, plus the tailings footprint itself. We have that much reserve storage, but it's always maintained. That's the fundamental -- that's the cardinal rule here when you are operating that facility, too. Not just the end of life, right, but anytime during the operating life of that facility if you are encroaching on the reserve storage for that flood, you stop adding material. So that's a shutdown scenario. If you're approaching that, there's two ways to



solve it, is you stop adding or you build to catch up. And you can't build to catch up once you've already encroached, obviously. That's an advanced planning question where if it looks like it's going to encroach sooner than planned, you're accelerating a dam raise, and that's nowhere you want to be. You want to get this planning right in the first place because dam raises are expensive. That liner system is a couple dollars a square foot installed just for those two layers, and that's not counting what the earthworks cost you to get to the point where you're ready to install it.

Q. So, again, you have -- Perpetua has a financial interest to do this properly?

A. Yeah. You want your raises to get you tailings capacity, and you want them to have it on time. You don't want to bring forward multi-million dollar raises because you plan badly.

Q. I'm going to hand you what's has been previously admitted as Exhibit 27A.

A. I think it's coming.

Q. Do you recognize 27A?

A. Yep. That would be the site-wide water balance for the ModPRO2.

Q. And you're familiar with it?

A. I am. I directed the modeling for this.

Q. You directed the modeling for the site-wide water

balance?

A. Yes.

Q. And does the site-wide water balance address the tailing storage facility?

A. It does. I couldn't tell you quite where, but it is in there.

Q. Why don't you flip to page 16.

A. Yeah, there we go. Yeah, that's the site map.

Q. Can you blow that up? And can you point and show us where the tailing storage facility is in relation to the rest of the project?

A. That is the large lilac polygon in the southwest corner of that map.

Q. And why is the tailing storage facility there as opposed to somewhere else?

A. It's one of the few suitable sites, both from a capacity and a geotechnics standpoint that we have on-site and it's, you know, to the extent possible, takes advantage of the disturbed area down there where SODA -- if you guys have talked about SODA. I don't know if that's been introduced yet.

Q. It has been.

A. So it does allow us to do something about SODA. In fact we use the SODA material to construct it, as well as the Hecla heap, and we then reprocess the old tailings



underneath and get them -- and they become stored with our tailings. So that's the upside, right, is you get to deal with those other facilities and so in constructing this, and this is one of the few suitable sites with a suitable environmental kind of cost benefit. I mean, you have -- we looked at a bunch of them. We looked at up in Blow-Out Creek. We looked up the East Fork up where the future worker housing will be.

Q. Uh-huh (affirmative).

A. We looked in Fiddle, and there just -- they're aren't a lot of suitable sites in country like this.

Q. Is it Perpetua's intention to follow the site-wide water balance with respect to the TSF?

A. Yeah.

Q. Why is that?

A. I mean, you've got -- that water balance and then, you know, again, these get modified and updated as you learn more as you go, but that water balance is what -- is how we planned for those raises, you know. That's how we determined that the initial dam needs to be whatever it was, 275 feet high. It's how we decided that, well, each -- the next raise is 100 feet three years later or two years later, and then raise after that is 50, 50, and 50 the next each three years, and that was determined from the water balance analysis.



Q. What if -- what if Perpetua got greedy and just wanted to fill the TSF faster than the site-wide water balance directs, what would happen?

A. Well, if you wanted to fill it with tailings, I don't know how we would because our mill runs at a maximum of about 24,000 tons per day, so you're limited in how much you can send through the mill. I don't know why you would ever contemplate filling it with excess water, because if you do so you, of course, run into, uh-oh, we have a raise scheduled for two years, and it's going to be full next year and you can't start that late and make it, right. You could run it up into your freeboard encroachment, right, and be shut down. But also if you put excessive water and tailings -- I mean, tailing facilities are planned and designed to store tailings, to deposit tailings by what's called subaerial deposition. So you deposit tailings onto a beach of other tailings. If you deposit tailings into an open pool, like if you had, you know, again, a facility of this shape it would take a lot of extra, but if you deposit those tailings in an open pool, you're not going to get the planned densities and, therefore, you're not going to get the planned space in that facility that you spent all that money building, right. You could take a serious haircut on capacity, both in the immediate short-term and ultimately. And if you deposited a bunch of tailings into a water pool



here instead of onto a beach, you know, you may find out that your facility, even if you got rid of all that extra water later, that facility won't last you 14 and a quarter years. It might last you 12, because you don't have -- you're never going to achieve the densities you planned for. You know, it's not a hole you can necessarily dig out of. There are ways, but it's not the way to bat. You want to be depositing properly onto a beach. I mean, early days it's unavoidable. You will be dumping into a pool, but once you've got a beach established, you want to keep it, and you want to maximize the density of the deposit of tailings.

Q. So what if someone said that they were afraid that Perpetua was going to take their full maximum amount requested in the water rights application or that they were going to take more water than requested in the water rights application, what would you say to that concern?

A. We'd have no use for that amount of water. It would be nothing but a liability.

Q. What do you mean, a liability?

A. It would fill the facility too soon. Again, a short-term concern of, can we catch up to the next raise or will be shut down because of encroachment on our freeboard allotment, and a long-term concern of, well, we've got a 14 and a quarter year mine plan and all of a sudden we have a tailings facility that won't last 14 years even when raised

because the densities are not achieved at the plant.
Q. So appropriate mine management and Perpetua's own business interests prevented from taking 9.6 --
A. Yeah.
Q. -- year-round?
A. We have no use for that much water that long. Again, the 9.6 is very necessary as an instantaneous or largely instantaneous demand. I mean, it could be a day to three, whatever it is, right. It's a short-term concern and still subject to the other conditions, right. You can't take 9.6 in February. There wouldn't be enough water to do so, but it's a short-term concern of, well, reclaim's down, keep operating, so you don't sand in everything and deal with a shutdown orderly or otherwise, and then deal with the restart. It's about that. It's not about any need to take 9.6 24/7/365. Never happen.
Q. And so what's your understanding as to why Perpetua's requesting 9.6 if it's not going to use it year-round?
A. Again, we need that as an instantaneous rate.
Q. Do you know if permitting and IDWR rules require Perpetua to request the maximum amount?
A. As I understand it, yeah, you need maximum instantaneous to be in the right.
Q. Let's go back to Exhibit 60, which is your expert



report. We've talked a great deal about fish tunnel, which was your second point. Can we blow up your first point?
A. Sure.
Q. Again, the first point or conclusion you reach is that water management at the SGP will conserve water resources while fulfilling the purposes of the SGP. Do you see that?
A. Yes.
Q. Okay. We're now going to move on and talk about water management at the Stibnite Gold Project. Are you familiar with the water management plan?
A. I am. I'm not supposed to lift anything this heavy.
Q. I'm handing you what's been marked as Exhibit 26. Do you know what Exhibit 26 is?
A. And, yeah, that is the water management plan.
Q. And what is the water management plan?
A. So that is a document that lays out the infrastructure layout and design criteria and general practices for water management throughout the project site. I don't believe it covers maybe Burnt Log, but it is all the on-site water management.
Q. And so other than Burnt Log, the water management plan covers all on-site water use at the Stibnite Gold Project?



A. Yep.
Q. What role, if any, did you have in the creation or approval of the water management plan?
A. I mostly led the designs and review or lead many of the analyses that fed it, and then I reviewed the final plan. Brown and Caldwell did excellent work assembling it all and getting it all in one place, but I, again, reviewed it, and I had a role, a heavy role, in all of the contributory content.
Q. And what is the difference between the water management plan and the site water balance that we just looked at, site-wide water?
A. So the site-wide water balance is just -- is documentation of a water balance model that implements -- essentially this plan is modeling this plan and with more detail on certain things like tailings consolidation. Tailings consolidation is not in here. So site-wide water balance is what ties together all the models relevant to water to the site and analyzes the water balance, that being checkbook balance, right. You've got credits, debits, and a balance. In water balance terms that is inflows minus outflows is the change in storage. That's the fundamental thing about the water balance. It's just the accounting system that does the analysis that tells you how this works or doesn't work. Does it overtop the contact water pounds?



Does it fill the TSF too fast? Do you ever discharge -- do you ever need to store water in pits? How often does that happen, if so, those kind of things, but at heart it just says in minus out is the change in storage. And from that you learn post-process figure out all those other questions.
Q. So the site water -- site-wide water balance is, like you said, the balance on your checkbook, and the water management plan is kind of like your budget?
A. Yeah.
Q. What you spend that money on?
A. It's your budget, the business plan, yeah.
Q. Okay. If somebody wants to get a full understanding of how water is to be used and managed at the Stibnite Gold Project, do they need both the site water -- site-wide water balance, as well as the water management plan?
A. I think for a full understanding, yes, but an overview the management plan would serve you, to get the overview, but to really understand the details you need to understand where the number came from and why, I think you need to understand the balance.
MR. WATKINS: Move to admit Exhibit 26.
HEARING OFFICER: I don't have Exhibit 26, and I'm not quite sure where I'm going wrong. There's a tab in this binder for 26, but I don't have it.

MR. WATKINS: There's nothing under that tab?
HEARING OFFICER: There's nothing. It's the back end of this binder, and so this is flagged as Exhibit 24 through 26. So I grabbed the next binder to see if it was maybe at the beginning of that, and it's not. So I don't know if maybe the label just got shifted in a certain way. Maybe the tab is in the wrong location. Let me see.
MR. WATKINS: Our crack legal team is on it, Mr. Cefalo.
HEARING OFFICER: The exhibit right before it -- well, maybe I can use these bates numbers to help identify where it might be, too.
MR. WATKINS: It's bates No. PRI0003319.
HEARING OFFICER: So the tab just isn't in the right place.
MR. WATKINS: I think you might have it there. It does have a header. It will say water management plan with a header of all the pages.
HEARING OFFICER: Let me ask: Are there any objections to this Exhibit 26?
FEMALE SPEAKER: (Inaudible.)
HEARING OFFICER: 26, Mr. Watkins, I have concerns just because it's 700 pages of pretty dense material. I don't have time to read through that 700 pages and understand what's in there. So I guess my question for you



is: What --
MR. WATKINS: If the Hearing Officer would be amenable to accepting pages 1 through 36, which is the summary, as well as pages 80 through 185, which are the specific sections and chapters that specifically go over kind of the nuts and bolts of the management plan, I think that would probably be sufficient for our purposes.
HEARING OFFICER: I appreciate that. So let's make sure we get that right. Exhibit 26, pages --
MR. WATKINS: One through 36.
HEARING OFFICER: One through 36. I see that's the summary, and then?
MR. WATKINS: If you get to page 80 it's titled water management system overview, Section 5.
HEARING OFFICER: I see that.
MR. WATKINS: And then that goes to page 185.
HEARING OFFICER: I appreciate that. That will minimize the amount of pages I need to read in reviewing this case. So Exhibit 26, pages 1 through 36, and 80 through 185 are admitted. Thank you.
MR. WATKINS: Might I have one moment?
HEARING OFFICER: You can. Yeah, let's take a short break.
MR. WATKINS: I just wanted to correspond with co-Counsel.



HEARING OFFICER: Yeah, no, that's fine. We won't leave our seats. Just take a moment.
(Recess.)
(Reconvened.)
HEARING OFFICER: Okay. We are back on the record for the afternoon session of Tuesday in the hearing. Mr. Bosley is still on the stand, and I would remind you that you're under oath, and, Mr. Watkins, you can proceed with your examination.
Q (By Mr. Watkins) Mr. Bosley, go ahead and push that button on your mic. Welcome back from lunch. To get us resituated after the break to kind of see where we've been, we talked a little bit about tailing storage facility and other witnesses, and I believe we've also hit on when that fills up a river will be placed across top of it and the fish tunnel will transition from that to the river; is that right?
A. Yes, separate areas, yeah, but same idea above where tailings fill and sufficiently consolidated. Meadow Creek and its tributaries go across top tailings. Before that, though, by a decade or more, is the backfill of the Yellow Pine Pit and restoration of the East Fork across that making permanent the temporary fish passage provided by the tunnel.
Q. And I guess that was my question. When in the mine



life will the fish tunnel go offline in the river across the top come through?
A. It's about year 10 or 11.
Q. So you'll have a riverway, not a fish tunnel, while the mine is still in operation?
A. That's correct.
Q. In your expert opinion, based off of all the data you've reviewed, your design of the tunnel, and working with various experts and other consultants, do you believe that the fish tunnel will work to get fish from point A to point B?
A. I do, absolutely.
Q. What do you base that opinion on?
A. Based on all the metrics we evaluated in the CFD modeling. Again, where this demonstrably is no challenge to three out of the four species of interest and very little challenge in the Bull Trout, it works for the Bull Trout, but it's, you know, a quarter of the necessary velocities for some of the other fish. Again, no challenge at all for them based on velocity. Meets all the depth criteria, and it's a really conventional weir pool. I mean, proven over decades. This sort of fishway is not anything new or anything, really truly interesting. It's been -- they've been used successfully for years all over.
Q. If the project does not go in and the fish tunnel

is not constructed, what is your expert opinion as to the percentage of fish that would be able to pass from the bottom of the tributary to the top on their own -- on their own volition?

A. None. There's no known upstream passage passed the Yellow Pine Pit Lake to the reaches above, due to the high gradient waterfall that exists over the high wall where the river pours over the high wall.

Q. So the only way for the fish to be able to volitionally move across the tributaries is by Perpetua being permitted putting in this fish tunnel and eventually reconstructing the river?

A. Yeah.

Q. All right. Before the break I handed you a copy of the water management plan. Do you still have that in front of you?

A. Right here.

Q. It's marked as Exhibit 26?

A. Yes, sir.

Q. Is it Perpetua's intention to follow the water management plan?

A. It's our intention, and it is, I'll note, part of the my plan, right. This is one of many ancillary plans. There's a development rock management plan. There is any number of, you know, tunnels. There's a fugitive dust plan.



All of these are component plans that are integrated into our authorizations, you know. In this case it's part of our mine plan that it will be authorized ultimately by the record decision by the Forest Service underneath.

Q. So to put a finer point on that, is the water management plan that is in front of you as Exhibit 26, is it aspirational or a good idea or is it required by law that you follow it?

A. It's all of those. Yeah, it's not optional once incorporated into the rock.

Q. What are the manage -- the water management needs at the Stibnite site?

A. At their simplest they're, you know, protecting water quality and supplying water mostly for ore processing but for all of our necessary uses.

Q. Why is protecting water quality part of the management needs at the SGP?

A. Well, it would be contrary to our own intent of improving the site, but it is also required by various rules. So, again, the cyanide rule that we're under for the tailings and the process plant, IPDES, any number of rules, you know, federal and state require the protection of water quality.

Q. And perhaps a self-evident question, but why is supplying water for ore processing necessary to water



management needs at the SGP?

A. Well, the supply comes from, ultimately, the environment one way or another. It's going to come from the natural system somehow, whether out of the sky, out of the groundwater, or out of the surface water. And, yeah, obviously you cannot process ore without that water. It's wholly necessary. This is a hydro-met process. There's no -- you don't have a smelter, for example. The way we obtain the gold is grinding up, crush the rocks, grind them up, separate the gold bearing components, and dissolve those, and then leach the gold out with cyanide. All of that is a hydrometallurgical process requiring water because everything that happens, happens in suspension as a slurry or as a solution.

Q. Could you walk us through the water management needs over the life of the mine?

A. Sure. We've got some maps I think that will help with that. Got those teed up?

Q. Talking about Exhibit 68, is that what you're thinking of?

A. I'm thinking whichever number you gave it.

Q. Well, let's go to those maps in a second. Just from a high -- higher level before we get into exhibits, is water -- is the water balance needs the same throughout the mine life or does it flip at some point?



A. No, it flips. And I alluded to this somewhat earlier is that, you know, initially during construction, really you just need water for moisture conditioning, fill, making concrete, things like that. When you get into operations, you start with a site or you start with an empty tailings facility and a relatively small disturbance footprint from which you collect contact water for the protection of water quality so you don't want to discharge that uncontrolled. And you'll have, you know, again, Yellow Pine Pit will be the first active pit. First thing you really do, of course, is (inaudible) issue I think at some point was you need first fill water, so you need --

Q. What does that mean?

A. To initially fill up the process plant and the tailings facility. So the tailings facility really needs to have a few months worth of inventory, and that's to insure sufficient, both quantity and quality, of reclaimed water in the initial stages when the tailings are going in. They are going to go into a pool, and they're going to go in at very low densities or early tailings. We can't -- if you just dump tailings straight in, you wouldn't be able to reclaim the water very well. The water coming off pure tailings discharge for the first few months would be very dirty and turbine would be inappropriate to use in ore processing. So we fill up the facility with several months of supply so

that, yeah, you're discharging into a pool, but, again, not for very long. It will recover from the density problems I've talked about earlier. But you're discharging to a pretty big pool, and that pool is a long enough resident time that the solids settle out sufficiently that you can withdraw clean enough water to run in the ore processing plant. So that's the first fill of the TSF.

You also need about -- and it comes off the TSF fill, you also need about 30 or 60-acre feet to actually just fill up tanks or pipes at the mill. A lot of big tanks. Pipes in between them. Some of the pipes are relatively large diameter. You got to fill all that stuff up and charge the mill before you introduce ore. So that's really the first fills. That's the first big water hit. And, you know, we have kind of an option when we take that -- we don't need to take it at low flow. You can build it up.

Q. In a high flow situation?

A. In a high flow situation or from groundwater and, you know, you can do it somewhat at your leisure, as soon as the tailings facility is there and put it into. So, you know, when you do it really depends on whether your mine years really start in January and how the construction goes, you know. So that's the first fill. What happens then, right, is you start the mill up, and you start running.



Mill needs will ramp up a little bit. The mill does not start at name plate capacity. No mill does.

Q. What do you mean, name plate capacity?

A. The design capacity, right. It's designed for 22,000 tons per day, and that's their crusher throughput. There are other parts of the mill that have higher capacity than that, but the bottleneck is the crusher. Well, you're not going to run 22,000 day one. You're going to run, you know, two-thirds of that, whatever. And that's in the water balance, that ramp-up is in there and is why you see variable mill demand over time you will see it ramp up. And you'll see it come up actually above name plate, and that's when we're processing, reprocessing the Bradley tailings. So there's about 6 million tons of bulk tailings underneath the SODA. That will be reprocessed. That's a resource, as well as a water quality liability. We'll reprocess those over a period of about four years, and that's additive to the rest because we don't crush them. Crushers the bottleneck. We add those to the sag mill so we can run 24,000 tons per day in that period. So that's what you have is -- that's your mill demand is basically you're going to scale -- your gross mill demand will scale to what you run through it.

Q. So --

A. It will ramp up. It will come up to 24, and then



it will drop down to 22 rest of my life. So that's one -- that's the demand side, right. Also on a demand side you've got ore processing losses at the mill, mostly due to steam production. You know, the autoclave is a hot process. There's a flash vessel that discharges steam and Co2, right. And so the steam is a loss to the system. So that's your loss site, really. That's the principle losses. Then you have a little bit of evaporation in the tailings facility. Those are the big loss sides. And, you know, that steam thing, that scales the production, right. If it's 24,000 it's whatever amount of steam. If it's 22,000 it's somewhat less. Tells the scales how much sulphide is in the ore, but that's a very minor detail. So that's your losses side.

Well, your sources side, again, is driven by your -- what pit you're mining and what your dewatering needs are for that pit and what disturbance area you have opened up. Again, early days, Yellow Pine Pit is really that big and is mostly a bedrock pit with not that great of a dewatering requirement. So the amount of water that we're required to dewater to just for safe working conditions in the pit is actually not sufficient for supply, even when added to the contact water from the relatively limited footprint we have. And then, again, we have the tailings facility that is young. Isn't very large yet and isn't making a lot of reclaimed water yet because there is -- a



lot of that water is locked up in pretty low density tailings early. And so what that gives us is we're in a water deficit, a natural water deficit requiring additional make-up water beyond what the contact water would furnish for the first, I don't know, it's about four years.

Q. The water deficits was in the first four years of mining?

A. Yeah, that's where there's a natural deficit where we have to pool extra water from wherever, right, the supply well field or the East Fork because of that -- all those factors where, you know, the demand's up, but the supply is -- the natural even incidental supplies, right, of contact water just aren't big enough to satisfy. Now, fast forward to years like three or four, I think it's actually -- and that isn't going to last until four because four is when Hangar Flats gets going. Once you start mining Hangar Flats, you're not done with Yellow Pine. You're still dewatering Yellow Pine.

Q. So you're doing two pits?

A. Two pits, yeah. You are still dewatering Yellow Pine but you're dropping Hangar Flats. Now, below the alluvial valley bottom and we're not mining the alluvium. If it's not placer, we're mining the ore underneath in the bedrock, but that high wall starts out with 100 feet of alluvium and, therefore, the dewatering needs for Hangar

Flats are double or so what they are for Yellow Pine. And you can still got Yellow Pine, and it's approaching its maximum depth. So all of a sudden mid-mine life you have excess water and you're in a position of constant treating and discharging. And constant is probably a better thing, right, rather than episodically treating contact water that you catch in the spring. You're treating a relatively constant dewatering value 24/7 for -- it's really high for about 18 months because you're in and out of Hangar Flats relatively quickly. So that's the middle of mine life, and that's when we have 2000 gallons a minute of water treatment capacity, and that's when we will discharge excess treated water up in Meadow Creek above Blow-Out Creek for stream flow augmentation. We are essentially, like it sounds, we are probably watering in circles, right. You know, and we're lining the stream and minimize the amount of circles that happen.

Q. Pulling water out, treating it, putting it back --

A. This is coming out of the Meadow Creek alluvium by the dewatering system being treated and reintroduced into upper Meadow Creek -- not upper, upper, but a little further upstream than Meadow Creek, the top end of that streamline.

Q. Can we go to page 94 of Exhibit 26?

A. Yep.

Q. Would it be possible for you to use this map that's



shown at page 94 of Exhibit 26 to describe how dirty water is treated at the site or will be treated at the site?

A. I can say where it's collected from, but treatment details, that's a process for a diagram that's not here.

Q. Let's talk about where and when and then we'll talk about the details.

A. Yeah. So the where is anything that's a mine disturbance that is not the tailings facility. The tailings facility is a lined impanelment and is processed water, not contact water. Makes all contact water but it's processed water in the sense of it is the ore processing water. It's the dirtiest water on-site probably. I mean, early days maybe some of the stuff coming off Hecla heap could be worse during construction, but in ops tailings water is the dirtier water. And it's the more complex to treat, right, because it's got other things besides just arsenic and antimony in it. One of them being some level of cyanide. So the tailings water is not intended to be treated in operations. The tailings water again is the principle water source for ore processing, so it gets recycled back to the plant. So that big footprint over there in the southwest is water we're not treating. It's water we are recycling, but every shaded polygon you see here has got water collection on it, so the water that runs off all these polygons. I mean, the biggest one being on this page being the buttress



below the TSF. Those produce contact stormwater and there will be some seepage that pops out, right. Lift boundaries or you fill some rocks up, drive on them for a while, and put another lift on top. Well, those lifts tend to cause some seepage, and you see that called pop-out seepage in the water balance. And so all that seepage, all that sheet flow runoff, whatever comes off this in a rain storm or from snow melt gets collected in our manmade ditches that are really generally follow the roads that are -- that lie on these facilities.

Q. Are those those pink arrowed lines?

A. No. Those are the clean water diversions.

Q. Where are the ditches you were just referring to?

A. They're too small to show at this scale.

Q. Okay.

A. They are just within those very same polygons along the roads, and those all direct to one of the various blue polygons which are the contact water storage ponds. And then from there, they end up pumped to the water treatment plant.

Q. And then how are they treated?

A. With a process called iron coal precipitation.

Q. What's that?

A. It's a process that introduces -- you can use perchloride or persulfate, in our case persulfate because we



don't want -- we don't want chloride introduced anywhere if we can help it. It's not good (inaudible). We don't want that anywhere near our ore process, and the residuals from that treatment go to the tailings facility. So we don't want chloride sent to the tailings so we use ferric sulfate which is just one of two coequal alternatives. What you do is you use ferric sulfate. There's other steps with oxidation steps and PH adjustment. Generally you use ferric sulfate to precipitate bursinic and antimony out of the solution to form a solid residual that's then dewatered, and in our case we just put it in tailings facility. It's a stable solid residual.

Q. And then it goes in the tailings facility and then goes back into ore processing?

A. Well, it just goes to the tailings facility. But if there's other reactive chloride in the water that goes with it, now we've introduced chloride into the TSF, which makes it in the mill process flow stream which means we have chloride in our autoclave, and chloride at those temperatures is hydrochloric acid will not be doing good things to the lining of the autoclave. So it's a matter of not eating your process equipment. We don't want the chloride. Sulphate is okay. We make lots of sulphate. The autoclave makes sulphuric acid, which we then immediately neutralize, but it can handle the sulphuric acid. We don't

want hydrochloric. So that's the only reason we differentiate those two chemicals.

Q. That treatment process you described, is that in the same treatment process utilized for all water on site? I am thinking water from the man camp, at the truck shop.

A. No. This is for mine impacted water, so this is contact stormwater that's been exposed to generally waste rock or pit walls and, therefore, is likely to have both arsenic and antimony in it. Those are the two primary constituents of concern. We do have mercury process on the back end of that, but it's largely conservative and a safe process. We don't actually have very high levels of mercury. As gold mines go we're actually quite low, but we have that removal step is in there as well on the back end. But the principle -- principle thing is to remove the arsenic and antimony. And so that's all that contact stormwater and that's also the dewatering water. The dewatering water is groundwater, but it's flowed through natural ore body areas or been recharged from bedrock groundwater that has flowed through an ore body and is therefore elevated in arsenic and antimony. Some of it is also, importantly in the case of Meadow Creek Valley and in the case of the vicinity Yellow Pine Pit, it's influenced by all these legacy features. The site has been mined for a hundred years. There's waste laying around that has a



groundwater quality influence, and so that will end up in the dewatering systems requiring all our dewatering water when there is an excess to be treated before discharge.

Q. Can you identify where the outfall is on this? Where is the water being put back in?

A. Sure. So -- and we may want to zoom in.

Q. Where do you want us to zoom in at?

A. To the bottom half of the map minus the legend but to the bottom half of the image part right there. Perfect. That's plenty. All right. So if we see SODA and we see Blow-Out Creek coming in from the south.

Q. Uh-huh (affirmative).

A. And you see, there's a stockpile there that's magenta. Right across the creek from that Hangar Flats stockpile at the foot of SODA and the foot of the buttress is where the stream flow augmentation discharge will be. So in cases where we need the stream flow augmentation in Meadow Creek, we will be pumping the water back up there to that spot to keep Meadow Creek fully watered.

Q. Is that the pink labeled alternative construction slash operations IPDES outfall?

A. That is, yep.

Q. And you said that this is for operations contact water. Do you treat water from other facilities like the man camp or the truck shop in a different way?



A. Yeah. So the truck shop stormwater runoff and the mill site stormwater runoff are generally just going to go straight to ore processing. They have ponds that -- there's some very small ponds there at the truck shop ore processed. Those just go and get used in ore processing. They could be treated, but they're right there. It's easy to use and we're going to need the water we just take and use them. Especially the plant site because we don't want any whiff of cyanide in the treatment flows. So the plant side in particular goes straight to use and, again, small acreage, small amount of water. The toilets facilities in all those are treated along with a man camp, in the man camp treatment plant, so there is a MBR, you know, member bioreactor wastewater plant or similar technology plant for the worker housing facility, and that's the one that's just at the right edge of the middle, right edge of the frame here. That worker housing facilities has essentially its own sewage treatment plant, and the minor flows from these -- from the toilet and restroom facilities, the other facilities will get sent up there too, but most of the flows -- most of these water flows originate directly from that man camp.

Q. Now, I understand that the man camp was estimated at 50 gallons per worker per day; is that you understanding?

A. That's right.



Q. Why did Perpetua not use a higher number, such as 80 gallops or 100 gallons per worker per day?

A. Well, 80 is a very high number. 80 is surely a residential number and likely includes outdoor uses.

Q. It's like irrigation?

A. For the amount of water irrigation uses is the reason I don't have a lawn, so outdoor irrigation, of course, consumes a lot of water and a family in a home consumes a lot -- has a lot different water needs than individual workers in a construction -- what's essentially a remote construction camp, right. So a conventional number, very conventional number, for remote construction campsite is 50. And that's actually what we've experienced. We've ran camp all summer for the AOC work, and we were mostly 50 and under. 30 some to 50. We had only one month above 50.

Q. And that's based off the data from this last season?

A. That's this last season for the cleanup work we did and some ongoing drilling work we've got going on.

Q. And there's no green lawns or jetted hot tubs?

A. No green lawns.

Q. It's a man camp? Okay.

A. Very green in the spring. It browns up nicely near camp and not very long the dust season begins.

Q. Will you go to page 24, Exhibit 26, please. And

could we blow that table, Ms. Franolich, just the table, not the notes under it. I wonder if you could walk us through the types of water impacted by the mine.

A. Sure.

Q. So let's start maybe with noncontact water on the left-hand side.

A. Okay. And then noncontact water is actually unimpacted water that we want to keep unimpacted, right. So, you know, natural stream seep springs anything from uphill of one of our site components, and then, you know, once we get into -- you know, there's some nuances here about construction. Stormwater and what is contact, what is not, right. But generally this is stuff that's not impacted, not affected by particularly mine waste, but not affected by our activities, and it's stuff we try to divert around. And this is also -- it also -- you see includes stuff like growth media stockpiles, water supply wells, things like that, because these are things that -- this is presumptively clean water this is unaffected by -- it's not something as arsenic and antimony in it. This is just, you know, now and then it could be, in the case of the growth media, dirty, right. It's got solids in it, but it's just naturally that way. This is not mine impacted water. And, again, this is mostly the things we divert around and under our facilities in order to keep it that way.



Q. That's the goal to keep non-contact water non-contact water?

A. Yeah, because you don't want to introduce it and have it become contact water unless you're doing it deliberately in terms of using it for water supply, but you don't want to accidentally make any of this contact water because then you're on the hook to treat it, if you're not using it.

Q. How about the contact water and, specifically, contact stormwater runoff and seepage and groundwater?

A. Okay, so the stormwater runoff is really what I said before except now it's here. It lists all the facilities in question, but basically these are all of the mine facilities that are ground disturbing facilities except for the tailings facility and the ponds themselves because they are enclosed lined facilities. We do account for the area of the water that falls on those, but those aren't contact water generators, per se. So this -- again, this is all our mine disturbance, basically, or at least all the disturbance that could have metal leaching aspects to it. Like worker housing is in here because worker housing is clean (inaudible) river outside of mineralization, doesn't see mine waste.

Q. And then how about seepage and groundwater?

A. That's what it says, right. So you've got the



dewatering water. When we say dewatering water here in this context we mean an active dewatering well. A water well that is pumped and generally around the periphery and outside of the pits, they are pumped in order to depressurize the aquifer, divert groundwaters to keep it from entering the pit and/or destabilizing the high wall for safe working conditions in the pit. That's when we say dewatering water. We say pit passive inflow or pit sumps, right. Passive inflow really is that is the remainder of the groundwater that gets past your dewatering system. You'll never catch it all. Some will enter the pit. It will co-mingle with the stormwater within the pit. It will end up in a ditch down or flow down a high wall, end up in the sump in the bottom of the pit. It will be pumped out and managed as dirty water. (Inaudible) like seepage, that's when we open up the Bradley tailings for reprocessing, well, we're on the hook for the water management for those, right, and those are -- you know, that's old tailings, and then known to have arsenic antimony levels that would require treatment. Hecla heap seepage similarly, we're going to dig up the Hecla heap. We're going to dig up SODA. We'll dig those up and use them to construct portions of the tailings facility. When we do so, we're on the hook for that to manage that water. And then the TSF buttress (inaudible) while they're being constructed



and beyond, we're on the hook for whatever runs off or seeps out of those. And then lastly, okay, under (inaudible), same thing, right. We have an expiration decline plant underground exploration requires water. There's some drill water required, but it also produces water when you're below the water table and scout will be partially so. And so we'll have water pumped out of that decline that we're required management.

Q. And on the sanitary wastewater that's the treatment, like you said, the man camp?

A. Yeah, yeah. That's, yeah, that's worker housing, as well as various restroom facilities around site.

Q. On the noncontact water, the noncontact water that you want to keep that way, what are the processes in the water management plan that address how to handle noncontact water such that it doesn't unintentionally get into the system?

A. So that would be largely clean water diversion channels of really two general natures of diversion of perennial streams, right. Those are the major diversions that we talk about most, right. So you have to divert Meadow Creek and its tributaries around the tailings facility. You divert Meadow Creek again lower down around Hangar Flats Pit, and then you've got relatively minor diversion of Garnet Creek, another one of Fiddle and

Midnight, and then you've got, of course, the fish tunnel which also is a clean water diversion and takes the East Fork around the Yellow Pine Pit. So those are all the major clean water diversions, and then you have a bunch of minor ditching, you know, for, you know, femoral channels and just hillside runoff that would otherwise flow onto your mine facilities. Well, there's ditches for all those, too. They are perimeter ditches around everything that has an up-slope perimeter to direct that stuff around and introduce it back into the natural system.

Q. Are you comfortable with explaining how dewatering water is conveyed throughout the system?

A. Sure.

Q. Could you go to page 115 of the waste -- of the water management plan? We're going to blow up a graphic at the top.

A. This is a great picture of a pump (inaudible) before that, too.

Q. What is shown on page 115 that we're looking at?

A. That looks like a schematic of the pit dewatering and contact water. Looks like it's got a good bit of the contact water management system on it, too.

Q. Can you kind of walk us through this schematic to show us how that water is treated throughout your system?

A. Yeah, sure. So this is, you know, working from the



top left. So HFP is Hangar Flats Pit, right, and you'll see, it will look repetitive. There's one for each pit. So Hangar Flat Pit dewatering wells. There's a manifold. That is just the header that they all report to, so you don't necessarily when this comes to a monitoring question here. You're not necessarily monitoring every single well. You monitor the aggregate of production from that whole field at the manifold.

Q. The manifold will tell you what the whole field?

A. Yeah, the whole field reports there, so measure the whole field, not necessarily all the individuals that will probably have meters on them, but at least check, spot check now and then. So you have that happens at Hangar Flats. Yellow Pine, similar. West End, similar continuously. West End is high and dry for the most part, so way up the hill it does eventually intersect groundwater, but those rocks tend to drain out on their own. You know, mostly downward due to the bedding plains. So the Stibnite pit beings there's another pit up there now that's never had water in it, so West End tends to be dry. And so West End dewatering is in there as a contingency. We'll put those wells in if we need them. We do not expect to need them at least early in development of that pit. There's just something probably stick it in year 10, 11. We start that pit, of course, at 7.



Q. Mine year seven?

A. Year seven, yeah, we start there. So we don't expect to need them that soon, but once we do, we have a pond there, because we need West End pond anyway to serve to collect the contact water from West End Pit. There will be lots of runoff when there's a storm, so you've got West End Pit to store that water anyway, the West End pond. Yellow Pine pond, Yellow Pine Pit is similar. Midnight pond is there right next to the rim of the Yellow Pine Pit. That receives the Yellow Pine contact water, and it conserves West End if there's an excess at West End because it's downhill from West End. Hangar Flats is a little bit different beast, right, because Hangar Flats is known -- and this is, again, the dewatering system. There is a pond there, too, and a sump, but mostly (inaudible) dewatering. Hangar Flats is a little different. It doesn't get routed through a pond. It goes straight to treatment or straight to use, you know. That gets split because there's more than you need to use. It just goes straight to use or straight to treatment. It doesn't have a stopover point, necessarily, because that's the time where this is a known excess water scenario, and it's relatively constant. That's why this goes where it goes when it goes. Detail-wise, you know, there are a number of tanks here. I don't know if we need to get into all these, but they're all over site.



Q. What is the purpose of those tanks?

A. So a booster tank, right, is because it's infeasible to pump water out of a 400-foot deep pit and then pump it however far up the river, however many miles up the river in a pipeline. It's often infeasible to pump it -- to lift it all the way out of the bottom of the pit and all the way up to its destination with a single pump. So when you put in a booster pump and a booster tank, that's because the water has a stopover point, and you have a new pump, right, because otherwise either the pump can't do it or a theoretical pump that would need to do it would pressurize the line so much that no material could handle that line or no material you want to buy. Like what we'd like to use polyethylene pipes, they've got a pressure rating of whatever it is, you know, 200 plus PSI. But they don't have the pressure rating steel pipe does. Steel pipes, of course, are a lot more expensive and harder to deal with and not really necessary for the application as long as you can just have a booster pump. So the existence of a booster pump and tank is really just an economic optimization by us where we say, well, instead of one gigantic pump that may not even exist, very high heads and high flows, maybe there isn't such a pump. But rather than one giant pump and one very robust, very strong pipeline, we have more smaller pumps and less strong pipeline material. Still rated for

its intended pressure. It's not like it's going to rupture, but it's economized to work with the intended pressure, not just overbuilt. That's why we do that, and then all these other ones, these other tanks, are really the feed tanks for various parts of the process.

Q. On the lower left-hand corner, the image, I guess, the southwest corner of the image it talks about water treatment in plant (inaudible) tank water treatment plan and then discharge to outfall. Do you see that?

A. Yep, yep.

Q. Can you walk us through that process, please?

A. Sure. So, again, the feed tank, all that is is you have pumps don't run all the time. They cycle on and off. It's not all things like things cycle on and off and water treatment process is one of them ore processes than others, so you have feed tanks to have some level of equalization because the inflow goes off and on. The outflow can be constant, or at the rig on demand. So the feed (inaudible) all that is just to even things out and feed at the rate you want to feed instead of being at the mercy of whatever the guy managing the well field does. And then, you know, the treatment plan, of course, the process I described, that's iron co precipitation for the contact water. And then that offtake for dust suppression, that's to use the treatment feed where it was untreated water. There's no point in



using treated water or clean water for dust suppression on facilities that themselves are contact water generators. So that dust suppression bar there is for in the pits and on the buttress, and that's pretty much it. It's not used on long-haul haul roads, right, that are managed with BNP's and not water treatment. It's not used at worker housing or anything like that or (inaudible). This is just used in pit pretty much and, again, on the buttress as well.

Q. So we've discussed water treatment at length. We've discussed the site and water -- site-wide water balance. We've discussed the water management plan. All of that is dependent on the hydrology on-site where the rivers are, where you're diverting noncontact water from, things like that?

A. Yeah.

Q. Are you generally familiar with the hydrology on-site including water that is contained in natural channels or noncontact water?

A. I am.

Q. Are there maps that demonstrate this?

A. There are. Produced for this proceeding, I believe, or for a previous run-up to this proceeding.

Q. I'm handing you what has been marked as Exhibit 68.

A. Yeah, those are the ones.

Q. And is Exhibit 68 a series of maps which show the



hydrology at the site per every year of mine life?

A. Yeah, I would say hydrography.

Q. Hydrography?

A. Yes.

Q. Hydrography.

A. Hydrology is the numbers, and hydrography is the map.

Q. Thank you for the correction. Hydrography. And do these seem to fairly accurately represent the hydrography?

A. They do. They do. I directed their development, and we reviewed them at the time, whenever that was, perhaps a year or six months ago.

MR. WATKINS: Move to admit Exhibit 68.

HEARING OFFICER: Any objection? A series of maps, Exhibit 68. Okay, Exhibit 68 is admitted.

Q (By Mr. Watkins) What does it mean on Exhibit 68 on the first page where it says: Stibnite Gold Project surface water with non-MSGP dischargeable water collection areas for mine year negative three?

A. Okay, and you'll hear more, I suspect, about the nuances of that from Mr. Durbin when he's called, but let me -- MSGP is the multi-sector general permit. So under the (inaudible) or IPDES permitting regime, that's the stuff that's -- stuff like worker housing, right. This is the stuff that is not mine impacted water. It's new and



influenced water. It's water from built features, but it's not -- if it's dischargeable under the MSGP, it doesn't require water treatment, and you manage it with your typical, you know, road-style BMP. So this is the kind of things you manage with silt fence and sediment traps and straw waddles and just surface stabilization, things like that. It's not full of metals like potentially mine impact water can be. And so it's not of much interest to map here in this context, and so it's not. And what we've mapped is the stuff you cannot discharge under an MSGP. That being really what we're calling contact water here in other context is -- what we are mapping here is the mine impacted water.

Q. This is the mine impact water map here?

A. Yeah.

Q. Does page 1 essentially show the mine and the hydrography of the mine as it exists today?

A. Yes. As year minus three nothing really happens at site in year minus three, and so that's essentially the existing condition right here.

Q. Where are the points of diversion in Perpetua's proposed plan on this map?

A. Well, they're not shown on this map because they're not there yet. I don't think we show points of diversion anyway. Yeah, we don't show them at all because we are

showing just disturbance footprints here.

Q. Map doesn't --

A. No, the map does not speak to those. I know where they are, of course, but they're not mapped here. These maps were not for -- not for the offtake. Not for the point offtakes like wells. This was -- these maps were generated in the context of stormwater and diffuse water.

Q. Can you fast-forward to page 3? That would be mine year -- let's do mine year one.

A. My third page is minus one. Do you want one or minus one?

Q. Do one.

A. Okay, mine year one.

Q. And does this show where the diffuse water will be captured?

A. Yeah. I mean, we capture diffuse water only from our own facilities. It's not diffuse water. It's just it's contact stormwater, and those are -- all those shaded facilities are areas where we're catching the water that falls on them.

Q. Does Perpetua propose to monitor various diversions that might occur?

A. Yeah, we measure our diversion flows.

Q. And from all points of diversion?

A. Again, if it's a well field you're going to monitor



the manifold. You're not necessarily going to monitor every single well in the field.

Q. And this is what we talked about before. It makes sense to get one ultimate (inaudible) controlling monitoring and not every single monitor, right?

A. Yeah, yeah. Yeah, and here you're -- clarifying, you mean diversion as in divert for beneficial use?

Q. Correct.

A. I'm going to probably find myself being sloppy here and confuse everybody because I'm a surface water guy, and so diversion to me also means clean water diversion. That is routeing water around and not using things, and so stop me if I get off base on the use of that particular word.

Q. Does Perpetua propose to publish its realtime monitoring online?

A. No.

Q. Why not?

A. It's infeasible to realtime monitor. We're not even realtime modeling all these things anyway. We'll do what we can, but realtime online for all these, all the little things, is not feasible. And a lot of these little things, again, you don't monitor them in realtime. You look at a totalizer. Realtime, up, down, every pump cycle, you know, of a well. You don't look at that. You look at a totalizer. That is, that being a flow meter that totals as



it goes. Just like your gas meter does at your house, your water meter. So you look at the totalizing meter at some interval, and that tells you what the picture of things is for the whole well field.

Q. And in fairness are you aware of any rule or regulation or requirement that would mandate that Perpetua provide realtime monitoring online?

A. No.

Q. Do these maps show where -- show where streams would be rerouted around mine features?

A. Yeah, they do.

Q. Can you point us to an example of that?

A. We've got the rerouteing of Meadow Creek around the tailings. And I apologize for switching colors multiple times. I think we've got an overlap of two colors that change to color, so it appears yellow to me here. That's the main diversion around the tailings facility. You can see it starting in the northwest tributary. Routes around counterclockwise all the way the TSF past the buttress and down and hits the old SODA ditch, right about the M in Meadow Creek. So that's one of them. And one of the major ones from that particular year, remember this is year one. Some of the other big ones have yet to be installed.

Q. And so if we were to walk through these slides, so let's say mine year 11 --



A. Yep.

Q. -- does this show additional diversions that have since come online --

A. Oh, yeah.

Q. -- at this point in the mine?

A. You've still got the tailings diversion. Again that lasts until year 23 plus.

Q. And that's the yellow line, the southwest corner?

A. That's the yellow. You've got -- looks like you've got Meadow Creek around Hangar Flats. That's not shown as yellow because that's a restoration corridor or it's not merely a diversion, and Rob will get into that later. But that liner is at depth. That liner is many feet down from surface, and there's a functioning stream and floodplain corridor on top of it. But that's shown there now. You've got some other clean water diversions on the north side of the Meadow Creek Valley along the TSF, along the buttress. So all that hillside runoff that would otherwise roll on gets diverted and then it ultimately enters -- difficult to see, but it enters a closed conduit to get it passed the buttress so it doesn't interact with the buttress on its way passed. So there's a closed storm drain system right there where that ramp is where the buttress transitions to those pink stockpiles. There's a closed system that comes down through there. And then there's a closed system over

through West End that's shown. There's Fiddle is shown. Hennessy is shown. Midnight is all shown. They're all there. It's a large map that normally is --

Q. Way high up?

A. Yeah, normally the size of this table, but they are all there.

Q. And, again, the goal here of all of these diversions is to make sure that noncontact water is routed around mine features?

A. Yeah, around and under. Some are pipes. Some are ditches. Majority ditches, but some are pipes for topographic and geotechnical reasons.

Q. To go around or under?

A. Yeah. Pipes can go under. Some of the pipes go around, just because we're on a steep enough hill where digging a ditch would be counterproductive for the stability of the hill. It's easier to just pipe it along. That's what we've done over in West End.

Q. And then go ahead to the last page of the set of maps, and this is mine year 23.

A. Yep. That looks like final restoration in, you know, upon construction of final restoration, of course, there's vegetation to grow post-'23. But '23, physically everything is in its final state as far as where the rocks and dirt and liners are.



Q. So this is showing the river, now going over top the storage facility in the bottom left-hand corner?

A. That's right.

Q. And you have a lake that has been -- come online in the upper right-hand corner?

A. Yeah, that's -- and that's not necessarily the year '20. There is a note there that says -- that's not necessarily the year '23 shoreline of West End Lake, but we had to put something in there. It's a transient lake, and it fills very gradually and then just kind of fluctuates around its ultimate height. Never spills, but this was just some other longterm average just so we had something to show here.

Q. If you look at the key in the upper right-hand corner it talks about drainage alignment, and it lists various types of streams, perennial, intermittent, ephemeral, etc. Do you see that?

A. Yep.

Q. And it also talks about open water and various aquatic features. Do you see that?

A. I do.

Q. How is it that Perpetua knows where the streams are, the intermittent streams, the ephemeral streams, et cetera?

A. They were all -- I mean, you could infer them any



way from the lidar topography. A stream of any size is pretty obvious in the topographic mapping, perhaps not at this scale, but zoom in and you can see them all anyway. But we did a comprehensive inventory. We being our consultants, HDR and then later Tetra Tech, did a comprehensive inventory of all the surface water features at site as part of the baseline work for wetlands for the 404 (inaudible).

Q. There has been a number of questions asked to a number of witnesses to the effect of how -- what evidence does Perpetua have to show that it isn't capturing any water that hasn't already been into a natural channel? Do you remember hearing a question like that of some previous witnesses?

A. Yeah, I recall.

Q. Is there evidence that Perpetua has that backs up the streams, both ephemeral and intermittent that are identified on this map?

A. Yeah, all the documentation from those wetland surveys, which if we don't like paper --

Q. Wait for it.

A. -- it's the large pile of paper.

Q. We're going to hand you what has been marked as Exhibit 52, and what is Exhibit 52?

A. That would be the draft compensatory mitigation



plan for streams and wetlands, and so that is a draft plan that is part of Clean Water Act, Section 404 permitting with the Corps of Engineers. This is the plan that explains how we will mitigate for the unavoidable take of wetlands and waters of the U.S. due to the project.

Q. And so if you just thumb through this image you'll see a series of maps and satellite images with computer overlays. Is it your understanding that this identifies all of the -- all or essentially all of the streams, both intermittent, permit, ephemeral throughout the area?

A. Yep, that's correct. This is that inventory I spoke of. Just plotted on pretty small maps.

Q. And did you -- who is Tetra Tech?

A. Tetra Tech is an environmental -- an extremely large multi-disciplinary engineering and environmental consulting firm. In this case Tetra Tech is the Boise office of Tetra Tech, and they did all the wetlands, all the recent wetlands work.

Q. And have you -- did you work with Tetra Tech or oversee Tetra Tech in the production of Exhibit 52?

A. I had some review of this because I'm more -- I didn't have a lot to do with the wetland surveys, but I had a lot to do in the early days with the mitigation planning, more particularly for the streams than the wetlands. And that was later handed off to our restoration manager.

Q. And does this appear to be a fair and accurate copy of the document that you observed?

A. Yeah. This is just a newer generation of what I've been through.

MR. WATKINS: Move to admit Exhibit 52.

HEARING OFFICER: Mr. Watkins, you know the jurisdiction of the Department as far as the water right applications doesn't extend to wetland mitigation. That seems to be a question that is raised with the Army Corps of Engineers under a Section 404 permit concern because it's a pretty lengthy report that I don't know that I'm going to get much out of in my review so --

MR. WATKINS: If I may respond?

HEARING OFFICER: Yes, go ahead.

MR. WATKINS: I certainly appreciate Mr. Hearing officer your position. We would agree with you. It's not Perpetua that's injecting this concept into the hearing. As I mentioned while getting this document in front of the witness, this has been a line of questioning that has been asked, I think, of every witness so far by the Tribes as in how do we prove and specifically what evidence does Perpetua have to show that they're not capturing water that wasn't already in the natural water course. And so this is that evidence that goes through in great detail and shows that. If the Tribes are willing to stipulate that we are not



capturing water outside of those water courses, we would be more than happy not to admit this evidence or just use it as demonstrative.

HEARING OFFICER: Is there any objection to Exhibit 52?

MR. LOPEZ: Officer Cefalo, the Tribe objects and does not stipulate that assertion.

HEARING OFFICER: And what is the basis of the objection?

MR. LOPEZ: Well, relevance, and it's also a draft. So don't know whether draft or final, but primarily relevance.

HEARING OFFICER: Explain that a little bit more about relevance. How do you feel that this isn't relevant?

MR. LOPEZ: Well, if it's offered for the purpose of demonstrating the existence or nonexistence of natural water courses, this is a draft mitigation plan for streams and wetlands. It's not a document intended to identify natural water courses.

HEARING OFFICER: Mr. Watkins?

MR. LOPEZ: As identified --

HEARING OFFICER: Oh, go ahead, Mr. Lopez.

MR. LOPEZ: -- under Idaho law, Officer Cefalo. It might apply to other water courses. For example, waters of the United States or things under the Corps' jurisdiction,



but not necessarily exclusively Idaho jurisdiction.

HEARING OFFICER: Mr. Watkins, any response?

MR. WATKINS: And, again, we are offering this exhibit directly in response to the repeated question by the Tribes as to what evidence do we have. In fairness, if they're going to ask our witnesses that question and kind of demand answers and put the idea in this -- inject this idea into the hearing that there's something lacking or information being hidden, I think in fairness and candor we have the ability or need the ability to show what evidence we have.

HEARING OFFICER: If we turn back to the -- or turn back to the interlocutory order, the decision was made that water rights met needed to capture diffuse surface water, and I think as part of those, that discussion at the time I remember being shortly after that interlocutory order was issued, and recognizing that if something else is being captured, that water that has entered a natural stream, that an additional water right application for permit would be needed. At the time Perpetua had represented that the full amounts listed on the application, the 9.6 cfs, was being sought from the groundwater wells and from the stream from the river anyway and so that there was no adjustment needed to that specific application. And so I feel like the full application, and what we've heard from the witnesses so far, is that that full amount is being sought still as part of



the application process. And so I just don't know that this issue, if this issue exists, that that is ultimately going to be decided as part of this process anyway, at least not this hearing. So with that, Exhibit 52 will not be admitted. I don't find that it will be helpful. I don't find that it is relevant to the issues that are presented as part of the application that is at hand to divert groundwater and water from the river.

MR. WATKINS: Point of clarification. Rather than admitting it into evidence can I question this witness for demonstrative purposes simply to close the loop on this question of what evidence do we have?

HEARING OFFICER: I will allow that, yes. You can proceed.

Q. (By Mr. Watkins) Mr. Bosley, did Perpetua rely on what has been characterized as a draft compensatory stream and wetland mitigation plan in determining whether or not it has identified and properly addressed all water in natural channels throughout the property?

A. Yeah, I mean, I would say it's -- you know, we and this plan rely on the baseline work that went into it and is therein summarized. Again, there is a lot of backdrop that led to those maps, right. A lot of work that no one wants to read that is under review with the Corps now. We're waiting a jurisdictional determination on all this backdrop.

That's where all those polygons came from. If this plan to determine what our mitigation amount ought to be, as well as our own planning to determine, well, are we making sure we're not diverting anything ought not be relying on that, but fundamentally I guess you could say we rely on this plan because I can look at this plan and learn all I need to know about it without going back to the fundamental work. But the baseline data is where the actual mapping, these things, comes from. And I'll also add, though, regarding it being a draft, it's a draft because we don't have a 404 permit yet. This isn't a draft for review by us or an internal copy.

Q. You're not putting red lines into this?

A. This is what it's called in the 404 review process. It used to be called -- there was a conceptual mitigation plan step two, right, that steps passed. This is the draft that's compensatory. The compensatory isn't a final compensatory until we've got that permit in hand, and that permit is in process right now with the Corps.

Q. So for purposes of how one might colloquially use the word draft, something where you're going back and forth and editing and revising, this is not that?

A. No, this is more of the -- this is more like what you would call a draft EIS as opposed to a final EIS.

Q. And those -- the Exhibit 68 that we were just reviewing, which were all of those maps --



A. Yes.

Q. -- I think the question that led off this whole conversation was, when we see streams, intermediate, ephemeral, et cetera, on that, that information to put those streams on those maps which you rely on comes from the thicker documents?

A. It comes from the documents even thicker than this that also fed this. It's the wetland baseline work.

Q. I'm going to hand you what's been previously marked as Exhibit 48.

A. I definitely can't (inaudible). Yep. That would be wetland baseline work dating back to HDR era.

Q. And so --

A. I would assume probably Tetra Tech (inaudible) in there, too.

Q. So that Exhibit 48 is what backs up or supports Exhibit 52, which then goes into the maps which are labeled as Exhibit 68; is that fair?

A. Yes. Yes, that's the background right there.

Q. So to the question of what evidence does Perpetua have to demonstrate that it is only dealing with contact water and not noncontact water, is what is on the -- what is on your desk representative of that evidence?

A. Yeah. That and the sizeable GIS database of all the mapped boundaries of those features.



Q. As the chief engineer for Perpetua and some of them working in the space for decades now, are you confident based off of the evidence which you have seen and which has been utilized in this hearing as a demonstrative, are you confident that there is sufficient evidence such that you can have confidence in Exhibit 68, which are the maps, showing where the streams are and other water features?

A. Yeah, absolutely.

Q. And are you confident, again based on your experience and role at the company, that Perpetua has adequately addressed ways to divert or deal with that noncontact water?

A. Yes.

Q. Curious, what if in that, call it, 6-inch stack of paper they missed a stream or they missed a seep somewhere, what happens if in mine year five you come across some water that is not accounted for in that 6-inch stack of paper?

A. Well, going to the geography, the topography, you know, if we find something else up-slope of a mine facility, well, it's going to report to the diversion that's already around said mine facility for purposes of diverting the water we do know about. And if somehow it's on a hillside somewhere in some little out of the way corner where there wasn't a diversion because it's way up the hill somewhere and somehow there's a spring or seep up there that needs to



be diverted, well, we'd install a diversion. And by diversion I mean our reroute, not a contact -- not a beneficial use take. I mean, if it doesn't report to an existing reroute diversion, we would install new reroute diversion to kick it out around the facility so that we didn't take in water that wasn't ours.

Q. Ditch or a pipe?

A. Yeah, ditch or pipe, french drain in some cases, whatever is appropriate to the location.

Q. So you've identified and properly dealt with everything. At the extent on the off-chance you haven't, you will address it?

A. Yes.

Q. Mr. Bosley, one more question. As the senior engineer for Perpetua, what are you asking this Hearing Officer to do as a result of all the information that you've talked about today?

A. Just consider the evidence, and I hope rule in our favor ultimately.

MR. WATKINS: Thank you.

HEARING OFFICER: Protestants, I don't know who's going to go first. Okay, Ms. Rogerson, if you want to come and get situated.

EXAMINATION

BY THE HEARING OFFICER:

Q. Mr. Bosley, to what extent are you familiar with the gauging stations for the river for the East Fork, South Fork in Meadow Creek?

A. I've been to them all. I've looked at the data from all of them.

Q. Okay. You heard Mr. Stanaway this morning testify that rough breakdown between the flows in Sugar Creek and East Fork, South Fork that confluence right before they come together is roughly two-thirds to one-third relationship.

A. Might be 60/40, but, yeah, it's something along those lines.

Q. Okay. So you would say that may even be different than two-thirds, one-third. Where -- is there data in a report or in a record that would reflect that, those flows and show that relationship?

A. It should be. It was a ratio that's calculated, but, yeah, all of those are in Rio's hydrology memo so elsewhere it was Rio 2023A referred earlier today.

Q. Okay.

A. All the data analysis for those gauges is in that document, using the most recent data, and it's also -- I mean, you could -- anyone can go on the U.S.G.S. and get it summarized online. But obviously that's not how we enter



evidence.

Q. We also -- Mr. Stanaway and I had a discussion about the existing U.S.G.S. Meadow Creek gauge and how it's located under what is the proposed TSF facility, and that gauge would need to be moved. Do you have any thoughts on where that gauge would be moved to?

A. I think downstream, a little bit downstream of the toe of the buttress, if you were to move it. I don't remember -- I don't remember the plans to relocate or what was to be done about that, but --

Q. Okay.

A. -- logically you would move it down. If you move it up you would need three. Monitor three key inflow points. It's better just move it down.

Q. That was going to be my question, whether there had been a discussion with U.S.G.S. in a site identified, but if there was --

A. If there was, I wasn't part of it. That -- our field operations supervisor or superintendent would have been part of that. He's primary contact with U.S.G.S. and he's not listed.

Q. Okay.

A. Because he's the site manager, right, so he deals with that. Their comings and goings at the site.

HEARING OFFICER: Okay. Thank you, Mr. Bosley. Ms.



Rogerson?

MS. ROGERSON: Thank you, Mr. Hearing Officer. Mr. Hearing Officer, I have one final question regarding natural water courses that I would like to follow-up on, and then I promise that I will move on.

CROSS-EXAMINATION

BY MS. ROGERSON:

Q. Hearing no objection, Mr. Bosley. Mr. Watkins entered Exhibit 68 into evidence to prove, as I understand it at least in part, that Perpetua's not capturing runoff that has entered a natural water course. Can you help us understand what specific standard or standards you used in constructing those maps or determining what constitutes a natural water course within the Stibnite Gold Project area?

A. Well, those maps map all the hydrography that is in the wetlands map in there. So it's all the waters of. All the wetlands are all shown on there. And as to the conclusion not capturing. Well, we don't divert only the things shown on this map. We divert broadly everything that comes down the hill at us, not just mapped things. So if something is out here -- out there around most of these facilities that happens to not be on the map, well, the diversion for it is still on the map and still part of the water management plan.

HEARING OFFICER: When you use the term divert, you



don't mean divert for use?

A. Yeah, I mean, a route.

HEARING OFFICER: A divert to a void?

A. Yeah, divert around rerouting around a voiding, what we are voiding, yeah. See, I warned you I was going to switch.

Q. Thank you. I promised I would stick to one question, so I am not going to ask you a follow-up.

A. All right.

Q. Mr. Bosley, I'd like to turn to the proposed tunnel design, and this is the bypass tunnel, the fish tunnel, that you described at length at the beginning of your testimony. We asked some of these questions to Mr. Stanaway, and he indicated that you would be a better person to answer them, so I'm going to go ahead and ask them again. Can I direct your attention to admitted Exhibit 206?

A. If I have that one. I do not. Maybe I'll find it in this binder. Okay, I'm there.

Q. And I am looking for bate stamp numbered page 4703.

A. Okay, yep.

Q. And I believe this page should discuss the design of the tunnel; is that correct?

A. I think this one is about the stream reach below. Okay, yeah, down lower. Okay, I see it third paragraph, yeah.

Q. Sorry, I'm just trying -- I don't have the binder in front of me. I guess I should have grabbed that.

A. This is the tunnel design based on flow iteration stats cfs and so forth.

Q. Right. Thank you so much. That paragraph about the tunnel design, it sounds like you've reviewed it. Can you just take a moment to review it one more time?

A. Oh, yeah. No, I remember it.

Q. Okay.

A. I wrote it.

Q. Great. That's what we want to hear. The description of that paragraph refers to of the current tunnel design, this is from June of 2022, as I understand it, and that is the same tunnel design that you are still proposing; is that correct?

A. Not quite. So that is the tunnel design that is still on paper --

Q. Okay.

A. -- for McMillen Jacobs 2018 which was designed for 8 cfs is the low flow -- the lowest fish passage flow for the Chinook and Bull Trout. What we're proposing to do is to modify that design as necessary to account for project flow depletions. Right now what we know of such a modification is what we -- what came of the modeling we promised here or -- I don't know when the sequence was that



the Fish and Game thing -- but the modeling that came out of this, the remodel, that is the McMillen Jacobs stuff we went through earlier, is the modeling that says, well, the current, you know, 2018 design has got a weir that's slightly too wide and we should narrow that up to 15 inches instead of 24 inches, so that the new current, or about to be current tunnel design is really a simple modification, just narrowing up that weir so that we get adequate Chinook depths down to 6.6 and adequate other depths down probably to about 5 cfs. So when this refers to current it means McMillen Jacobs 2018. Where we're headed is the 15-inch wide weir, but we hesitate to go and modify all these engineering drawings knowing that, you know, we're going to see more out of this in consultation and we don't know what mitigation measures are coming at us in NEPA that may change that design still more. So there's no point in reissuing a big drawing set just to change one dimension of a weir wall.

Q. Okay.

A. So that's the disjoint --

Q. Okay, no --

A. -- between the design iterations here.

Q. Right, and I think we are just trying to track that. So appreciate that explanation. Just to turn you back to this text. It looks like this paragraph is also referencing NMFS or NOAA fisheries 2011 guidelines, which



are passage criteria for various stages of anadromous fish; is that correct?

A. That's correct, and those guidelines are now updated. There is now a 2022 that got adopted darn near around the same time, and we're going to use 2022 guidelines but nothing really changed. Those two generations of documents don't have any numbers in them relevant to our design that actually changed in that period, but we will adopt the new guidelines.

Q. Okay. So that's relevant because the passage criteria cited here are the same weir type ladder criteria that you're planning to use for the proposed tunnel; is that correct?

A. Yeah, yeah, it's a weir pool, standard conventional weir pool fishway.

Q. A weir pool fish ladder, that's what you're calling it?

A. Yeah.

Q. Okay. Great.

A. I like fishways simply because it's so darn flat. It does not resemble a ladder unless you turn it on its end.

Q. Right, I understand that. This paragraph also states that the, quote: Present design accommodates adult upstream passage for flows down to 8 cfs and likely lower, though 8 cfs was the lowest flow range model; is that



correct?

A. Yeah, and the reason I put that in there is likely lower, is twofold. Is, one, we model down to 8 cfs. These are expensive models to run.

Q. Right.

A. And 8 cfs was the design criteria. If it works at the design criteria there's no reason to model at that lower below design criteria for this purpose, right. We didn't, again, know what the low flow project completions were. So there's no reason to model it below 8. Modeling below 8 is just more money for -- it doesn't get us much, and we know from what we saw from the performance of that headworks, the tunnel headworks in the control weir, what we leaned from that is this thing meets most of the criteria. Meets the criteria over a very broad flow range in the river because the tunnel flow is controlled by that weir. And we also know that, well, at 8 it's one foot, right. It just works for Chinook. We know that just because it's .99 feet deep or .85 feet deep doesn't mean Chinook passage stops. It just means it's incrementally harder. There are many individuals in the Chinook population that are going to get up at .8-foot depth, especially given the rest of the fishway where it's -- there's no other challenges except getting past these weirs. Everything else is in your slack water, right. So, again, twofold. No point in really

modeling it, and we know that the thing performs over a broad range, and we know that, you know, the range doesn't -- passage doesn't stop at the bottom end of the range.

Q. Okay.

A. Those criteria are, again, fishway criteria that were set to optimal. Fish swim up suboptimal conditions all the time, and that's what you would have here if you were shallower than design flow. The fish don't stop moving. They just may not make -- all fish may not make it. Fewer fish may not make it or fewer fish may make it or it may take longer, but it doesn't drop to zero.

Q. Right, but just to confirm: At the time of this June 2022 technical memo, is what I believe it is, 8 cfs was the lowest low range model?

A. Yeah.

Q. Because that's the only flow range that we can really speak to based on the modeling; is that correct?

A. As of 2022, yes, but then the work was completed later in the year or in the 2023, and then we have that modeling and we were talking about it earlier.

Q. Right, when we make it there again. So at the time of this 2022 technical memo 8 cfs is my understanding is sort of equivalent to the 95 percent exceedance level for that reach; is that correct?



A. Yes.

Q. Sort of as we were talking? I think it was referenced earlier that's base flows?

A. Yeah, during the Chinook and Bull Trout window, so it's not a year-round number. It's the -- that was the target design for Chinook, Bull Trout, and the way you do it is the 95 percent exceedance during the occupancy period or passage period.

Q. During their passage period. Yeah. Can you just remind me what those months were that you evaluated the passage period?

A. Oh, it was sometime in June through end of September, I think, and we later modified that period to extend it earlier a week in the new work.

Q. Okay.

A. So, but I think it was late June through end of September or maybe it was mid-June and end of September. I think now it's -- actually now I think it's mid-June. Before it was third week of June or maybe first -- somewhere in there, and that's all -- that's all in that McMillen Jacobs reference.

Q. Okay. Great. And once again, the 8 cfs is pursuant to the NMFS guidance as well, correct?

A. Yeah, yeah.

Q. For fish passage?



A. Yeah, and that was why we wanted to revisit it was NMFS guidance from, you know, several years ago, so we have more recent stream flow to add to the record. Several years ago, and it predated the impact evaluation of flow depletions. So the new work takes into account project flow depletions on this. The old work was just flow record.

Q. Right.

A. Which again is NMFS guidance, but NMFS guidance doesn't necessarily contemplate a mine with flow depletions. It's geared towards operating a reservoir. Operating a hydroelectric dam or so forth. They don't contemplate a depletion situation.

Q. But I think you also just testified that NMFS has updated their guidance?

A. Yes.

Q. But it's essentially unchanged, so are they still recommending 8 cfs for passage?

A. No. NMFs does not recommend 8 cfs.

Q. Okay.

A. NMFS specifies a technique wherein you use the most recent 25 years of record and from that you calculate the flow exceedance from the fish passage window of species of interest, right. In this case Chinook Salmon and Bull Trout. Because they have such a similar window, we group them together for simplicity here. So you take in that fish



passage window, the window in this case, you know, mid-June to end of September. You take the flow record from that window only, not the rest of the year. You calculate your 5th and 95th percent exceedance. You use the 95th to evaluate low flow passage. You use the 5th, the 5 percent to evaluate high flow passage, and how that really shakes out is at the 95 it's depth controlled, you know. Too shallow or not too shallow. And at the 5 percent it's velocity controlled. You are looking at the depths are always adequate at a number that high of flow, but you may have too high of a velocity. So NMFS didn't tell us 8 cfs. NMFS said here, NMFS guidance is here is how you do the calcs.

Q. Right.

A. And what we've done in the new work is add, you know, again, not in the guidance because NMFS never contemplated depletions. They were looking at mainline reservoirs, hydroelectrics for the most part. So we added to that. We said, well, NMFS guidance will give you this number. Adjust that downward for the project flow depletions to get an adjusted 95 percent exceedance. That way you can evaluate the project in its totality.

Q. Okay. Well, thank you for that clarification, but the 95 percent exceedance level for the East Fork during that passage period is still 8 cfs; is that correct?

A. It's like 8.2 because of the new record added.
Q. Okay.
A. And accounting for --
Q. Under the NMFS guidance we are still at the 8 cfs or 8.2?
A. Yeah, you are still right about there.
Q. Thank you.
A. Yeah, slightly high. Slightly higher than 8. I think it's 8.2. It's whatever is in Rio, the pre-adjusted number in Rio's memo, but 8.2 sounds right.
Q. All right. Well, thank you, Mr. Bosley. I'd like to now turn your attention to Perpetua's admitted Exhibit 30, which I believe is the McMillen Jacobs technical memo titled 15 percent design alternatives and dated May 25th, 2018.
A. Is that in a packet, Elijah?
MR. WATKINS: A copy for you.
A. Yeah. Well, her numbers are in the 208s.
MS. ROGERSON: Sorry.
A. That one was several years ago, but I probably remember it enough. We're here.
Q. (By Ms. Rogerson) Great. Mr. Bosley, I believe you previously testified that you are familiar with this memo; is that correct?
A. I am, yep.



Q. Does this memo contain the modeling that you mentioned regarding upstream passage for fish?
A. Let me see if this is the model. Yeah, it is. Yeah, this is the original modeling.
Q. Okay.
A. From 2018.
Q. So Perpetua's June 2022 letter also discusses anticipated future modeling, I believe, in Section 3.2. We understand that from Mr. Stanaway that that modeling was done in part due to discussions between Perpetua and Idaho Fish and Game; is that correct?
A. That's right.
Q. Was the idea for the future modeling to determine whether fish could pass upstream of a tunnel at flows lower than 8 cfs?
A. Yeah, it was to -- generally exactly that. Is determine how -- confirm that the project performs for flows lower than the original --
Q. Okay.
A. -- with project completions, and also to add species, right. We added -- we added West Slope Cut more explicitly.
Q. Okay.
A. Mostly that fell into the Rio camp because that's the natural channel. There was no -- there is little



question of their ability to pass the tunnel because they're so little, but that was added in that modeling effort, too, because previously we only looked at the three ESA species.
Q. Okay. And it seemed like it was also potentially to update your understanding of water usage and stream flows just under the ModPRO2 in general; is that --
A. Well --
MR. WATKINS: Objection. Sorry to interrupt. Mr. Hearing Officer, I don't know that this has been admitted yet.
HEARING OFFICER: I was looking. I was looking through my notes, and I don't think it was offered for admission. So we have both Exhibit 30 and 31 that we spent time in, but they were not offered.
MR. WATKINS: So I don't know what the Hearing Officer's policy is on this, if it should be shown on the Zoom, it's a public document yet or how you want to handle it.
HEARING OFFICER: You can proceed, Ms. Rogerson.
MS. ROGERSON: Would the Hearing Officer consider admitting that into evidence?
HEARING OFFICER: Both 30 and 31? Mr. Bosley, was Exhibit 30 the original analysis?
A. 30 here in front of me is the original analysis from 2018, and then there exists 2023, which was cited



earlier but maybe we didn't talk about it directly. Cited -- it's cited in the letter or the memo that synthesizes its results, but it was talked about earlier by Mr. Stanaway, I believe.
MS. ROGERSON: Yeah, my apologies, Mr. Hearing Officer. I think I got confused because we did admit two other McMillen reports into the record.
MR. WATKINS: That's correct. There are multiple McMillen --
MS. ROGERSON: Yeah, there are multiple. There are many.
HEARING OFFICER: There are two right here, 31 and 32. Yeah, and then Rio shows -- So, Mr. Watkins, where were those other McMillen Jacobs reports, because I feel like we --
A. The other McMillen reports --
HEARING OFFICER: Were they attachments to a separate exhibit? I apologize for this confusion.
MR. WATKINS: We looked at, I believe it was Exhibits 46 and 47 were the McMillen Jacobs attachments. We presented 46. We admitted 47. 46 was the 2018 one and 47 was the 2022 technical memo.
MS. ROGERSON: Mr. Hearing Officer, I think that it's possible that 46 is essentially the same as proposed Exhibit 30. I don't know if Mr. Bosley would like to weigh

in on that.
A. What's 46? 30 is clearly the old one here.
THE CLERK: 46 was never admitted.
MS. ROGERSON: I thought that 46 and 47 had been admitted.
THE CLERK: 47.
MS. ROGERSON: Just 47, not 46?
THE CLERK: Correct.
A. What do I have here? I got 46, 47 right here. Whether they are admitted, I do not know, but they're here in folders. And I should correct my earlier testimony, it's 8.6 on the Rio report.
Q. (By Ms. Rogerson) Okay.
A. Not 8.2.
Q. Great. Thank you, Mr. Bosley.
MS. ROGERSON: Is 46 the updated version of 30?
MR. WATKINS: I don't -- I can't speak to the witness --
A. No. 46 is also an old -- an old one. 46 is 15 percent alternative analysis. I think that is 30. Yeah, that's 30.
HEARING OFFICER: (Inaudible). It does appear that 46 and 30 are the same document. However, there is one difference. One is at the very top bar titled technical memorandum No. 5, and the other one is titled technical



memorandum No. 6. Otherwise, as I go through word-by-word, they -- at least they seem identical, so --
MR. WATKINS: So I can't speak to that, Mr. Hearing Officer. I would have concern, unless we've gone line by line through the whole thing, if there's some updated analysis on page 11 or whatnot that we are not catching yet to treat them as the same or identical, if they've -- two different exhibit numbers, two different titles. I think they're two different documents. It's not uncommon that in reports there would be some recycled language, but one change updated which I can't run a red line on right now.
HEARING OFFICER: Yeah, I think these are identical documents. So, Ms. Rogerson --
A. (Inaudible) correct TM identifier on the first page.
MS. ROGERSON: I believe -- I'm happy to go with Exhibit 46.
HEARING OFFICER: Okay.
MS. ROGERSON: Yeah.
HEARING OFFICER: Is there any objection to Exhibit 46? We already admitted 47.
MR. WATKINS: No objection to 46.
HEARING OFFICER: Okay. Exhibit 46 is admitted at this time. Thank you. Sorry for the confusion.
MS. ROGERSON: Well, my apologies for that confusion.



Q. (By Ms. Rogerson) So, Mr. Bosley, I believe you have Exhibit 30 in front of you. I think we're going to have you turn to 46 now. Is that in the same binder?
A. It's the folder I got from Mr. Watkins earlier.
Q. Oh, okay. I believe you previously testified that you were familiar with this memo?
A. That's right.
Q. Or technical report?
A. Yep.
Q. Okay. My apologies. So, Mr. Bosley, I think that that objection came at the end of that line of testimony, so I don't actually have any additional questions regarding that, now that we've sorted out which one we are admitting into the record. I think I'm going to turn my attention actually back to Exhibit 206, which I believe you do still have in front of you.
A. There we go.
Q. Have you been able to pull it up? Okay, great. Sorry, I can't see the top of it. So this is the August 2nd, 2022, letter from Idaho Fish and Game to the Office of Species Conservation to Hearing Officer Cefalo. And you're familiar with this letter, correct? I know we talked about the appended technical memo previously, but the actual letter you are familiar with?
A. Yeah, the letter at the time. I haven't reviewed



it since.
Q. Mr. Haslam earlier testified that this letter was based on responding to Perpetua's June 27, 2022, request. Is that your understanding as well? Request for technical assistance?
A. Yeah, I couldn't tell you the dates, but, yeah, that sounds right.
Q. Okay. I wanted to turn to IDF&G and Office of Species Conservations first full recommendation in that letter, which is on the first page. It mentions Chinook Salmon, Steelhead, Bull Trout, and Cutthroat Trout. Are you familiar with this recommendation?
A. Yes.
Q. IDF&G and OSC are recommending volitional passage for all life stages of these species from the East Fork, South Fork Salmon River and Sugar Creek Confluence, upstream the East Fork, South Fork Salmon River passed Perpetua's surface water point of diversion, proposed surface water planned diversion; is that correct? Is that your understanding of that bullet?
A. Yeah, that's my understanding. It doesn't say surface water there, but, yeah, that's --
Q. Right.
A. I understand it to mean the East -- the intake on the East Fork of the tunnel headworks.

Q. And do you understand this recommendation to be recommending volitional passage up through Perpetua's proposed tunnel?

A. Oh, yeah. It would have no meaning in any other context.

Q. Okay, just clarifying. And is it fair from your testimony that Perpetua's proposed water right with conditions will provide for volitional passage for all life stages of these species from the confluence of Sugar Creek and the East Fork, South Fork Salmon River passed Perpetua's proposed surface water point of diversion?

A. Yeah.

Q. Excellent. I'd like to now turn your attention to Exhibit 219.

A. It's a different document. It says Exhibit 218.

Q. Oh, one more binder. No, that's 226. Sorry about that. It looks like you've reached Exhibit 219; is that correct?

A. Got it. Yes. Yes, ma'am.

Q. All right. So we talked about this letter with Mr. Stanaway. Can you please take a moment to skim that exhibit down to page 10, which I believe is the real page 10, not the pdf page 10.

A. That is the end.

Q. Okay. Did you have a part in drafting this letter?



A. Yeah, I wrote most of it.

Q. Great. Well, okay.

A. This letter was a synthesis of the work that Rio Bio-Analysts and McMillen did in support of the previous -- previously promised modeling that we said we would do for Fish and Game. So we did all the modeling. This letter synthesizes those results.

Q. Okay. And you -- and you are testifying that you did most of the synthesization of those?

A. Yeah, I wrote this. The work, the original work, is that of Rio's.

Q. Right.

A. And Mark --

Q. You were interpreting their results?

A. Yeah, and I reviewed their memos, too. I directed and reviewed their work as well.

Q. Okay. So I assume that you're willing to vouch for the accuracy of this letter?

A. Yes.

Q. Excellent. And this letter shares the results of Perpetua's updated tunnel modeling; is that correct? Flow modeling through the tunnel, to be precise?

A. Yeah. Not limited to that, but, yes.

Q. But it is sharing that updated information, because we talked about that earlier?



A. Yes.

Q. That you folks went back and did some additional modeling for the tunnel?

A. Yeah, which is in 47, yeah. Yeah, 47 is the tunnel modeling that is synthesized here or summarized here.

Q. Okay. And then it looks like this document contained four attachments, which are listed at the bottom of page 10?

A. Yeah, and those are the reports I keep referring to of one from Bio-Analysts which just made minor adjustments to migration periods and fish design criteria. Attachment B is Rio updating the hydrology for those new migration periods and with new gauge data and with flow depletions accounted for. And then C and D respectfully are Rio's and McMillen's hydraulic analysis using those new flows.

Q. Okay. So would it be fair to say that the attachments reflect the updated modeling that was performed?

A. Yeah. They are the documentation.

Q. They are the --

A. Yeah.

Q. The documentation, the updated modeling? So is it fair, then, to say that Exhibit 219 expresses conclusions about new low flows that would allow fish passage from the confluence -- in the East Fork, South Fork Salmon River from its confluence with Sugar Creek up through the tunnel passed



Perpetua's proposed surface water diversion?

A. Yeah.

Q. And the conclusions to be specific are that adult Chinook Salmon can pass at this reach at flows as low as 6.6 cfs and adult Bull Trout and Steelhead can pass at flows as low as 5 cfs? Would that be a correct summary?

A. I think so. I think we -- I can't remember if the 5 cutoff was those or the West Slopes, but let me check that.

Q. Yeah, if you would like to take a moment, please.

A. Yeah, I think that's correct. I just need to confirm it here. It's got to be that. I'm just looking for it.

HEARING OFFICER: Mr. Bosley, I believe that beginning on page 9 there's a discussion at the very last paragraph of the 6.6 cfs, and then it extends.

A. Yeah, that's in the tunnel.

HEARING OFFICER: That is in the tunnel. I apologize.

A. McMillen, and I'm looking for the Rio -- I'm pretty sure she's right. I'm just looking for a clear statement in here to find. My eyes aren't doing well this afternoon. Anyway, if it says that in there it is accurate. I just don't recall if it was for Bull Trout or the West Slope Cut. It's got to be for Bull Trout because the Cuts will go down way lower than that.

Q. (By Ms. Rogerson) Okay.
A. Actually, here is how I know. Yeah, the criteria is .7 for them, the flow depth. Yeah, it's got to be the Bull Trout and the Steelhead based on the depth criteria.
Q. Okay. So the 5 --
A. I know 5 is not going to knock it down below .7.
Q. Okay.
A. 5 cfs won't knock the flow depth criteria down below .7. Yeah, so it's got to be there.
Q. Great. So it's your understanding --
A. It's here somewhere.
Q. -- that 5 is the passage volume or cfs for adult Bull Trout and Steelhead?
A. Yeah.
Q. Correct?
A. 5 is the at criteria, right. Again, like I said before, passage doesn't go to zero when you hit a fishway design criteria. It just becomes incrementally more difficult, and some individuals won't make it until you get -- there is a zero-point somewheres down there, but that zero point is not 4.9 or 4. It's somewhere below that.
Q. Okay. So is it fair to say that 6.6, then, is the currently accepted sort of baseline, though, for allowing upstream adult Chinook passage?
A. Yeah, and that's why 6.6 essentially is going to



become the new tunnel flow design target.
Q. 6.6 is?
A. Yeah. So where we're headed in the tunnel design is that the target will be 6.6 and the weir will be 15 inches wide. And we'll have a tunnel that will pass Bull Trout or Chinook down to that 6.6, and it will pass the others at 5 or --
Q. Okay, but just to clarify, the 6.6 will get the Chinook. You believe it will get the Chinook Salmon up sort of daylighted reach --
A. Oh, yeah.
Q. -- of the East Fork before you get to the tunnel and then through the tunnel?
A. Yeah.
Q. And then 5 would be true for Bull Trout --
A. Yeah, for the smaller fish.
Q. -- and Steelhead?
A. Yeah.
Q. Okay. Great.
A. And then some lower number would still work for the West Slope Cuts just because they're so small.
Q. Because they're smaller. Okay. Great. Right, so and for all other species essentially?
A. Yeah, yeah.
Q. All right.



A. Yeah. We don't evaluate on white fish or sculpins but they exist and if the cuts can do it, probably they can, too.
Q. Okay. Great. All right. So I think we're now going to turn to admitted Exhibit 60.
A. I have it right here.
Q. You have that one right there.
THE CLERK: 60.
Q. (By Ms. Rogerson) Oh, I think the header on that one is incorrect. Can you just scroll --
A. It is.
Q. -- up to the top. It says it is financial capability which is throwing me. That's not actually what that report is.
A. Yeah, that's my expert report.
Q. Yeah, that's your expert report? That's why I thought I was --
A. (Inaudible.)
Q. Yeah, sorry. All right. So you recognize this report, I assume?
A. Yes.
Q. All right. And you authored this report?
A. I did.
Q. Okay. Can you turn to heading two on page 1? Scroll down a little bit there.



A. Yep, I see it there.
Q. And I believe this says: The freshwater intake and diversion are protective of fisheries resources while allowing Perpetua to divert water to beneficial use, close quote; is that correct?
A. Yeah, that's right.
Q. And you've already testified, I believe, that this summarizes your opinion, and you still agree with that opinion, I assume?
A. I do.
Q. All right. So I would now like to go to the second page of your expert report and to the last paragraph that begins with McMillen, open paren formally McMillen Jacobs. Do you see that last paragraph?
A. I do, yeah.
Q. And that paragraph you have the following statement, quote: The updated CFD modeling demonstrates the ability of the tunnel fishway to maintain water depths and velocities meeting the fish passage criteria -- or, excuse me, design criteria for Chinook Salmon down to 6.6 cfs of flow and for Bull Trout and Steelhead down to 5 cfs, close quote. Does this updated CFD modeling is McMillen Jacobs December 9th, 2022, modeling report; is that correct?
A. Yeah. Exhibit 47, whatever that date was. Sounds right. Yeah, December 9th, 2022.

Q. That's Exhibit 47, not 46, is that what you said?
A. Yeah, that's 47.
Q. So this paragraph seems to track with the discussions of the 6.6 and the 5 cfs passage criteria in the Governor's -- or, excuse me, the letter to the Governor's Office of Energy and Mineral Resources, which is Exhibit 219. I think we need to have you pull up 219 so you can confirm that.
A. It does.
Q. Don't you have 219 in front of you?
A. I have it. I just have to find where it is in the pile. Yeah, there it is.
Q. Okay. And I believe it would be bate stamp numbers 19 --
A. Yeah, that's 219. That's what we just talked about.
Q. Okay.
A. And that's my letter.
Q. Right.
A. I wrote that.
Q. I'm just confirming --
A. Yeah.
Q. -- that these two sort of statements track one another?
A. Yeah, they track. They're intended to do so.



Q. And both are -- both are sort of conveying that 6.6 and 5 cfs respectively are meeting fish passage criteria for various types of fish?
A. Yes.
Q. So is it safe to say that the new analysis, which is 219, that's the updated analysis that Perpetua provided to the Governor's Office, says form the basis for the conclusions in your expert report?
A. Yeah. I mean, and the heart of it was the work that it's -- you know, that's two steps removed, right. The original work was that of Rio and McMillen in those four attachments.
Q. Right.
A. So this expert report is really a summary of a summary in that regard.
Q. A summary of that summary letter that was sent as an update to the Governor's Office?
A. Yeah, yeah.
Q. Okay. Great. Okay. So I would now like to direct you to Rio ASE's March 21, 2023, technical memorandum which was attachment E to Exhibit 219. It's titled the Stibnite Gold Project updated fish passage flows.
A. Okay. I'm there.
Q. Okay. So are you familiar with this technical memorandum?



A. I am. Yes, ma'am.
Q. And can you just tell us what information it provides?
A. So this is the hydrology side, right. We conduct modeling. There's the hydrology side, which is what is the flow. There is the hydraulic side which is given the geometry of the channel and that flow once the depth of velocity. This is the first part is the hydrology. This is where Rio took the new gauge record. Took the mine plan, the ModPRO2 mine plan as far as what the drainage areas now are, because they change slightly due to pits and Hennessy Creek is going in closer to where it should have been instead of where it goes in now which is below Sugar. So adjusting for things like Hennessy Creek, minor drainage area modifications, and adding that extra five years of record on the back end and throwing away the earlier five years of record that's no longer part of the 25-year window, and then reanalyzing those flow exceedance numbers based on that. And then they took that, and they took off the project flow depletions to get the lower number, the, you know, 6.6, the lower project affected low flows.
Q. Okay. Thank you for that explanation. Can you take a look on page 8 at table 6?
A. Yes. Got it. And that was the basis for my earlier correction.



Q. Okay. So I'm just -- this table 6 is showing the 95 percent exceedance flows specific to the timing of the different life stages of listed fish; is that correct?
A. That's correct, also the 5 percent.
Q. So is 6.6 cfs the anticipated 95 percent exceedance at the U.S.G.S. gauge 13311250?
A. Is that the above Sugar Creek? I know them by location.
Q. That's the East Fork, South Fork upstream of Sugar Creek near the proposed tunnel.
A. Yeah, yeah. And that's -- I should clarify the approach here, right. So this first column without water rights condition, right, that's 95 -- that's a by-the-book cookbook 95 percent exceedance with whatever adjustments were necessary due to drainage area to get to the point of interest and reflect the mine plan, new drainage areas with Hennessy coming in closer to where it should. The 95 percent with water rights basically take that flow and then calculating what the low flow would be if we withdraw up to that water rights condition. Now, strictly speaking, that's a conservative estimate of the new 95 percent because we wouldn't always withdraw. And that would be model the statistics, but there's no clean defensible way to do it any other way, so we took a more conservative approach here and just took the depletions off the first calculation of

exceedances. I mean, the real -- the real 95 percent exceedance number with depletions, if you actually first mined, did everything, did our whole project and then reback-calculated those statistics, the real number wouldn't be 6.6. It would be, I don't know, seven, seven and a half, some number higher than 6.6. 6.6 is a conservative estimate and a clean estimate to make. You could go way to the weeds on this and not learn anymore, so we went just conservative lower number.

Q. And this number represents the 95 percent exceedance for the entire reach between the point of diversion and the East Fork, South Fork confluence of Sugar Creek?

A. Yeah, yeah. There's no meaningful intervening drainage area or lateral inflows there.

Q. Okay.

A. To change that number within such a short distance. No tributaries either, of course.

Q. Right. Okay. Thank you for that clarification. All right. Can you now flip to appendix C or attachment C, I think it might be called, of the same Exhibit 219.

A. Yeah. Got it here.

Q. And are you familiar with this technical memorandum?

A. I am.



Q. I understand from the first sentence of this memorandum that it, quote: Concludes hydraulic developments -- excuse me, development results and the evaluation of fish passage at low and high flows from the East Fork, South Fork Salmon River from the tunnel outlet to the confluence with Sugar Creek. Is that your understanding?

A. Yeah, that's right.

Q. So this memorandum addresses the East Fork, South Fork Salmon River downstream of the proposed tunnel and not the proposed tunnel itself?

A. Correct. Different type of model. Different consultant in charge of the respective work scopes.

Q. Right. And which consultant was in charge of this one?

A. This is Rio.

Q. This is Rio, okay.

A. Yeah.

Q. So McMillen's tunnel.

A. That's right.

Q. Rio is the daylighted reach sort of down to the confluence of Sugar Creek?

A. Yeah, that's right. And there's more in that model. They modeled part of Sugar, and then modeled below Sugar as well in here out of necessity, right. You can't --



Q. Right. No, I understand.

A. You got a regular model past your area of interest.

Q. Right. No, I got it. Okay. So I would like to direct your attention to page 3.

A. All right.

Q. On the last paragraph on that page -- I'll let you catch up on the screen here. Oh, you're still looking for the attachment, it looks like.

HEARING OFFICER: Gene, it's 19451 is the bate stamp number. So you're going to go quite a ways up. Yeah, you are way passed it.

Q. (By Ms. Rogerson) Okay. Could you scroll the last paragraph there, Gene. Thank you. So I believe this last paragraph speaks to -- it speaks of minimum depth criteria based on the California Department of Fish and Wildlife and then on -- is that correct, Mr. Bosley?

A. Yes.

Q. Okay.

A. They pulled together criteria where they could find them.

Q. Right. No, I understand.

A. Comprehensive on everything.

Q. But they are citing the California Department of Fish and Wildlife?

A. Yeah.



Q. Okay. And then on the next page I wanted to direct your attention to table two, I believe. Yes, table two.

A. Uh-huh (affirmative).

Q. And I believe that this shows a minimum depth for adult Chinook Salmon of 0.9 and a minimum depth for adult Bull Trout and Steelhead of 0.7 feet.

A. That's right.

Q. Is that correct?

A. Yeah, that's correct.

Q. Okay. And the basis for these flows is the California Department of Fish and Wildlife citation on the previous page?

A. That's right.

Q. All right. Great. Okay. So I would now like to actually turn to that citation, which I believe is Exhibit 2 -- proposed Exhibit 230. Let me check that.

A. Which pile is it in? I don't have any of those.

Q. Yes, it's proposed Exhibit 238.

A. I'll warn you ahead of time, this is really a question for Gary Nelson probably as it's being his reference.

Q. Well, are you familiar with this?

A. I'm not. No, I'm not familiar with this. This is design criteria our consultants adopted and selected, so I'm not -- I don't remember reading this, at least.

Q. But you understand that this is the study that Rio ASE was citing to come up with the 0.9-foot minimum flow depth for adult Chinook at 0.7 minimum for adult Bull Trout and Steelhead; is that correct?

A. And that one came out of attachment A from Bio-Analysts. So our fisheries --

Q. I'm sorry, which one came out?

A. That -- use of this. Rio cites it because they just cite primary sources. Wouldn't cite Bio-Analysts for it, but the recommendation to use this came out of attachment A, which was by Bio-Analysts, not by Rio. So Rio relied on Mark's work there.

Q. Mark Miller, the author of the --

A. Yeah, Mark Miller.

Q. -- fisheries expert report for Perpetua?

A. Yeah. Did he write -- yeah, I guess he did. Was it him or Paul? Okay, so, yeah, yeah. So, yeah, that was Mark -- that Mark Miller was also the author of the Bio-Analysts report.

Q. Okay. Well, I'm going to have you -- I'd like to introduce this exhibit into evidence if that's possible.

HEARING OFFICER: Why don't you start by getting to the --

MS. ROGERSON: Get to the meat of it? Okay.

HEARING OFFICER: -- the page that you would like him



to refer to.

MS. ROGERSON: Page 20, table one.

A. It seems to match ours.

Q. (By Ms. Rogerson) I think that this table shows the same depth criteria that we've been discussing, the 0.9 and the 0.7; is that correct?

A. It does. That's correct.

Q. Okay. Can you, then, turn your attention to page 6?

A. All right.

Q. Okay. And there should be a paragraph on this page that states this -- I think it's speaking to the scope of the application -- only applies to the weighable streams having low grade riffles and less than 4 percent gradient and substrates dominated by gravel and cobble. Do you see that on the page?

A. I do.

MR. WATKINS: Objection. Mr. Hearing Officer, the witness has already said that he's never seen this document. Doesn't remember reviewing it. He's not quite sure who authored it. It's not admitted into evidence, but he's being questioned directly from the exhibit.

HEARING OFFICER: Sure. Meaning the Exhibit 238 that he's never seen?

MR. WATKINS: I think that was his testimony, yeah.



HEARING OFFICER: Okay. Your objection is noted on the record. You can continue to ask questions about this.

MS. ROGERSON: Thank you, Mr. Hearing Officer.

Q. (By Ms. Rogerson) So the passage I just read. You are staring at it, it looks like?

A. Yeah.

Q. Okay.

A. I was reading what followed.

Q. So this explains the type of stream, the 0.9-foot passage criteria for adult Chinook Salmon and 0.7 foot passage criteria for adult Bull Trout and Steelhead apply to, correct?

A. Sorry. Again I zoned out reading it.

Q. Why don't you give me your understanding of that passage that we're discussing?

A. Well, this document is a big standard operating procedure and specifically applicable to streams of those characteristics weighable low gradient, and it goes on to say specifically what it isn't, which is culverts, a bunch of other things that aren't the case here, and then silt sand substrates, so it's mostly saying is don't use it in fine grained materials.

Q. But I believe it is also saying that it only applies to weighable streams having low gradient riffles with less than 4 percent gradient and substrates dominated



by gravel and cobble.

A. Yeah. This SOP, that does not eliminate the ability to make inferences from some of the contents in here such as appropriate flow depths.

Q. Okay, but --

A. And those are inferences made by our fisheries biologist that -- is he coming? Paul will be, so --

Q. We would love to know if he's coming.

MR. WATKINS: I'm not going to respond.

Q. (By Ms. Rogerson) Okay. My only point is I wanted to point out that NMFS has different passage criteria for weir type fish ladders like proposed tunnels; is that correct?

A. They have quite a few, yeah.

Q. Can you turn to the next page on page 7?

A. It's already here. Yeah.

Q. Okay. At the top I believe it states: This criteria is not applicable to culverts, weirs, bedrock ledges, or anticlines with associated drops. Do you see that language?

A. Uh-huh (affirmative).

Q. The proposed fish tunnel has weir features, correct?

A. It does.

Q. So these 0.9-foot and 0.7-foot passage criteria

wouldn't apply to the proposed fish tunnel, correct?

A. I'm not sure in here what they mean weirs. There's a number of configurations that could mean, but, again, that's a question for a fisheries biologist.

Q. Okay.

A. But these criteria are not really different from anything we've used before. This Chinook, if there's other criteria for stuff that are one foot difference by all of a tenth of a foot and all the other fish are smaller than Chinook, it would stand to reason that a smaller fish would have a smaller depth criteria. This provides at least some guidance to how big those fish are and what depth criteria to use for them. So while, you know, you're not analyzing a critical riffle, which, again, this is a, you know, 20 some page document with a procedure and SOP in it. You know, the specific depths that a fish can swim through, I don't understand why a fish can't swim through that depth when it occurs over a submerged weir if they can swim through it over a riffle.

Q. Okay. But needless to say it does say it only applies to riffles; is that correct?

A. The standard operating procedure only applies to riffles.

Q. Okay. Thank you, Mr. Bosley.

A. It doesn't say table two only applies to riffles.



Q. Okay. I'd like to now direct you to Exhibit 46, which should now be admitted into the record.

A. Yeah, McMillen, original McMillen.

Q. Right. We're back to the 2018 technical memo from McMillen Jacobs before they became McMillen, and I believe you earlier testified that this technical memo contains flow modeling for the Perpetua's proposed tunnel; is that correct?

A. Yep. Yeah, this is the flow modeling of the tunnel as originally designed in 2018.

Q. Okay. And can I direct you to table one, which I believe is on page 6.

A. Yeah. Which page of the table? It starts on 5.

Q. Oh, it start on 5.

A. Yeah.

Q. Okay, I think I want you to go to page 6, then. Does this table represent the 2011 NOAA fish passage criteria?

A. It does where noted, and I'm not sure about the one foot because it doesn't cite it right there probably. The key part about that criteria, as well as the depth, is the streaming flow. Streaming flow is why I say if it's streaming flow, the flow regime is that of one of those critical riffles (inaudible) as opposed to plunging flow.

Q. All right. So if you could turn to the second page



of the table, which I think you're actually on at the moment. Sorry, it's a long table. But regardless, can you turn to the fish ladder section?

A. Yeah. Yeah, that's what I was just looking at.

Q. All right. It's my understanding it says: Fishway overflow weir should provide at least one foot of depth over the weir crest. Is that what you're seeing on the page?

A. Yeah.

Q. Now you've been testifying about a 0.9-foot depth requirement for adult Chinook in the tunnel, as I understand it; is that correct?

A. Yeah. That's the CDFW 2017 criteria.

Q. For riffles?

A. For riffles applied to this.

Q. Okay. But what I'm seeing here is a NMFS requirement of one foot; is that correct?

A. If that's NMFS. Again, it's not cited directly in that block of the table, so I'm uncertain, but it seems likely.

Q. Okay. Okay. Now we're going to go back to Exhibit 219, attachment D if you would. Just for the record I believe that this attachment D is also Exhibit 47 which has been admitted into the record.

A. It will be easier to find as 47, less flipping.

Q. Do you need some help?



A. Nope, I got it. Yeah, 47 is that attachment.

Q. Okay. Can you confirm for me that what you have in front of you, then, is the McMillen Jacobs 2022 supplemental tunnel hydraulic modeling report --

A. Yes.

Q. -- for Perpetua's proposed tunnel?

A. Yeah, that's right.

Q. Okay. Can you flip to page 3 of the report, please?

A. I'm there.

Q. And is that -- okay. I was going to give you the bates number. That's fine. Is there a task purpose section on that page?

A. Yeah, yeah, right in the middle of the page.

Q. All right. I'm going to read from that, and please let me know if what I've read is correct. Quote: The purpose of this task is to provide supplemental hydraulic modeling of the tunnel fishway in to investigate the lowest possible tunnel fishway flow that satisfies established fish passage design criteria by modifying the fish weir -- excuse me, the fishway weir geometry. Specifically, the analysis determines the lowest possible inflows that meet threshold depth and (inaudible) criteria by way of (inaudible) hydraulic modeling, close quote. Did I read that correctly?

A. That's correct.

Q. Is this your understanding of the purpose of this report?

A. Yeah, that's right.

Q. If you could flip to page 4, I think you will find a table one. Do you see a table one?

A. Yeah.

Q. And does that table one show design criteria to be used?

A. It said to be reviewed.

Q. To be reviewed. Can you read to me what it says?

A. Table one design criteria to be reviewed minimum flow one foot, maximum flow velocity over weir (inaudible) Bull Trout 6.6 (inaudible) feet per second. Max flow velocity over weir for Chinook burst speed 22 feet per second. Maximum hydraulic drop between fish ladder pools 12 inches and minimum weir length 15 inches.

Q. Okay. Does that table show a one foot NMFS or NOAA criteria?

A. The only one foot NMFS criteria it shows is for the maximum hydraulic drop between the pools. The other -- the one foot cites McMillen Jacobs 2018 which is, I believe, Exhibit 46 or -- yeah, 46, probably.

Q. Okay. Is it fair to say that the McMillen Jacobs 2022 technical report is evaluating minimum flows through the tunnel using NMFS one foot criteria at least for Chinook



Salmon not the California Department of Fish and Wildlife 0.9-foot criteria for low gradient riffles?

A. Well, it started there. This is an intuitive design process where it ended may differ from where it started. What you do is you start with this and then analyze, see how it works, adjust the weir length, and so forth. And, yes, they did do a one-foot flow depth for all these calculations and then later on I think they went and got down to see -- yeah, you got point -- here we go. It's in here somewhere. Later on they went down to a different flow depth or figured out the discharge at a variety of flow depths. And I'll have to move on here to find that.

Q. Well, I would like to direct you to page 11, table 6, if I might.

A. Yep. Looking at that.

Q. So as I read this table I believe it shows that 6.6 cfs will only provide a 0.92-foot over the weir crest?

A. Yeah, that's right, and this is what I was seeking is this is where I know the 6.6 correspond to .9.

Q. Okay, but the 0.92-foot the ditch showing over the weir crest is below the one foot NMFS criteria for this kind of tunnel design; is that correct?

A. Yes, yes, .9 is less than one. However, I'm not sure it's NMFS. Again, the McMillen quoted it. I'm not sure NMFS was cited correctly or not in that.



Q. Okay.

A. I know that -- I'm certain that NMFS hydraulic drop criteria is 12 inches. I'm not certain that the original 12 that was used for flow depth was NMFS or not, and McMillen doesn't help because it's not cited as NMFS in that block of the table.

Q. Okay. Can you now turn to page 12?

FEMALE SPEAKER: Do you know what PR number is?

MS. ROGERSON: Yes. I have 19707.

Q. (By Ms. Rogerson) So I know we're still scrolling for the folks who are online, but what I have on that page, and hopefully you can locate it, Mr. Bosley, is that the report states in bold, quote: 7.25 feet of volume-metric flow rate will meet the minimum flow depth of one foot as well as the other design criteria such as velocity and hydraulic drop. Did I quote that correctly?

A. Yeah, that's correct. That's quoted correctly.

Q. So it's fair to say that the 6.6 cfs will not meet the one foot minimum depth criteria for Chinook Salmon?

A. Slightly shallower than one foot.

Q. Okay. So let's now go back to the top of Exhibit 219 to pages 9 and 10 of the letter to the Governor's Office of Energy and Mineral Resources, and I believe the bates numbers are 19425 and 19426. It looks like you've gotten there.



A. Gotten there, yeah (inaudible).

Q. The paragraph that spans these two pages, I believe, states as we were just discussing from the 2022 McMillen report that: 7.25 cfs is the minimum flow necessary to pass adult Chinook through the tunnel under the NMFS criteria, but then it goes on to say that the use of the 0.9-foot minimum criteria for riffles is from the California Department of Fish and Wildlife citation. Is that correct? Is that your reading of that passage?

A. I'm looking for -- I'm looking at the end of the first page, and I'm not seeing any reference to any particular citation.

Q. The citation is on the second page.

A. Oh, second page.

Q. So it's that paragraph that spans the two pages. It's the last -- it's the last paragraph starting on page 9, and it bleeds onto page 10.

A. Oh, yeah, I was at the front of the document. Sorry. All right. Okay. Yeah, I see it there. So it says, yes, slightly over the California number at 95 percent exceedance Chinook and Bull Trout.

Q. Right. And, again, we are maintaining that this NMFS criteria applies to that that's being applied to the fish tunnel. It's being applied to the fish tunnel, not to 0.9-foot riffle. So the statement on page 10 that, quote:

The depth over the weir is slightly greater than the Chinook Salmon minimum depth of 0.9. Is this an error?

A. No, it's precisely correct. It's 6.6, which is the 95 percent exceedant flow. The depth is slightly over the California criteria.

Q. So you're maintaining that the riffle criteria applies to the Perpetua's proposed tunnel?

A. Perhaps. It's, again, a question for the fisheries biologist that made that determination, but I don't have any reason to believe that determination was incorrect --

Q. Okay.

A. -- based on my knowledge of hydraulics in both fishways and natural channels.

Q. But regardless, you used this California Department of Fish and Wildlife citation in your expert report as well?

A. Yeah.

Q. You relied on this information --

A. Yes.

Q. -- to reach the conclusions contained in your expert report?

A. Yes.

Q. Okay.

A. And given, this is a point one foot question .1 feet at issue. I think that the conclusions stand regardless of whether it's .9 or .1 because passage does not



drop to zero as a criteria is exceeded.

Q. Okay. I believe you testified on direct earlier that a mistake in the tunnel design would make you, quote, go back to the drawing board. Do you recall that testimony?

A. I did not say back to the drawing board. I would say we'd have them reevaluated or correct -- you know, correct the analysis, correct the dimensions of whatever it took to make it work.

Q. Is this the type of mistake or error that might cause you to go back and reevaluate?

A. It's not much of a reevaluation here, if it's a tenth of a foot. That's readily adapted. Again, we have the simplest possible weir geometry here of a rectangle. There are enumerable alternative geometries that were meant for just this sort of purpose, right, to get higher heads and lower flows and so forth. This is not a big lift, nor is it a big lift -- there wasn't anything to think it's insurmountable. Again, it's a tenth of a foot at a really low flow.

Q. But I think you've earlier testified also that you are not a fish biologist so you can't speak to whether a tenth of a foot is important for adult Chinook Salmon?

A. I can speak as an expert in hydraulic engineering that getting an extra tenth of a foot out of a weir geometry is readily achievable.



Q. So I now want to shift gears entirely and I was hoping to go back to some of the questions related to diversion monitoring that we've asked a few previous witnesses who have not felt capable of speaking to these questions.

HEARING OFFICER: Mr. Bosley, can you make sure you're close to the mic.

A. Oh, sorry.

HEARING OFFICER: Yeah, scoot as close as you can. I know there are a lot of binders in front of you, but go ahead.

Q. (By Ms. Rogerson) So has Perpetua considered having metering devices on each of its points of diversion?

A. We'll have metering devices where we need them to manage our system, but, again, each point of diversion is not feasible or necessary.

Q. Okay.

A. And by that I'm broadly including the groundwater wells. That's specifically where it's not sensible to have every wellhead.

Q. Okay. I would like to go back to Exhibit 1G, which is Perpetua's application for permit 77-14376 -- 78, also the 9.6 application, and that's 1G. So I think we're going to have to pull out another binder for you.

A. Are we concluded with any of these that we can move



off the desk?

Q. Yes, let me check. I believe -- I believe that we are. I believe that we are done especially with like the 206 and the 219 exhibits.

A. This one? (Inaudible.)

HEARING OFFICER: Here is the one you're going to need.

A. Okay. I think I'm there. You want tab G?

Q. (By Ms. Rogerson) Yes, 1G. All right. So it was my understanding from Mr. Stanaway's testimony that Perpetua plans to have metering devices on each point of diversion, and I was hoping that you could point me to where that is found in the application.

A. I am not familiar with the details of this document.

Q. Okay.

A. I was involved in the underlying technical work, but I don't know where things are in here.

Q. Okay. You didn't -- you didn't help compile the actual application for permit?

A. Well, not these -- not these front matter tables or anything like that. I reviewed the Word doc when it was prepared, and I haven't looked at it since.

Q. Okay. Then I'll just ask you a separate question which is: Is Perpetua willing to have external unbias sort

of third party monitoring of diversions?

A. I think anyone is free to monitor what they want to monitor.

Q. So Perpetua would be willing to report diversions to the public or provide it in some sort of public forum so that the public could monitor?

A. Yeah, and that's, I think, something for our -- someone with the vice president in front of their name.

Q. I believe that in your testimony you agreed with Mr. Stanaway that in his opinion it would be administrative burden on Perpetua to have to have multiple points of quantifications for its proposed condition; is that correct?

A. Yes, yeah.

Q. Okay. Can you please remind us why you believe it would be an administrative burden for Perpetua to have more than one point of quantification for its condition?

A. Well, aside from additional reporting, again, the biggest problem is that more than one point of quantification in measuring the same flow, more or less same flow two different spots in the river with gauge uncertainty, we're talking about small numbers to begin with here, right, what do we do if one is higher and one lower? Like one point says curtail, the other point says you're in the clear. Well, then what? What's the prioritization? How do you decide which one to use?



Q. Wouldn't that be determined based on what -- excuse me, which reach of the river the condition is attempting to protect?

A. Yeah, if it was one straight reach, but we have contributing reaches, right. We have the (inaudible) system with different tributaries, and some of these cases you're adding gauge to tributary flows to arrive at a total below the confluence. Well, trip A plus trip B may or may not equal the gauge number at below confluence C just because of gauge uncertainty, just because a measurement error or measurement uncertainty. You just have to have a clear set of rules for how you apply it and how we apply it when we decide whether to divert or not and how Mr. Cefalo and his department administrate.

Q. Right. Do you think that it would be feasible to arrive at sort of a clear condition or set of rules that would --

A. We have a very clear condition and set of rules. It's the East Fork below Sugar Creek as depicted in our Fish and Game condition.

Q. Are you aware of any water management projects where there is more than one point of quantification?

A. I am not, but I am not an expert in water rights or aware of that many other projects in Idaho and how they manage their water that way.



Q. Okay. That's fair. It's my understanding from previous testimony -- can't remember if it was yours on direct -- that East Fork, South Fork flow is variable. Is that your understanding as well?

A. I can't imagine a river where it would be otherwise.

Q. And the flow of Sugar Creek is therefore variable as well?

A. Yeah, likewise.

Q. So I'm thinking a possible scenario is that the contribution of flow at the point of quantification is significant compared to that from the East Fork, South Fork. So Sugar Creek's contribution at the point of quantification could be significant based on variable flows, but we're at the point of quantification we're measuring combined flow from both the East Fork, South Fork, and Sugar Creek. If that were the case is it fair and accurate to say that the flow at the East Fork, South Fork above Sugar Creek could potentially fall below what we would need for fish passage even though the point at quantification indicates that we are still within, you know, the range that would allow for fish passage?

A. Well, that was the purpose of the modeling was to demonstrate otherwise, right, to demonstrate that at the contemplated rule or the contemplated point of compliance



that, point of quantification that if you withdrew all the water, all the allowable water up to the criteria all from the East Fork, again some of it may be removed from West End in reality instead there by dropping Sugar Creek numbers, you removed it all from the East Fork in that analysis and that analysis demonstrated that you've got passage up through that reach at those low flows. And the numbers that are better than those in Sugar Creek itself regarding passage, meaning meeting criteria or not meeting a passage criteria.

Q. Right. But nevertheless, Perpetua's proposed condition is sort of -- it's a fixed 20 percent below 25 cfs sort of regardless of the respective flow contributions to that point of quantification from Sugar Creek or the East Fork, South Fork Salmon River; is that fair?

A. Well, the 20 percent -- the point of 20 percent is that it's not fixed. It's scales to the total flow. That's why we are doing --

Q. But it doesn't adjust based on the flow variable, you know, the variable flow that you might be getting at the -- contributing from the East Fork versus contributing from Sugar Creek?

A. No, it doesn't do that, I guess.

Q. Yeah.

A. And, again, let's step back a second and think

about how these streams behave. This is a snowmelt runoff dominated system, and there's a relatively typical ratio of those two, and it's related to their drainage area and their elevation and aspect. It's my recollection Sugar Creek yields a little less per square mile just because it's a little lower and a little rain shadowed. So Sugar Creek yields a little less per square mile than the East Fork does, and the East Fork is also slightly greater in drainage area. And that's what we see at the flows of interest is a pretty consistent difference between the two and a pretty consistent contribution between the two. The way you would see a widely (inaudible) contribution between the two is if a thunderstorm cell camped out over one and not the other, in which case, well, we're not withdrawing water based on transient flows of a few hours that would result in something like that.

Q. But A scenario like that would influence the rolling three day average that you have in your proposed condition and so it could affect the amount of water --

A. Possibly.

Q. -- that you could withdraw under the condition?

A. Slightly, but those kind of conditions, again, aren't likely to occur during the critical times as a summer falling limb usually condition, not a winter low flow or late fall low flow occurrence basically, just



meteorologically speaking.

Q. A thundercloud camping out over --

A. Yeah, small storm cells dumping rain is more of a spring/summer phenomenon. You get them in the fall, but those sorts of things are not terribly likely during the flow periods of interest for low flow protection.

Q. Right. But we do have fish passing through that area in September, I believe, based on your previous testimony, and so it's possible?

A. It's possible.

Q. Is that fair?

A. Yeah.

Q. Okay.

A. And we don't just bump up against it a lot in the months that become really critical. And, remember, in September you're still reseeding, so you're not all the way down to the lowest of the lows usually yet.

Q. So sort of just to wrap up this section, then, Idaho Fish and Game has recommended Perpetua that water conditions on Perpetua's water right applications fully protect all life stages of fish species of concern on the East Fork, South Fork Salmon River, and that was in the letter, that Exhibit 206 that Idaho Fish and Game OSC sent Officer Cefalo. Should Perpetua be required to halt operations when the protection of all life stages does not



occur or were it to not occur?

A. Well, we've proposed what we've got for that condition that they seem quite comfortable with as being protective, and that's not a halt all operations condition. That's a halt water withdrawals condition. I don't understand how a halt all operations condition applies here in this context at all.

Q. All right. So I want to turn to some testimony I think that you gave on direct. Actually, I'm going to do something else. Strike that. So I want to just ask you a few questions about sort of mine water economics. Is that something you feel comfortable speaking to? Do you know how the cost of diverting surface water from surface water sources compares to diverting from groundwater sources for mining operations?

A. Depends on the source. I mean, too many variables to characterize, right. The deeper the well, the larger the diameter of the well, the bigger the pump and the farther from the point of use the more expensive it is, right.

Q. Right.

A. Remember here we have a surface diversion, it's integrated into an existing tunnel headworks that we have to build anyway, right, so it's there for the price of the pump and the wet well and the screens. It's going to a pond that's already right there on the hill, right, stump over



point, talked about booster tanks, goes to Midnight pond, and then it goes up the river in a pipeline that already existed for the Midnight pond contact water. So the incremental cost of that is better, but by sheer luck there are other surely are some Hangar Flats wells that if you took the total capacity four and a half of a bunch of wells stuck in over there, they probably -- they could come out less because then it's just lifted out of the well, you know, a hundred or two feet and then down the river. So that might come out less, but again, absent a detail evaluation it could go either way.

Q. Okay. So it's not necessarily less expensive to divert from surface water or groundwater, it depends on --

A. Not categorically, no.

Q. Okay. Thank you. But it's something that you might consider as a business, is that fair to say, the expense of where you divert from?

A. Oh, yeah. I mean, in operations we've got a set of -- we've got a whole set of criteria, right. We've got the low flow condition and we've got, well, where do we get it from, what's already in our hands is the biggest consideration, right. Dewatering water is already there, and that's for the same reason we built things out of rock that is already in the back of a truck, we'll use dewatering water that's already in our pipes before we'll ever go seek

it out from either extra groundwater or surface water. That's the bigger economic consideration is we don't go looking for water to pump and pumps to run on power that we have to pay for when we've already got the water.

Q. Okay. That makes sense. Thank you for that clarification. I'd like to turn to basically the Stibnite Gold Project proposed mine plan.

A. Is there an exhibit with that?

Q. I do not. This is just a general line of questioning, based on your professional expertise. Can you remind me how long you're planning to current -- to operate the Stibnite Gold Project?

A. Well, operations as in running the mill, deposit running ore through the mill, is 14 and a quarter years.

Q. And does that -- that does not include the three years of construction?

A. Yeah, that's exclusive of three years of construction, and then all the reclamation on the back.

Q. Okay. So how many years of reclamation on the back end are you planning?

A. It's about a five-year period for most of the work, but then because of the need to get the tailings consolidated sufficiently to be able to build upon there's a lag where we don't get to the tailings facility until year 23. So it's about, you know, all in, 9, 10 years of



reclamation but with a gap in the middle of it while you wait for the tailings consolidation to --

Q. Okay.

A. And then the gap may not be real because the fact is the edges consolidate sooner, and you go in and you start placing fill on the edges before you go out into the middle where it's less conducive to (inaudible) equipment. So really it could be continuous, but there might be a slight gap there.

Q. Okay. Can you just add up all those numbers for me and give me a range of how long the mine --

A. 14, 17, about 27 years.

Q. Okay, because I've seen 23 in a couple of your maps. So is it fair to say that 23 to 27 is sort of the projected length of mining operations?

A. Yeah, year 23 is year 23 of the mine plan, remember, which has the three in the beginning of it. There's no zero, so --

Q. Right, so we get to 26?

A. -- minus three, minus one, or minus three, minus two, minus one, one through 23, 23 of the mine plan, which is 26 from inception, is the start -- is the finish of the restoration of Meadow Creek on the tailings facility.

Q. Okay.

A. So, yeah, that's why you see 23 plastered



everywhere. That's the final physical restoration year. We still have a tail of restoration monitoring, planting vegetation monitoring and water treatment that extends a little beyond that.

Q. Okay. And could it take longer? I mean, is there -- I understand that's your estimate, but it could take a little bit --

A. It could take longer. It could take shorter, yeah.

Q. Okay. Is it possible that you could decide to extend the life of the mine? Like you could decide to do additional mining work and, therefore, the whole life of the mine, including reclamation, would take longer?

A. It's possible. I wouldn't concede that reclamation would take longer on a particular facility because, remember, we retire them as we go. Some are already reclaimed before we get even to such a decision point, but regardless any life extension is a whole other permitting process and a whole other NEPA kettle of fish.

Q. Right. But you could in theory go through NEPA again with the Forest Service to expand the mine if that --

A. Theoretically.

Q. -- if that was an interest?

A. Yeah, that could happen.

Q. And if you were to do that, would you still be relying on the water right that is at issue here today?



A. Yeah. We would still have a 22,000-ton per day mill with a similar mill demand.

Q. Is there a scenario in which you would change the size of the mill in order to facilitate additional mining?

A. Well, changing the mill size wouldn't facilitate additional mining. You know, you can extend your mine life with the mill you've got. It might change the mill site, but that could happen, too. Again, with permit modifications that would entail, right, both NEPA and for cyanide permits, probably others. If you were to change the mill size theoretically we could but, again, a whole other set of permitting to do so. And if we increase the mill size we would increase the water need and, therefore, increase -- we would have to go back for water rights again. So in all likelihood we would keep what we had even if we were going to mine more.

Q. Okay. Is it possible that Perpetua would sell itself, sell its mine to a different company?

A. That's not the plan, but it's certainly possible.

Q. And is it possible that a different company could make different plans than what you have made?

A. They can make different plans, but you're selling a mine -- you're selling a permit at that point if we sell ourselves soon or if we sell ourselves later regardless, you're selling a permitted facility with a permitted mine

plan and a whole set of stipulations that come with that, along with those that come with this water right. So you're selling a set of commitments in addition to an asset. So whoever it is, is locked into the same commitments we've contemplated in our water rights conditions with Fish and Game and the same commitments we're going to see as part of our, you know, NEPA conditions that will be imposed along down the line with every other permit that has conditions.

Q. Right.

A. Those don't go survive us.

Q. Right. You would also be selling your water right?

A. Oh, yeah, real property would come along with.

Q. Exactly.

MS. ROGERSON: Okay. My apologies. I'm just going to take a moment to make sure I am tracking my outline here of questions that -- thank you, Mr. Hearing Officer. I think those are all the questions I have.

HEARING OFFICER: Okay. Thank you. Ms. Thrower, did you have some?

MS. THROWER: I did.

HEARING OFFICER: Okay.

MS. ROGERSON: Thank you, Mr. Bosley.

A. Thank you.

MS. ROGERSON: You can remove those. I will come help you.



MS. THROWER: I won't be long.

A. (Inaudible.) I don't want to tear up all these carefully assembled binders. There you go.

MS. ROGERSON: These are all yours.

A. Yeah.

CROSS-EXAMINATION

BY MS. THROWER:

Q. Okay. You're almost done.

A. Unless there is redirect.

Q. So I want to go back to some testimony that we heard yesterday and that you've testified to as well about operational flexibility. In other words, the flexibility of how much and from where the water diversions occur and how that is needed in case there's a failure in one of the mine facilities. Do you kind of remember --

A. Yes.

Q. -- talking about that? Okay, so Perpetua's operational model is to prevent operational failures, correct?

A. That's right.

Q. And that's because equipment or facility failures result in lost money, right?

A. Yeah, and, you know, after a limit could result in enviromental damage, all kinds of things that no one wants to see them happen.



Q. Right. So is it fair to say that not all operational failures would require a shutdown or require such operational flexibility in terms of diverting the amount of water for the East Fork or pumped from the ground?

A. Yeah, that's correct. I mean, there's a range of failures ranging from irritating to very severe, right. We're only talking about the middle and upper end of that range to where that puts you in a, you know, in a large diversion scenario.

Q. Right. So one of the failures that Mr. Scanlan testified to that might require a significant amount of flexibility in the amount of water diverted is if a pump failed on the reclaimed water system; is that correct?

A. That's right.

Q. And I'm not sure if I'm using the right term, but what I mean by reclaimed water system is that that is the system that delivers the reclaimed water to the portion of your mill demand?

A. Yeah, that's the system that recycles water from the tailings facility, pumps it back to the mill to be ore processed.

Q. Okay, just want to make sure we're on the same page. Thank you. Now, is it your understanding that the requested -- or the water right application 77-14378 and that's the one that requests 9.6 cfs as the diversion rate,



that that requested diversion rate is significantly higher to account for such large operational failures?

A. That is. That's about the instantaneous demand if you don't have a working reclaim system, that's what you need to send to the mill to keep the mill running.

Q. Okay. And you also testified that Perpetua, or really any mine, should have redundancy in their most critical pumps?

A. Yes, and we do.

Q. Okay. And you testified specifically that the reclaim water system has two pumps, correct?

A. That's correct.

Q. And you also stated that only one of those pumps operates at any given time?

A. That's correct.

Q. Okay. So that is the redundancy you're talking about, right, if one pump fails you can quickly switch to another pump and be essentially online instantaneously?

A. It's, again, it's hours. These are not small pieces of equipment but, yes, instantaneously from a standpoint of water diversions, right, because the time scales of those are longer.

Q. So based on the way Perpetua is designing their operations is designed redundancy in these critical pieces would you say that the likelihood of failure of this

reclaimed water system to the extent that you cannot use any of that water would need a full -- the full water right 9.6 cfs? Would you agree that is extremely low?

A. I wouldn't call it extremely low. I mean, your typical equipment availability number's 90 percent. Things break from the factory, too. Yes, they are tested before they're installed, including that standby pump, but if they're both 90 percent availability of the chances something doesn't work some day is .9 times .9, which is a small number. One minus .9 times .9. That's a small number, but it's not vanishingly small. And the consequences of such a failure where, you know, the consequence, again, we're under a low flow restriction anyway, right. You can't violate that either way. So it doesn't seem sensible to us to have, you know, a low probability but high consequence failure not mitigated by having that extra ability to pump the 9.6 when the 9.6 would never be pumped when it was a time that would actually adversely affect fish in a meaningful way because, again, we still bump up against the low flow condition 9.6 or otherwise, we hit that low flow condition if it's during low flow. If it's during spring runoff 9.6 is maybe 10 percent of the water available and would not be noticed by any (inaudible) stream.

Q. And have you done that analysis, that if you took



out 9.6 during the times when the low flow condition is not in effect, have you done that analysis that it will not impact fish habitat?

A. Well, I've not done the fish impact, fish habitat impact analysis, but if flows are acceptable for passage and protectiveness at the number, the low flow numbers, right, if 9.6 takes it all the way down to that number, then it still works.

Q. Okay. And you don't have an analysis showing that?

A. No. That's the realms of the fisheries folks.

Q. So you provided testimony that -- right when you were referring to the 9.6 cfs water right application, you provided testimony that you have no use for that amount of water; is that correct?

A. Yeah, not continuously.

Q. And you provided testimony that the East Fork, South Fork Salmon River point of diversion intake cannot even handle more than 4.5 cfs; is that correct?

A. That's right. You wouldn't get it all from there.

Q. So you also stated that Perpetua's modeling shows that they will not need to divert more than about 4.5 cfs instantaneously from that point of diversion, correct, on the East Fork, South Fork?

A. Yeah. That's during normal operations, and if we needed a full nine, we get it from a combination of that and



the supply well field and whatever active dewatering we have at the time.

Q. Okay. So could Perpetua potentially replace intake to handle more in the future should the mine operations change?

A. It could. It would be permitted just like anything else.

Q. And I believe you testified that Perpetua does not anticipate needing to divert from the East Fork, South Fork after mine year four; is that correct?

A. No, that's not correct, not -- not that it's going to zero. It's that it becomes quite infrequent. The way it works is, you know, years one through three or four diversions are frequent. I don't think they run to 4-5 all the time, but they are frequent and quasi-continuous at whatever number they are at because we're water poor at the beginning. Hangar Flats comes online. We're diverting nothing for a couple of years because Hangar Flats is significant dewatering with actually a water excess and treatment needs. When Hangar Flats goes away, then we're back to getting some out of the river but not nearly what we did in the first couple of years because by then we've got big exposed footprints, large tailings facility, and, you know, well field of course in Hangar, of course, is still there. Could be turned back on.



Q. So there are years where you anticipate not having to divert water --

A. Yeah.

Q. -- from the East Fork?

A. It will likely be zero during the pumping of Hangar Flats alluvial wells.

Q. And that's about year four, year five?

A. Yeah, four through seven, something like that.

Q. Okay.

A. It tapers. You know, the amount peaks in about four or five, and then it kind of has a taper on either end.

Q. The amount from the tanks?

A. Yeah, from the well fields.

Q. Okay. You also stated that it's your understanding that under the Department's rules you're required as an applicant to request the maximum amount possible that is needed, right, maximum amount of water diversion?

A. Yeah.

Q. You also stated that a water right can be subject to condition, correct?

A. I don't recall stating it, but my understanding is that you can and will be subject to conditions. We've already agreed to conditions with Fish and Game.

Q. So based on what you testified, that it's extremely unlikely that Perpetua need to use its full water right in

the event of a pump failure, let's say, and that it also has no use for that amount of water. Do you believe that the water right should be subject to a condition?

A. I do not. And, again, I will not concede it's extremely unlikely. It's unlikely, and, again, we also plan to use that 9.6 again subject to low flow restrictions for those first fills that I've discussed earlier.

Q. Right. Yeah, not necessarily talking about the first fills but just through the whole operation of the mine. So you don't believe there should be a condition on --

A. No. I think we've got a condition that's protective, and I'll add to it to the extent the tunnels are a concern, (inaudible) is a fixture of the tunnel design. We have the infrastructure right there at the outlet of the tunnel to do a short two-mile trap and haul if that ever becomes an issue due to a withdrawal.

Q. Right. So that would be getting fish up in trucks?

A. Yeah.

Q. And not -- and with the --

A. Which is the status quo except it's a hundred miles now and not two.

Q. Yeah, but with the condition -- with the condition that you're supposed to have -- you're say if you don't -- if you can't maintain that condition you have trap and haul?



A. We do. And, again, and I don't expect that to ever become the case, but I wanted to point out it's there. It's on the table. It's already built into the infrastructure and into the FOMP, fisheries operation (inaudible). Explained in one of these exhibits earlier.

Q. Okay.

MS. THROWER: Okay. No further questions. Thank you.

HEARING OFFICER: Okay. Thank you. Mr. Watkins, any redirect?

REDIRECT EXAMINATION

BY MR. WATKINS:

Q. Just briefly, Mr. Hearing Officer. Mr. Bosley, I'm going to start with the questions immediately asked by you -- to you by Ms. Thrower, and then I'm going to go onto Ms. Rogerson's questioning.

A. Okay.

Q. Why would pumping 9.6 not impact fish with respect to flow rates?

A. Well, to the extent passage is the question, right. We've got -- you can't do 9.6 when you're in the water right down to a certain point because of the water rights conditions, right. Those are protective. If you're protective down at 6.6 in the river remaining in, right, any number that doesn't drop it down below 6.6 is fine for passage. And we've deliberately put that offtake point



right there at the tunnel so if we do have to go take that much or whatever amount, right -- four and a half, again, is the design flow of the pump system there. So even if you take the whole amount the thing is capable of pumping down to whatever -- down -- we can only take down 6.6. If that's good at 6.6, then how is it not better for every other higher flow for what you're taking a proportionally less amount of the water.

Q. So it would be fair to say that at the times where you would be allowed to take 9.6, based off of flow of the river, it would have less impact on the river because there's more water running down the river?

A. Yeah.

Q. And that's a feature that's built into the application?

A. Yeah, built in partly because of the position that intake is we avoid taking most of that water from higher reaches that would have those impacts last from wherever they happen all the way down through the end. We've moved that point of impact as far down as we physically can.

Q. So what would you say to the concern that Perpetua's going to pool out 9.6 in such a way that it will lower the river to a level that would be unacceptable for fish?

A. I say, again, it's infrequent and even less likely



to happen during times when it would be critical for fish. Our fisheries folks can add more color to that, I'm sure.

Q. You talked about needing that operational flexibility of 9.6 in case there's a failure so (inaudible), things like that. Is 9.6 requested just to deal with operational failures?

A. Yeah, for the most part. I mean, we need it -- we need some higher number than four and a half to do those first fills, but mostly it is about that.

Q. And those first fills are necessary to operate the plant?

A. Yeah. We have to have the start-up water, yeah. We absolutely have to have the first fills.

Q. And would you be able to do the first fills as required without that 9.6?

A. It would take longer. Could take a lot longer depending on when, right. You know, because the thing 9.6 lets us do is catch up in those high flow months if you're locked down in a restriction for low flow. Remember low flow is the majority of months of the year. You're locked down in a restriction on low flow and your high flow number is itself also capped at some arbitrary cutoff below 9.6, well, how do you ever catch up. You could be looking at a significant delay in startup to not be able to fill up those first fills, you know.

Q. So the 9.6 is necessary for startup?

A. Yeah. We need it for startup and then, again, we need it for flexibility in operations. And then once you're off and running, again it's infrequent, it's not exceedingly unlikely or possible to need it, but you need it infrequently and for relatively short durations.

Q. You mentioned to Ms. Rogerson that there's going to be section 7 consultation and potential for design changes to the process described for the fish tunnel.

A. Yeah, for the tunnel, yeah, not so much the process plan.

Q. But definitely the fish tunnel.

A. Oh, yeah, the tunnel has got to go through -- and, again, it's still pending NEPA. We still have more mitigation measures potentially coming at us from NEPA.

Q. High level and in a general sense can you generally describe that process, that section 7 consultation, how it applies to the fish tunnel?

A. Okay. So it applies actually to the whole project, not just the fish tunnel, but the Forest Service writes a biological assessment that was recently, you know, declared, whatever, incomplete (inaudible) the surfaces. So the biological assessment goes to the relevant services and, right, I told you before, NMFS is for the anadromous fish. Fish and Wildlife is for the Bull Trout, as well as some



terrestrial species that aren't really relevant here. So it goes to the services. They produce a biological opinion based on the biological assessment, and that is where they say, this project will likely adversely affect the species, will not affect, right. They make their affects call is will the project affect it badly, daily, whatever. And, you know, they may attach conditions to approval of the project under that -- they're called reasonable and prudent measures, I believe. So they could attach additional conditions in there as reasonable prudent measures, and those could be related to water withdrawals. They could be related to water quality and management on -- I don't know what's coming our way in Section 7, but they have pretty broad authority where there's a tie to those specific species that are in their purview.

Q. Based on your expertise in this area and your decades of experience, do you anticipate to the extent that NMFS issues any conditions or guidance with respect to the fish tunnel, that those guidance or conditions will make it harder, more difficult for fish to pass through the tunnel?

A. I can't imagine so. They wouldn't be doing their jobs if that were the case.

Q. Anything that NMFS is going to issue would simply make the fish tunnel better than it already is?

A. Yeah. It would make it more protective. Whether



that's making it easier to pass, whether it's making it physically safer. I can expect a condition, and not one we object to, but I expect to see a condition that says use rounded edges on the concrete weirs. We are going to do that anyway, but it's not in the drawings yet because they're 30 percent drawings. We'll see things like that. We may see things related to water. I just don't know.

Q. Will ramping up the mill after running at less than capacity to meet a low flow condition take more water than the site-wide water balance requires?

A. No. Ramp up -- we'll ramp up -- if you accelerate, right, if you have to make up, then, yeah, but it will be done during high flow where it's proportionally less and on an annual basis it will balance out.

Q. Be another example of that 9.6 --

A. Yeah.

Q. -- but done at a high flow scenario?

A. Yeah. No, it's not going to 9.6. If you had a -- if you had a -- it wouldn't go all the way up to there, right. So we have a number that, I want to say maybe it's four-ish. Four is your more typical number, and say you got cut, you could take four in low flow. Say you were down to three. Well, if you compensate for the same number of months, well it's going to be five. It's not going to be 9.6. You're not going to make it all up in one month



cranking at 9.6. It will be -- take a block of months, smooth it over those block of months. So that may not make it ever up to 9.6. And if it did, again, it would -- that would only ever be done during high flow, a low proportion of stream flow.

Q. Going back to the fish tunnel briefly. Regardless of what conditions NMFS puts on the fish tunnel ultimately will be the decision -- will it be the decision of NMFS that approves or blesses the fish tunnel?

A. Pretty much. Forest Service gets their say, right. They also have to approve on the record a decision but hard to imagine there would be a record decision (inaudible) conflict.

Q. Are there any other Idaho state agencies besides the Forest Service or NMFS -- which I understand not (inaudible) agency, that would approve or has authority to approve creation less the fish tunnel?

A. Not that I'm aware of. Fish and Game has had their say and, you know, we expect to continue talking to them, too, to do the best job we can here. But, yeah, that's about it. Other, outside of just general construction type things, right, it's like everything, there's a construction stormwater component to it when we build it, but I don't think that's what you're looking for.

Q. There was a lengthy bit of questioning about what

was called NMFS criteria or what NMFS requires in terms of minimum flow rates and passage through the tunnel. You generally remember those questions?

A. I do, yeah.

Q. Tell me, is the NMFS criteria so-called based on minimum flow or some other factors?

A. The criteria apply at the design flows, right. So the NMFS criteria applies at the 5th and 95th percent exceedance flow and really all flows in between, but there's little point of evaluating them in between. You evaluate the ends. One for depth. One for velocity in general. So that's where they apply at, not at a particular flow. Again, NMFS doesn't tell us it's eight. They provide a set of guidelines for how one determines the design flows, and then one applies their criteria, their guidelines, at the design flows.

Q. Now you say criteria. Then you also say guidelines. Are they criteria or --

A. They tend to treat them as guides, but it's criteria even though the cover of the report says guidelines.

Q. Let's go to Exhibit 246.

A. I gave up all my exhibits, I believe.

Q. We are getting them for you.

A. If I still have it. I do not. Oh, there we go.



Q. Is 246 those guidelines that you were just --

A. Yeah, those are the updated ones which we intend to adopt but, you know, predate some of the work we did.

Q. And these are the --

A. Some of the work we did.

Q. Would these guidelines dictate or, quote, unquote, require a certain cfs through a fish passage or --

A. They'll probably say what you need for velocities or depths. Again, they're not going to say thou shall not have fishways below certain cfs. That's not how it works. They'll tell you how to come up with how many cfs based on your hydrology, and they'll tell you, you know, what are your depth velocity criteria. And, again, this one used to be called guidelines, and now they changed it. Now it's a design manual, so there you go.

Q. Are you familiar with this document?

A. I'm more familiar with the older one, the 2011.

Q. But have you reviewed this document or seen it before?

A. No, I haven't cracked it open. You know, I just told the consultants, hey, it's out there. It's now adopted.

Q. As far as you're aware, do your consultants utilize this document or do you anticipate --

A. Oh, yeah. No, I've told them, we are using the new



one at the -- going forward.

MR. WATKINS: Move to admit Exhibit 246.

A. Yeah, to the point of, you know, the question of will we redesign. Yeah, again, we will under whatever criteria we end up with. But there's no point in doing a bunch of reanalysis redesign now when it's all about to change yet again once we get through the Section 7.

HEARING OFFICER: From the Protestants there's been a motion to admit Exhibit 246 into the administrative record. This is NOAA fisheries design manual.

MS. THROWER: No objection.

HEARING OFFICER: I'm not going to let it in, so I don't see the value of it for what I need to decide. Information already contained in the record is sufficient. So I will exclude Exhibit 246.

MR. WATKINS: For demonstrative purposes could we show the witness page 17?

HEARING OFFICER: That's fine.

MR. WATKINS: Exhibit 246.

HEARING OFFICER: Go ahead.

A. 17?

Q (By Mr. Watkins) And we are looking at the second paragraph down, as well as the first sentence of the third paragraph. Do you remember Ms. Rogerson questioning you about the criteria and whether or not



you were meeting the design criteria that was required by NMFS? You generally remember those questions?

A. I recall.

Q. I'm going to read from those so-called design criteria and ask you to follow along. It says, quote: This document is intended to provide internal assistance to NMFS biologists in designing effective fish passage, encourage consistency across the WCR region, while supporting the implementation of NMFS statutory authorities relating to the conservation and protection of marine resources and provide technical assistance to project to project proponents. The efficacy of any fish passage structure, device, facility, operation, or measure is highly dependent on local hydrology, target species, and life stage (inaudible) orientation relative to the stream facility operation and many other site specific considerations. While the information provided herein will apply to many structures, it should be regarded as general guidance for the design, operation, and maintenance of fishways throughout WCR. The criteria described in this document are not universally applicable and should not replace site specific recommendations. Did I read that correctly?

A. Yes, you did.

Q. In coming up with the design and the flow rates of the fish passage, did you make sure that you and your

consultants were following site specific recommendations that is unique to your site as opposed to some other site?

A. I would say all four of those -- those appendices or attachments that Mark Miller's, Rio's, McMillen's, all constitute site specific approaches.

Q. You remember there was a number of questions concerning what various California recommendations were with respect to projects and flow rates?

A. Yeah.

MR. WATKINS: Can we show the witness Exhibit 249, which has been previously admitted?

A. Which one is that? 249?

Q. (By Mr. Watkins) 249, and we are looking at page 18.

A. C-18?

Q. Page 18 of Exhibit 249.

A. Yeah. She handed me one that has C in front of the page numbers. That's why I was asking. Population totals? Yeah, that's it.

Q. C-18, excuse me.

A. Yeah, I'm there. I had it.

Q. It's my bad.

FEMALE SPEAKER: I don't have this exhibit (inaudible).

HEARING OFFICER: Mr. Watkins, I don't have a 249 in



the record yet.

MR. WATKINS: My apologies, Your Honor. My dyslexia is kicking in. It's 246, not 249. My apologies.

HEARING OFFICER: Wait, that's where we just were.

FEMALE SPEAKER: That's where we just were.

MR. WATKINS: I thought the witness had 249 in front of him.

HEARING OFFICER: The NOAA design manual was 246.

MR. WATKINS: Was 246. Correct, 246.

HEARING OFFICER: Okay.

A. So we want the design manual back?

Q (By Mr. Watkins) Correct.

A. 249 is some appendix, something about population totals.

Q (By Mr. Watkins) Okay. That NOAA design manual about how the criteria are recommendations, not requirements. There's a chart there that's being blown up on the screen. Do you see that?

HEARING OFFICER: Page 16.

Q (By Mr. Watkins) 18 of the pdf, 16 of the document.

HEARING OFFICER: Thank you.

A. I have it here.

Q (By Mr. Watkins) It says: NOAA fisheries WCR guidance to improve the resilience of fish



passageways facilities to climate change. Do you see that?

A. Yes.

Q. And then it asks the question, project in California, yes, or project in California, no. Do you see that?

A. I do.

Q. And if it's in California there's various California interim guidance that applies. Do you see that?

A. Yes.

Q. And if you're in Washington, Oregon, or Idaho there's different guidance that applies, correct?

A. I see that there. Yeah.

Q. Stibnite Gold Project is in Idaho, correct?

A. Last time I checked.

Q. Okay.

MR. WATKINS: Can we show the exhibit -- the witness Exhibit 219, please?

A. I have it here.

Q. (By Mr. Watkins) Do you remember some conversation with the questioner about the amount of water going over the weir, whether it was a foot or .9 of a foot?

A. I recall that.

Q. Can you go to the last paragraph on the second page, please -- second to last paragraph, please.



A. Of the second page, second to last?

Q. Page 219 of the second to last paragraph.

A. Oh, on page 1? I have bates numbers and no page numbers. Oh, here we have it.

Q. We are in page 9.

A. Page 9, okay. (Inaudible) page numbers on the subsequent. Here, got it.

Q. Here Perpetua's representing that, quote: Low flow simulations targeted maintaining approximately one foot of depth over the weir. Do you see that?

A. Uh-huh (affirmative).

Q. In your professional opinion is .9 approximately one foot depth over the weir?

A. It is.

MR. WATKINS: Can we show the witness Exhibit 206, please?

A. Okay, I have it.

Q. (By Mr. Watkins) And we are looking at the first bullet point on page 1.

A. I see it there.

Q. The first bullet point on page 1, which you were questioned about, it says: Surface water diversion and infrastructure will not at any time impede the passage of any life stage of Chinook Salmon, Steelhead, Bull Trout, or Cutthroat Trout from the confluence of the East Fork, South

Fork Salmon River and Sugar Creek upstream passed the point of diversion. Did I read that correctly?

A. Yes, you did.

Q. And I think that you agreed that that meant volitional passage, meaning fish moving on their own will, correct?

A. Yes, of course.

Q. Would there be any volitional passage passed the Yellow Pine Pit without creation of the tunnel?

A. No.

Q. Do you -- I think you alluded to this, but you said currently there are trap and haul procedures going on because there is no volitional passage?

A. That's correct.

Q. And that's a distance of some 100 miles?

A. Yeah, I believe they were originate in traps down on the South Fork somewhere and are brought up to -- they're excess fish from the hatchery program, they are brought up and placed on-site.

Q. Do you have any idea why someone would prefer or favor trap and haul, moving fish in a truck, versus putting it in a fish tunnel which would allow them to move volitionally, which Exhibit 206 calls for?

A. Yeah, I don't think anyone would favor it as a longterm solution. To seed an area, sure, but as a longterm



sustainable solution, I don't imagine why it would be favored over volitional passage. I believe it's official policy to favor volitional passage among NMFS and other agencies.

Q. Over trap and haul scenario?

A. Oh, yeah.

Q. Who is it that's currently doing the trapping and hauling of those 100 miles?

A. I believe it's the Nez Perce Tribe, I believe in cooperation with Fish and Game.

Q. And do you know how many tribal employees, how many tribal members are employed to drive those trucks and facilitate that trap and haul process?

A. I don't know. I mean, I've seen it occur at site and maybe 10 folks were there. I didn't count, but I don't know how many are involved in the whole program. I have no idea.

Q. Do you know if those tribal jobs would go away if the fish tunnel opened up such that the fish couldn't move volitionally rather than needing to be trucked?

A. Perhaps. Again, if you might start it to seed it but once you've got a sustainable population, you don't need a trap and haul program anymore.

MR. WATKINS: No further questions.

MS. ROGERSON: I think we'd like to cross on redirect



if that's all right.

HEARING OFFICER: Sure.

RECROSS-EXAMINATION

BY MS. ROGERSON:

Q. Mr. Bosley, I didn't think I'd be back.

A. Oh, I figured you would be.

Q. I think you testified just then on redirect after cross that NOAA or NMFS, excuse me, I know we're referring to NOAA fisheries as NMFS in this proceeding. NMFS has --

A. They do prefer NOAA fisheries, if I recall.

Q. -- given you some feedback on informal consultation under the Endangered Species Act. Would you remind (inaudible) that testimony for me?

A. Oh, about feedback in informal?

Q. Yeah.

A. Well, I know one thing they commented on back in informal is what I think you're referring to, is about rounding the concrete at the weirs, expecting condition to come out in writing. We know we're going to do it. It's just that they are looking at a 30 percent design set and you don't (inaudible) concrete edges at 30 percent design, right. So we expect little things like that. The other thing I recall from consultation, which I haven't yet testified over, is -- well, I did testify what they asked for. They asked for additional flow range model and



additional outputs and additional locations and additional summary table formats. So they just -- we had in the initial work, which you have here as an exhibit, we had like 8 cfs and 54 cfs and kind of a point at the weir, which is the critical section, which is where the velocities are high. And they wanted just a fisheye view of weir pull, weir pull, transition, weir pull up through the system with the velocity and depth reported at various points up through the system and adding broader range of flows than we had previously reported. And we prepared that. That's in the FOMP, that being the Fisheries Operation and Maintenance Plan.

Q. Okay, that's helpful. Sorry, can you explain the range that they're asking for additional flow modeling for like geographically?

A. Oh, no, no. It was additional numbers of cfs, so we had 8 cfs. We had 54 cfs, and we had 720, which is the 500-year flow, and they wanted us to infill some additional flow rates. And I think we took it up to the Steelhead flows, maybe, up to 121 or something like that and that was just -- that was the other supplemental modeling I referenced in earlier testimony.

Q. Okay.

A. Not the latest greatest from McMillen 2023. This was probably 2020.

Q. Right.
A. I don't think was admitted.
Q. So they're asking for additional flow rates within the model you already completed for the proposed mine site; is that a fair recitation?
A. Yeah, yeah.
Q. Okay. Great.
A. They're just looking for more hydraulic output details.
Q. Right. And is it fair to say that they declined to enter formal consultation with you until they have received that additional information?
A. No. This was a couple years ago. Formal consultation is triggered upon receipt and acceptance of the BA, which that was a recent development there. The BA was set back for incompleteness a month ago, maybe.
Q. Okay. Can you explain why the BA was sent back for incompleteness a month ago?
A. Well, there's a large letter of, you know, your typical reasons for incompleteness that kind of happen every time you send a permit in. We went three rounds on the (inaudible) permit, and this is round one of, I hope, one on the BA. But it was a long list. I don't recall all the details there.
Q. Okay.



A. That's mostly been our permitting team running through those.
Q. I have seen the letter, and I believe one of the reasons was lack of information with regard to water management but --
A. And a lot of those -- I'll note that a lot of the requested information exists but was not put in the BA, right. So there's lots of information in NEPA world that they're asking to be restated or included that didn't make it in, so that's a lot of that list.
Q. Okay. Could we pull up Exhibit 206 again and walk back through that OSC IDF&G letter? Can you go back up to the letter? This looks like an application. I think -- yeah, there we go. Awesome. Thank you. So could you just scroll down so we can look at the language down towards the bottom there above those bullets? Okay. So as I read this letter: Perpetua Resources requested that OSC and IDF&G (inaudible) 27 June 2022 technical memo that we discussed earlier on cross describing fishery and aquatic habitat protection measures for the East Fork, South Fork Salmon River and the Stibnite Gold Project's water right application 77-14378. OSC and IDF&G have determined that Perpetua's proposed measures will likely protect fisheries and aquatic habitat in the East Fork, South Fork Salmon River in addition to measures and draft water right



conditions outlined in Perpetua's technical memo, OSC and IDF&G recommend, this is in addition to, they recommend that the Idaho Department of Water Resources consider developing water right conditions for this permit that would insure fish passage at the project, and then they provide the following examples. So is it your understanding that those bullets do not reflect your current proposed condition but rather reflect examples for additional condition metrics?
A. Yeah, well, the first one is potential example. The second one is already planned anyway. That's -- I don't know the need to put the second one in. Water rights condition, we plan on it. Have already said we're going to have NMFS compliant fish screens.
Q. Okay. But the first bullet then reads: Surface water diversions and infrastructure will not at any time impede the passage of any life stage of Chinook Salmon, Steelhead, Bull Trout, or Cutthroat Trout from the confluence of the East Fork, South Fork Salmon River and Sugar Creek upstream passed the point of diversion. That is an additional recommendation from IDF&G in addition to their assessment of your proposed condition.
A. And is one to consider, yeah, it would seem so.
Q. All right. Thank you. Mr. Watkins asked you on redirect about Nez Perce Tribal jobs and whether -- if there were to be volitional passage at the site, whether the Tribe



would lose jobs because they wouldn't have folks driving fish around the fish passage barrier. Do you remember that question?
A. Yeah.
Q. Are you aware that the Tribe attempted to fix the fish passage barrier around the time that Midas Gold obtained a patent for the Yellow Pine Pit?
A. I thought there was something that NMFS might have had conceived of. I know there was some history there. I don't know any the details.
Q. Okay. The Nez Perce Tribe obtained money and had plans to fix the fish passage.
MR. WATKINS: Objection. Counsel is testifying.
HEARING OFFICER: Sustained.
MS. ROGERSON: Thank you.

REDIRECT EXAMINATION

BY MR. WATKINS:

Q. Just briefly. The BA was not accepted by NMFS, is that right, because it was incomplete?
A. Yeah.
Q. To be clear, it was deemed incomplete because the United States Forest Service, the lead agency, did not give sufficient information for NMFS to engage in the analysis; is that correct?
A. That was the general thrust, yeah, and it is the

Forest Service's BA is not our BA.

Q. It's a Forest Service issue, not a Perpetua issue, as to why it was deemed incomplete?

A. Yeah.

MR. WATKINS: Thank you. That's all the questions I have.

HEARING OFFICER: Okay. Thank you, Mr. Bosley. See, I just -- I just get into the groove, and I don't take breaks.

MR. WATKINS: Get going.

HEARING OFFICER: Knock out four hours just like that. I apologize everybody. That did go on a little bit long. We're going to go off record.

(Recess.)

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BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF APPLICATIONS FOR PERMIT 77-14377, 77-14378, 77-14379, APPLICATIONS FOR TRANSFER 85396, 85397, 85398, AND 85399, AND APPLICATION FOR EXCHANGE 85538 IN THE NAME OF PERPETUA RESOURCES OF IDAHO, INC.,

TRANSCRIPT OF THE HEARING
HELD ON THE 13TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 14TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 15TH DAY OF DECEMBER, 2023

BEFORE: MR. JAMES CEFALO, HEARING OFFICER

TRANSCRIBED BY: KEITH EVANS, RPR, WA & ID CSR NO. 655



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BE IT REMEMBERED that the above-entitled matter came on for hearing December 13, 2023, at the Idaho Department of Water Resources, City of Boise, County of Ada, State of Idaho.

(Thereupon the following oral proceedings were had as follows, to-wit:)

HEARING OFFICER: Okay. Good morning. Welcome. Wednesday, December 13th, third day of the hearing in the morning getting started. And, Mr. Watkins, are you going to lead off with this witness?

MR. WATKINS: I am.

HEARING OFFICER: Okay.

MR. WATKINS: Perpetua would call Doug Durbin.

HEARING OFFICER: Okay. So, Mr. Durbin -- there he is. Okay -- is participating via videoconference.

DOUG DURBIN

after having been first duly sworn,

was examined and testified as follows:

MR. DURBIN: I do.

HEARING OFFICER: Right. Okay, we can see you right from where we're at. So go ahead, Mr. Watkins.

DIRECT EXAMINATION

BY MR. WATKINS:

Q. Mr. Durbin, good morning.

A. Good morning.

Q. Where are you calling in from?
A. I'm in Raleigh, North Carolina.
Q. Could you please state and spell your name for the record?
A. Yes. My name is Douglas Durbin, D-u-r-b-i-n.
Q. And, Mr. Durbin, what is it that you do for a living?
A. I'm an environmental consultant with Brown and Caldwell.
Q. And how long have you been in that role?
A. It will be seven years with this company in December.
Q. Can you briefly describe your educational background that would qualify you for this role?
A. Sure. A Bachelor's Degree in biology and a Master's degree in biology and a Doctorate in zoology where the emphasis was on aquatic ecology and water resources.
Q. Can you walk us through your work history, please?
A. Sure. After I got my Doctorate I was employed by an environmental consulting firm in Florida. Was with that firm for about 15 years. Then went to another firm for about five years. Another firm after that for about five years, and then Brown and Caldwell for a little more than -- for almost seven years. So for a total of 31 years. Some of them with rounding, so they might not add up, but 31



years of environmental consulting as of this past November.
Q. Throughout your career have you worked on other projects or job sites that are similar or have any sort of relation to what you're doing right now with Perpetua?
A. Yes, I have.
Q. Any examples?
A. Well, I worked on other mining projects in Idaho in recent years. I've also worked on mining projects in North Carolina. I've worked on many projects during my 20 years that I lived in Florida that included phosphate mining, sand mining, blackrock mining. So mining (inaudible) has been a big part of my entire consulting career.
Q. And that consulting career you were in with mines, is it fair to say that you're dealing with mines and how they interact with the local stream or water table in ecology?
A. Yes, because my educational background is in water resources, primarily most of the work that I do have as a consultant has to do with water resources, and that includes both the biological side, the organisms, plants, animals, and so forth and also the water quality temporal side.
Q. Did you prepare an expert report as part of your work on this project?
A. I did.
MR. WATKINS: I'm going to ask that the witness be



shown Exhibit 58.
A. Change my layout here so I can see it. Is somebody going to be on the screen?
Q. It should be here momentarily.
A. Okay. Okay, I can see it. Well, I can see a list of files.
Q. If we could just slowly scroll through the report. I just want you to confirm if this is the report that you referenced that you prepared in connection with this matter. Is this your report, sir?
A. Yes, that is it.
MR. WATKINS: Move to admit Exhibit 58.
HEARING OFFICER: Any objections? Hearing no objections, Exhibit 58 is admitted.
Q (By Mr. Watkins) Could we go to page 2 of the report? Mr. Durbin, what can you tell us or what do you know about the water quality at the Stibnite Gold Project?
A. We actually know a lot about it, and this as you can see is a very brief report, so I was compressing a wealth of information on site water quality into a pretty small space. And there are other documents referenced in this report that provide much more detail, but in a nutshell, there has been some pretty intensive water quality data collection that's gone on at the Stibnite Gold Project



site since at least 2012 that included monthly sampling for the first several years of that, which is a really intensive water quality monitoring program. Many times you see samples are collected twice a year, maybe quarterly, but monthly sampling is a real luxury. So it's been good to have that data. In addition, for many, many parameters that were collected, oftentimes again water quality sampling is done, you might see 8 or 12 parameters collected. Here for all of that sampling period something like 75 different parameters were evaluated on a monthly basis, and then also there was a really large number of sampling locations or monitoring stations. I believe it was more than 50 different surface water locations where samples were collected on that very frequent basis. So we ended up having tens of thousands of data points from basically every corner of this project site that we can use to look at, not just sort of the average water quality, but we can look at patterns on a predefined scale within the site itself.
Q. So tens of thousands of data points over how long of a period of time were these intensive sampling being taken?
A. The intensive sampling, as I recall, began 2012. Went through 2016. So that would be five years, and then since 2016 I believe the schedule was relaxed back to a quarterly pattern. So in the past six or seven years

there's still been additional data collected and that monitoring goes on today.

Q. So intensive data collection, tens of thousands of data points over a decade or so of time; is that fair?

A. That's right.

Q. Based on all that sampling and all that data, what can you tell me about the current conditions of the water at the Stibnite Gold Project?

A. Well, it's sort of a two-faceted conclusion. For all of those parameters where we have all that information, or I should say for the large majority of them, we find concentrations that are in line both with typical concentrations across the country, across Idaho, and also that are generally in compliance with Idaho's surface water quality criteria. So that means that they would be meeting the expected levels for those various things and on point on it I'm really talking about things like metals, many different metals have been sampled. Also other anions have been sampled. So sort of the mineral constituents of the water, as well as some other things like nutrients and various field components like dissolved oxygen, temperature, pond activity, turbidity. So for most of those things the water quality is in pretty good shape. The other facet is that for a small number of components there are levels found at various points in the site that exceed Idaho's water



quality criteria. And the three accountable constituents that come out that way are arsenic and antimony and mercury. And, again, not everywhere on the site but only at certain locations in the site do we find those elevated levels, and then in addition and more recently, there has been an identification of having temperature levels in the streams that exceed some of the Idaho surface water criteria.

Q. Focusing on the temper -- excuse me, the temperature component, is that temperature exceedance unique to the Stibnite Gold Project or is that an issue throughout Idaho?

A. No, it's actually an issue that has sort of recently come to light. The State is required to publish a report every couple of years summarizing water quality. It's a Clean Water Act requirement, and in the most recent version of that that was finalized in 2022, Idaho added, I think the number was, something like 5700 miles of streams in Idaho that are not meeting the temperature criteria of the state. So that's a really big number. We think about almost 6,000 miles of streams across pretty much the whole state.

Q. Do we know what causes that temperature exceedance?

A. For the most part it's the fact that streams don't have enough shade, but the main way that streams -- the water in the stream warms up is by being exposed to



sunlight, and as you might imagine just like a bus, if you are in the shade you feel a lot cooler when the sun is shining and if you have a stream where riparian canopies we call it, the trees are gone either because of removal for land development or agricultural uses or whatever or because of some of the wildfires that have occurred in recent decades, that lack of tree cover has an important fact on stream temperature.

Q. In addition to your monitoring and reviewing of this dataset, are you familiar with any of the steps that Perpetua has or is taking or will take to address some of these concerns that you've identified?

A. Yes.

Q. Do you know what, if anything, Perpetua is or is going to do with respect to temperature?

A. Well, Perpetua is already looking at means dirty mining and after mining of providing that shade as one component in looking at ways that they can either divert some water around mining activities and some of that water diversion would be enclosed pipes which provides a lot of shade, as you might imagine, so that's a way to keep the water cool as it's being diverted around some of the mining activities to move it on downstream. As part of the mine reclamation restoration there's a real focus on that riparian canopy that I mentioned, getting more trees planted



in the area adjacent to streams to grow that canopy over the tops of streams, increase that shade, increase the ability to prevent sunlight from hitting that water. And even some more engineering-based approaches like, for example, part of the site that we call the Yellow Pine Pit is currently occupied by a lake that was left over from former mining. In the analyses that were done with respect to temperature was identified that the Yellow Pine Pit actually provides a cooling mechanism that prevents the water from warming up as much as it moves on downstream so the reclamation of that Yellow Pine Pit area after it was going to be some more mining includes basically replacing a pool-like or a lake-like segment of that stream, so you mimic the same kind of temperature moderating effect we get today from the Yellow Pine Pit.

Q. With respect to arsenic, antimony, and mercury at the high level, what, if anything, is Perpetua doing or going to do to reduce those levels?

A. Well, Perpetua already has activities that have begun on the site as part of an agreement with, I believe it's with EPA and U.S. Forest Service. The abbreviation is ASAOC. I probably couldn't remember what all those initials stand for, but under that agreement there's already earth moving going on. I was actually on the site in October and saw that they had moved a lot of material that is going to

prevent water from picking up the arsenic, antimony, potentially mercury, and conveying it into some of the streams on the site. So that's an activity that's already underway. And then there are some even larger earthmoving and other types of engineering solutions as a part of the mining program that will move legacy waste material from previous mining out of the way or off of areas that it could contribute to surface waters. So basically picking up material that is a known source of some of the metals and putting it into places where it has little or no opportunity to contribute those metals into surface waters during the mining process and then after mining as well.

Q. Could we go to page 4, please? Mr. Durbin, do you know what the site-wide water chemistry modeling report is?

A. Yes, I do.

Q. What is the site-wide water chemistry modeling report?

A. This report was put together by one of the consulting team members for Perpetua, and it is a very long and detailed report that looks at the existing data, and not just data on water quality but also data on geological properties of the composition of the rocks and soils of the site, and used analytical approaches, including some really complex modeling, to identify the behavior of some of these metals, like arsenic, antimony, mercury, along with some



others to allow that to be predictive of what the anticipated changes would be as part of the proposed mining and reclamation process.

Q. Have you reviewed the site-wide water chemistry modeling report?

A. I have. There are actually several different versions of it because it was updated a couple of times as the site plans were improved and agency and public reviews went on. So I recall reviewing at least three, maybe four different iterations of that report, including the final that is part of the package today.

Q. Based on your review of that dataset and the modeling contained in the report and your expert experience in this field, are you comfortable and confident that the SGP project will result in water improvement quality with respect to those metals that you identified?

A. Yes, yes. And I would say that it's based certainly on the analytical and modeling results of the report, but also there's just sort of a logical inference that you can make. If you know landscape that has a lot of remaining legacy materials and you know from actual measurements of those pieces of rock or that soil, that waste material, if you know that it contains these heavy metals, then logically it's easy to infer that if you move those to a place where they can't contribute and can't be



touched by rainfall or snowmelt or whatever, then just logically, even without a model, you can say that's going to have to make a big difference. So as an aquatic ecologist and a watershed analyst, I say that looks like it could really work and to me the site-wide water chemistry model allows us to quantify the actual effects that could be seen.

Q. So logically if that stuff is touching the water and you remove the bad stuff, that would clean up the water and we have modeling to prove that; is that fair?

A. That's fair.

Q. In terms of temperature, have you ever heard of a document called the stream and pit lake network temperature report?

A. Yes, I have.

Q. And what is that?

A. Sorry. It's an analysis that was focused in not on the chemical constituents that we've been talking about, but really focusing just on the temperature facet. And that was done, in particular, because there has been concern over the potential effects both existing in the future on the temperature of these streams with respect to some of the (inaudible) species that have these streams and some of those are listed species. Others are not. But the (inaudible) model was the mechanism that actually involved a couple of different models that was the mechanism for



looking at the attainment or ability to attain state water quality criteria associated with temperature.

Q. So that model is data that tracks the temperature in the East Fork, South Fork of the Salmon River around the mine site?

A. Yes. That's right. There and other streams and other water bodies as well, yes.

Q. Based on your review of the stream and pit lake network temperature report, are you confident that temperature quality improvements will occur at the site?

A. Yes. As with the site-wide water chemistry model there were several different versions of the splint model and (inaudible) report based on agency coordination and public input and improvements to the mine plan. So the splint model actually was refined over a few years so that the current version predicts based on the current and proposed activities, predicts the way that stream impacts can be avoided and minimized.

Q. Now, there are some legacy issues from previous mining activities at the mine, which have in some ways contributed to these metals and these temperature changes that you've been discussing; is that fair?

A. Yes, that's right.

Q. What assurances does the public have that Perpetua won't just do the same thing and once they get the ores that

they want, cut bate and not improve the water quality or the temperature quality in the area?

A. Well, a lot of the work that I've done and my colleagues and other consulting members of the project team are to satisfy regulatory concerns, as well as U.S. Forest Service concerns as the host entity, if you will, on some of this project. And so in doing that we know that there are documents that are already in existence or will be in existence that have very specific and legally enforceable provisions. We call them things like permit conditions. That would essentially mandate that in order to complete the project that these improvement mechanisms or improvement processes need to be in place.

Q. So just in a modern regulatory scheme, Perpetua will be required by law to improve the water quality at the SGP?

A. That's how they are pretty much would be issued, yes.

Q. In your professional opinion, Mr. Durbin, what effect will Perpetua have on the Stibnite Gold Project and water quality in that area?

A. With respect to only water quality, without even thinking about the habitat effects, this is a project that has the ability to take a site that has had, I would say, a series of insults environmentally, legacy materials, things



done before there was technology or even awareness of water quality concerns and impacts, and this project brings a state-of-the-art approach to managing water, to containing water, controlling water, keeping clean water separate from water that is contacting some of the mine materials, so keep clean water clean, and then putting all of that into a plan that, along with the ASAOC that's already improving water quality, it provides the ability for this project to, in a very predictable way, end up with a better water quality situation after mining than we have today.

MR. WATKINS: Thank you, Mr. Durbin. That's all the questions I have.

HEARING OFFICER: Okay. Mr. Durbin, we will -- you will now stand for cross-examination from the Protestants. I don't know who wants to go first or ask questions. Ms. Thrower, go ahead.

MS. THROWER: Thank you, Mr. Hearing Officer.

CROSS-EXAMINATION

BY MS. THROWER:

Q. Okay. Good morning, Mr. Durbin. Can you hear me okay?

A. I can. Good morning.

Q. Great. So I'd like to discuss with you Exhibit No. 58, which has been admitted into the record. This is the technical memorandum summary of water quality conditions



associated with the Stibnite Gold Project. Can you let me know you have that in front of you? I guess it is if you're looking at the screen, right?

A. Yes, I think so.

Q. Okay.

A. Yes.

Q. Is it true that you were a coauthor of this report?

A. That's right.

Q. Do you feel qualified to speak to the entirety of this report?

A. Yes. Although, I was assisted by a colleague of mine in some of the content, but I reviewed the entire report and was aware of the information going into it before we created it.

Q. And you can see -- you feel qualified to speak to all that information that was in there?

A. Yes.

Q. Okay. So you testified that a lot of data has been collected since 2012 to evaluate water conditions at the Stibnite site; is that correct?

A. Yes.

Q. What entities collected that data?

A. As I understand it, it began before I became involved in the project, but it's been done by several different consulting firms. My understanding is that there



were even some of the Perpetua Resources staff that were involved. So I don't have a list of specific names, but I'm aware that at least a few firms and therefore several individuals conducted the sampling.

Q. Okay. Thank you. Excuse me, Mr. Durbin, did you evaluate any of the data collected by the public entities?

A. You have to be more specific. I reviewed data that was collected by others besides Midas Gold or Perpetua. For example, I know there have been U.S.G.S. sampling efforts. I believe EPA. I know the Idaho DEQ has collected samples. So I've looked at that information, but I don't know if you have other specific entities in mind.

Q. So you said U.S.G.S. and the State of Idaho, is that correct, as the public entities?

A. And EPA as far as I know, yes.

Q. Okay. Thank you. What data did you use to analyze -- to determine the pollutant concentrations?

A. For that work we relied -- as I recall we relied entirely on the date that were collected by Midas Gold and Perpetua Resources.

Q. Okay. So you didn't use any of the public -- the data from public entities, then?

A. Well, let me rephrase that. The work that we did as part of our permitting efforts largely relied on -- or almost entirely relied on the data collected by Perpetua.

We did review in detail information collected by, for example, U.S.G.S. on temperature and on metals and so forth, and obviously there was some DEQ data. DEQ had some biological data that we looked at. So we reviewed all of that in light of the analysis that we were doing for our purposes, but the calculation of statistics as far as average concentrations or trends over time, things like that, those were based on Perpetua data.

Q. Okay. Can you remind me, does your expert report just focus on surface water quality assessment analysis and evaluation or does it also look at groundwater?

A. No, it only looks at surface water.

Q. Okay. So please walk me through how you evaluated that data that we were just discussing to determine pollutant concentrations.

A. Well, we did that over the course of about six years, so it might be a long answer. But we obtained the database that had been created as the sampling was being done by Perpetua and for Perpetua, and we looked at concentrations. We looked at the trends over time. We looked at spacial differences between stations. We looked at the difference between what we call a total recoverable concentration and a dissolved concentration. Sometimes those differences were very minor. Sometimes they were large. That tells us something about how that material that



we're looking at, whether it's mercury, maybe it's arsenic, but the ratio between total recoverable and dissolved tells us whether some of that might be associated with particles in the water or dissolve in the water in such tiny pieces that it wouldn't necessarily sink to the bottom. We looked at relationships between the parameters. So, for example, we looked at the relationship between cations and anions that tells us something about the geology make-up of the contributing area to a location. We looked at the differences between, for example, medians and averages that could tell us something about what we call the (inaudible) of the data and how the overall distribution of the -- on the samples looks. We looked at differences from high flow periods to low flow periods for most of the parameters. That tells us whether there's an influence in, say, snowmelt or rainfall and how that might affect water quality. So those are just some of the (inaudible) that we did what we call data mining or data investigation. There have been quite a number on lengthy reports put together that lay out all that information.

Q. Okay. Thank you. And what purpose mine features did you consider to reach your conclusions?

A. We looked at the activities on the site overall. We looked at the potential effects of creating the tailing storage facility and kind of going from the upstream part of



the mine to the downstream. But we looked at the tailing storage facility. We looked at the removal of some large legacy material piles like what we call the SODA and the Bradley tailings and the Hecla heap. We looked at the creation of the Hangar Flats Pit. We looked at the relocation of part of Meadow Creek to accommodate that mine. We looked at the building of the employee or the worker housing facility that's on the upper portion of the East Fork, South Fork Salmon River and how that might affect water quality because it will have a small amount of domestic treated wastewater discharge. We looked at the potential effects of creating the plant, the processing plant or the ore processing facility. We looked at the contribution that we anticipate of treated mine water when it's necessary and there's excess water from the mine, that would be treated and discharged to the East Fork, South Fork Salmon River. So we looked at what that discharge would do to the river in terms of water quality. We looked at the changes that could be brought about by the enlargement of the Yellow Pine Pit during mining. We looked at the tunnel that routes the East Fork, South Fork Salmon River around the Yellow Pine Pit during a portion of the mine life. We looked at the potential effects of the West End Pit which is the third and sort of downstream most pit for the mine and looked at all of those constituents as part of our review of



potential changes in water quality.

Q. Okay. Let's go to Exhibit 1G, and that has been admitted into the record, I believe. That should be the water right application number -- if I get it right -- 77-14378. Okay. Mr. Durbin, do you see that document up on the screen? It says --

A. I do.

Q. -- application for permit and on the right-hand corner it says 77-14378.

A. Yes.

Q. Okay. Great. Are you familiar with this document at all?

A. I am not.

Q. Okay. This is the application for permit for one of the water rights that Perpetua is requesting. This is for the largest water right 9.6 cfs. So you do not know the contents of this document?

A. That's right.

Q. So if you can flip through quickly, maybe just in the -- it's a large document. There's a lot of duplication there, but if you can flip through quickly and let me know if you see any of the mine features that you mentioned and used to reach your conclusions, do you see any of those anywhere listed in this application? You can take your time.

A. I see reference to construction or enlargement of the new or existing dam which I would guess is associated with the construction of the tailing storage facility that I mentioned. It references something about applications for land use with the U.S. Forest Service, and so those applications would address some of the facilities that I mentioned. Portions of some of those may be on U.S. Forest Service lands. These pages have, until this one, all looked relatively similar, and all of them contain references to townships and ranges and sections, which are ways to find a location on a map. Not knowing off the top of my head where those township sections and ranges are, I don't know how they relate to some of the features that I mentioned, so I may not be able to answer your question about whether I'm seeing locations of things that I mentioned or maybe I misinterpreted your question.

Q. Okay. And just lastly, what you've scrolled through, you mentioned in your testimony that restoration activities, planting and creating shadier streams, that was a big part of taking care of temperature issues or potential temperature issues in the stream. So in your scrolling through that application, did you see anything about restoration activities?

A. I don't recall seeing that (inaudible) it was there.



Q. Okay. In your analysis did you analyze the impacts to water quality based on the entire mine plan?

A. Yes.

Q. Did you ever analyze impacts to water quality based on this water rights application and the contents in there?

A. I did not specifically do that, no.

Q. Okay. At what points in the life of the mine did you analyze water quality?

A. We looked at it from existing conditions. We looked at the construction, the mine construction period which is a few years. The operation period which is all 12 years or so, 15 years, and then both mining or closure period.

Q. Okay. So, again, you analyzed really the potential effects from proposed mine features or actions and not the potential effects from just the water withdrawals independent of all those other mine features; is that correct?

A. Yes, that's correct.

Q. I just want to ask you a question about just what your understanding is of what Perpetua is required to do post mine in terms of water quality. Is Perpetua required to get water quality to state and federal standards or just reach baseline conditions currently seen at the site?

A. Well, we are currently in coordination with Idaho



DEQ on several different permits that address water quality. The one that I spent the most time working on is what we call the IPDES permit, and that permit every indication is that they are looking at a permit that would have full compliance with state water quality criteria, which would potentially include something like a mixing zone where mixing zone you're allowed a small amount of diversion above and exceedance of a water quality criterion. I, frankly, don't expect that there will be much of a mixing zone opportunity for this facility. As I said, most of the parameters out there are already within the state water quality criteria, and so we're not concerned about exceedances of criteria for those things. For the antimony and arsenic and to a lesser extent the mercury, we anticipate that any discharge would be -- would have to be lower than many of the ambient levels out there and full compliance with state water quality criteria.

Q. Okay. Mr. Durbin, you mentioned the word discharge. Is the IPDES permit deal with discharges?

A. It will, yes.

Q. Does the IPDES permit deal with water withdrawals or water diversions?

A. It does not directly deal with that, no.

Q. Okay. So the conclusions, and I believe the IPDES permit has not been issued; is that your understanding?



A. That's correct.

Q. Okay. So any conclusions that come out of the IPDES permit don't really have any impact on water withdrawals and impacts from two water quality from water withdrawals; is that correct?

A. Well, maybe I spoke too quickly earlier.

Q. It's just a yes or no question. Is the IPDES permit going to consider withdrawals of water?

A. In terms of the water rights, you mean?

Q. Yes.

A. Not directly to my knowledge, no.

Q. Thank you. Okay. I'd like you to turn to Exhibit 259, please. I assume you don't have those exhibits in front of you?

A. I don't see them.

Q. Yeah, I think we're trying to pull it up on the screen so just a minute, please.

FEMALE SPEAKER: This is what I have marked Exhibit 259. Although in here it says Baldwin.

MS. THROWER: Yes, that's right. It's arsenic, antimony, mercury in the title. Yes, thank you.

Q. (By Ms. Thrower) And if you could just leave it on the first -- the title page of the document that will be fine. Okay. Mr. Durbin, do you see that up on the screen now?

A. I do.
Q. And what document do you see there?
A. It's a U.S. Geological survey report on antimony, arsenic, mercury, and temperature, and it references the years 2011 through 2017.
Q. And does it reference an area that this report is talking to?
A. Yes, the Stibnite mining area.
Q. Okay. Are you familiar with this document?
A. I think I've seen it before, but it's been a long time. And I don't recall the degree to which I read through it.
Q. And you said this was a U.S.G.S. document; is that correct? Is that what you're seeing on here?
A. Yes, that's right.
Q. Are you aware that this was prepared in cooperation with the Idaho Department of Lands and Midas Gold who is currently now called Perpetua?
A. That's what it says on the cover, yes.
Q. Okay. So this application has quite a bit of reference to your water quality expert report. Did you review it for your water quality expert report?
A. Not specifically, no.
MS. THROWER: Okay, Mr. Hearing Officer, I'd like to introduce into the record Exhibit No. 259 titled arsenic,



antimony, mercury, and water temperature and streams near Stibnite mining area of Central Idaho 2011 through '17.
HEARING OFFICER: Any objection? Okay, Exhibit 259 is admitted.
MS. THROWER: Thank you.
Q (By Ms. Thrower) Mr. Durbin, I'd like to turn your attention to pdf page 18 in Exhibit 259. We'll pull that up for you here. Is that pdf 18 or are you still trying to get to it? Can't see.
FEMALE SPEAKER: That's it.
MS. THROWER: It's not quite the right page. Just give me a moment, please.
FEMALE SPEAKER: That one?
MS. THROWER: Yes. Thank you. Thank you.
Q (By Ms. Thrower) Okay. Mr. Durbin, can you see those figures that are up on the screen?
A. Yes, I can.
Q. Is your screen big enough to be able to read the legends and all of that?
A. If I squint, sure.
Q. Okay. Tell me -- tell me if -- there we go. She enlarged it. Thank you very much. So I wanted to look at figure three, and we'll start with figure 3A. What does the X or horizontal axis represent?
A. It says it's the data mean stream flow in cubic



feet per second.
Q. Right. Okay, there we go. And what is the weir vertical access?
A. Well, on figure A it's dissolved arsenic in micrograms per liter.
Q. Yeah, and I'll be just talking about figure A right now. So, so this figure generally depicts a relationship between stream flow and dissolved arsenic; is that correct?
A. It appears to, yes.
Q. Okay. So I want to bring your attention to the orange triangles. Do those orange triangles represent sampled concentrations of dissolved arsenic in water at certain stream flows?
MR. WATKINS: Point of clarification. I see blue triangles and orange circles.
MS. THROWER: I'm sorry. Thank you very much, Mr. Watkins. Let's go with orange circles.
A. Okay. And tell me -- what was the question?
Q (By Ms. Thrower) Yeah, I'll ask that again. Thank you. Do you -- do the orange circles represent sampled concentrations of dissolved arsenic in the water at certain stream flows?
A. I can't say that for sure because I don't know. I don't see anything that says these are individual samples, so they could be averages of several samples on a given day



or at a given location. I don't even know how many different locations we are looking at, but they do represent concentrations of something, of either individual samples or groups of samples, but without seeing more text or legend or whatever I'm not sure exactly what each dot represents.
Q. Right. Thanks for that clarification, but the orange circles do represent a value of dissolved arsenic at certain stream flows, would that be more --
A. That's what it appears. That's how I would interpret it, yes.
Q. Okay. Thank you. So now let's look at the blue triangles, and I think I'm getting my geometry geometrical shapes right here. So do these blue triangles represent values of dissolved arsenic in the water at certain stream flows?
A. They appear to, yes.
Q. And for what months of the year do the orange circles depict?
A. According to the explanation in the lower right, the orange represents April through June sampling, and the triangles July through March.
Q. All right. You anticipated my next question. So July through March, is that generally the period of lower stream flow on the East Fork of the South Fork Salmon River?
A. Yes, although it can still be flowing pretty well

in July or even August but, yeah, certainly the fall months and through March are low flows.

Q. Okay. And April through June is generally the period of high stream flow in the East Fork of the South Fork Salmon River; is that correct?

A. Yes.

Q. Okay. Then in figure 3A what months show the highest concentration of dissolved arsenic?

A. The July through March. I'm sorry, the highest concentrations, yes, July through March.

Q. Okay. And just to confirm, that corresponds to the lowest stream flow scenarios; is that correct?

A. That's how it looks.

Q. Okay. Excuse me. So for figure 3A, that figure demonstrates when stream flows were low there were higher concentrations of dissolved arsenic; is that correct?

A. Yes.

Q. Okay. And looking more closely at figure 3A -- let us know if you need that enlarged anymore -- but it appears that the highest concentrations of dissolved arsenic were recorded during times when daily mean stream flows were approximately 9 to 15 cubic feet per second. Are those the numbers you see in that figure?

A. I would have to get out my ruler because it's X access is on the (inaudible) scale and so it's hard to



figure out 9 to 15 specifically.

Q. But is that kind of the general range?

A. Well, I think we already agreed that the highest concentrations occur at the lower end of the range of stream flows on this figure.

Q. Okay. So based on this figure and the relationship it gives to stream flow and dissolved arsenic, if stream flow on the East Fork of the South Fork Salmon River dropped lower than the values depicted because of, for example, water diversions would you expect that the dissolved arsenic concentration to increase?

A. Not necessarily.

Q. Based on this figure, Mr. Durbin, if the stream flows in the East Fork of the South Fork Salmon River dropped lower than the values depicted, would you expect dissolved arsenic concentration to increase?

A. Well, that was the same question but --

Q. Yes.

A. -- not necessarily. This is a pattern that Brown and Caldwell also looked at in a report that is posed at about the same timeframe as I recall, the 2017 water resources summary report, and we identified the same situation for both arsenic and antimony and identified the fact that the concentrations of arsenic and antimony are lower when the stream flow is higher and that is attributed



to the relationship between the amount of water in the stream that's contributed from groundwater as opposed to surface water inflows maybe from snowmelt or other surface inflows. And that also, then, was inferred to mean that groundwater concentrations were what was responsible for bringing most of the arsenic and antimony into the stream. So when the stream flow is low, most of the water coming into the stream is coming from groundwater through the bed of the stream, the size of the stream, and so you see the higher concentrations of these two metals because the groundwater has more than -- more of those than snowmelt. Snowmelt obviously would have a really low arsenic and antimony. So the pattern is easy to explain through that contribution ratio surface water and groundwater, but your question was about whether removing water from the stream would, then, cause the concentrations to be higher.

Q. Well, Mr. Durbin --

A. And --

Q. Mr. Durbin, I'll ask the questions. But is it -- are your scenarios here that you just described, are those depicted or shown in any way in figure 3A?

A. No. I was providing the explanation that I'm aware of through the work my firm did.

Q. Right. And my question was based on figure 3A. So according to figure 3A it does not show that if you decrease



concentration stream flow even lower arsenic concentrations will drop, is that correct, based on figure 3A?

A. I'm sorry. Can you ask that again? I'm trying to follow the logic.

Q. Yeah. Based on figure 3A is there anything in that figure that shows that if you decrease stream flows even lower arsenic concentrations will decrease?

A. I wouldn't expect them to decrease, but they wouldn't necessarily increase.

Q. Okay. But there's nothing to show that they would decrease on this figure? There's no data points?

A. You can't tell. You can't tell from that figure. You can't reach that conclusion by isolating what you're talking about to just what's on that figure.

Q. Okay. Is it possible that concentrations could increase with water diversions, just generally?

A. Not necessarily.

Q. Just generally, is it possible?

A. No, if you say just generally then --

Q. It's not possible at all?

A. Well, that's a different question. It depends on how the diversion happens.

Q. Okay. So it is possible. Just depends on the situation? Is that a correct interpretation of your statement?

A. It depends on -- it depends on where the water is diverted from.

Q. And did you conduct any analysis of the effects on diversions on pollutant concentration just on diversions?

A. I didn't, but as I recall some of the modeling in the site-wide water chemistry report considered that.

Q. But that's not in your expert report?

A. No, it's not.

Q. So I'd like to direct your attention to pdf page 15 in the same Exhibit 259, and I'd like to focus at the top of this section titled exceedances of water quality criteria. I have this as pdf page 15. I'm not sure it's the same as page 15 in the documents, though. I think we probably should have had a conversation about standard citation to pages. Make your job a little easier. Okay. I think you have the right page. Do you see that page, Mr. Durbin? It says exceedances of water quality criteria.

A. I do.

Q. All right. Thank you. And do you see the sentence that starts with: Samples from sites EF1, EF2, EF3, and Sugar Creek?

A. Yes.

Q. Okay. Can you read that whole sentence for me, please?

A. Samples. I assume you're talking about the one in



the first paragraph. Samples from sites EF1, EF2, EF3, and Sugar Creek regularly exceeded the HHB criterium for dissolved arsenic and micrograms per liter with exceeding frequencies as high as 98 and 100 percent at EF2 and EF3 respectively figure 2A.

Q. Okay. Thank you. And you said HHB. What is HHB?

A. It's a human health criterion. I am not -- I would have to look up what the B is referencing.

Q. Okay. Like, well, so human health based, maybe, is that it? Would that would be a fair --

A. Sure.

Q. -- interpretation of it?

A. Summarizing is defined in this document.

Q. Right. Are you familiar with the term exceedance frequency?

A. Yes.

Q. Okay. My understanding of exceedance frequency is that it is a percentage of samples collected where the water quality parameter of interest exceeded water quality criteria. So, for example, an exceedance for frequency of 100 percent would mean that all samples collected of the water quality parameter of interest exceeded the applicable water quality criteria. Is that your understanding of that term?

A. Generally, yes.



Q. Okay. So based on the passage quoted above, exceedance frequencies for dissolved arsenic were as high as 98 and 100 percent at EF2 and EF3. That would mean that nearly all of the collected samples for these locations exceeded arsenic water quality criterion; is that correct?

A. That's how I interpret that sentence.

Q. So I'd like to -- I'd like to direct your attention to figure one on pdf page 10 of Exhibit 259. Okay. In this map do you see where the sampling locations EF2 and EF3 are?

A. I do.

Q. Okay. And where is EF2?

A. It's on the East Fork, South Fork Salmon River area close to the confluence of Garnet Creek.

Q. Okay. And EF3, where is that located, approximately?

A. It looks like it's also on the East Fork, South Fork Salmon River slightly upstream of the confluence with Sugar Creek. And without zooming in more, I think this map doesn't necessarily have the resolution. I'm assuming that those stations are on East Fork, South Fork as opposed to being on the Garnet Creek tributary, for example, or some other minor tributary of the East Fork. So without a more -- a higher resolution map I can't say for certain.

Q. Okay. Well, let's -- if you are okay, assuming they are on the East Fork of the South Fork, let's go with



that. So it looks like EF2 is located below Perpetua's proposed groundwater pumping in the Meadow Creek area. Do you see that on the map?

A. Yes, and I'm not -- I'm not well-informed on the locations of specific wells, but, yes, that location is downstream of Meadow Creek, so I would infer that means it's downstream of the Meadow Creek groundwater withdrawal.

Q. Okay. And EF3 is located below Perpetua's proposed East Fork, South Fork Salmon River point of diversion and above the confluence of Sugar Creek that will supply additional stream flow to dilute arsenic concentrations. Do you see that?

A. You put about three facts into that one sentence, so --

Q. Okay. Where -- do you see where the -- do you see that the EF3 is located below Perpetua's proposed East Fork, South Fork Salmon River point of diversion?

A. Well, again, I'm not up-to-date on specific locations of diversions, so I would have to see a map of where the diversion is to know how it relates to EF3.

Q. Okay. But it is above the confluence of Sugar Creek; is that correct?

A. It appears to be, yes.

Q. Okay. And based on the geography and stream flow that you are aware of, will Sugar Creek supply additional

stream flow to the East Fork, South Fork Salmon River?

A. It's a tributary, so that's what it should do, yes.

Q. Okay. So providing additional stream flow would generally dilute arsenic concentrations at that location; is that correct?

A. Not necessarily. Sugar Creek is also impaired for arsenic, which means that arsenic concentrations in Sugar Creek tend to be higher than, say, water quality criteria. So it's really going to depend on what the concentration is in East Fork, South Fork and what the concentration is in Sugar Creek as to whether there would be a dilution or not.

Q. Okay. Do you know whether the concentrations of arsenic in Sugar Creek are higher than or lower than in the East Fork, South Fork Salmon River?

A. As I recall under current situations the concentrations in East Fork, South Fork just upstream of Sugar Creek are currently higher than Sugar Creek; however, those are subject to change as a result of some of the activities that we've discussed with respect to the ASAOC and other activities during the mining and reclamation process that would lower arsenic concentrations. So I don't know what the ratio might be after (inaudible) for example.

Q. Okay. But without mine activities and without the next 20 plus years, just existing conditions, Sugar Creek arsenic concentration is lower than the concentrations of



arsenic in the East Fork, South Fork. That's what I understood your answer to say. Is that correct?

A. In general, yes, but I would need to go back and look at specific modeling station data to know what the difference is.

Q. Okay. So if that's the case, if arsenic is lower in Sugar Creek than East Fork, South Fork, this means that the locations where we may see the most impact to surface flows are the same locations that currently have the highest concentrations of arsenic in the system, which are exceeding recognized water quality standards; is that correct?

A. I don't know that I agree with that premise. The removal of water from East Fork, South Fork at a location where there are elevated levels of arsenic and/or antimony would remove arsenic and antimony that's in the stream. So it's not like only the water is being taken out. Everything that's in the water also comes out with that diversion, so you're not changing the concentration by taking water out of the stream at that location.

Q. Okay. But diversions could decrease stream flows; is that correct?

A. Yes.

Q. And we talked about this figure 3A where there's a relationship between lower stream flows and increased arsenic concentrations; is that correct? Do you remember



that?

A. Yes, yes.

Q. So given that figure 3 establishes that relationship, it seems possible that if you were to divert water out of the East Fork of the South Fork thereby decreasing stream flows, that arsenic concentrations could increase; is that correct?

A. That's not logically. When you take water out of the stream, you also take the constituents of the water with the water, so it's like saying I have a glass of sweet tea, and if I take out half of that glass the tea gets sweeter. Well, no, because I took out sugar with the half that I took out. The same thing happens here. If you take water out of East Fork, South Fork, you haven't changed the concentration, you just have less water. In fact, you are removing low -- you're not changing the concentration, but you're removing the overall amount of arsenic that would be going downstream. So sort of opposite to your conclusion, it can take out some flow from East Fork, South Fork, and then Sugar Creek is still providing the same amount of flow, even at a lower concentration of arsenic downstream of Sugar Creek.

Q. Okay. Would that be the case if you had pollutants contributing to the East Fork, South Fork Salmon River water from ground -- the ground?



A. As long as you're taking the water out of the stream where the groundwater and surface water are mixed, then, yes.

Q. Okay. So West End Creek -- excuse me. Give me one second here. I'd like to go back to Exhibit 259, pdf page 25, please, and it should be figure 5 on that page.

FEMALE SPEAKER: Exhibit 25?

MS. THROWER: Yes, 25, please.

MR. WATKINS: Mr. Hearing Officer, while we're looking for that exhibit, I believe the witness has until about 10:00 today. He has another matter to attend to, but just heads up.

HEARING OFFICER: Okay.

MS. THROWER: So I do not know if I will finish by 10:00. Is there -- I mean, we'll see if we can bring him back if we need to.

MR. WATKINS: I think he's available later on in the day.

MS. THROWER: Oh, okay.

MR. WATKINS: He just has an appointment at 10:00.

MS. THROWER: Okay. Got it.

Q (By Ms. Thrower) Okay. That looks like it. Thank you. So, Mr. Durbin, let's walk through figure 5 together. On the horizontal axis, the horizontal axis shows the months of June through September; is that

correct?
A. Yes, it does.
Q. Okay. Based on our earlier discussion July through September corresponds to low stream flow periods; is that correct?
A. Yes. I'm sorry, say that again.
Q. Based on our earlier discussion July through September correspond to low stream flow periods; is that correct?
A. Yes. Although, I said that July you can still have some moderate flows depending on the particular year.
Q. Right. So the vertical access shows the percentage of days that exceeded water quality criteria. Do you see that on that figure?
A. Yes.
Q. Okay. So, again, (inaudible) approaching 100 percent would mean that in the month, in that particular month, all of the recorded measurements exceeded water quality criteria; is that correct?
A. Close to that, yes.
Q. Okay. And the top horizontal axis shows water temperatures as they relate to certain sampling sites; is that correct?
A. That's my interpretation, yes.
Q. Okay. As we discussed earlier, we'll focus



predominantly on EF2 and EF3 locations, as these will be most affected by Perpetua's withdrawals. So based on this figure that's up on the screen, figure 5 in Exhibit 259, what specific water quality criteria for water temperatures are not being met?
A. Which ones are not being met?
Q. Yes.
A. Well, the right-hand vertical axis has abbreviations for the different surface water criteria, and forgive me for not remembering all the other abbreviations, but there are several different ways that Idaho represents water quality or water temperature criteria. And it has to do with daily averages or monthly averages, and so I would have to look back at the -- at the rule to recall the abbreviations. But it appears that they have looked at water temperature with respect to three different numeric criteria or indices for temperature. And that appears to be what's represented in three different colored tiers of that chart.
Q. Okay. And so we could -- we could go to the page that had the acronym spelled out, but maybe I can just tell you what I think they mean and see if that refreshes your memory on what they mean.
HEARING OFFICER: We can go. It's just a page in this document.



MS. THROWER: Okay. I was trying to make it easy for --
HEARING OFFICER: So what is it?
MS. THROWER: Page 8, please. I think it's pdf page 8. Okay, I think we have it there.
Q. (By Ms. Thrower) So do you see those acronyms I think that were on figure 5 are MDAT-SS, meaning maximum daily average water temperature criterion for cold water aquatic life. Do you see that, Mr. Durbin?
A. Yes.
Q. Okay. Thank you. And MDMT-SS is maximum daily average water temperature criteria for salmonoid spawning; is that correct?
A. Yes.
Q. And MWMT-VT stands for maximum daily maximum water temperature for salmonoid spawning; is that correct?
A. Yes.
Q. Okay. So let's focus first on the cold water aquatic life criterion. So that will be the MDAT-SS. Would cold water aquatic life include Chinook Salmon, Bull Trout, Steelhead, and West Slope Cutthroat Trout?
A. Yes.
Q. Okay. And to confirm, these criteria are absolutely critical for cold water aquatic life, including those that I mentioned, right: Chinook Salmon, Bull Trout,



Steelhead, and West Slope Cutthroat Trout? They are critical to live in the East Fork, South Fork of the Salmon River; is that correct?
A. I don't agree with that as an aquatic ecologist. These are criteria that were promulgated to be protective of these species, and it has to do with the protection of all life stages, so everything from eggs to larvae to juveniles to adults. So four different parts of the life periods of each of those different species that you mentioned, there are different levels of protection which also include some safety factor built in, so I can't, as a blanket statement, agree that these specific numbers are critical across the board for those species that you mentioned. I do agree that as water quality criteria for the state, they are important in regulating water discharges and the compliance with state and water quality standards.
Q. Okay. So just to make sure I understand your answer, I'm going to kind of rephrase that and see if you would agree with this. So for all of these species that I mentioned: Chinook Salmon, Bull Trout, Steelhead, and West Slope Cutthroat Trout, and for all life stages you would agree that these criteria are critical as a group in all life stages for cold water aquatic life, for them to live in the East Fork, South Fork, or at least --
A. (Inaudible.)

Q. -- or at least protective of their ability to live there?

A. They are protective. I just had a problem with the term critical.

Q. Okay.

A. And that's what is in my workup. I dealt with fish for -- it was in my Master's thesis days in the 1980's, and I know that fish very often survive in conditions of temperature and odor, physical and chemical conditions where you would not expect them to based on water quality criteria alone.

Q. Okay. Does the top -- so let's go back to figure 5. So the top figure with the green bars, again focus only on EF2 and EF3, and they show that most of the days during the months of July and August those EF2 and EF3 are exceeding critical cold water aquatic life criterion; is that correct?

A. They're exceeding the criteria. I'm not going to (inaudible) critical. We talked about that.

Q. Okay. So the protective. The protective cold water aquatic life criteria?

A. (Inaudible).

Q. Let's focus on the green bars for the sampling location within Sugar Creek. We've established earlier that Sugar Creek contributes to stream flows to the East Fork of



the South Fork Salmon River. Do you still agree with that?

A. Yes.

Q. Okay. And we've established that additional stream flow contributions from Sugar Creek into the East Fork, South Fork Salmon River can dilute concentrations or affect water quality criteria; is that correct?

A. As a general statement contributions from Sugar Creek and change concentrations in the East Fork, South Fork depending on the concentrations of each stream when they co-mingle, yes.

Q. Okay. So looking again at the top figure with the green bars and again focus only on Sugar Creek, does that bar show that most of the days during the months of July and August are exceeding the cold water aquatic life criterion?

A. It does say that.

Q. Okay. Now comparing Sugar Creek green bars to the EF2 --

A. I'm sorry, I need to correct that. Looking again at the axis (inaudible) list of abbreviations, you read off the cold water criterion, but this one -- the first two rows here are both salmonoid spawning, so at least according to the abbreviations on that Y axis cold water criterion is -- wasn't a subset of one of those two. It's salmonoid spawning rather than just the blanket cold water.

Q. Okay. So let's compare the Sugar Creek green bars



to the EF2 and EF3 green bars. Does it appear that the number of days exceeding cold water aquatic life criterion is slightly less in Sugar Creek during the months of July and August?

A. It does.

Q. Okay. Now let's focus on the orange bars in the middle of the figure for EF2 and EF3. These figures show -- these figures are showing the percentage of days per month that are exceeding the maximum daily average water temperature criteria for salmonoid spawning; is that correct?

A. Yes.

Q. And the maximum daily average water temperature criteria for salmonoid spawning is for salmonoids to spawn; is that correct?

A. That's how the criteria was developed, yes.

Q. Okay. So does the middle figure with the orange bars, again focusing solely on EF2 and EF3, does the middle figure with the orange bars show that more than half of the days during the months of July and August are exceeding the maximum daily average water temperature for salmonoid spawning?

A. It does.

Q. Okay. Can you please explain the effect of water diversions on water temperature currently?



A. Well, as I said with respect to chemical concentrations, it depends on how you take out the water and what your tributary is doing as well. So if you had a tank of water that was 30 degrees and you took out half of it, the rest of the water would still be 30 degrees. If you have tributaries and you think about that, if you pour new water into that tank after you took out some, that's what a tributary does, the temperature of each of those tributaries would raise or lower the temperature in your main stream or in your tank. So it really depends on several factors when you take out the water, how much water you take out, and how much other water may contribute by the tributaries downstream as you were discussing for Sugar Creek. So it's not a simple answer that taking out water would change the temperature because it depends on where you take out the water and how much you take out and what else is happening in the stream.

Q. Right. And there are other features that may impact water temperature because of diversion. For instance, the quality of the riparian areas; is that a fair statement? That would be one other thing that might be considered?

A. Yes.

Q. Did you evaluate -- did you evaluate water diversion -- did you evaluate the effect of water diversions

on temperature? Just water diversions.

A. I did not, but, again, I was --

Q. Okay, thank you, Mr. Durbin. What are water temperatures in the proposed mine area likely to look like in the future with climate change given the current conditions and assuming no mining actions will occur?

A. I don't have an opinion on that. That was addressed in some of the submittals, but I was not part of that analysis.

Q. Could the geo-synthetic liner in Meadow Creek cut off groundwater and result in higher stream temperatures?

A. Well, the purpose of a liner in Meadow Creek is to isolate the stream flow from groundwater to protect flows, so that could happen, but you asked a two-part question. And the second half was -- I missed the second half.

Q. Could that liner result in higher stream temperatures?

A. It could go either way. Again, it would depend on how the liner affected the exchange of water between groundwater and stream water and whether that exchange brought a temperature change. But the liner itself, the liner would be covered with streambed material, so it would look and behave the same as a natural streambed. So just the presence of a liner wouldn't be expected to change water temperature.



Q. Okay. So I think you hit on a couple of points here. So you said the liner will cut off groundwater exchange with the stream, correct? That's --

A. A liner is intended --

Q. That's the purpose of it, right?

A. The liner is intended to prevent loss of stream flow into groundwater when the water table and the surrounding area is reduced, yes.

Q. Okay. So does groundwater have an importance in regulating or cooling stream temperatures?

A. It can be.

Q. So if you cut off that hydrological connection with groundwater with a liner, that could have an effect of increasing stream temperatures; is that a fair statement?

A. Well, again, it depends on the degree to which that connection is cut off. The liner isn't just going to be a (inaudible) under the stream. There's still going to be a surficial amount of water that is in the ground and on top of the liner in the stream. So there will still be exchange of that groundwater. And the other thing about the liner is the liner isn't -- will not prevent exchange of temperature. So if it's colder on one side of the liner than on the other, the temperature change will be reflected through the liner to some degree. So if you had cold groundwater underneath the stream, it would cool the stream even with a



liner (inaudible).

Q. Okay. And could diverting groundwater impact surface temperatures?

A. In some cases it could.

Q. Okay. Mr. Durbin, I see that we are coming up on 10:00, which is when I understand you have another commitment. I do have some further questions to ask you. So, perhaps we can figure out with your Counsel when we can do that later today. Does that sound okay, Mr. Hearing Officer?

A. Yeah. I'm about 10 or 15 more minutes. I don't know how much longer you --

Q. I'm kind of getting onto another topic. I guess we can start.

HEARING OFFICER: Let's go ahead.

MS. THROWER: Sure.

HEARING OFFICER: Yeah.

Q (By Ms. Thrower) Okay. So you testified, Mr. Durbin, that you reviewed Perpetua's proposed mitigation measures; is that correct?

A. Some of them. I didn't review, for example, all the Section 404 permit mitigation requirements, but in terms of water quality protection, then, yes.

Q. Okay. And you concluded that those proposed measures will improve water quality conditions at the site;



is that correct?

A. Yes.

Q. Okay. So I'd like to take a closer look at this proposed mitigation measures. You testified that riparian plantings adjacent to streams within the site will provide stream -- will work to reduce stream temperatures; is that correct?

A. Yes.

Q. Okay. Can you please specify what plantings will be placed in riparian areas next to streams?

A. I would have to look back at the plans. I don't recall that off the top of my head.

Q. Okay. Generally what is your understanding from your knowledge and experience of what kind of riparian plantings would normally be used to try and reduce stream temperatures in habitat that's similar to this site that we're talking about?

A. In general, it's species of willows that can be both quickly and easily planted in large numbers and expected to grow relatively quickly. So you wouldn't plant a lot of very slow growing or (inaudible) trees. You would plant trees that you could put literally right at the shoreline and maybe 20 or 30 feet back from the shoreline that you would expect to create a shading canopy within a relatively small number of years. So I just don't recall

the species off the top of my head.

Q. Okay. And you said that the distance in the riparian areas about 20 to 30 feet from the stream; is that correct?

A. As I recall, there were several different widths that were discussed, and that width, I think it was increased through some of the agency and public comment, but I don't recall what the number is in the current plan, what the width is.

Q. Okay. And are you aware of any studies that evaluate distances on either side of streams that riparian planting should be located to have temperature benefits?

A. There were a number of studies. I don't have any at the tip of my fingers, but temperature mitigation has been a big deal particularly in the Pacific Northwest for a long time, so there are many publications, both literature and peer review on that topic.

Q. Okay. Is there a delay between plantings and the maximum benefits with respect to temperature?

A. Yes. Since it takes time for trees to grow there is a delay between the day you plant and the day that this maximum shade is obtained.

Q. Okay. Do you know what the delay is going to be for the Stibnite Gold Project?

A. I don't recall. And, again, because of the way



that the planting would be done, it would happen in different places at different times. So there would be some of it that would be relatively early in the overall mine plan. Some of it would be much later, depending on where activities were or (inaudible).

Q. Okay. So it would be fair to say, then, that the maximum benefits of all the planting activity proposed in the mine plan, the maximum benefits, then, would not be realized until years after the mine is closed. Would that be a fair statement?

A. No. It's more appropriate to say --

Q. I'm sorry, maximum being that all the riparian plantings have been done throughout, you know, to get the maximum benefit, you would want all the riparian plantings to be done everywhere where they were proposed and to have those plants grow to a height that provides that shade benefit. So based on that --

A. No.

Q. No?

A. (Inaudible.)

Q. Thank you, mister --

A. Stream reach you get the benefit when the plants grow on that stream reach, and that may be very early in the mine life for some stream reaches.

Q. But for the entire East Fork, South Fork wouldn't



it be fair to say that the maximum benefit would be reached when all the plantings are done and all the trees have grown to a sufficient size?

A. No. It's more appropriate to say that the benefit is incrementally reached throughout the mine life.

Q. Okay. In your testimony you also mentioned that reclamation of the Yellow Pine Pit is proposed as mitigation -- as a mitigation measure to improve water quality; is that correct?

A. I said that there would be a lake established on the reclaimed surface of Yellow Pine Pit that would have a temperature moderating effect.

Q. Okay. Can you please walk me through what that proposed measure entails?

A. It's essentially a mimic of the effect of the existing Yellow Pine Pit, which is that you have a deeper and broader water body where you have a thermal load, in other words you have a repository for cooler water, and by putting that back after you reclaim the stream across the top of the reclaimed Yellow Pine Pit, you maintain that thermal reservoir that keeps cooler water cool.

Q. Okay. When is this proposed mine feature anticipated to be completed? Like what specific month here?

A. I don't recall the specific mine year. I would say it's somewhere out in the 10 to 13 range, but I don't know a



certain year.

Q. Okay. So the potential benefit to temperature from this lake would occur -- wouldn't occur until at least the time that it's completed; is that correct?

A. The effect that the lake would have will come -- the lake will be constructed -- the base in the hole where the lake is will be constructed while water is still going through the bypass tunnel, and the water is going through the bypass tunnel, again it's in the shade for nearly a mile, so during all of those years all of the mining of the Yellow Pine Pit you have this cooling effect of the tunnel --

Q. Yeah, Mr. Durbin, I asked you about the cooling effect of the Stibnite lake, not the tunnel.

A. Yes and --

Q. So the cooling effect of the Stibnite Lake will not be realized until it's completed; is that correct?

A. The cooling effect of the Stibnite Lake would happen as soon as water started flowing back outside of the tunnel so it would be essentially instantaneous once the water is rerouted through the aboveground portion of East Fork, South Fork.

Q. And once they're done mining Yellow Pine Pit, is that correct, which isn't --

A. Yes. They can't reclaim it until they finish

mining it.
Q. As part of the analysis you did, Mr. Durbin, did you evaluate whether the level of this proposed lake-like segment is to remain constant after it's completed?
A. I have not looked at that.
Q. Is it fair to say that the water level of this proposed lake-like segment may fluctuate over time?
A. Presumably since stream flows will fluctuate. However, the current Yellow Pine Pit has very little water level fluctuation now because it's controlled by the sill elevation of the downstream end.
Q. Okay. Is it fair to say that inputs such as sediment from upstream sources may cause or contribute to the lake-like segment?
A. Well, I don't know what you mean by cause or contribute to it.
Q. Can sediment -- is it fair to say that sediment from upstream sources may be deposited into the lakes such that it changes the level of the lake?
A. No, I would say not.
Q. Or the volume of the lake?
A. It could change the volume because all lakes accumulate sediment.
Q. So why doesn't a depth change from sediment cause a change in the temperature effects?



A. I haven't looked at that, and depending on the change in the volume there could be an effect on temperature, but it also might be so minor that it wouldn't make a difference.
Q. But you didn't look at that?
A. I said that, yes.
Q. So in concluding that the proposed lake-like segment would improve water quality -- hang on. Strike that, please. Okay. I want to go -- are we good on time still, Mr. Durbin?
A. I really only have about two more minutes.
MS. THROWER: Okay. Why don't we just -- is it okay if we just break now?
HEARING OFFICER: We can break now, yeah.
MS. THROWER: Okay. Thank you. I'll talk to you maybe this afternoon.
HEARING OFFICER: Thank you.
A. Thank you.
HEARING OFFICER: Why don't we go ahead and take a five-minute break. It seems like a good time, and then we'll start up again with your next witness.
(Recess.)
(Reconvened.)
HEARING OFFICER: All right. We'll jump back on the record. Mr. Watkins, we'll come back to Mr. Durbin later



today. So you can call your next witness.
MR. WATKINS: Perpetua calls Paul Leonard to the stand.
HEARING OFFICER: Okay.
PAUL LEONARD
after having been first duly sworn,
was examined and testified as follows:
MR. LEONARD: I do.
HEARING OFFICER: Okay. Have a seat. Go ahead, Mr. Watkins.
DIRECT EXAMINATION
BY MR. WATKINS:
Q. Mr. Leonard, go ahead and hit that green button, or make it green. There it is. Mr. Leonard, would you please state and spell your name for the record.
A. Paul Leonard, P-a-u-l L-e-o-n-a-r-d.
Q. And what is that you do for a living, Mr. Leonard?
A. I am an enviromental consultant doing a wide range of fisheries assessments, instream flow evaluations, permitting compliance for a variety of infrastructure projects and water resource projects.
Q. How long have you been in that role?
A. I've been in that role for about almost 40 years now in various capacities.
Q. What's your educational background?



A. I've got a Bachelor's in aquatic sciences, and a Master's in fishery science, and I'm a certified fisheries professional by American Fisheries Society.
Q. What does that mean to be a certified fisheries professional?
A. Well, it means you've accomplished a set of -- a set of accomplishments in your career that American Fisheries Society specifies that makes you a certified professional, just like any certification, a level of expertise.
Q. Like a CPA but of fish?
A. Yeah, right. It's actually called a CFP, Certified Fisheries Professional.
Q. Can you walk us through your work history, briefly?
A. Well, I've been involved in environmental consulting for those types of projects that I mentioned for almost, yeah, over 40 years now. Again, a lot of fisheries assessment and evaluations effects, evaluations instream flow studies, which are similar to the kinds of things we are addressing here, as well as a variety of other kind of impact assessments on water quality and fisheries, et cetera. So it's pretty broad.
Q. Can you -- have you worked on any projects in the past that are similar or have particular relevance to this Perpetua SGP project?

A. Yes. All my career I've been doing exactly these kinds of things. A lot of time spent with instream flow studies, which is very similar to the types of technical things that we're dealing with here. And, in fact, during -- many years ago during the Salmon River flow adjudication process I was an expert involved in evaluating some of the -- designing some of the studies that would be used for water rights, things in the Upper Salmon Basin. I've done instream flow modeling, habitat modeling, hydraulic modeling for fisheries habitats for hydroelectric projects and other water supply projects that might alter flow regime of streams.

Q. I wonder if you could walk us through the current status of fish in the East Fork, South Fork Salmon River. Could you start by just telling us what is the current status of Snake River Basin spring to summer Chinook Salmon?

A. Are you talking about in the project area?

Q. In the project area, yes, sir.

A. Well, interestingly enough, there's -- we've talked about the four species that are -- that are present there. A very important feature is the fish passage barrier at the Yellow Pine Pit. Upstream of that there are essentially isolated populations of West Slope Cutthroat, of Bull Trout, and -- but Steelhead are not up there because they cannot get upstream passed that barrier, and Chinook are there as a



result of artificial stocking as part of a supplementation program with excess hatchery fish. And so essentially these populations of Cutthroat, Bull Trout, are isolated from the rest of their fellow fish downstream, and so adult Bull Trout cannot get up there. Steelhead are rare in the project area. There's some evidence of them spawning in the very lower part of the East Fork, South Fork upstream of Sugar Creek but not very many. And we did studies as part of the project for the fish populations in the Yellow Pine Pit, which was mostly Bull Trout and Cutthroat. We did -- we did document some small -- excuse me, Chinook coming downstream after they were stocked and were out migrating. And there's -- so that -- the population in the lake is mostly Bull Trout and Cutthroat and white fish and very few Chinook or Steelhead have showed up there during the two years that we did that study.

Q. So to be clear, above the Yellow Pine Pit there are no Steelhead; is that your testimony?

A. That's correct.

Q. And above the steel -- above the Yellow Pine Pit there are Chinook as a result of them being trucked in?

A. That's correct.

Q. Where are they being trucked in from?

A. Well, you know, there's hatchery programs for supplementing Chinook Salmon in the basin as part of their



recovery efforts, and the Tribe, the Nez Perce Tribe, takes, when there is enough excess hatchery stock that they don't need to make eggs, you know, to rear young, they will essentially deposit them up in this area. The adult spawn and die. The young grow there for a year and a half or two, and then they're gone. And so if that's -- if that were to stop, then eventually there would be no Chinook up there as well.

Q. The only reason there's Chinook up there is because the Tribe is keeping them alive?

A. That's correct.

Q. There's no volitional movement?

A. No volitional movement.

Q. Are you familiar with the fisheries and aquatic resources mitigation plan?

A. I am. I was very closely involved in that and directed that.

Q. I'm going to hand you what's been marked as Exhibit 29. What is Exhibit 29?

A. Exhibit 29 is what's taught in the fisheries an aquatics mitigation plan that was developed for the Stibnite Gold Mine.

Q. And how is it that this document came to be?

A. Well, you know, during the project, you know, Perpetua understood that there were some potential impacts,



as well as potential opportunities, and so they asked us to essentially look for a whole variety of ways to protect and manage fish during the mining period. That included as an umbrella the fish passage to get fish -- adult fish up there earlier that can't get there now. Other protection methods during some of the stream locations and stream restoration that follow some very rigorous protocols for protecting and salvaging fish before that happens and moving them to other habitats that they can survive in. Things like the Blow-Out Creek restoration. You know, Blow-Out Creek is currently contributing a huge amount of sediment to the stream, and early restoration of that will reduce that sedimentation considerably, which is a benefit for fish. There's a number of other items. I won't go into all of that detail but --

Q. And that's fine. Fair to say all of that's detailed and supported, substantiated with data as part of the FARMP?

A. Yes. In addition to the fishway operations and management plan, the (inaudible) compensatory mitigation plan and the stream restoration and enhancement plan.

Q. And you said you oversaw or directed the work in creating the FARMP?

A. Uh-huh (affirmative).

MR. WATKINS: Move to admit Exhibit 29.

A. You said the FMP, right?

Q. (By Mr. Watkins) Fisheries and Aquatic Resources Mitigation Plan.

A. If that's different from the fishway operations and management plan, yes.

HEARING OFFICER: Exhibit 29 has been proposed. Any objections? Hearing none, Exhibit 29 is admitted into the record.

Q (By Mr. Watkins) Does the Fisheries and Aquatic Resources Mitigation Plan require active adaptive management?

A. Yes. It's designed to include adaptive management.

Q. And what is adaptive management?

A. Adaptive management is a way to address uncertainty. Not all of these things can be exactly predicted, as we all know, and so through monitoring you can determine if they are or not actually happening, and you can make adjustments during the mining process to reduce any effects that are out of balance with what are their goals and objectives to protect the fish.

Q. What assurances do we have that Perpetua will actually do what the Fisheries and Aquatic Resource Mitigation Plan requires it to do and not just chuck this to the side once it gets its permits?

A. It's largely because all of the agencies that are regulating and overseeing this require this project to



assume that that's a commitment of the project. So in other words, it becomes part of the project. And so when it is approved as part of the project and the expectation is they will do it, and there's expected to be reporting as part of the environmental monitoring and management plan, so the agencies can take a look and see how that's going. And there's things like proposed annual visits to see how it's going to go, so it's going to be overseen through that process.

Q. Do you know what the biological opinion process under the Endangered Species Act is?

A. Yes, I do.

Q. As part of that biological opinion process, is it possible that NMFS might provide additional conditions in addition to what's already in the Fisheries and Aquatic Resources and Mitigation Plan?

A. It's quite likely that they will, yes.

Q. And that process would simply make the FARMP more beneficial for fish than it already is?

A. Yes. It's likely that it would have some more additional measures or refinements to those measures that satisfy NOAA fisheries and Fish and Wildlife Service to protection will be in place.

Q. NMFS isn't going to make the FARMP less beneficial for fish, are they?



A. No.

Q. Okay. We've talked at length about the fish tunnel at the SGP. Are you generally familiar with the fish tunnel?

A. Yes.

Q. Is it fair to say that the fish tunnel is one of the mitigation efforts detailed in this document?

A. Yes, absolutely.

Q. In your professional opinion, based off of your years of experience, will the fish tunnel work to get fish volitionally up above Yellow Pine Pit?

A. It's my opinion that it will. It's been designed according to the criteria that are specified by the agencies that manage those species. And there's a number of fishways that are similar in nature to this, pool weir fishways, some of them which are quite long, that do operate in this manner. And the nice part about it is that there's also adaptive management within the fishway operations and management plan, so that the fish are arriving there and they're not effectively using the tunnel or hanging around the opening too long, they would be collected and brought up and transplanted upstream as a backup plan. And then again, there's going to be reporting on that, and there will be continued consultation with NMFS and Fish and Wildlife Service on that document because it's designed operation is



not entirely finalized.

Q. Besides the fish tunnel, what other mitigation efforts does -- mitigation measures does the FARMP put in place?

A. Well, the FOM, you're saying --

Q. Fisheries and Aquatic Resources Mitigation Plan.

A. Not more than the ones that are listed at page 11 in this document and summarized -- very well summarized in that. I think I covered most of them. There's probably some ones that I'm --

Q. You said page 11, sir?

A. Yes, page 11, as well as -- and they're nicely described also in -- where is that -- at page 22, summarized at page 22.

Q. Do the mitigation efforts that are bullet point listed on page 11 and further summarized on page 22, in your opinion will those mitigation efforts have positive impacts on the fish population inside the mine site footprint?

A. Yes.

Q. And what is that opinion based on?

A. My opinion is that this -- all of these efforts together act to avoid and minimize impacts during mining and set up things as they -- the end of mining occurs, to have things like volitional passage, improved water quality, et cetera, so together both during and after but the biggest

bang for the buck comes towards the end as these fish can volitionally pass up there and the conditions are improved and they can have natural spawning and access to those important habitats.

Q. As part of your role did you do any analysis -- did you or your team do any analysis regarding Perpetua's use of a water right in the area and how Perpetua's use of a water right might impact fish in the mine site area?

A. I'm aware of the documents that have been written in support of that, and I was not involved directly in those but I'm aware of those, yes.

Q. Will flow -- will flow withdrawals reduce stream flow in some segments of the area of operation in the mine?

A. Yes. At times there will be some, but most of them occur downstream of the intake at the top -- at the upper end of the tunnel which has been described before by other testimony. And -- but it will still allow the tunnel to operate effectively, and some of the other temporary sort of reduction to water upstream, et cetera, are really not going to have substantial impacts and they're really going to be short-term as pretty well discussed in the EIS, as well as the biological assessed biological assessment.

Q. So to the extent there are flow reductions, they are short-term and minimal, do you believe that those short-term and minimal flow reductions as a result of



Perpetua utilizing its water right will have any negative impacts on fish?

A. I think that they may have minor impacts during those -- during those periods, but nothing longterm. Fish are pretty adaptive. When some of those flow reductions occur they have -- they are adaptive. They'll go into -- move into different habitats, move to different segments of stream that have better flow conditions, and so, yeah, I don't think that any of those are going to be long-lasting effects at all. And, yeah.

Q. And perhaps it's a similar answer to this question. Hypothetically if Perpetua were to take its full water right, that is 9.6 cfs for, say, three days straight --

A. Uh-huh (affirmative).

Q. -- what would happen to the fish?

A. Mostly the effects of that withdrawal has been discussed before is going to occur in the fishway and downstream, and what we have already seen is that there will still be enough flow with that withdrawal to continue to have the fishway operate properly. And downstream of that, I don't think it's going to prevent the spawning and rearing of fish. There will still be enough flow there. Maybe a change where some of the spawning occurs. It may have a small effect on the care and capacity of some fish, but those are temporary effects and not likely to have



population effects.

Q. Would the longterm benefits of the site, in your professional opinion with all the restorative work and reclamation work that has been discussed at length, outweigh any sort of temporary minor effects on fish?

A. Yes, I believe they will.

Q. Speaking of flow rates, I'm going to hand you what's been marked -- previously marked and admitted as Exhibit 63. Do you have Exhibit 63 in front of you?

A. I do.

Q. Please flip to page 25.

A. I'm there.

Q. Now, Exhibit 63, specifically page 25, is a document that was reviewed at length. If we could blow up the first chart on that document.

A. Uh-huh (affirmative). I can do that.

Q. And do you see a blue line on this chart?

A. I do.

Q. And if you look at the key below it says East Fork, South Fork Salmon River less expected diversion rate. Do you see that?

A. Uh-huh (affirmative).

Q. And then there's a black line that runs across called fish flow criteria. Do you see that?

A. Yes.



Q. And do you see how the blue line first intersects with the black line or dips below the black line sometime in what I'll call late August or early September?

A. Yes.

Q. Here is my question: What happens to the fish if the blue line goes below the black line?

A. What -- the effect of that -- yeah, this is a real issue because I heard the testimony about this yesterday, and I'll say some of the things that I wanted to say then is that -- that black line is not an on/off switch. It doesn't mean fish will pass, fish will not pass. These are criteria that were established generally by NMFS for these species and for these fishways. And what you're supposed to do is adapt them to site specific conditions and flows and fish populations, and that's exactly what we've done. And so, you know, it may -- it may slow the -- you know, the upstream passage ever so slightly. It may not. Fish are pretty adaptive, too, and these conditions that would occur in the fishway, they are still passable. The other thing is that in every year during these periods there are little bumps that go up and when the flow goes up, etc. That's typically when fish take their cue and go, and so they might -- you know, they might hang around for a while, fairly typical, and then go when the flow's right or they may just continue going. But that's not a -- that's not a

black and white will pass, won't pass line. So, that's my take on it.

Q. Will reduced stream flows decrease Steelhead productivity above the Yellow Pine Pit?

A. No, because there's no Steelhead up there.

Q. So stream flows have nothing to do with Steelhead productivity because none currently exist?

A. Not upstream because the fish aren't there.

Q. On Exhibit 63 I understand this to be -- could we go to the first page of 63? It says Nez Perce Tribe and Save the South Fork Salmon Fisheries Expert Report Rebuttal for Perpetua Resources Water Right Application. Do you see that?

A. You're talking about the first page?

Q. Yes, sir.

A. Yes, I do.

Q. Did you assist in preparing this rebuttal to the Nez Perce Tribe's expert reports?

A. I did.

Q. And if you'll go to page 30 of the document. Does page 30 through 35, Section 4, Nez Perce Tribe Fisheries Expert Report Rebuttal, Fisheries Issues, represent your critique of the expert report filed by Kinzer & Ackerman?

A. Yes.

Q. Now, I'm not going to make you go through and read



all five pages, but I just want to talk generally about some of the shortcomings you identified with the work of Kinzer & Ackerman; is that okay?

A. Uh-huh (affirmative). Yes.

Q. Do you take issue with the hydrology characterization of the location and the duration of withdrawals that Ackerman & Kinzer identified?

A. Yes, I do.

Q. And why is that?

A. And the reason is, is because they didn't get the hydrology right. They assumed that these withdrawals would occur all the time without stop. They would occur -- some of those withdrawals they assumed would occur in Meadow Creek, but, you know, surface level withdrawals, and that's incorrect. So essentially they created sort of a worst case situation that would never happen, and so since although their subsequent analysis are based on that high -- that improper hydrology, then, all the other results that flow from that are also kind of at risk of being wrong.

Q. So hydrologically speaking, they kind of set up a strawman. They said, here is this really, really bad hydrological situation that isn't true?

A. Yes. Right.

Q. And they beat up the strawman?

A. Yeah.



Q. Okay. What should they have done?

A. Well, you know, that's just an opinion, but I think that they should have been given access to a more complete body of information. I saw their reports was just a limited set of five or six reports, which didn't really give them the right context for assessing the impact of these things because there's lots of other things happening. They didn't say, well, the stream is going to be -- this stream is going to be an approved section -- section is going to be approved or restored, but it's going to have the hydrology effect. They just said the hydrology is going to be affected. So -- say the question again.

Q. They relied on a limited set of data --

A. Yes.

Q. -- to make a bigger conclusion (inaudible)?

A. Yes, they did. And then they -- they took that, and then jumped off to population effects for the larger basin that aren't based in any literature or knowledge or data that they presented.

Q. Do you take any issue with some of the streams that they did select to draw data from?

A. Well, on the phs analysis -- that's physical habitat simulation modeling that they did -- and on the productivity analysis they took those from different streams that are not the same as the stream that they were applying



the results to. And that's kind of a scientific no-no. When you do a transfer of data like that, you're supposed to say, okay, well, this is different from that, so we have to take it with that caveat. And then this stream doesn't have this species and this stream does. They didn't really do any of that. They just took this and said it applies here.

Q. Why is it problematic to take data from, say, a stream -- from the next watershed over, to say what happens in that stream will necessarily happen in this stream in this watershed? Why is that bad?

A. Physical habitat conditions can be very different. Johnson Creek and some of the areas I looked at there is a much lower gradient stream than the East Fork, South Fork. The fish populations are not the same. And so competitive relationships, et cetera, between the species might be different. There's a whole variety of factors that you should consider when you transfer data like that, and that's just, you know, not really -- not really appropriate. Especially if you don't acknowledge those differences and sort of interpret them. That was not done. They were just applied as if this equals that.

Q. That they were exactly the same thing? How does getting that wrong, what you just discussed, how does getting that part wrong impact the reliability of their conclusions?

A. Well, if you don't know how applicable they are, then there's a great amount of uncertainty about whether they apply or not, and so -- and you can see any subsequent analysis saying that this change in flow will cause this change in productivity, that may be true in another stream with different fish assemblages and habitats, but it doesn't mean it's exactly true or even approximately true for this stream.

Q. In their conclusions were Ackerman & Kinzer, were they addressing localized effects on fish or more broadly undefined populations of species of fish?

A. They did both, but the problem that I have with that is they would say something like, well, this much flow is going to change productivity. This much -- they never really related that to the number of fish. They didn't relate it to the number of fish that might be affected to the population. You know, when you have a -- when you have a population of young Chinook that rear and leave and come back, you might have only a return of less than one percent of that population coming back as an adult. And so, you know, they say -- they just don't make those kinds of conclusions and use, so this -- you know, if there's fish density information that was available to them, and so they could have related these things to numbers and actual impacts using much more data that was just not done.



Q. How does Ackerman & Kinzer's lack of reliance on actual population numbers of fish and specific fish just localized to the area, not just generally, how does that impact the reliability of their conclusions?

A. Well, it creates a lot of uncertainty about the applicability of those and subjects their analysis to error.

Q. I think you said earlier that you took some issues with how they characterized the water rights withdrawals, whether 9.6 was used all the time or --

A. Yeah, okay.

Q. What -- why is that problematic? That's the strawman issue?

A. Yeah. Can you say that question again?

Q. Sure. It was a bad question.

A. Make sure how to answer what you are --

Q. How did those experts characterize Perpetua's water rights withdrawal?

A. Well, what I saw is that they confounded it with both potential effects upstream of the withdrawal and potential effects downstream of the withdrawal and didn't really tease out what that water right effect was because they said a lot of that water was also going to be taken upstream out of Meadow Creek, which is not correct. And so it confounded the analysis and made it difficult to actually say what they were talking about in terms of the water right



because of the hydrology errors.

Q. And, again, that would lead to faulty conclusions?

A. Yeah, yeah.

Q. Did the experts discuss the impacts to Steelhead, including Steelhead above the Yellow Pine Pit?

A. Yes, and they really didn't make a clear distinction. They didn't say like, this is what we know about populations of Steelhead downstream. This is what we know about populations of Steelhead upstream, which there aren't any. And then they said, well, there would be productivity effects from those withdrawals upstream of where the fish are not now, and if there's no productivity right now for the species, there can be no impact on productivity on those species.

Q. So to the extent that the experts were addressing Steelhead productivity above the Yellow Pine Pit, that is misleading?

A. That was misleading and incorrect. At this point if Steelhead do get up there as a result of the fishway and start reproducing, that would be an increase in productivity.

Q. One fish --

A. In that area. In that area.

Q. -- one fish volitionally getting up there is more than the zero fish that are currently up there?



A. Well, you kind of need two.

Q. Two. I get you.

A. To tango.

Q. Did these experts find statistically significant relationships between flow and juveniles?

A. You know, they stated that, but, you know, they never give the source of their data. That's the problem I had. You know, they didn't provide complete citations. They just said, we did this analysis. Now, I'm familiar with this analysis already from back in 2018 when we were in informal consultation with the agencies, not only Fish and Wildlife Service and NOAA fisheries, but a whole bunch of other agencies. And we talked about these analyses, and we said that there were some limitations to those. And there was a technical memorandum by -- not Miller. Trying to remember right. I've got it handy. But they did not -- they used that population data from -- from Johnson Creek, but they showed no significant relationships between any of the flow parameters and juveniles, which doesn't match up with what they said in this report that they said there were significant relationships. So, that seems to conflict with NOAA's technical memorandum on the topic.

Q. Is that the technical memorandum from Marvo (phonetic)?

A. Yeah. Yes.

Q. So -- so the experts reached conflicting conclusions with respect to flow and juveniles than NOAA reached; is that --

A. Yes, and that's assuming they used the same data. Well, there's -- you know, this data comes from the same place. It's data collected as part of the Johnson Creek scape, the program down there for monitoring fish and supplement population of fish in Johnson Creek. So I'm assuming they use the same data, but that's the problem, they didn't say so it's -- you can't even tell what data they used.

Q. Did the experts analyze the other benefits of the project to fish that will come online once the water right is approved and the other permits get approved, or did they just analyze the impact of the water right use with the withdrawal of water?

A. They attempted to isolate it to just that effect, which is really, in my mind, taking it completely out of context because --

Q. Why is that?

A. Well, there's a whole bunch of other things that are happening in the fisheries management plan and getting fish up there to the fishway that actually affect -- that will affect the populations and well-being of those fish. So it was just sort of like looking through blinders.



Q. So to that analogy, if you're looking through blinders just at the water rights removal and saying, if you remove water, X will happen to fish --

A. Uh-huh (affirmative).

Q. -- but you ignore all the other parts that are going to come along with that water rights removal, that gives a false sense of reality?

A. It does give a false sense of that, yes.

Q. Did the experts only address fish in this localized project site area or did they look more generally at the region or other watersheds?

A. They pretty much did it for just the project and the water right, but then they made statements about how that would affect the broader population, but those statements were not supported by any literature, data, or references. And there's a lot known about the numbers of returning adults and populations up there, but they didn't seem to use any of them.

Q. So overall high level, as an expert yourself, what is your expert opinion of the expert opinion of the Tribe's fishery experts?

A. I would have a hard time relying on it because of all the things that I said.

Q. Overall, in your expert opinion, do you believe that the project is good for fish?



A. I do believe that it is good for fish, and I will caveat that by saying, yes, there will be some benefits and some minor sort of localized effects on fish during the project. See some beneficial things during the project for fish, but the most important part is in the longterm it will achieve some very important objectives for these species, especially Steelhead, Bull Trout, and Chinook Salmon. And if you go and look at the recovery plans for these species by the Fish and Wildlife Service and by NOAA fisheries, NMFS, you'll see that some of their priorities for restoring the basin are going back and recovering, you know, abandoned mines from -- from continuing to impact the fish populations to reestablishing, getting rid of barriers that are stopping fish from accessing historical habitats, and reducing sediment. And this project is going to be addressing all of those for the longterm.

Q. And so the longterm benefits for generations on fish, does that leave you, as an expert, to believe that this is a project that should be approved and a permit that should be issued?

A. Yes, I do, and it's entirely consistent with what Perpetua's theme for the project is: Is do the mining but restore the area.

MR. WATKINS: Thank you, Mr. Leonard. No further questions.



MS. ROGERSON: Mr. Hearing Officer, can we just take a quick five-minute bathroom break?

HEARING OFFICER: Yes. We can take a break.

(Recess.)

(Reconvened.)

HEARING OFFICER: Okay. We're back on the record. Ms. Rogerson, you may proceed with cross-examination.

MS. ROGERSON: Thank you, Mr. Hearing Officer. One moment while I pull up my notes, please.

HEARING OFFICER: That's all right.

CROSS-EXAMINATION

BY MS. ROGERSON:

Q. Mr. Leonard, it sounds like you're quite familiar with the Nez Perce Tribe's fisheries work.

A. I think I'm fairly familiar with it at eye level, yes.

Q. Okay. What's been your experience with the Tribe's fisheries department?

A. Well, you know, I haven't had direct experience with the Tribe's actual program. I've read about it, and I'm familiar with their stocking of the upper -- of the upper East Fork Meadow Creek, and I've read some of the reports by Rob, Robe, which reports on a lot of the data. But I don't have a lot of -- you know, I haven't been -- haven't participated with the Tribe in any of those things.

Q. Oh, okay. Are you aware of sort of the scope and nature of the Tribe's fisheries work?

A. At a high level.

Q. Can you tell me what you know?

A. That they're involved with the (inaudible) program, which is the Johnson Creek something supplemental program. I'll just call it (inaudible), and they trap fish coming upstream and downstream and count the number of fish leaving and count the number of fish coming up that had traps, and document that and use those at some hatcheries cooperatively with other agencies to raise fish and supplement the populations there.

Q. And can you let us know where Johnson Creek is relative to the proposed project site?

A. Downstream about 20 miles roughly.

Q. And it's a tributary to the East Fork, South Fork Salmon River? Does that sound correct?

A. Yes.

Q. Have you worked with any -- have you met or worked with any of the Tribe's fisheries staff in any capacity?

A. In initial -- in our informal consultation meetings as part of Endangered Species Act program and planning for the eventual biological assessment and buyout by the two agencies NMFS and Fish and Wildlife Service.

Q. So tribal staff were present in a few of those



meetings?

A. Yes, periodically, periodically, not consistently.

Q. Are you aware of the size of the Tribe's fisheries department?

A. No.

Q. What is your understanding of the objective of the Tribe's fisheries department? Why does the Tribe have a fisheries department, to your knowledge?

A. To supplement largely Chinook populations in the upper East Fork through an artificial program. There's both nature spawning fish, and then there's artificially supplemented fish, and that program is to assist those populations.

Q. I think I'd like now to pull up Exhibit 34 if we could, Jean, and I believe that's the fishway operations and management plan. And I believe we want to be on pages 1-9, and that's bates 4067. So we'll have to find that for you, Mr. Leonard. I think it should be at the end of this binder.

A. What's the exhibit number?

Q. Exhibit 34.

A. And what page?

Q. 1-9. Is that what we have up on the screen?

A. Which is page 21, exhibit page 21.

Q. Sorry. The bates number on it ends in 4067. Do



you see bates numbers on the bottom of those pages?

A. Yes, and I'm on page 1-7 -- 1-9.

Q. Okay. Correct. Great. So I believe that this page states that the fishway will be designed and implemented to provide, quote: Safe, timely, and effective passage, and then goes on to provide the following -- a few definitions. Have you located that passage on the page?

A. Are you talking about No. 3?

Q. Yes, I believe I am. Do you understand what this page means when it says: Safe, timely, and effective passage?

A. I believe I do, yes.

HEARING OFFICER: Mr. Leonard, can you pull that microphone? Keep it close to you. It just makes it easier for the people in the back.

A. Yes, I do.

Q (By Ms. Rogerson) What do you believe it means in this context, wherein the fishway operations and management plan? And this is referring to Perpetua's proposed tunnel.

A. Safe meaning not damaging fish. Timely means design and operating the fishway according to what's known about the timing of when fish arrive, and understanding that fishway is operated within the criteria and site specific analysis to allow those fish to pass upstream, as well as



downstream.

Q. And what about effective?

A. Effective is -- is a -- is typically referred to as some sort of percentage about -- between the fish that arrive at the fishway and those that successfully exit the fishway after passing it.

Q. Okay. Great. This sort of safe, timely, and effective passage term is commonly used when discussing fish passage facilities; is that your understanding or your professional experience?

A. Those two get mentioned a lot of times associated with fishways, yes.

Q. Okay. On the page you're looking at, page 1-9, I believe safe passage is defined as, quote: The movement of fish in a manner that does not result in unacceptable stress, incremental injury, or death of the fish. Do you see that definition?

A. I do.

Q. Do you agree with that definition?

A. That that's what safe passage means?

Q. Yes.

A. Generally speaking, I do.

Q. On that same page, timely passage is also defined. Do you see that definition?

A. I do.

Q. I believe it is defined as the movement of fish in a manner that proceeds without substantial delay or impacts to essential behavior patterns or live fishery requirements. Do you agree that that's the definition?

A. I agree with the definition generally. It does not define things like substantial and essential, so those are left open to interpretation.

Q. And then I'd just like to move on to the third definition of effective passage, which I believe is defined as the successful movement of target species resulting from a favorable alignment of structural design, project operations, and environmental conditions during one or more key periods. Do you see that definition?

A. I do.

Q. And do you agree with that definition?

A. Just a second. As concepts to guide the design and operation of fishways, yes.

Q. I'd like to now turn to the NOAA 2022 fish passage criteria that we used yesterday as a demonstrative. I believe this is proposed Exhibit 246.

A. Yes.

Q. Can we go to page 68 of the document? We are looking for header 4.1.

A. Page 68 is not 4.1. It's 5 something. Did you say page 68?



Q. I did. We will find it here. I think we need to go up. My apologies. I must have transposed the numbers. There we go. What page are we on?

FEMALE SPEAKER: 40.

Q (By Ms. Rogerson) 40.

A. I'm there.

Q. Great. So I believe 4.1 starts with a fish -- quote: A fishway design and facility must allow for the safe, timely, and effective passage of fish within a specific range of stream flow bracketed by high and low flows. Do you see that statement?

A. I do.

Q. Do you agree with that statement?

A. Based on my experience, that should probably say a fishway facility should be designed for the safe, timely, and efficient passage of fish within a specific range.

Q. But it doesn't say that. It says, it must allow for the safe, timely, and efficient passage of fish; is that correct?

A. I know fishways that do not, so I can't say that it must is the most appropriate word there.

Q. Okay. But that is -- this is NOAA's criteria or NMFS, as you were referring to them yesterday; is that correct?

A. Well, this is a document that was written



interpreting those things. It doesn't provide a citation to actual guidance there at that point.

Q. Okay. So it sounds like you don't agree with the full statement? You think it should allow for the safe, timely, and effective passage of fish; is that fair?

A. That's probably a better way to put it.

Q. Okay. And would the low flow that it's referring to there be sort of the 95 percent exceedance flows?

A. I think that's how they define them in NMFS's criteria for the design.

Q. We heard from Mr. Bosley yesterday that the 2011 and 2022 NOAA fish passage criteria are substantially the same. Is that also your understanding?

A. Could you say that again, which two set of criteria?

Q. The NMFS or NOAA 2011, and then I believe it was the updated 2022 NOAA fish passage criteria.

A. They're substantially the same?

Q. Yeah.

A. Yeah, not exactly, no.

Q. Do you know what the differences are?

A. I can't recall.

Q. Okay. But it is your understanding that this proposed tunnel has been designed in accordance with NMFS or NOAA fish passage criteria?



A. That's my understanding, yes, and that has been the case in our dialogue with NOAA as well consulting.

Q. Okay. And is it also your understanding that were Perpetua to do any redesigns of the tunnel moving forward, that those redesigns would also be in compliance with NMFS or NOAA fish passage criteria?

A. Yes. Let me restate that. You said in compliance with, but those are general guidelines, and they recognize right in their guidelines that that's supposed to be adapted to the situation and adjusted in consultation with them which is exactly what's being done.

Q. Okay. You testified, I believe on direct, that there's an adaptive management strategy in place; is that correct?

A. Yes.

Q. And so in the event that fish are not able to get to the tunnel sort of the plan would be to have a trap and haul program?

A. That's correct.

Q. Sort of similar to what's happening up at the site now; is that correct?

A. No, there's no fishway present in the other program that you're referencing, and so this is adapted to the conditions at the actual -- that we are likely to occur right at the downstream end of the fishway where fish come

up and enter, and it's designed to watch and monitor that. And if -- and if it's not working the way that one would hope or optimally, that that choice of trapping and hauling could be employed. And there are going to be criteria that are agreed upon with the services, fish (inaudible) and NOAA to -- like how long do you wait before you trap and haul, you know, those kind of things. And that's the adaptive part of it because it's going to be monitored heavily with video and people and tagging and a variety of other things that will tell how the fishway is working.

Q. Okay. So just help me understand, what is the distinction between the trap and haul program that Perpetua would propose as a backup and the trap and haul program that Idaho Fish and Game and the Nez Perce Tribe are currently implementing at the site?

A. Well, it's substantially the same in the sense it involves putting fish in a truck and transporting them to another location and letting them go.

Q. Okay.

A. But it would be a much shorter -- it would be a shorter distance for trucking.

Q. Okay. I believe we heard testimony yesterday, and I honestly cannot remember who it was from, that trap and haul is not usually the preferred policy or option of many management agencies, including NMFS and Idaho Fish and Game.



Is that also your understanding?

A. In some situations trap and haul has been decided to be the primary way to do it, and I have, you know, examples of that where when they evaluated the option they said the best thing here is to allow fish to come up to the location, collect them, put them in trucks, and take them upstream a long distance, and as the primary means. So that's really -- you know, you always want volitional to happen before trap and haul, but so it's flexible, and as a combined strategy can be really good if, you know, some fish are volitionally making it up and some aren't. Like a different species or certain time, and so that's a pretty effective way of making sure that the objective of getting fish up there is met.

Q. Okay. So you just said that I believe that volitional is usually the primary, and trap and haul is --

A. That's -- that would be the goal.

Q. Okay. And why would it be the goal from a fish biology standpoint?

A. Because it doesn't allow -- it doesn't require you to handle the fish and transport them. They do it themselves.

Q. And why is handling fish not ideal?

A. Well, it's -- you know, it has a cost associated with it, and there is some handling, as the folks involved



in the Nez Perce Tribe, they do trap -- or they do collecting and hauling fish up there and sometimes, you know, it has to be done. It has to be done well-oxygenated water, special nets not to hurt the fish, et cetera, but you always get a little bit of expected mortality when that happens. And it's to be avoided, but it can't always be.

Q. Would it be fair, then, to say that trap and haul can sort of stress fish?

A. Sure.

Q. Okay. So remind me. So the trap and haul program would be a backup were the tunnel not to operate as designed or why would there be a scenario under which trap and haul would need to happen given Perpetua's fishway plans?

A. Because it's prudent to do. You've got the fishway there. You know the fish are going to arrive, and it would be very disappointing at the end if some of them -- some of those fish were not getting up there as quickly as one might hope. So you provide an adaptive backup for that. And stress from that may be -- may be even similar to stress, fish get normally trying to pass upstream even in natural channels. So it's really -- it's really designed as an appropriate backup to be used when necessary to achieve the goals of the passage.

Q. Okay. I just wanted to tease out something you just said there because I was assuming that trap and haul



would be used if the fishway turned out, despite best design, you know, work was not actually passing fish, but I think you said as perhaps trap and haul be used if fish weren't passing as quickly as one would like. So is there a world in which the tunnel is working at some sort of reduced capacity or can you just help me understand sort of --

A. Not all fishways pass fish with a hundred percent efficiency, and that's where the efficient comes in.

Q. Okay.

A. So it's well-known that fishways don't pass fish a hundred percent of the time. You hope that they do, but it's prudent when they don't if you have -- if you saw the same couple of fish hanging around down there and they just didn't seem to want to go up even though other fish were going up or different species, it would be prudent to go ahead and get them up there.

Q. Okay. Thank you for that. So just going back to that definition of safe, timely, and efficient passage, how does what you just described relate to that definition?

A. It's all goals of the program overall. The goal is safe, efficient, timely passage. It's always the goal at all fishways. All fishways don't operate that way. Some fishways just for one reason or another don't operate as well as others. This one, I think, is very well-designed and we are working with the agency that's in charge of the

species to make those adaptations and we know and have had dialogue with them that there is probably going to be some additional measures as part of the trap and haul to adapt -- to achieve that as much as possible.

Q. Okay. I understand that, but it's nevertheless possible that the fishway won't provide safe, timely, and efficient passage; is that a possibility?

A. Anything is possible, I suppose.

Q. I think since we are talking about adaptive management here, I was just hoping to explore that a little bit more. So it sounds like trap and haul is a potential adaptive management solution if the fishway isn't operating quite as folks had hoped it would be. Are there any other adaptive management steps that Perpetua might take if the fishway isn't operating optimally?

A. Yeah, I think there could be. I mean, there might be some engineering adjustments that could be made. I'm not an engineer, and I don't know how realistic that would be to make that. But what I do know is that enough monitoring is being planned for that to actually watch and monitor the fish movement there. Those kinds of things will give us ideas during the adaptive management phase to make any adjustments that are possible, in consultation especially with NMFS and Fish and Wildlife.

Q. Okay. Is it possible that if the fish tunnel



wasn't operating optimally that folks maybe even in consultation with NMFS might decide that they need to increase flows through a tunnel in order to facilitate fish passage?

A. That might be one of the universe of things, but, you know, that is -- you know, we don't know that at this point.

Q. Okay. So I'd like to turn back to Exhibit 34. I believe you still have that in front of you, is that correct, or is it in the big, black binder? And we are looking for page 1-4, I believe, but I struggle with my images apparently. So I'm looking for 1.1.3.

A. I'm sorry, we're talking about Exhibit 34?

Q. Yes, and I believe you're on page 1-4.

A. Yes.

Q. What is the section header you see on that page?

A. 1.1.3.

Q. Excellent. We're in the right place, then. Can you look at the paragraph and bullets at the bottom of that page?

A. Uh-huh (affirmative).

Q. What does the paragraph that begins with the 5th and 95$^{th}$ percentile, that's that -- that's that final paragraph there, what does that paragraph describe?

A. Are you talking about the paragraph that starts the



5th and 95th percentile stream flows --

Q. I am, yes.

A. -- were selected based on fishway design recommendations of the National Marine Fisheries Service for high exceedance and low exceedance stream flows, based on the hydrologic analysis, site specific hydrologic analysis.

Q. And that 90 -- and those low extreme flows there are identified as the 95th percentile exceedance flows?

A. That's what it says here in the document, yes.

Q. And what do the following -- the bullets that follow that paragraph describe about the exceedance stream flows that should be calculated?

A. I can read from what it says.

Q. Yeah, go ahead.

A. The fishway -- the fishway is on high flow is the mean daily average stream flow that is exceeded 5 percent of the time during the periods for which a given species migration period.

Q. And can you read the next bullet, please?

A. The fishway design low flow is the mean daily average stream flow that is exceeded 95 percent of the time during periods for a given fish species migration period.

Q. So based on the fishway operations and management plan is it fair to say that the tunnel design is based on species specific exceedance flows?



A. Yes.

Q. I'd now like to direct you sort of three pages down in that same section. So we're still in 1.1.3, and I'm going to pages -- page 1-7, which I believe should have the bate stamp number ending in 4065.

A. Yes.

Q. I'm looking for table 1-2.

A. I'm there.

Q. This table provides species specific 95th percentile exceedance flows; is that correct?

A. Let me look. Yes, it does.

Q. Are you able to determine from which U.S.G.S. gauge those flows were calculated?

A. Not from the table, no.

Q. Could you turn to the next page 1-5? Probably 1-8. Are you able to determine from this page what U.S.G.S. gauge is being identified there on that table?

A. I do not see a reference on that particular page --

Q. Yeah, let's go back --

A. -- citing a specific gauge.

Q. Yeah. Let's go back to page 1-7, if we could, Jean. You're not seeing it on that page either, I'm assuming?

A. It's on the page previous.

Q. Oh, okay.

A. Two page previous.
Q. So which page is that table referring to?
A. The East Fork, South Fork stream gauge near Stibnite is U.S.G.S. gauge 13311250 is very close to the proposed location of the downstream portal of the stream flow period of gauge and record was limited to 2011, 2017, and then they go on to say how that period was extended using other data.
Q. Okay. So is it fair, then, to say that the table that we were looking at that was on that page, that provides species specific 95th exceedance flows is based on the U.S.G.S. gauge which is on the East Fork, South Fork Salmon River above the confluence with Sugar Creek?
A. I believe that's correct, as adapted for the period when fish were -- are designed for the fish, occurring during certain periods, not the whole record. It's the record during that period that is important for that species.
Q. Can you just elaborate on what you mean by that?
A. Well, the flows during ones when no fish are coming up are not important or --
Q. It's for the passage period for those --
A. It's for the passage period, yes.
Q. -- for those species; is that correct?
A. Yeah.



Q. Okay. Great. And does table 1-2 also provide time periods for each species and which volitional passage is to be provided?
A. It appears so, yes.
Q. Could you just read those time periods for us?
A. Here you're talking about table 1-2?
Q. Yes, please.
A. Time periods for Chinook Salmon adult July 8th through September 30th. Bull Trout same period. Steelhead April 1st through May 31st. Juvenile salmonoids year-round.
Q. And does that sound -- do those time periods sound right to you based on your professional experience?
A. Yes, they do.
Q. Okay. I would now like to turn to Exhibit 46, and this was admitted into the record yesterday, I believe. We're going to have to get you a new binder, I think. It's going to be in this one.
A. 46.
Q. Yes, please. Have you been able to locate the exhibit?
A. I'm at the first page of that exhibit.
Q. And are you looking at the technical memo from McMillen Jacobs related to the 15 percent design alternatives analysis?



A. I am.
Q. And is it your understanding -- well, are you familiar with this document? Let me ask you that first.
A. I have reviewed it at some point in the past, yes.
Q. Okay. And is it your understanding that this document includes fish passage components for Perpetua's proposed fish passage tunnel?
A. That is how it's labeled.
Q. Okay. Great. I'd like you to turn to Section 2.1 and table 1.
A. Uh-huh (affirmative).
Q. Which should be entitled design criteria?
A. Fish passage design guidance criteria.
Q. Thank you for that clarification. We discussed this table with Mr. Bosley, I believe. I'll let Jean catch up with us here. There you are. Excellent. Okay. So the title of this table is fish passage design guidance criteria NMFS 2011; is that correct?
A. Correct.
Q. Okay. Can you please turn now to the second page of that table. It's the fish ladder section that I'm trying to locate.
A. Uh-huh (affirmative). Yes.
Q. Okay. I believe it says on that -- in that section: Fishway overflow weirs should provide at least one



foot of depth over the weir crest. Can you locate that language? I believe it is in the second row under flow depth under fish ladder.
A. Fishway overflow weirs should provide at least one foot of flow depth over the weir crest, yes.
Q. And then it says, streaming flow preferred?
A. Uh-huh (affirmative).
Q. Do you understand that one foot depth to be the NOAA criteria for fishway weirs, or the NMFS criteria? Excuse me.
A. I'm reading that here now, and that's what it says.
Q. Okay. Unfortunately I'd now like to direct you to Exhibit 47, which I'm hoping is in that same binder for you, which is the McMillen Jacobs supplemental tunnel hydraulic modeling report.
A. Uh-huh (affirmative). Yes.
Q. And are you familiar with this document?
A. I've reviewed it in the past sometime ago, as a matter of fact.
Q. Can you turn to Section 1.2.1?
A. Yes.
Q. I'm going to wait for us to catch up for the folks online. Past purpose is the header on that section.
A. Uh-huh (affirmative).
Q. This section starts with: The purpose of this task

is to provide supplemental hydraulic modeling of the tunnel fishway and to investigate the lowest possible tunnel fishway flow that satisfies established fish passage criteria by modifying the fishway weir geometry, close quote. Is that what you're seeing on the page there?

A. That's what I'm seeing on the page.

Q. Do you understand that statement to be the purpose of the modeling contained in that report?

A. I'm not the right person to ask about that because I wasn't involved in the modeling.

Q. Who would be the right person to ask?

A. Gene Bosley.

Q. Bosley.

A. And as he referenced, other people that were involved in the creation of that document since it's a McMillen Jacobs document.

Q. Can you now turn to table 1 on the following page?

A. Yes.

Q. What does this table tell us about the design criteria used in that modeling analysis, if you can determine that from the table?

A. It says the table is entitled design criteria to be reviewed.

Q. Uh-huh (affirmative).

A. And it has design criteria that -- it has, you



know, things like flow depth, velocity, hydraulic drop, minimum weir length.

Q. But it looks like in that first row it again repeats at the minimum flow depth value is one foot; is that correct?

A. The table suggests that that is a criteria to be reviewed.

Q. Great. Thank you. Are you aware of any modeling that Perpetua has done for their proposed tunnel using a lower flow depth criteria than one foot?

A. I heard that yesterday as mentioned by Gene.

Q. Could you now turn to, I believe, table 6 in that same document, which should be on page 11?

A. I'm sorry. Could you state that again, which table?

Q. We are on table 6, and it is on page 11, it looks like, of that same document, subsection 3.2.2.1 entitled one foot flow depth.

A. Yes.

Q. As I read it this table shows that 6.6 cfs will only provide a 0.92-foot flow depth over the weir crest. Do you agree with that reading of that table 6?

A. That's what it says in the table, yes.

Q. And that would be below the one foot NOAA depth criteria that we saw earlier in this document; is that



correct?

A. If you're asking if .92 is less than 1.0, that's correct.

Q. That is what I'm asking. Thank you. Can we now turn to page 12 of that report? And we should have figure 5 on that -- yes, we have figure 5 on that page. Figure 5 appears to be a calculation of a minimum flow that will meet the modeled criteria. Do you agree with that description of the figure?

A. Are you talking about the figure?

Q. Figure 5, yes.

A. It looks like it's a case study. Results were estimating flow rate corresponding to one foot depth. That's what I can tell you about that, as I didn't prepare that.

Q. Okay. That's fine. Thank you. And what is the minimum flow that will meet the model criteria, according to that table, or that figure, excuse me? Can you just try and interpret what the table is actually representing?

A. You know, I'd be loathed to try and interpret this as the work of an engineer. I'm not an engineer. It seems to be exactly what it says (inaudible) estimating the flows of one foot may occur with a little bit of confidence around that because -- intervals around that because we know that these things aren't absolute, and there's variance in the



depth as the flow goes through over those weirs. It's not a constant flow. So it seems to be an exploration of that.

Q. Would it be fair to read that table as stating that 7.25 cfs is at the one foot depth mark?

A. I'm sorry, can you direct me to where you're --

Q. Well, can you just walk us -- can you just walk us through? It's a little bit hard for me to see, but can you just walk us through the axis and what they demonstrate on that figure?

A. X axis is flow rate through the weir, I assume, through the -- over the weir, and on the Y axis is flow depth.

Q. And what are the lines on the figure representing?

A. I don't know.

Q. You don't feel like you can interpret that figure?

A. Well, it has flow depths, and it has confidence intervals. And then it has a line joining those, and it has a couple of reference flows in red lines. But as I didn't do that modeling and didn't create this report, I would be -- I would not be qualified to go further than that.

Q. Okay. As I read this figure it looks to me like if you look at the flow depth axis when you get up to the one foot mark and you then move over to the flow rate axis, that there is a circle indicating flow depth, somewhere a little above 7 cfs. Does that look right to you?

A. If you're talking about -- there is a dot at approximately 7, a little bit more than 7 that achieves depths centering, it appears, around a foot.

Q. Okay. And that would be above the 6.6 cfs number that we previously discussed and that we've been hearing from Perpetua's other witnesses?

A. Well, it would depend on how you interpret those confidence intervals.

Q. Okay. Could we now go to Exhibit 206?

FEMALE SPEAKER: (Inaudible.)

A. I don't have 206.

Q (By Ms. Rogerson) 206 should be coming here. So we're turning back to Perpetua Resources request for technical assistance of Idaho Fish and Game and the Office of Species Conservation. It's always hard for me to say that. That's the technical memo that's appended to the cover letter that was sent from IDF&G and OSC to Officer Cefalo. Can we go to bates No. 47110?

A. I'm sorry? Are we talking about Exhibit 206?

Q. We are.

A. It only has two pages. Oh, attached pages?

Q. Yeah. There's a request for technical assistance appended to the letter.

A. Okay.



Q. So we're going into the request for technical assistance.

A. What page would you like me to be on?

Q. We're going to bate stamp number page 4710, and we will have the corresponding number soon here. Can you scroll down to the end of the page, Jean? Thank you. So we're looking at the second to last bullet. There appears in this bullet --

A. On what page? I don't have page numbers other than the --

HEARING OFFICER: 4710.

Q (By Ms. Rogerson) In the very bottom of the page corner you're going to see a stamp.

A. Thank you.

Q. Okay. Excellent. And you see a list of bullets on that page?

A. I do.

Q. We are in the same place. Okay. So can you read to me the second to last bullet?

A. Establish with the aid of qualified fisheries biologists, comma, additional species specific residency --

Q. I don't believe you're on the same page as we are.

A. I'm on PR10004710.

HEARING OFFICER: Second to the last bullet.

A. Oh, second to the last. I thought you said second



bullet. Sorry. This says: Compare modeled conditions at the fish passage flow (inaudible) percent exceedance and lowest flow with the relevant species criteria, swim speed, body size, minimum water depth.

HEARING OFFICER: One more down. We'll get there.

A. I'm having a hard time with bullets today. Sorry about that.

Q (By Ms. Rogerson) No worries.

A. Fishway adjustments would likely continue changing weir dimensions likely to a narrower opening limited by the need to accommodate Chinook Salmon dimensional criteria 15-inch opening width and 12-inch water depth or changing the distance between weirs to meet the drop height criteria. The present lowest weir opening is approximately 24 inches wide and weirs are spaced according to the tunnel gradient to provide a 12-inch hydraulic drop at each weir.

Q. Thank you. Is it your understanding from this bullet that Perpetua Resources is representing here that the tunnel redesign would maintain a one foot depth criteria?

A. I do not.

Q. So what is the 12-inch reference in that bullet?

A. It's the Salmon -- one of the two Salmon dimensional criteria that would likely constitute changing weir dimensions.

Q. Can you help me understand what that means?



A. I can't. I didn't write it.

Q. Okay. All right.

A. I don't know what they intended. Sorry.

Q. All right. Unfortunately I'm going to have you switch exhibits again. We're going to switch exhibits again.

A. Okay.

Q. Now that we have read that bullet that references the one foot depth criteria, as I understand it, we are now going to turn to Exhibit 219, which is the July 11th, 2023, letter from Perpetua to the Governor's Office of Energy and Mineral Resources.

A. This one is 218.

Q. I know.

A. More bullets. Thank you.

Q. Can we go to pages 9 and 10 of the letter?

A. Uh-huh (affirmative).

Q. And those should be bates numbered 19425 and 19426.

A. Yes, I'm there.

Q. Excellent. There's a paragraph that spans these two pages.

A. Uh-huh (affirmative).

Q. Do you see that?

A. Yes.

Q. As we discussed from the 2022 McMillen report, it

appears to start with the one foot weir depth and 15-inch weir widths. Do you see that?

A. Uh-huh (affirmative). Yes.

Q. But then it continues to say that 6.6 cfs will allow passage through the tunnel. What is your understanding of that paragraph?

A. You're going to have to give me a moment to read it.

Q. Please take your time.

A. Well, it's stating a lot of results from the CDF model that I wasn't involved with, and -- but it -- and -- and I'd be reading into it if I told you what it meant. It appears to me to show -- it appears to me to suggest that modifications can be made to the weir as Gene described yesterday to achieve passage.

Q. Okay. But the McMillen report that we previously reviewed for fish passage used that one foot depth criteria, is that correct, in terms of modeling fish passage through the tunnel?

A. It said it was going to consider those, yeah.

Q. So would it be fair to say that the 0.9-foot criteria cited here from the California Department of Fish and Wildlife is not what was modeled for the tunnel by Perpetua?

A. I couldn't say that, no.



Q. Okay. Can we go back to Exhibit 33? Is 33 contained in that binder?

A. I'm there.

Q. Excellent. This should be Rio ASE's fish passage evaluation for the East Fork, South Fork Salmon River below the tunnel. Is that what you are seeing?

A. Yes, yes.

Q. Technical memorandum. Excellent. This is also attachment C to Exhibit 219 that we were just looking at.

A. Okay.

Q. Are you familiar with this technical memorandum from Rio ASE?

A. To a certain extent I evaluated -- I mean, I read it at some point in the past, and so I'm generally familiar with it and the type of analysis they did.

Q. Okay. So you're on the first page; is that correct?

A. I am.

Q. So I understand from the first sentence of this memorandum that it includes, quote: Hydraulic development results and the evaluation of fish passage at low and high flows from the East Fork, South Fork Salmon River from the tunnel outlet to the confluence with Sugar Creek. Is that your understanding of that first sentence?

A. I'm reading that as you're reading it. That is my



understanding.

Q. So this memorandum addresses the East Fork, South Fork Salmon River downstream of Perpetua's proposed tunnel and not the proposed tunnel itself; is that a correct understanding?

A. Uh-huh (affirmative).

Q. Okay. Can you now go to page 3 of that technical memorandum?

A. Yes.

Q. And the last paragraph.

A. Uh-huh (affirmative).

Q. I believe that this paragraph speaks of minimum depth criteria based on the California Department of Fish and Wildlife evaluation. Is that what you're seeing in that?

A. I'm sorry? You said you believe that that's what it --

Q. Well, minimum depth requirements criteria for all fish species of interest were selected based on passage studies from the California Department of Fish and Wildlife and requirements and guidelines from NMFS. Is that the first sentence you're reading in that last paragraph?

A. Yes. Yes, I see that.

Q. Okay. Can you now flip to the next page and look at table 2?



A. Yes.

Q. Okay. So I believe this table shows a minimum depth for adult Chinook Salmon of 0.9 feet at a minimum depth for adult Bull Trout and Steelhead of 0.7 feet. Is that what you are seeing?

A. Could you state that again? I'm sorry.

Q. Looking at this table --

A. Yes.

Q. -- table 2 --

A. Uh-huh (affirmative).

Q. -- I believe it shows a minimum depth for adult Chinook Salmon of 0.9 feet --

A. Uh-huh (affirmative).

Q. -- in that far right column.

A. Yes, I see it. Yes.

Q. And a minimum depth for adult Bull Trout and Steelhead of 0.7 feet in that far right column.

A. I'm seeing that, yes.

Q. Okay. Is the basis for these flows the California Department of Fish and Wildlife 2017 study?

A. It appears that way as that's how they describe it.

Q. Okay. Can we now turn to proposed Exhibit 238, which is that study?

A. 238?

Q. Yes, which actually should be in that second -- the

219 to 240 binder that I gave you that's green. It will be one of these white binders, I believe. Yeah.

A. Go up to 238.

Q. (Inaudible). Unfortunately these got split into two books.

A. Yes.

Q. Okay. So you're looking at, as you understand it, a study from the California Department of Fish and Wildlife from 2017?

A. Uh-huh (affirmative).

Q. And do you understand this document to be what Rio ASE was citing for their 0.9 minimum flow depth and for adult Chinook -- excuse me, for adult Chinook and their 0.7-foot minimum foot flow depth for adult Bull Trout and Steelhead?

A. From your reading of it before and --

Q. Yes, from that previous table.

A. That's what -- I accept what you said, yes.

Q. Okay. Can you -- can you flip to table 1 of this study on page 20?

A. Yes.

Q. Are you seeing the same flow depths that we've been discussions there, 0.9 and 0.7-foot depth criteria?

A. Yes.

Q. Okay. Can we now go back to page 6? I'd like to



read a paragraph from page 6.

A. All right.

Q. So under the scope of application, can you read that second paragraph for me?

A. This SOP applies only to weighable streams having low gradient riffles with less than 4 percent gradient and substrates dominated by gravel and cobble. This procedure is used to identify flows that support movement of salmonoids through critical riffle sites. Other factors that may be important to evaluate overall migratory success include length of riffle, availability of rest areas, condition of fish water temperatures, and others.

Q. Thank you. So this -- that paragraph explains the type of stream, the 0.9-foot passage criteria for adult Chinook Salmon and the 0.7-foot passage criteria for Bull Trout and Steelhead, apply to, correct?

A. Generally correct.

Q. This is different criteria than what was modeled by the McMillen Jacobs for Perpetua's proposed tunnel; is that correct?

A. You'd have to tee that up better for me.

Q. Well, we were previously discussing the McMillen Jacobs report.

A. Yes.

Q. And did they -- do you remember them citing this



2017 study from California Department of Fish and Wildlife?

A. Yes.

Q. Are these the criteria they used for the proposed tunnel?

A. Apparently, yes.

Q. I want to return to Exhibit 33, Rio ASE's fish passage evaluation.

A. Yes.

Q. So Mr. Bosley testified that the purpose of the McMillen 2022 report was to model the minimum flow to allow fish passage through the tunnel, but the Rio ASE fish passage evaluation doesn't calculate the minimum flow through the downstream reach; is that correct?

A. I don't believe it does. I think it evaluates and presents the conditions that do occur over a variety of (inaudible).

Q. Could you identify in the Rio ASE memo the minimum flow that it does provide? Can we go back and do that?

A. Where do you find that?

Q. I don't find it. I'm wondering if you could find it in Exhibit 33.

A. Do you want me to go through this and look for the memo?

Q. I do.

A. When you search it, does the word minimum come up



anywhere? Let's see if it's in the conclusions. Checking with the conclusions. It doesn't appear to present a minimum flow but rather suggests that these conditions are largely passable during -- in the range of flows that they evaluated.

Q. Can you read that passage for me, so I can --

A. I didn't -- you asked me to --

Q. Oh, I thought you were looking at a passage.

A. No.

Q. Okay. Can you provide --

MR. WATKINS: Objection, Your Honor. We're talking about, if I understand correctly, we're talking about a 246-page document, and they're asking the witness to find the word minimum flow in that 246-page document. I don't think that's a fair question regardless. I'm looking at page 12, and it talks about minimum flow depth, but I think I need a word search on a pdf which the witness doesn't have the ability right now.

HEARING OFFICER: Ms. Rogerson, any response to that?

MS. ROGERSON: The witness testified that he believed that it provided a minimum flow, and I simply asked him to back that up with information.

A. No, I did not --

HEARING OFFICER: Sustained. I don't need anything from you. Sustained. I don't find this line of questioning

very helpful so let's move on.

MS. ROGERSON: We can cover this.

HEARING OFFICER: Thanks.

MS. ROGERSON: I have quite a bit more ground to cover. I just wanted to do a quick time check. We are at the noon hour. Do you folks want to keep going? Okay.

Q. (By Ms. Rogerson) So I just wanted to move on to a different subject. So in your expertise can water diversions or water withdrawals strand fish?

A. Depends on the conditions.

Q. Can you elaborate on that?

A. Well, stranding of fish -- the literature on stranding fish is mostly related to --

HEARING OFFICER: Mr. Leonard, move that microphone a little closer.

A. (Inaudible) is mostly related to very different circumstances than these where the magnitude of flow changes are much greater than what are going to be experienced here through adjustments of -- in the range that we are talking about. And so I -- can you state the question again so I make sure I answer your question?

Q (By Ms. Rogerson) Yes. So I just asked if water diversions or water withdrawals could cause fish stranding?

A. Conceptually, yes. Depends on the circumstances.



Q. How would you prevent them from -- how would you prevent a water withdrawal from preventing -- how would you prevent a water withdrawal from causing fish stranding?

A. It depends on the circumstances. I don't have enough information to sort of tell you when I don't know what conditions --

Q. Let me give you an example. If you were to withdrawal a lot of water from a stream quickly, could you cause fish stranding?

A. How much is a lot and how much is quickly? You know, that's pretty general.

Q. Well, you tell me. At what point would we cause fish stranding?

A. That's totally hypothetical.

HEARING OFFICER: Ms. Rogerson, that's --

A. I mean, I want to answer the question, but it's -- the way, I mean, it's being posed is just --

Q (By Ms. Rogerson) It is my understanding that from looking at Perpetua's water right application --

A. Uh-huh (affirmative).

Q. -- that there are no -- there are no restrictions in the application on the speed with which water can be removed through a water diversion.

A. Uh-huh (affirmative).



Q. And so I'm trying to understand if that could be a problem for fish?

A. You know, the expert reports comment on this, and I didn't agree with their analysis because they used literature that was not applicable here. And what you need to consider is that these streams are already at near base flows, so these withdrawals are not going to cause a lot of potential for that. And something that happens up here might take two hours to get down to there and is so much frictional loss that it's going to be a slow change anyway.

Q. So it's not possible that an amount of water would be withdrawn that would cause fish stranding under the water right application?

A. You know, with those -- with those amounts of changes and the way they are sort of implemented slowly here and there, no, I don't think that there's much potential for stranding at all.

Q. Even in like a low flow scenario?

A. Actually, even more than a low flow scenario because the river has already constrained down to the smallest part of the channel. If it's way up here and it goes down to way down here, that's a greater potential, but if it's already way down there and it just narrows slightly the width of the channel slightly, I don't see that potential at all with these flows.



Q. I'm sorry, what are these flows?

A. The water right flows withdrawals during time of base flows seasons.

Q. Okay. So is it my understanding -- it's my understanding from the previous testimony that Salmonoid species, including Chinook, Steelhead, Bull Trout, and I guess those were the Salmonoid species that were mentioned earlier, have sort of optimum temperature ranges; is that correct?

A. Uh-huh (affirmative). Well, they are optimum for different things. These are complex life cycles, multiple life histories, different requirements at different stages of their life histories. And what's optimum may not be -- you have to say optimum for what. Optimum for growth. Optimum for incubation. Optimum for migration. So there's -- you know, that's a difficult question to answer in a generalized way.

Q. That's fine, but there are sort of -- there's an understanding of optimum temperature ranges for those various life stages?

A. There are, but those are typically not in water -- you know, water quality standards. They usually talk about maximums because that's where the concerns are to not -- it's not growth. And since the temperature changes throughout the year regardless, there are periods when it

can be optimum, periods where it can be naturally less than optimum. So it would have to --

Q. But these are things that we should consider, correct, when you are withdrawing water from the stream? I mean, fish have -- fish have some temperature requirements. There are lethal thresholds for fish.

A. Sure.

MR. WATKINS: Objection to the extent that it calls for a legal conclusion.

HEARING OFFICER: Yeah.

Q (By Ms. Rogerson) So I think you mentioned the Tribe's fisheries report earlier, expert report. I would just like to turn to that. That's Exhibit 201. I'm probably -- no, it should be in the 218 binder -- 201 to 218. Yep, it should be Exhibit 201.

A. It is.

Q. And it's table 1 on page 5.

A. Yes.

Q. Okay. So you're looking at table 1 right now?

A. Yes.

Q. This table describes the three-day rolling mean of daily averages for monthly 95 percent exceedance median and 5 percent exceedance flows at the U.S.G.S. gauge site 13310850 located on Meadow Creek. Is that your understanding of this table?



A. Yes, but it's missing some important facts that would help me understand the table.

Q. Okay. Do you agree that these stream flows accurately represent the Meadow Creek stream flows at the gauge?

A. For -- you know, I cannot --

Q. For the exceedance levels listed on the table.

A. I cannot attest to this because they don't describe how they did that analysis. They didn't say they took flows from this period of record. They didn't say how they did the rolling average. You know, and they don't know -- and it doesn't specify what period of record or what season. Are these year-round flows or are they -- so, you know, it's really hard to say because there is not enough information to do that.

Q. I understand that. My understanding is that the U.S.G.S. gauges are available, but there's a historical set of data and the header on that table says for recent years in which complete data were available. So I'm assuming it's for the data available through the U.S.G.S. gauges online.

A. Okay. I can't assume that, but you can. I just don't know.

Q. Well, I'm just reading the header.

A. Okay.

Q. Given the flows that are represented in this table



is it fair to say that the proposed water divisions by Perpetua, if taken from Meadow Creek, could proportionally be quite large given the flows we are seeing there? 95 percent exceedance representing base flows. Well, as I understand it, and 5 percent of exceedance column representing high flows.

A. I don't understand the construction of your question. Could you help me?

Q. Sure. So my understanding is that Perpetua's applying for a 9.6 cfs water right that could be taken from either their surface water diversion on the East Fork, South Fork or from groundwater wells --

A. Uh-huh (affirmative).

Q. -- near Meadow Creek. Is 9.6 a large percentage of the exceedance flows that you are seeing on that table?

A. This is at Meadow Creek near Stibnite, which is upstream of almost all the withdrawals, the proposed withdrawals.

Q. My understanding --

A. So I can't make that comparison, no.

Q. My understanding is that the 9.6 application applies to all groundwater wells within the project site -- or, I mean, not to all, but there are a number of groundwater wells within the Meadow Creek area that it applies to and that the water right application is not



specific with regard to how much water can be taken from the groundwater or surface water.

A. My understanding it was limited to less than the cfs. I think it was an average about a half a cfs from the wells in total.

Q. Okay. Could we pull up the water right application, which I believe is 1G? We're going to have to get you Exhibit 1G. I'd appreciate it if you could just look through the application and let me know what you believe it applies to.

A. Which exhibit?

Q. 1G, I believe, but I am doing that from memory. Let me check for you.

A. It's an application for permit 77-1437.

HEARING OFFICER: Ms. Rogerson, we need an effective way to go about this. Mr. Leonard, do you know whether there's a .5 cfs limitation in the application?

A. I do not.

HEARING OFFICER: So let's move on to the next question.

Q (By Ms. Rogerson) Okay. Mr. Leonard, can you just tell me in your sort of expert opinion what happens to stream flows during summer months or give me the sort of hydrologic cycle for stream flows.

A. Snowmelt -- snow accumulates in the mountains and

throughout the area. It melts in the spring. Stream flows go up. Stream flows go down in the summer through the fall, and that cycle repeats each year and can be quite variable.

Q. What times of year are sort of -- do fish typically experience the lowest flows?

A. During the summer period. It's usually in the late summer and fall and in the fall to winter when temperatures are a lot colder, et cetera, and things freeze up. It can be low throughout the winter until the repeated cycle of runoff and higher flows.

Q. Okay. And where are we in terms of flows typically during the passage periods we discussed earlier for Chinook and Steelhead and Bull Trout?

A. For Steelhead it's -- you know, Steelhead uses a cue of the highest flows raising flows so they are coming up on that big -- on that big runoff point and getting up during high flow conditions, laying their eggs and getting out of there before things start trailing off on the other side and get lower.

Q. But things can start to trail off in late August, September; is that correct?

A. Yep, yep, uh-huh (affirmative). Sure.

Q. And we still have passage happening through that area?

A. For Steelhead?



Q. For Chinook.

A. For Chinook? Chinook has adapted to a different cycle. They come up in the summer, and they enter up into the river in the winter. They hang out in the winter, and then they come up these streams in the fall and typically are accessing these streams, as we saw earlier, that periodicity part is a really important part of July through September.

Q. Okay. I think the final thing I'd like to do is turn to the fisheries expert rebuttal report that Perpetua submitted. This is Exhibit 63. I don't remember if you have that binder.

A. I don't appear to. Thank you.

Q. Can you turn to Section 2.5.2, which is page 4 of 5?

A. I'm sorry. Can you repeat that section --

Q. 2.5.2.

A. I'm sorry. Are you in Exhibit 63, Nez Perce Tribe, the rebuttal, Perpetua's rebuttal.

Q. It's the rebuttal. Yes, it's the Tribe's rebuttal report. I'm sorry. Sorry --

A. Page 34.

Q. This should be -- this is Perpetua's rebuttal report.

A. All right. I'm getting there.



Q. Yeah, let me know when you get there.

A. I'm sorry. I'm a little confused. This section two is introduction. It only has two --

HEARING OFFICER: Page 30 -- page 34.

A. Oh, 34. Okay. The numberer -- page numbers. All right, I'm there.

Q (By Ms. Rogerson) No worries. Sorry.

A. Thank you.

Q. Could you read the last sentence of the first paragraph for me?

HEARING OFFICER: Of Section 2.5.2 (inaudible).

Q (By Ms. Rogerson) Yes, please.

A. Reading this stream temperature? 2.5.1 full paragraph, last sentence?

Q. Yes, the second paragraph, last sentence.

A. All right. This stream temperature condition would be most pronounced during low flow periods and the proposed low flow water right condition explicitly limits water withdrawal during low flow periods that extend from the summer through the winter months effectively refuting this assertion.

Q. I'm seeing that it says -- are you in the second paragraph?

A. There's an incomplete paragraph at the top. Are we at page --



Q. Yeah, I don't think we are in the same place. Let me just come and take a look at what you're looking at.

A. You can help me.

Q. Yeah. If you could just read the last sentence there. Thank you.

A. All right. Thank you. Limiting water right withdrawals at the Stibnite Gold Project will largely -- will be largely ineffectual to address stream temperature within the project site because the surface water diversion is at a down gradient end of the site limiting effective stream length, stream flow effects of groundwater pumping and are lagged and attenuated in any case.

Q. Can you just -- can you help me understand. Is this statement referring to the short stream reach downstream of the proposed surface water diversion?

A. I assume based on that description that it is.

Q. Okay. And I'm -- I'm trying to understand what this means for fish. So limiting water right withdrawals at the Stibnite Gold Project would be largely ineffectual to address stream temperature within the project site because the surface water diversion is at the down gradient end of the site limiting effective stream length, stream flow effects of groundwater pumping are lagged and attenuated in any case.

A. Yeah. Stream flow sole radiation affects stream

temperature, but it takes a certain length of stream to do that. And I believe what's being said here is that that change in that short period, length of stream would not result in the stream temperature a significant -- sort of measurable change in stream temperature is how I interpret that.

MS. ROGERSON: Thank you. Officer Cefalo, I have no additional questions.

HEARING OFFICER: Okay. Thank you. Ms. Thrower?

MS. THROWER: No.

HEARING OFFICER: Okay. That's fine.

REDIRECT EXAMINATION

BY MR. WATKINS:

Q. Mr. Leonard, thank you for your patience. I want to talk a little bit about trapping and hauling. A little bit about the difference between 11 inches and one inches, and finishing up with the fish tunnel gradients there. So first there was quite a bit of discussion about trap and haul practices at the fish tunnel --

A. Yes.

Q. -- as well as the Tribe's own trap and haul practices. Do you recall that?

A. Yes, I do.

Q. I think you testified that trap and haul could occasionally be used at the fish tunnel if there was, for



whatever reason, a fish that wasn't going up the tunnel?

A. Uh-huh (affirmative).

Q. Is that correct?

A. Yes, yes.

Q. Do you have any idea about the approximate length, meaning miles driven on a road, that a fish would need to be driven up from the bottom of the fish tunnel to the grounds above the fish tunnel?

A. Two miles, three miles maybe.

Q. Do you have any idea of the approximate length that the Tribe is currently trucking fish from downriver to above the fish tunnel?

A. You know, I'm unclear about that, but if it's from the McCall Fish Hatchery, which is I believe where they get their excess stock, I think that's, you know, a much longer distance. I don't know the distance. It's got to be at least 30 or 40 miles and take a real long time because it's very slow on those roads.

Q. Is a distance of 34, 30 to 40 miles a real long time more stressful on fish than the distance of two miles --

A. Yes.

Q. -- in a truck? Would you expect to see more adverse outcomes the longer a fish is trucked versus the shorter distance the fish is trucked?



A. Yes, I would, more stress.

Q. Biologically speaking, fish going up in a fish hatchery 30 to 40 miles away, would you expect them to be genetically different or biologically -- or have a different impact on the ecosystem to an ecosystem 30, 40 miles away versus fish that are only two miles away?

A. Yes, I would. I mean, this is really just a program that is implemented because they feel like they have to supplement as a way to get that done. But it is far from optimum, and the -- the goal here is to get naturally occurring fish up there and spawning so they return and do all this work themselves, both during and after mining. And a hatchery supplementation program is sort of a -- I don't want to call it a Band-aid but sort of like -- it's like what you can do. It's what you can do to supplement it. And I do understand that the objectives for the surfaces are always to maximize the amount of naturally occurring spawning by the fish that have not been raised -- are not of hatchery stock. That's the goal. And so in that sense restoring fish passage is moving towards the goal of being able to have less -- less importance of the supplemental part of it and more of the natural reproduction part.

Q. What are some of the reasons that would cause a fish not to pass up a tunnel?

A. Since you can't interview fish, it's really hard to



tell, and people wish they could interview the fish but it's a matter of their condition. You know, they just -- if it's, you know, return fish, they just came a long way. They might be resting there for a while, and it may appear that they're not ready to go up. But they may go up the next day, and so you don't want them hanging around there for probably more than a few days and that's sort of like, well, let's get these fish up there. So it's really a judgment call about when that happens, and there is going to be monitoring in place for that. Did I answer the question?

Q. Yeah. And does adaptive management as explained in the FARMP, the F-A-R-M-P, allow for that sort of flexibility to --

A. Yeah. So you say, okay, well, we want them to go up the fishway, and if they do, great. If some of them don't and they hang around for a while, we want to just get them up there because maybe they're, you know, in rough shape from, you know, the thousand mile travel from the ocean.

Q. Yeah.

A. Go ahead and get them up there.

Q. Fair to say that the flow of water through a fish tunnel is not the only factor that may cause a fish not to go up the fish tunnel?

A. Yes.

Q. In your 40 some odd years of experience, are you aware of any fish tunnel that transports 100 percent of the fish 100 percent of the time through the fish tunnel?

A. No, far from that.

Q. Currently what percentage of fish are passing passed the Yellow Pine Pit?

A. Zero.

Q. So if we go from 0 percent fish passing to 99.5 percent fish passing, that's better than the current status quo?

A. That would be a good outcome, and the goal of the fishway.

Q. And it would be less stressful from a biological health standpoint than trucking fish some 30 to 40 miles away?

A. I believe so.

Q. There was a number of questions about a 5 percent exceedance flow and a 95 percent exceedance flow. Do you generally remember those questions?

A. Yes.

Q. Would adaptive management measures allow Perpetua to both raise the stream flow, as well as reduce the stream flow?

A. If the water is available and they have the flexibility to do that, yes.



Q. You were shown Exhibits 46 and 47, which were technical memos from McMillen. Do you remember looking at those?

A. Uh-huh (affirmative). Yes.

Q. And in those memos there was a reference to a one or 12-inch one foot flow rate over a weir.

A. Right.

Q. And I believe I looked at the clock, I think it was about 30 to 40 minutes of questions on this line. Do you generally remember that?

A. Yes.

Q. Okay. Those NOAA parameters, in your professional experience, are those criteria requirements that must be followed, that 1-inch flow rate or is that guidance?

A. It says right in the document that its guidance, and it should be used together with site conditions and fish populations and hydrology to find a workable solution. They really would, you know, like you to use those, but they recognize clearly in that document that that cannot always be achieved.

Q. And regardless if one foot is required, the documents you showed saw areas where there would only be 0.92 flow going over those weirs. Do you remember seeing that?

A. Yes.



Q. I did the math on that. .92 of 12 inches is 11.04 inches. Will you agree with me on that?

A. Yes.

Q. From a biological standpoint on fish, would you expect a fish that can pass over a weir at 12 inches to also be able to pass over a weir at 11.04 inches?

A. Yes.

Q. And why is that?

A. You know, these are not absolutes. Conditions in the fishway are not constantly at .92 or .1. There's (inaudible) in there that fluctuates. I'm not sure that the fish, you know, would really respond to that difference at all anyway.

Q. The fish aren't getting out a tape measure and making sure there's exactly 12 inches, right?

A. No.

Q. Okay. Any idea -- this may be an unfair question for you, but any idea how many dams you would expect the fish to come across on their way up before they get to this fish tunnel in their --

A. Remembering my map of the Columbia River system and what I know, I think it's at least eight.

Q. How does -- how do -- how does the Stibnite Gold Project's fish passage tunnel compare to those obstacles of at least eight different dams that these fish have already



traversed?

A. Well, I would say that each one of those obstacles is just another obstacle, and they effectively pass those obstacles. But in some cases they are very different. In some cases they are getting more similar, but down in the Columbia River those dams are -- it's a huge river. And you've got the huge river, and then you've got a passage facility over there, and the fish find that and pass their way upstream. But the types of passageways often are very similar to this pool and weir or other similar designs that have been designed according to the same criteria, and they're pretty effectively passing those.

Q. So if those fish are able to navigate eight different dams, you would expect them to likewise be able to navigate over a one-inch difference between water flow over a weir?

A. Yeah. I don't think that -- it's not even a full inch, but I wouldn't expect that to be the variable that would really affect. That difference would not really affect much the difference of the effectiveness of that passageway.

Q. Finally, could we show the witness Exhibit 238, please? And we're going to look at page 6 on that.

A. (Inaudible). That's not it. Thank you. Yes.

Q. You'll go to paragraph -- or, sorry, page 6 of 238.

A. Yes.
Q. And we're going to look at the second to last paragraph.
A. Uh-huh (affirmative).
Q. And this was read during your direct examination -- or, excuse me, your cross-examination. It says that: This SOP applies only to weighable streams. I'll pause right there. Is the fish tunnel that's being constructed a weighable stream?
A. No.
Q. Having low gradient riffles with less than 4 percent gradient. Is the fish tunnel proposed a low gradient riffle with less than 4 percent gradient?
A. No, it is not.
Q. And substrates dominated by gravel and cobble. Is the concrete fish tunnel have a substrate that's dominated by gravel and cobble?
A. No.
MR. WATKINS: No further questions.
HEARING OFFICER: Okay. Thank you, Mr. Leonard.
A. Thank you.
HEARING OFFICER: I think we'll take this opportunity. It's 12:30. Break for lunch and pick back up at 1:30.
(Recess.)
(Reconvened.)



HEARING OFFICER: Go ahead, Mr. Watkins.
MR. WATKINS: Mr. Hearing Officer, going back to that one email that we reference, it's an October 2nd, 2023, email at 1:00 from Mr. Bassista to yourself.
HEARING OFFICER: Okay. We are back on the record. It is the afternoon session on Wednesday, December 11th -- December 13th, and before we jump in with the next witness I would entertain a motion. We had a discussion off the record about Exhibits 216, 261, and 262, which are the daily stream flow data for three of the gauges within the proposed Perpetua site. Two of those being ones that we've had quite a bit of discussion about of the East Fork, South Fork right above the confluence of Sugar Creek and the Sugar Creek gauge. I would entertain a motion. I don't know if --
MS. ROGERSON: Yes, Officer Cefalo, I would like to move to admit proposed Exhibits 260, 261, and 262 for the record.
HEARING OFFICER: Thank you, Ms. Rogerson.
MR. WATKINS: No objection.
HEARING OFFICER: And with no objection, we'll admit those three: 260, 261, and 262 into the record at this time. Thank you. Mr. Foster, you can proceed calling your next witness.
MR. FOSTER: Perpetua calls Rob Richardson.



ROB RICHARDSON
after having been first duly sworn,
was examined and testified as follows:
MR. RICHARDSON: Yes, I do.
HEARING OFFICER: Have a seat. Go ahead, Mr. Foster.
DIRECT EXAMINATION
BY MR. FOSTER:
Q. Good afternoon, Mr. Richardson. Would you please state and spell your full name for the record.
A. Sure. Rob Richardson, R-o-b R-i-c-h-a-r-d-s-o-n.
Q. And, sir, how are you currently employed?
A. I am a principal geomorphologist at Rio Applied Sciences & Engineering here in Boise.
Q. You were retained as an expert for Perpetua in this matter; is that correct?
A. Yes.
Q. And in what capacity have you provided support for Perpetua?
A. Our company has been involved on the Stibnite Gold Project since -- well, for about the last six years. Prior to that I did some small scale qualitative sediment erosion analysis up on-site, I believe, in 2010 for a prior consultant that I worked for.
Q. And what was the directive that you were given when you were hired by Perpetua?



A. Namely, well, two things. One is to provide volitional passage for fish at the Yellow Pine Pit as part of our restoration after the Yellow Pine Pit has been backfilled; and, secondly, to improve conditions on-site where we have the ability to do so through our restoration design.
Q. And what training and education do you have that qualifies you for this role?
A. I have a Bachelor's Degree in environmental science, post baccalaureate work at a different university in geology and a Master's degree in (inaudible) science specializing in geomorphology.
Q. And what are some examples of other projects you've worked on?
A. Well, our company specializes exclusively in river restoration. That's all we do, and that's all I've done, frankly, for almost the entirety of my career over 20 years. And we work on projects in Washington, Oregon, Idaho, primarily (inaudible) elsewhere. All of our projects are related to river restoration, enhancement, improving conditions from areas that have been previously impacted.
Q. And what types of organizations hire you?
A. We work for the federal government. We work for tribal entities. We work for NGOs. We work for private entities kind of across the board.

Q. And I'm handing you Exhibit 63, and is that the expert report you assisted in preparing?

A. It is.

Q. Now there's three authors listed on that expert report. Let's go to page 5. What role did you play in preparing this expert report?

A. Some discussion on the hydrology and fish passage associated with hydraulic modeling that our company did, the reach below the outlet, the downstream outlet of the tunnel down to Sugar Creek on the East Fork, South Fork Salmon River.

Q. Ms. Franolich, can we zoom in on (inaudible) All right. The last sentence of your bio, will you read that for me?

A. Sure. I'll just read it off of this.

Q. It should be on page 5.

A. Regarding Stibnite Gold Project, SGP, Rob completed a qualitative assessment and erosion study of the site in 2010 and has been working since 2017 as the lead scientist of stream restoration design and stream functional assessment.

Q. And what is stream restoration design?

A. It's sort of a broad category, but, in essence, it's trying to evaluate what's happened to a stream historically to get it to where it is now, identify if it's



impaired as a result of those historical effects, what sort of conditions are appropriate for that stream channel given its environmental setting, and any potential constraints associated with that environment, and then what can be done to effectively enhance or improve that stream to allow it to function more naturally. And then on the design side we take that information and develop an engineering design criteria to create essentially a set of plans that somebody could go out and build or construct to create that end result.

Q. So does that, then, that stream restoration design, overlap the stream functional assessment?

A. Yes and no. Stream functional assessment plays in sort of at the front end and at the back end. The front end, any assessment of the function of the stream helps us identify what the existing conditions are, what may be functioning poorly or functioning well, how we might need to improve that, and then it also provides certain metrics by which we can evaluate our design, both in establishing design criteria to try to meet those objectives to improve those various functional criteria. And also on the back end in monitoring to see did the implemented design actually help improve those metrics as, you know, whatever the goals and objectives were to those.

Q. And how do you collect the data used in stream



functional assessment or stream design, restoration design?

A. There's varieties. Often the partners that we work with have already collected those data. Some of them are readily available. For example, gauge data from the U.S.G.S. Sometimes we go out and collect those data. It's basically using the best available science that we can gather. Often there's a large amount of spatial data, whether it be lidar or light imaging detecting radar, that is basically measuring surface topography. So we pull together what is readily available and collect the data that we need otherwise.

Q. And does this data collection require you to go out to the Stibnite Gold Project quite a bit?

A. Yes.

Q. Are you familiar with the stream functional assessment report for modified proposed action No. 2?

A. Yes.

Q. And I've just handed you what's been marked as Exhibit 42. Is that the stream functional assessment report?

A. It is.

Q. And how are you familiar with this report?

A. I wrote large portions of this report and oversaw most of the rest of it.

Q. And so let's go to page 20 of this report.



A. 20 being the numbers on --

Q. The center bottom of the page.

A. Got it. Okay.

MR. WATKINS: Ms. Franolich, can you pull up that table on the top?

Q. (By Mr. Watkins) So what elements are included when you perform the stream functional assessment or when you performed this stream functional assessment?

A. Yeah, for this stream functional assessment we included 17 different watershed condition indicators. These were established initially for this area by the Forest Service, and so their indicators are broken out into various categories like water quality, access, habitat, and so on, as you can read across the top there. And then each of those has various elements that are measured, and so those 17 elements, minus the three on the end which were components -- I'll read them. The occupancy potential critical habitat, presence, absence. Those were pieces that fish use piece that were being developed by others that were not available at the time. So the 17 ending at watershed conditions.

Q. And do you -- so how do you perform a stream functional assessment using these indicators?

A. All right. So these data associated with these various elements have been collected primarily by others

over the several years leading up to our assessment through consultation with the Forest Service, other entities, agencies, partners of the project. Most of those data have been compiled and were provided to us, and then we pulled those data together. And each one of these elements, because they're watershed condition indicators the Forest Service uses, Forest Service has already broken them out into three categories as either functioning appropriately, functioning at risk, or functioning at unacceptable risk. We use those three categories as written by the Forest Service where we could. Sometimes those -- they weren't well-quantified, they were qualitative measures of that function. On occasion we had to work to create a quantitative metric by which we could measure what was otherwise identified as qualitative. So we use those metrics and compared against the data that were available and said, well, for any one of these metrics at a given reach is that metric functioning at risk, functioning appropriately, or functioning unacceptable risk. That's for the baseline condition. Then for the future condition and every single mine year through the mine life, we evaluated how the conditions change. And so, for example, in an area where we propose restoration, we look to our stream design to say, well, how do the physical conditions change? Are we adding large woody debris, for example? In which case we



can go to the large woody debris category and say, this is how much we are proposing to add per mile versus how much we had measured per mile in that reach prior. I believe there's on the order of 120 reaches that we evaluated within the project site, and using these criteria at each of those reaches. I'll note that not every reach has data -- has all 17 of these metrics. So the data that were available, the data that we used to evaluate and we did that through every year and then compared results across the years.

Q. So is it fair to say that the stream functional assessment assesses a baseline condition, an interim condition, and a future post-mining condition?

A. Yes, that's exactly what it does.

Q. And the future post-mining or interim conditions are based on -- what are those conditions based on?

A. They're either based on some sort of design that has quantified this is the change that we expect to see or a model. A model that identifies how temperature may change, for example, earlier Mr. Durbin spoke to the (inaudible) model, the stream pit lake temperature model. That was used to evaluate temperature, which is one of these watershed condition indicators. There were other models that were used to evaluate chemical contaminants, for example, and how those change throughout the mine life.

Q. So let's go to page -- sorry, Exhibit 42, page 50.



A. Okay.

Q. And what do these graphs represent?

A. There are four graphs here that represent those temporal outputs of our stream functional assessment for the entire project. So this is an aggregation of all of the stream reaches. So the top line is the stream length, basically how much the length of stream across the entire project area changes over time. The second is a functional index. So, in essence, that's the quality I mentioned earlier; that there are three categories, functioning appropriately, functioning at risk, and functioning at unacceptable risk. We assigned a numerical value to each of those just one, two, and three, and then divided by three being the maximum to get a percentage of each metric within each reach. And that percentage aggregated here is shown how that percent change across all indices across all of the reaches changes over the mine life.

The next one is a stream functional unit. We take essentially that same percentage, the functional index, and multiply it by the length of stream for which it's applied at each reach to create sort of a quasi-area that length included rather than just the, you know, quality and quantity. So that's depicted in the third one down. The fourth one is just rather than the absolute value of that functional unit, it's a percentage.



Q. So what do these charts tell us?

A. Based on the stream functional assessment that we conducted, the length of stream is diminished for several years during construction as a result of the various diversions that have been discussed, and then beginning around mine year 17 as many of the streams are being reconstructed as part of our restoration effort, the stream length rebounds to slightly above the baseline, which is the red line. I don't know, they're very hard to see there. And then it increases further. The other three representing the functional index which is essentially the quality of the stream, and then the functional units which also includes the length, those similarly have a short-term impact. So by year minus two you can see as a result of the diversions primarily but other impacts associated with the project, there's a reduction in stream function. That persists going up and down slightly over several years, and by mine year 23, which corresponds to the stream being restored on top of the tailings facility, Meadow Creek being restored on top of the tailings facility, we pass back above baseline, and there's anticipated, therefore, to be a net improvement in stream function beyond that point and from that point on.

Q. Great. Thank you. So let's go to Exhibit 63, page 11. Jump back to your expert report.

A. Okay.

Q. And what does this map show us?
A. This shows the Stibnite Gold Project area.
Q. And does it depict fish passage barriers or other channels?
A. It does.
Q. Did you have a hand in preparing this map?
A. Uhm, I did not; although, I did have a hand in preparing some of the data, the spatial data that went into this map.
Q. So looking at this map, are there currently complete barriers to fish passage shown on the map?
A. Yes, there are.
Q. And would you tell us where those are. Maybe start at the top and work down.
A. Sure. I'll start at the top of the drainage basin which is actually the bottom of the map.
Q. Perfect.
A. So that's Meadow Creek, and as we work down Meadow Creek there is -- it appears that they are showing a complete barrier. Got to see what year this represents. So this represents post -- I guess it's showing both. It appears it's showing both existing and proposed conditions on this map.
Q. Mr. Richardson, should that be a complete barrier or an incomplete barrier based on your knowledge of the



site?
A. Well, under the existing conditions that should be a partial barrier that's located there just upstream of the East Fork of Meadow Creek which is otherwise known as Blow-Out Creek. I believe that is a typo on that map there. That's at the downstream end of the SODA diversion. It's a constructed riffle that's been deemed as a partial barrier. As you work your way up it also appears to be missing a partial barrier on Blow-Out Creek downstream end. If you move your way down, you'll see there's a partial barrier just below the confluence of Meadow Creek and East Fork, South Fork of the Salmon River. That is a box culvert that the road crosses over. There's a little fish ladder within that, but there is a scour and other contributing factors that have deemed -- that others have deemed to cause a partial barrier. As you move downstream there is, also not shown in that, two existing complete barriers at Fiddle Creek, one associated with the gradient barrier. One associated with a culvert precluding access to migratory fish up Fiddle Creek, and then there's -- once you get to the Yellow Pine Pit area you can see the existing complete barrier that is at the Cascade of the upstream end of the existing Yellow Pine Pit.
Q. Okay. And I'm going to hand you Exhibit 45. Is that -- take a look at it. Is that the stream design report



you prepared or you testified to earlier?
A. It is. Yes, I helped prepare large portions of this.
Q. All right. And let's go to page 228 of that --
A. Okay.
Q. -- just as an example. Is that -- this page on page 228, is that a schematic of the proposed stream design?
A. It is for this one particular reach which appears to be on Blow-Out Creek.
Q. All right. And so does this report provide designs for every reach that Perpetua's proposing to restore?
A. Yes. Schematics such as this, as well as an impending set illustrates a plan view of all of our restoration reaches, and it shows how, in addition to in cross section -- and this, by the way, is a simplified cross-section, but also shows plan views in the appendices.
Q. Great. So when you're proposing to remove fish passage barriers or perform stream restoration, it's based on what's in the stream design report; is that correct?
A. Yes. Our design approach is to create streams that function naturally to the extent that we can, and allow, therefore, fish to pass through the reconstructed restored streams as they would any other natural stream channel.
Q. All right. Great. So with that, I'm going to ask you, at the risk of confusion, to go back to the map for me.



A. Sure.
Q. And your expert report, and that should be Exhibit 63 of page 11, and I would just like to take a minute and talk through existing conditions and proposed conditions of the Stibnite site. So maybe let's start at the top of the watershed again, the bottom of the map. And what -- what are the existing conditions of Meadow Creek, and then what are the key restoration measures that are going to occur in Meadow Creek?
A. Sure. I'll give an overview because this could take a very long time if I went into all of it. But the existing conditions of Meadow Creek -- see, I'll break it into upstream of the existing SODA or upstream of where the proposed tailings dam facility would be located. That watershed burned several years ago but is otherwise in relatively pristine condition that would be in the restored condition, the stream gets diverted around the stream, sorry, during offs, and then would be restored back over the top of the tailings facility as part of the restoration plan. So there's a significant change of the gradient as a result, and so the channel function changes so it's not as confined. It's not as steep. It becomes a lower gradient more sinuous channel floodplain. And I can speak to that in more detail if desired. The existing Meadow Creek from that point down is diverted around the SODA in a rock lined ditch

until that partial barrier that I spoke to earlier just upstream of the East Fork of Meadow Creek, otherwise known as Blow-Out Creek, in the proposed design there's actually -- that's where the stream, the restored Meadow Creek stream would drop off of the tailings facility down the tailings buttress, and that would create a new barrier in this reach. And that would be a total barrier to all fish, isolating the population of fish upstream. And then as we work there would be a restored stream channel below that, essentially all the way down to just up from the East Fork of the South Fork of the Salmon River. Existing condition of Meadow Creek, again as I mentioned, has the SODA ditch, and then the Blow-Out Creek comes in, and then it also goes through a section of restored stream channel that the Forest Service, I believe, restored in, I think, 2008. And then there's a short section that's not been restored prior to rejoining the East Fork. Blowout Creek, Blow-Out Creek has -- the existing condition on Blow-Out Creek is that there was a dam historically up in the meadow in Blow-Out Creek that failed and essentially unraveled the section below it that has been contributing sediment ever since. It's been documented as the largest source of sediment to the East Fork, South Fork of the Salmon River. That area, and you can see it in the map kind of right in the middle there, and as a result of that erosion, it's also



then dropped the level of the stream and caused incision into the meadow upstream of that point to the tune of about 14 to 16 feet. And so that wet meadow is now a dry meadow and there's vegetative encroachment of dried species of trees and such, and so we're proposing --

Q. Just on that, so it's a significant contributor of sediment. Is sediment bad for fish habitat?

A. Yes, generally speaking, although sediment is also necessary for fish habitat. It's fine sediment in particular is bad for spawning and especially incubating eggs. The Blow-Out Creek contributes quite a large amount of particularly fine sediment but also contributes other types of sediment like gravels and things.

Q. And so what's the restoration plan for Blow-Out Creek?

A. It's two part, to address the two issues I mentioned. The lower downstream portion where the fine sediment source is located. The fix there is to install essentially a rock drain up that valley, up that cut, and then that would allow water to flow subsurface through that rock drain. As you recall it's a passage barrier, even though it's not marked as such on this map. And that enables equipment to also get up there to do the restoration in the meadow, and so the meadow restoration would include essentially building a new grade control structure to offset



the amount of incision that's occurred to raise the water table in the meadow back to approximately where it was historically to reestablish the hydrologic conditions within that meadow. And then the downstream portion where the rock drain goes, after a period of time if that rock drain doesn't itself fill in with sediment allowing the stream to therefore flow back over the top, that would be essentially plugged up after the completion of the project operations and reclamation to encourage the stream to flow back on the surface again, approximating the gradient of the existing condition.

Q. And when will that take place in mine life?

A. The restoration of the rock drain and the sediment, I believe, is year minus one. So one year prior to operations beginning, and then the subsequent restoration on the meadow I think is the following year, which is mine year one because there is no mine year zero.

Q. So it will happen well before mining has ended; is that fair?

A. Correct, correct.

Q. And even before mining has started?

A. Right. The restoration of -- the treatment of that sediment source would occur prior to the operations beginning.

Q. Great. Is there -- I think you testified earlier



there's a barrier on the East Fork, South Fork?

A. There is. I believe it's a partial barrier, and it's within that reach.

Q. And what is that barrier?

A. It's a gradient barrier. Sorry. Are you saying the East Fork of Meadow Creek?

Q. The East Fork, South Fork of Salmon River.

A. Oh, sorry. My mistake. Yes, on the East Fork, South Fork of the Salmon River there are two barriers. One is a partial barrier that's located just upstream of Garnet Creek, and that is a 15-foot box culvert with an ineffective fishway.

Q. And what's the plan for that box culvert?

A. To remove the box culvert and replace it with a bottomless either bridge or culvert and the natural stream bed within.

Q. And when will that occur?

A. That occurs in year minus one, so one year prior to operations. I should note that removal of that barrier is associated with a larger restoration component also planned for that year, which is actually an enhancement. So in our stream design report we differentiate between restoration which is where we're taking a stream that was moved into a diversion or otherwise, and we're reestablishing it. Therefore, rebuilding it and restoring it versus enhancement

which is a reach that is otherwise not going to be moved as a result of the Stibnite Gold Project and, therefore, not diverted but has exhibited, for whatever reason, some amount of impact, largely due to historic or legacy issues or potentially indirect effects associated with Stibnite Gold Project. So we're proposing to enhance those stream reaches, and so this map is a good illustration of that. The kind of shaded pink polygon represents the disturbance footprint of the proposed Stibnite Gold Project. And you'll note that the East Fork, South Fork Salmon River roughly from Meadow Creek down to about Yellow Pine Pit is not included in that shaded area primarily, and so although there are not direct impacts from the Stibnite Gold Project proposed, there are historical effects. And so proposing (inaudible) within that reach which include adding large woody debris, adding bolder clusters, adding pools, and improving fish passage where it's identified that there are barriers or partial barriers, including this box culvert.

Q. Thank you. How do we know that these proposed restoration measures are actually going to be effective?

A. Well, from our part there's sort of two reasons. One is just history of these restoration designs are no different than the other restoration designs that we perform all over, and we have a lengthy history of implementing similar types of projects. The other reason is, you know,



the due diligence on our engineering side. And so well I should say our science and engineering side. Every single one of these projects we do, including this project, we go out and evaluate reference conditions, and I believe we looked at 22 different reference sites in the vicinity of this project area to establish conditions, not necessarily to say this is the best or the worst, but identify what similar conditions are on similar types of streams within the area and help develop design criteria for those. We fill in gaps where needed using empirical equations and statistical analyses like extending gauge records and things like that. And then we also use published design guidelines. All of that information is compiled to help us develop our design criteria to identify how a stream should function, geomorphically what is appropriate for a stream within a given reach. And obviously there's a range of what's appropriate and within that range we work with the fisheries biologists on the project and all of the other stakeholders and regulators and agencies that are engaging on the project to try to optimize conditions for those biological species within the realm of what's geomorphically appropriate.

Q. And when do benefits from this restoration begin to accrue?

A. I think our first action is end of year minus one,



and so prior to mining there are the enhancements that I spoke to on the East Fork, South Fork Salmon River, as well as the sediment fix on Blow-Out Creek. And then they happen periodically throughout the mine life all the way through end of the year, I think mine year 23, which is once the tailings consolidated sufficiently to be able to restore the stream on top of the tailings facility. So it's not at any one particular time.

Q. So it's throughout the life of the mine?

A. Correct.

Q. And in your opinion what effect is the Stibnite Gold Project going to have on aquatic habitat on the Stibnite site?

A. Well, our stream functional assessment I think is good to point to there where we identify that across -- if you aggregate all of the reaches, it shows that there's an impact for 23 years where it drops below -- the stream function drops below baseline. After 23 years it shows that there would be a net improvement overall. If you look at any one reach, it varies substantially. Some reaches are benefited throughout entirety of the project as a result of enhancements and restoration that we do. Other reaches are impacted and never recover back to their baseline. But the net result from our stream functional assessment pretty substantial benefit.



Q. Okay. And I'm going to hand you Exhibit 219.

A. Thank you.

Q. And when you get there will you tell me what 219 is. It's already been admitted.

A. Okay. This appears to be a letter from Perpetua Resources water rights technical assistance review follow-up. Is that the right one?

Q. That's the right one. So let's go to page 23 of that, and were you present for Mr. Leonard's testimony this morning?

A. Yes.

Q. All right. Great. And what is on page 23?

A. This is a memo written by my business partner at Rio, and it's to Gene Bosley regarding Stibnite Gold Project updated fish passage flows.

Q. And are you familiar with this memo?

A. I am.

Q. And did you review it before it was finalized?

A. I did not, actually.

Q. But you've since reviewed it?

A. Correct.

Q. Do you understand the science that goes into this memo?

A. Yes.

Q. And let's go to page 33 real quick, and what is

that one?
A. This is similar memo and also from our company to Gene Bosley at Perpetua Resources, follow-up to the hydrology memo we just spoke to. This is called the Stibnite Gold Project fish passage evaluation.
Q. And what does that memo tell us?
A. In short we were asked to evaluate that we would prepare a hydraulic model for the section of the East Fork, South Fork Salmon River from Yellow Pine Pit down to Sugar Creek to evaluate depth and velocity at 95 percent, 5 percent flow exceedances to evaluate fish passage.
Q. And did that model rely on cross-sections of particular -- of a particular reach?
A. Yes.
Q. Will you flip to page 52. And, Ms. Franolich, can you bring up page 52? There we go. And zoom in on the top map. Is this a map of those cross-sections?
A. It is.
Q. And how frequently did you conduct cross-sections?
A. Our staff conducted cross-sections on average every seven and a half linear feet.
Q. So just to be clear, you didn't take the cross-sections; your staff did?
A. I did not. Yes.
Q. Great. And you testified to the hydraulic model.



So were these -- these cross-sections, information from these cross-sections were used in the hydraulic model?
A. That's correct.
Q. All right. And was this hydraulic model used to evaluate effects Perpetua's proposed water withdrawals on fish passage?
A. Yes, it was.
Q. And did the evaluation include the -- I'm going to refer to them as a voluntary low flow conditions that have been discussed previously in the Idaho Fish and Game letter?
A. Yes.
Q. Okay. Great. And is this the report summarizing the results of that evaluation?
A. It is.
Q. All right. And before we dive too deep into this, were you present yesterday for Mr. Bosley's testimony?
A. I was.
Q. And let's go to page 28. Did you hear the Hearing Officer ask Mr. Bosley about the distinction between Sugar Creek flows and East Fork, South Fork flows?
A. Presumably I did, yes.
Q. Would table 3 or table 4 tell us or give us some idea of those flows?
A. Yes.
Q. Which table would be the best for that?



A. Table 4. Table 3 represents gauge data from 2011 through 2022. Table 4 extends that record back to 1997 using extrapolation method based on the Johnson Creek gauge which has a longer record to help extend the record of these gauges.
Q. And why was an extrapolation necessary?
A. The gauges of concern here don't have as long of a record, and so we used the nearest available gauge, Johnson Creek, to develop a statistical relationship between the two so that we can extend the record back to capture the 25-year record that's recommended by NOAA fisheries to evaluate fish passage.
Q. Let's go to table 5, which is on the next page or on page 30. And what does table 5 show us?
A. Let's see, it says it's a summary proposed 95 percent, 5 percent daily average exceedance discharge values based on that 1997 through '22 data with and without water rights conditions applying.
Q. And based on this evaluation, what effect do the water rights -- well, I guess would water rights condition apply or is it a baseline with water withdrawals with the conditions?
A. It depends on what stream you're looking at. Sugar Creek has no effect because the water rights don't affect it, but the other East Fork upstream of the Sugar Creek



confluence East Fork downstream, you can see it shows the 95 percent exceedance both with and without the water right and the 5 percent exceedance we assume there was negligible difference, so we did not evaluate a change.
HEARING OFFICER: Mr. Foster, where are you?
MR. FOSTER: I am on Exhibit 219, and it's -- Mr. Richardson, is there a page number besides 30 on there?
A. Oh, it's -- the report is page -- report page 8.
Q (By Mr. Foster) And do you have a bates number in the corner?
A. Yes. It ends in 9446.
HEARING OFFICER: I was at the wrong table 5. Thanks.
MR. FOSTER: No problem.
Q (By Mr. Foster) And so -- actually, just a second. I just handed you Exhibit 34, and is that the fishway operations management plan?
A. It is.
Q. Would you go to page 19 of that exhibit?
A. Okay, I'm there.
Q. And does the technical memorandum that we were just discussing update the exceedance flows that are reflected on page 19?
A. Yes, it does.
Q. Is Exhibit 201 in that binder that's in front of you?

A. Two what?
Q. 201.
A. Yes. Want me to go there?
Q. Let's go there, and I would go to page 6 of Exhibit 201. And at first will you just tell us what Exhibit 201 is.
A. Sure. Yes. This is the Kinzer & Ackerman expert witness report.
Q. And did you review this in preparing your rebuttal report?
A. I did.
Q. Will you go to page 6 for me?
A. Okay.
Q. And, Ms. Franolich, will you blow up that? And this is gauge data from gauge 13310850. Where is that gauge located in the Stibnite site?
A. That gauge is located upstream of the SODA maybe a quarter mile, so I would say not quite a mile upstream of Blow-Out Creek on Meadow Creek.
Q. And have you done some evaluation on this gauge?
A. I have not, but our company has, yes.
Q. And what effect would Perpetua's proposed water rights have on flows of this gauge?
A. As I understand it, Perpetua's proposed water rights would withdraw water downstream of this gauge, so



there would be no effect, other than the fact that this gauge wouldn't be there anymore, but at least at that location of Meadow Creek.
Q. All right. And let's go back -- sorry for hopping around here. Let's go back to Exhibit 219.
A. Okay.
Q. And this is the fish passage evaluation technical memo; is that correct?
A. That's not what I'm seeing.
Q. Exhibit 219 at 33. Sorry.
A. Thank you. Correct. Yes.
Q. Okay. Great. And so did this memo evaluate fish passage -- what reach did this memo evaluate fish passage in?
A. Principally from the downstream, proposed downstream portal of the tunnel to the mouth or -- sorry, the confluence of Sugar Creek on the East Fork, South Fork Salmon River.
Q. All right. And will you go to page 43 and read the bates number for everyone who doesn't have paginated pages.
A. 43?
Q. Yes, sir.
A. Bates number ends in 9459.
Q. And what does this table tell us?
A. This is the hydraulic model results comparison to



fish passage criteria per species within the reach and interest that I just identified at the 95 percent or low exceedance flows.
Q. And does it compare existing conditions with proposed conditions?
A. Yes.
Q. And does the reach meet the depth passage criteria under existing conditions in all cases?
A. Not the entire reach, no.
Q. And what effect would the proposed withdrawals have?
A. A slight reduction to the amount of the reach both in width and length that would meet those guidance criteria.
Q. So is it fair to say that there would still be portions of the reach meeting those guidance criteria?
A. Yes.
Q. And in your opinion would fish still be able to pass through that reach?
A. I'm definitely not a fisheries biologist, but I think our analysis shows that the changes are minimal. And one thing our analysis also shows, which isn't depicted here, is to establish the boundary conditions on our model we had to do some modeling up Sugar Creek as well. The conditions in Sugar Creek are such that there are -- there's less length and width of Sugar Creek that meets these



conditions than in the existing or the proposed case on the East Fork, South Fork Salmon River. And to my knowledge there are no known or identified passage barriers or impedences on Sugar Creek within that reach. So the fact that under existing and proposed conditions we identify depths and velocities that are better, substantially better than Sugar Creek and Sugar Creek has no passage issues, I would conclude that there should also not be passage issues on the East Fork in this location.
Q. And just a point of clarification. So we had -- Mr. Leonard had been asked about the California fish passage criteria, which I think are referenced in this memo.
A. Yes.
Q. And do you know why those criteria were used?
A. Yeah. We received that reference from Mark Miller with BioAnalysts who we work with closely on these projects since we don't employ fisheries biologists for this work. We rely on our partners and the agencies that we are working with. Mark indicated to us that there were no guidelines for a natural stream channel provided by NOAA fisheries within the State of Idaho that he was aware of. He gave us reference information from the nearest available -- physically available source, which therefore is in California, so we could have some guidance. And NOAA guidance is for crossings like culverts and weirs and

ladders and things like that, but for a natural stream channel they don't provide depth guidance.

Q. So is the California guidance the best you had?

A. It is the best we had for a quantifiable number.

Q. And do you have any reason to believe that it's not protective?

A. No. In fact, I think it really is because as was pointed out in testimony earlier today, this reach that we're talking about is characterized as a step pool reach, not a riffle pool reach. The California guidelines are for -- are inherently for riffles. Riffles extend over a length that's generally much greater than that of a step in step pool system, so if the depth was the issue in question and fish are struggling to pass the depth over a longer length such as a riffle versus a shorter length as a step pool, I would conclude, therefore, that using the riffle guidance in a step pool system is actually conservative.

Q. Okay. Thank you. And you testified earlier that you reviewed one of the expert reports prepared by the Nez Perce Tribe. Have you reviewed the other fisheries experts reports filed in this action?

A. I reviewed two.

Q. I'll point you to Exhibit 201 and Exhibit 301. Are those the expert reports?

A. Yes, they are.



Q. All right. And I don't want to walk through those chapter and verse, but I do have a few questions. So both reports discuss the effects of Perpetua's proposed withdrawals and suggest the diversions under the water rights applications made to water Meadow Creek. Do you agree with that conclusion?

A. I do not. My understanding of the -- well, there is two reasons why. One is, as we discussed earlier, the hydrologic analysis on Meadow Creek appeared to be in error. They used the values from the Meadow Creek gauge, which is located approximately a mile upstream of where most of the spawning occurs in Meadow Creek and is upstream of Blow-Out Creek, and therefore, does not include 40 percent of the drainage basin. They use those numbers directly within the section of Meadow Creek where the spawning occurs, and that they were inferring would be dewatered. And so I think, A, the hydrology is incorrect.

The other reason is my understanding at least of the water rights is that there would be groundwater taken out of Meadow Creek, not surface water. The groundwater as was established earlier today in testimony, is to be separated from surface water by the liner within the stream.

Q. So Meadow Creek would be lined in that section?

A. Correct.

Q. And what effect would that liner have?



A. Well, twofold. One is it would -- and the purpose for the liner is to prevent excessive groundwater losses during pit dewatering and other reasons. The other is the liner would be buried at depth beneath the stream channel so that there would be adequate depth of suitable stream material for the stream to scour pools, to migrate laterally. And we consulted heavily with Perpetua in the development of those criteria so that the stream would have those adequate, you know, geometries in order to function naturally.

Q. Okay. In your opinion is it appropriate to evaluate the impacts from the Stibnite Gold Project based solely on the diversion rate proposed in the application?

A. No. I don't think so. Again, my understanding is that the water right is part and parcel with the project, and the project ought to be reviewed as a whole. I mentioned that we're proposing enhancements in the lower East Fork that would occur prior to any of the water being withdrawn for operations. Those enhancements were not evaluated in our hydraulic analysis that I spoke to earlier showing that there was a conservative analysis that we did not include those. I think also that they were not included in these expert testimonies from the Nez Perce Tribe. Likewise, up on Meadow Creek there are substantial enhancements that we're proposing, as well as protective



measures such as the streamliner that would reduce the amount of impact associated with water withdrawals.

Q. And there's some discussion in the expert reports about a flow ecology relationship or a flow habitat relationship. Do you agree that every unit of flow reduction results in an equal unit of habitat reduction?

A. Not necessarily. It certainly can from -- you know, as a geomorphologist I'll speak to the physical attributes associated with streams, stream function, stream flow. You know in a stream that has, say, a U-shaped bottom to it, cross-section, if you reduce flow then the banks, the edge of water will contract and so you'll lose wetted area or wetted width within that cross-section. You extrapolate that over a distance, you lose wetted area. Where the stream has near vertical banks, if you reduce flow, you're not going to reduce the wetted area. You're just going to lower the depth. And so a lot of the analysis that was done was based on wetted weighted usable area, and so it's -- again, I think, although the area may change, there's habitat is evaluated typically based on the amount or the quantity but also the quality. So it is possible that you can reduce the area, but potentially improves so that would reduce the quantity. But you could improve the quality to either offset or partially offset that. Of course our restoration aims to provide the best quality as possible.

Likewise, I'm working on several projects in other streams where it's been identified that instream velocity is actually a problem. And I'm not saying that's the case here, but it's not ubiquitous to say that reducing stream volume will inherently reduce habitat in and of itself. You really must evaluate the other habitat metrics.

Q. Appreciate that. And the Nez Perce Tribe's expert report, I believe it's Kinzer & Ackerman, suggests that there has not been sufficient evaluation of aquatic habitat at the Stibnite site. Would you agree with that?

A. Not necessarily. I mean, we briefly walked through the stream functional assessment that we helped prepare. There was substantial effort that went into collecting all of those data over many years to establish a baseline condition. Substantial effort that went into evaluating how that changes over time both during operations and after. There were numerous other analyses done by the Forest Service and its partners and have been introduced into the Environmental Impact Statement. There's a substantial amount of analysis and evaluation of changes to stream function and habitat within these reaches.

Q. Is it inappropriate to use modeling in evaluating fish habitat or impacts to fish habitat?

A. Certainly not. I think it's very common, especially evaluating proposed conditions and/or



extrapolating in between data points.

Q. So is it inappropriate to use modeling to evaluate impacts from the Stibnite Gold Project?

A. I don't believe so, no.

Q. And, Mr. Richardson, in your opinion what effect is this project going to have on fish habitat at the Stibnite site?

A. Yeah. It's a complex question, but a short answer is: Each reach is different. Some reaches, as I mentioned earlier, will be impacted more than others. Some will be restored more than others. Reach by reach I think you could draw many different conclusions. I think if you aggregate all of those reaches and look at the net result, you have an impact that occurs for on the order of 23 years before the sum of all of the restoration components adds up to a point where you then pass over baseline and start to see a net benefit. So my opinion is that after that period of time there would be a net benefit associated with this project. It's a substantial tradeoff, and you have impacts and benefits, but the net benefit would occur.

MR. FOSTER: Great. Thank you. No further questions.

HEARING OFFICER: Mr. Richardson, while Mr. Lopez is coming up, are you going to do cross-exam? Come on up.

MR. LOPEZ: Thank you.

HEARING OFFICER: As he's coming up and getting



situated, I just have one question.

A. Yes, sir.

EXAMINATION

BY HEARING OFFICER:

Q. So help me understand the liner that is going to be -- or that's proposed to go in the Meadow Creek area. You had said that needs to be deep enough that a stream can continue its natural function, scouring. So how deep will that liner be? Are we talking 20 feet, 50 feet? How far below ground service?

A. Yeah, it varies depending on the reach and the characteristics within that reach, but in general we've calculated a maximum anticipated scour depth using relatively conservative bridge scour calculations, applied to factor safety and based on that, then, we also include essentially an armor layer below that maximum calculated scour depth, and then there's some transition layer so you don't have coarse rock right on the liner. So there's some amount. The liner is buried. Then there's some amount of, you know, transition layers. There's some amount of armoring, and then you have the maximum calculated scour depth. In that reach of Meadow Creek below Blow-Out Creek it's probably on the order of 6 to 8 feet, if I had to guess. I can't remember off the top of my head. It's in our stream design report.



Q. So at no point, I guess, would the stream actually make (inaudible) the liner --

A. Correct.

Q. -- because of, I guess, some armoring at depth or some larger rock layers at depth. What happens if after a couple of years you find the stream has scoured its way down to that armoring layer? Are there things that can be done after that point to remediate that without tearing up the liner again?

A. Yeah, absolutely, and those types of adaptive management measures would be things that we would include. You know, you would have to identify the cause of that to see such a substantial amount of scour beyond what we had calculated from a rich pure scour would indicate that something is causing that scour to occur and perhaps that feature could be changed, removed, whatever the case may be. That would be most likely the solution. I think beyond that would just be to over-excavate that particular location. You know, divert the stream around that spot, over-excavate, add additional material if need be.

Q. And that liner, then, would follow the gradient of the stream at depth?

A. Correct. Yeah, I should add, often we work on projects where we see channel incision. That's a common, you know, issue within Pacific Northwest streams, and so we

commonly also install grade control features and things. And so something similar could be applied if we were seeing excessive scour or incision beyond what we had anticipated.

HEARING OFFICER: Okay. Thank you. Mr. Lopez, go ahead.

MR. LOPEZ: Thank you, Officer Cefalo.

CROSS-EXAMINATION

BY MR. LOPEZ:

Q. Good afternoon, Mr. Richardson.

A. Good afternoon.

Q. I'd like to return to admitted Exhibit 219.

A. Okay.

Q. Which is attachment C that starts on pdf page 33. If we could please pull that up on the monitor.

A. 219, you said?

Q. Yes, and it's actually page 33.

A. Okay. I'm there.

Q. The pdf, I think. Thank you. This is the Rio ASE's fish passage evaluation for the reach of the East Fork, South Fork Salmon River below the tunnel that you just testified to; is that correct?

A. Yes, it is.

Q. And you're qualified to speak to the conclusions in the report, correct?

A. The conclusions, yes.



Q. I understand from the first sentence of the memoranda that it, quote: Includes hydraulic development results and the evaluation of fish passage at low and high flows from the East Fork, South Fork Salmon River from the tunnel outlet to the confluence with Sugar Creek; is that correct?

A. Yes, that is.

Q. And this evaluation is of the East Fork, South Fork Salmon River downstream of the proposed tunnel and not the proposed tunnel itself; is that correct?

A. Yes, that's correct.

Q. And I want to direct your attention to page 4 of that memo, please, table 2.

A. Okay.

Q. What is that table of, please?

A. Table 2 fish passage criteria and species specific 95 percent exceedance flows.

Q. Thank you. And that table shows a minimum depth for adult Chinook Salmon of .9 feet and a minimum depth for adult Bull Trout and Steelhead of .7 feet; is that correct?

A. That's what the table says, yes, sir.

Q. Thank you. And the basis for these flows is the California Department of Fish and Wildlife criteria that you referenced previously in your testimony; is that correct?

A. Yes.



Q. And that's the same study that we've been discussing with other witnesses earlier today; is that correct?

A. It has been discussed earlier today, yes.

Q. Thank you. Is it fair to say that you use the California criteria and not the one foot depth criteria for the tunnel?

A. We didn't evaluate the tunnel.

Q. And the use of the California criteria is intended for use in a natural stream drainage, correct?

A. As we understand it the riffles within a natural stream reach, yes.

Q. Okay. Thank you. Can you please describe in general terms how Rio ASE evaluated fish passage in the downstream reach, please?

A. Downstream of what?

Q. Downstream of the tunnel.

A. Yeah, this reach in question here?

Q. Yes.

A. Okay. Yeah, yeah, I'll try to be brief.

Q. Thank you.

A. Yeah. So the cross-sections that were illustrated earlier we, you know, surveyed. Physically went out and surveyed cross-sections roughly every seven and a half feet within this -- within this length of stream. So hundreds of



cross-sections. Those cross-sections then were merged with lidar data that are more continuous, but the lidar data does not -- the lidar itself does not penetrate the water surface, at least the lidar that was used for this particular survey. That was done a handful of years prior. So we merged those two datasets in order to create a digital terrain by which we could cut cross-sections essentially wherever we wanted to. But we focus our cross-sections for our modeling purposes at those locations where we actually measured them. There's just interpreted data in between, especially below the water surface. And then all of those cross-sections were put into the Army Corp of Engineers hydraulic modeling software which is industry standard hydraulic modeling software. Then the various flows are applied to that hydraulic model, as well as other inputs such as roughness, and so our report describes how we calculated roughness because roughness changes. It impacts the hydraulics within a given cross-section.

The model then calculates the physical parameters at each of those sections, and so in particular here we were looking at depth and velocity at those various flows, just very high level.

Q. No, I appreciate that. Thank you. I'd like to turn to table 1 on page 3 of that memo, please. So table 1, please.

A. Okay.

Q. Thank you. Can you please explain what this table shows?

A. Sure. I'll read the title. I think that helps. Fish (inaudible) and estimated 95 percent and 5 percent exceedance daily discharge values for the 1997 through 2022 timeframe with and without the proposed water right condition applied.

Q. For low flows you evaluated the existing 95 percent exceedance flows and the proposed 95 percent exceedance flows shown in this table, correct?

A. Yes, sir.

Q. Okay. Like to direct your attention to table 12 on page 12 of that document, please, if you could scroll down, please.

A. Okay.

Q. Thank you. Can you please describe what this table shows?

A. Yes. It says this is the hydraulic model results of locations out of compliance per species within the reach of interest at 95 percent exceedance flows.

Q. What is and, quote, out of compliance, end quote, reach?

A. Sure. So the compliance that we were evaluating were based on those at least for 95 percent exceedance



discharge were based on -- let's see, we looked at depth and velocity. This one appears to be presenting depth primarily, I think. But, in essence, it's the criteria that were established in the beginning of the report as guidelines either from the California Department of Fish and Wildlife or otherwise, and what length of -- so there's two ways to look at it. Within each individual cross-section there are components of the cross-section that are either within or outside of those metrics. And then within each cross-section, depending on how much of that cross-section meets those criteria, it's -- I think we said if 10 percent of the width does not meet that criteria, then it's considered out of compliance based on those criteria. And so that cross-section was marked as out of compliance. The length from that cross-section halfway up to the next one and halfway back to the one prior to it, that length of stream was therefore marked as out of compliance according to this. So we have cross-sections that are out of compliance and a length of stream reach associated with each of those.

Q. Okay. So even under the 5 percent exceedance without the water right parts of the reach are already out of compliance with the California criteria; is that correct?

A. Sorry. Did you say 5 percent exceedance?

Q. Yes.



A. The 5 percent exceedance I would have to go to that table and compare.

Q. Oh, I'm sorry. We were talking about the 95 percent. So, back to that, please. So even under the 95 percent exceedance, my apologies, without the water right parts of the reach are already out of compliance with the California criteria; is that correct?

A. Yes, that is correct.

Q. Okay. Thank you. So I'd like to direct you to table 13 now on page 13. It's the next table there. Thank you. Can you please explain what this table shows?

A. Yes. This is essentially identifying the percentage of the existing proposed condition that did or did not meet those criteria.

Q. So is it fair to say that the Rio ASE evaluation shows the relative change in passage conditions between the 95 percent exceedance flows with and without the water right withdrawals with Perpetua's proposed condition?

A. I think I would phrase it slightly differently, if I may.

Q. Okay.

A. That this shows what percentage of the stream length based on our hydraulic analysis and the metrics that we used in order to evaluate depth do or do not meet those criteria.



Q. Okay. Does this evaluation allows us to determine a minimum stream flow for the reach below the tunnel that would guarantee passage for adult fish?

A. No.

Q. Thank you. I want to -- I'd like to go now to exhibit -- the same exhibit but way back to the beginning pages 9 and 10 of the document, all the way up to the top, please.

A. 9 and 10 --

Q. Of Exhibit 219 all the way to the top, please, and then to pages 9 and 10. So actually just to provide some context, let's just start with page 1 at the very beginning just so you know what the title of this is before we go into the content, please. Thank you. Have you seen this letter before?

A. Yes.

Q. What is this letter?

A. This is the water rights technical assistance review follow-up from Perpetua, and I have seen this during testimony.

Q. You've seen it during testimony. So you haven't seen it previously?

A. I don't believe I have.

Q. I'd like to move now to, let's see, pages 9 and 10 of that letter, please. So just the bottom of page 9,

please. And, again, this is a letter from Perpetua to the Governor's Office of Energy and Mineral Resources. Beginning at the -- I want to discuss that last paragraph on page 9 that goes on to page 10. Can you please take a moment to review that paragraph?

A. It's the one that begins results of the CFD simulations?

Q. It is. Please take your time to review the paragraph.

A. Okay. I've briefly reviewed it.

Q. Thank you. After reviewing that paragraph, Mr. Richardson, did you intend (inaudible) Rio ASE technical memorandum that you developed to apply to Perpetua's proposed tunnel?

A. I don't see the relevance to our technical memorandum and this paragraph I just read. Is there a relationship that I'm missing?

Q. Just a second. Just finding that language in the particular paragraph. The language that I am referencing here is the California criteria that Rio ASE used, the study which said it applied not to tunnels.

A. I'm sorry. Are you asking me a question?

Q. Yeah, I am asking you a question. So the reference in there to the CFD modeling, did your analysis and use of that CFD modeling, is that intended to apply to tunnels?



A. The CFD simulations were. Those were performed by McMillen Jacobs to evaluate the tunnel hydraulics. That's the model that McMillen Jacobs completed.

Q. Right. So it was used to apply to tunnels; is that correct?

A. Yeah. The CFD simulations were the model that McMillen Jacobs used to evaluate the tunnel. The computational fluid dynamic model that was discussed earlier by Gene Bosley yesterday.

Q. Right. And I believe that you had testified previously that you were applying those criteria to the area downstream of the tunnel (inaudible) the California criteria; is that correct?

A. Sorry. Are you referring to the California criteria or the computational fluid dynamic simulations?

Q. No, the California criteria.

A. Oh, okay. The California criteria was one set of criteria that we used in our analysis with lack of better criteria for natural stream channels, yes.

Q. So, just to clarify, so your use of the California criteria was intended to apply to areas downstream of the tunnel for your purposes in your analysis and not the tunnel itself; is that correct?

A. Yeah. We only evaluated the area downstream of the tunnel.



MR. LOPEZ: Okay. And -- okay. I don't think I have any further questions. Thank you very much, Mr. Richardson.

REDIRECT EXAMINATION

BY MR. FOSTER:

Q. Mr. Richardson, will you look at that paragraph -- actually, Ms. Franolich, will you scroll up a little bit? I just want to clarify. Oh, sorry. Can you up just a scooch? The other up. There we go. So I just want to clarify the record here. To be clear, did Rio do any evaluation of the tunnel?

A. No, we did help provide some of the hydrology that -- the flow values. That was it.

Q. And is it your understanding that the CFD in this paragraph on page 9 of Exhibit 219 refers to a computational fluid dynamics modeling?

A. That's my interpretation of what CFD refers to, yes.

Q. All right. And Rio did not do the computational fluid dynamics modeling?

A. We did not.

Q. All right. Very good. And then I want to go back to -- stay on Exhibit 219, but we're going to jump. And let's go to page 43 of Exhibit 219.

A. Okay.

Q. Which is, will you tell me the table number you're



on?

A. 11.

Q. Table 11. And was that the table that you were previously -- Mr. Lopez previously asked you about?

A. I believe so. Although, I can't recall which specific tables he asked about.

Q. All right. And is that the one that shows that their reach, the East Fork, South Fork below the outlet of the tunnel, is already out of compliance for the minimum depth flow criteria?

A. It is one of the tables that would illustrate that.

Q. Is there -- is table 13 also one of the tables?

A. No, it's not.

Q. All right. Let's stick to table 11, then. And you testified earlier that Sugar Creek is out of compliance with minimum depth flow criteria?

A. Not all of Sugar Creek, but some portions of Sugar Creek that we evaluated, yes.

Q. And are existing conditions in Sugar Creek worse for fish passage than the existing conditions in the East Fork, South Fork that you evaluated?

A. I guess it's hard for me to say better or worse for fish passage. The conditions for -- there are greater -- there's a lesser amount of Sugar Creek that meets those low flow criteria for fish passage under the existing condition

than under either the existing or proposed conditions for the lower East Fork.

Q. So even under the proposed conditions for the lower East Fork, we'll call it, it would still meet those depth criteria, have more reaches meeting those depth criteria than Sugar Creek?

A. Yeah. There's a greater percentage of the length of stream channel within the East Fork, South Fork Salmon River downstream of the tunnel to Sugar Creek that meets those criteria than the portion of Sugar Creek that we evaluated.

Q. And fish still pass up Sugar Creek?

A. Correct.

MR. FOSTER: No further questions.

HEARING OFFICER: Okay. Do either of you have any other questions? Go ahead, Ms. Thrower.

MS. THROWER: This is recross.

HEARING OFFICER: I didn't mean to jump over you, but go ahead.

MS. THROWER: Yeah. No, that's okay. This is recross.

RECROSS-EXAMINATION

BY MS. THROWER:

Q. Mr. Richardson, new face. I wanted to -- let's see. Make sure I get myself organized here. Sorry. Jean



has been having to deal with all week so far is jump to the right pages of the exhibits.

FEMALE SPEAKER: (Inaudible.)

Q. (By Ms. Thrower) So you testified that you assessed fish passage downstream in the tunnel using the California criteria for fish passage, right?

A. Right. We didn't evaluate fish passage. We evaluated fish passage depth and velocity criteria.

Q. Right. In the area downstream of the tunnel?

A. Correct.

Q. And you testified that that criteria, that study, did not apply to tunnels?

A. To my knowledge it was intended for riffles and stream, natural stream channels, the California criteria.

Q. That's correct.

A. Yeah. That one particular component. I can't speak to the entire document. There may be other portions of that document that are relevant.

Q. Okay. So I want to go back to Exhibit 219, page 9 and 10, if you can kind of get that last paragraph down on the bottom.

A. Yes. Okay.

Q. Now, I believe you testified you hadn't -- you didn't have any part in writing this document; is that correct?



A. That's correct.

Q. And this is the first time you've seen it?

A. Well, in detail. I've seen it during testimony.

Q. Seen it before, yeah, yeah, during testimony. So I want to -- so is it your understanding that this document involves or is focused on fish passage through the tunnel?

A. This -- I've only read the one paragraph. If I could go back to the --

Q. Yeah, if you could just kind of -- well, cover letter is pretty long but --

A. I guess short of reading the whole thing, I don't know. It does appear that that one paragraph is related to the tunnel.

Q. Okay. And if we look at -- I'm sorry. Scroll back down. I was going to the top to see if there was a subject line in there. If we go back down to that paragraph. I want to get down to the second sentence where it says: At 6.6 cfs the Bull Trout and Chinook Salmon 95 percent exceedance flow and the depth over the weir is slightly greater than the Chinook Salmon minimum depth of 0.9 feet. And it cites the California Department of Fish and Wildlife 2017. Do you see that statement? It's the last paragraph of 9.

A. Yes. Yeah, it carries over from page 9 to page 10, yes.



Q. So does that 6.6 cfs and that depth, does that depth -- does that apply to natural flows? Is that what you -- or natural stream channel; is that what you determined?

A. Sorry. The .9 feet depth, is that what you're referring to? Yeah, my understanding from the California Department of Fish and Wildlife is at .9 feet as to adult Chinook Salmon, and that's what we used for our analysis of the stream below the tunnel.

Q. Right. Okay. Thank you.

A. You're welcome.

HEARING OFFICER: Thank you, Mr. Richardson.

A. Thank you.

HEARING OFFICER: As I'm reviewing my notes from earlier in the hearing, we had excluded this Exhibit 238. I'm trying to remember (inaudible). What do you have, Jean? I can't find in my notes that it was (inaudible).

MS. ROGERSON: On Tuesday.

MR. WATKINS: That's our recollection (inaudible) get it in (inaudible).

MS. ROGERSON: Tuesday after lunch.

HEARING OFFICER: So Tuesday after lunch is when it was raised. I can't -- in my own handwritten notes, I can't find record of that. If I had decided that to exclude it, we're going to change that. We're going to go ahead and

admit this thing. We've only spent 10 hours talking about this California method. It's 10 pages. I think we need it in if there's going to be that many references to it. So overturning whatever I had said earlier, is there any objection? I guess I can look to the group, if it was Mr. Watkins who had offered it originally.

MR. WATKINS: I think the reason we offered it originally, Your Honor, was in response to what Protestants were saying, as I said when I tried to get it in. I said, I do not think it's relevant. I do not think that it's important (inaudible) analysis are relevant in any way, so we would stand on that objection. But we recognize your ruling.

HEARING OFFICER: There's been so much testimony offered about this and references, of course, within the documents to. Any comments from the Protestants on this Exhibit 238?

MR. LOPEZ: No objection.

HEARING OFFICER: No objections, no comments. We will admit that into the record at this time, Exhibit 238. Okay, with that I turn to Perpetua and ask if you have -- oh, we were going to bring Mr. Durbin back. I don't see that he's on right now.

FEMALE SPEAKER: He is.

HEARING OFFICER: Oh, is he? Okay, he's not on the



list that is showing on the screen. That's all right.

MR. WATKINS: Call Mr. Doug Durbin for redirect.

HEARING OFFICER: That would be fine. If we can get him back up on the screen. Mr. Durbin, if you can hear me.

FEMALE SPEAKER: There he is.

MR. DURBIN: Yes, I'm here.

HEARING OFFICER: Okay. You are back. Yeah, we can see you.

MR. WATKINS: Mr. Durbin, welcome back.

HEARING OFFICER: I remind you we consider you still under oath. And go ahead, Mr. Watkins, you can proceed.

MR. WATKINS: Thank you, Mr. Cefalo.

REDIRECT EXAMINATION

BY MR. WATKINS:

Q. Welcome back, Mr. Durbin. I just --

A. Thank you.

Q. I know that there's been a gap between your testimony this morning, the cross-examination, and now this redirect examination, so I will try to jog your memory where necessary, but hopefully it shouldn't be too painful. There was some questions of you about groundwater, and you testified that you did most of your research concerning surface water. Do you remember that?

A. Yes.

Q. Are you aware of whether or not there are any



groundwater qualities studied at the SGP?

A. Oh, yes, there was extensive groundwater study parallel to the water quality study, and one of the documents that I referenced the water resources summary report and there were several different annual versions of that, it includes an entire section on groundwater quality. So I'm aware of the study. I've reviewed the groundwater quality water. I just did not perform those analysis.

Q. Generally speaking, what is your understanding of the SGP's impact on groundwater in the mine site footprint?

A. You mean of the proposed project?

Q. Yes, sir.

A. In general, it's (inaudible) parallel to the surface water. There's a lot of removal or relocation of plants and mine materials and also the protection of groundwater areas just like there would be of surface waters so that the overall effect is that there would be less material available and less potential for contamination of groundwater to occur in the future than there is today.

Q. So under the proposed mine plan, groundwater improves; is that the upshot?

A. That's right, yes.

MR. WATKINS: Can the witness be shown Exhibit 259, please?

Q. (By Mr. Watkins) All right. And 259 as the title



reads: Arsenic, antimony, mercury, and water temperature in the streams near Stibnite mining area, Central Idaho, 2011 to '17. Do you see that?

A. Yes.

Q. And there was quite a bit of questioning by you from this document. Do you remember that -- or of you about this document?

A. Yes.

Q. If we could go to page 18, please, and specifically I want to focus your attention on figure A which is the chart in the upper left-hand corner. Ms. Franolich will blow that up for you.

A. Okay.

Q. Do you remember some conversation about this exhibit or this chart?

A. Yes, I do.

Q. And was the thrust of that questioning attempting to establish as best you can recall that when stream flows are low there's higher arsenic levels present. Do you generally remember that?

A. Yes.

Q. And I think you said something to the effect of, if you take half a cup of sweet tea out of a cup, the remaining half doesn't get sweeter because you took out the concentrate with the first half. Do you remember that?

A. Yes.
Q. Would reducing the sources of pollutants lower the pollutant concentration regardless of flow level?
A. Sure. If you take away the source, then you take away the potential contribution to the water body, and therefore, concentrations will be lower in the water.
Q. So, for example, if you have legacy mine features like a tailings pile that is leaching chemicals and metals into the water, if you remove that, regardless of the flow level, there will be lower amounts of pollutants?
A. Yes, that's right.
Q. She also asked you, I believe -- Ms. Thrower asked you, I believe, if there was a relationship between a decrease in groundwater arsenic about this figure 8. Do you remember that?
A. Vaguely, yes.
Q. And I believe your testimony was something to the effect of, the chart doesn't speak to that, or you can't identify that information based off this chart.
A. That's correct. I think I generally said that without reading the report that discusses (inaudible) it's hard to interpret quite a bit about what the dots and the triangles are based on.
Q. And why is that information not apparent to you by just looking at this chart? Why do you need that other



backup information?
A. Well, each dot on this chart represents some information amount. We don't know whether that information is entirely stream water, whether it's, you know, some groundwater and runoff combined. We don't know whether it's a single sample or an average of samples or one location or multiple locations.
Q. So not entirely helpful to the point that was trying to be made; is that fair?
A. Yes.
Q. Can we go to page 2 of this exhibit? There's a map that we're looking at. One moment. My apologies, page 10. Can we zoom in on the colored part of the map? You don't need the whole legend. Do you remember discussing EF2 and EF3 on this map?
A. Yes.
Q. And remind us what was it that EF2 and EF3 were supposed to represent?
A. Well, my interpretation, again, without reading the language in the report, was that EF2 appears to be a sampling location or some evaluated location on East Fork, South Fork Salmon River somewhere near the confluence with Garnet Creek, and EF3 is similarly a data location on East Fork, South Fork Salmon River somewhere upstream of the confluence of Sugar Creek.



Q. Now when you say that it is on the East Fork, South Fork of the Salmon River, does the map, as you're looking at it today, provide sufficient detail to determine whether EF3 and EF2 are actually on the East Fork, South Fork of the Salmon River or if they're on something approximately close to that, such as Garnet Creek?
A. I can't tell. If I would just venture a guess, the fact that it's called EF sounds like it might be East Fork, but I also know that some of the nomenclature that has been used in other sites, that there are different ways of using abbreviations that may or may not actually have to do with the stream the location is on. So I wouldn't guarantee anything just from the label in the diamond shape.
Q. So fair to say that's a guess?
A. Yes.
Q. So if the assumption is wrong, that these are not actually on the East Fork, South Fork of the Salmon River, the conclusions based on those assumptions would also be incorrect; is that fair?
A. Yes.
Q. Regardless, the U.S.G.S. report, Exhibit 259, that's dated from 2011 to 2017; is that correct?
A. Yes.
Q. Tell me, Mr. Durbin, is there data that exists that is more recent than 2017 of the site?



A. Yes. As far as -- well, not as far as I'm aware. I looked with my own eyes at data that has been acquired across the entire site all the way up through at least the end of 2022 and maybe even a few months into 2023.
Q. Since 2017 have there been -- has there been work done at the site, such as the ASAOC work that might have change some of the conditions at the site with respect to temperature or the chemical make-up of the river?
A. Yes.
Q. And so is data from 2011 to 2017 reflective of the current conditions at the SGP site?
A. It should be for some locations but certainly in areas where some of that ASAOC work has been done or is being done, there is also certainly the chance the conditions have changed.
Q. So as a professional in your field, do you find data from 2011 to 2017 very helpful in answering the question of the current conditions of the water conditions at the site?
A. Well, in light of what I know about the recent earthmoving activities in the past couple of years, I would want to see more recent data to have a more current idea of what the existing conditions are now.
Q. I believe I recall you saying that since your Master thesis days you've learned that fish can live in all

kinds of conditions that are less than optimal. Do you remember saying something to that effect?

A. Yes.

Q. How does -- and can we go to page 13 of 259? I'm looking at figure 5. I think there's a distinction between page numbers and pdf numbers that we are working through.

A. What page?

Q. Figure 5. All right. Do you remember looking at figure 5?

A. Yes.

Q. And there was some question about optimal and suboptimal temperatures for fish at different stages of fish life. Do you generally remember those questions?

A. Yes.

Q. And I believe you said that since your thesis days you are aware of fish living in all sorts of conditions that are different optimal levels; is that fair?

A. Yes.

Q. How does that understanding and background impact the way that you interpret figure 5?

A. Well, figure 5 -- I have no problem saying that figure 5 indicates that there are substantial periods of time when the water at these various locations, wherever, whichever stream and location they might be on, that they do exceed the numerical criteria that are in the Idaho water



qualities standards. What I was saying is that the (inaudible) magnitude of difference or the frequency of those exceedance isn't necessarily directly related to the degree of (inaudible) for fish because fish can exist for certain periods of time, sometimes long periods of time, in conditions where instantaneously you might take a measurement that exceeds a particular criterion and they can sort of get through that and perhaps with respect to temperature, overnight the temperatures cool down, it gets time for recovery, and by the next day they may be in a different portion of the stream or in a tributary that doesn't have the same temperature. So I was merely trying to get across the point that just because you have some exceedances in some locations at some times of temperature criteria, doesn't mean that you are excluding the ability of fish to exist in those areas.

Q. Does figure 5 say anything to you that relates temperature to flow rates?

A. There's not a direct indication of that.

Q. Does the air temperature have any impact on the temperature of water?

A. Yes, of course.

Q. Does the length of time that the sun is in the sky in a given day have impact on the temperature of water?

A. Yes, definitely, and the angle of the sun above the



water as well.

Q. In your professional experience, does the air temperature, length of sun in the sky, and angle of the sun in the sky present hotter conditions in the months of July and August, typically?

A. Absolutely.

Q. Is it surprising to you, then, that stretches of river might be warmer in July and August?

A. No. That always happens.

Q. Does that phenomenon have anything to do with water user exercising a water right and taking water out of the river?

A. I don't see a linkage there, no. Like I said before, if you are taking water out of the river and that water is warmer than optimal temperature, it just means you are taking the warmth or the heat out of the stream with the water so you're not making it any worse in terms of the diversion or removal.

Q. And then last set of questions. There was some questioning of you concerning what sort of plants would be planted on the banks of the rivers, and how long it would take for the quote, unquote, maximum benefit of those plantings to provide shade to the river. Do you generally remember those questions?

A. Yes.



Q. Obviously Perpetua has no control over the length of time it takes for a tree to grow; is that fair?

A. Yes. That's right.

Q. Are there any other options, in your professional experience that you're aware of, that can shade a river besides planting trees and other vegetation around the river?

A. Well, in terms of a river it becomes difficult. I did mention the fact that when the bypass tunnel is in existence for the East Fork, South Fork, that that's almost a mile of river length that will be in a tunnel in contact with essentially underground rock and so that is an indirect way of keeping that water cooler or cooling it off. There are certain many artificial methods. You know, you could put types of canopies and covers over streams, but that's not a very practicable or natural approach. The best thing you can do for a stream is to get that natural vegetation going across it because that provides other benefits besides simply the temperature moderation. It also provides an input of organic matter for that serves as the base of the food chain that is also very important to these fish.

Q. So fair to say if we were only focused on short-term benefits like immediate shade, we could do a manmade option; i.e., a canopy or a tunnel, but is it better for the longterm benefits to a natural approach like

planting trees?

A. Certainly. No doubt.

Q. And is that what Perpetua's proposing as part of their reclamation efforts?

A. Yes.

MR. WATKINS: Thank you, Mr. Durbin. That's all the questions I have.

RECROSS-EXAMINATION

BY MS. THROWER:

Q. Hi, Mr. Durbin. Thank you for coming back. I just had a few questions. You mentioned the ASAOC. Did you testify that you reviewed the ASAOC and what I mean by that is the administrative settlement agreement and order on consent?

A. I don't know that I reviewed the final documents. I remember having general discussions with some of the Perpetua team as they were putting that together, but I don't have -- it's not in my files, and it's not anything that I referred to as a document that I relied on.

Q. Right. Are you familiar, though, with the specific actions that have to be performed under the ASAOC?

A. Only in general terms.

Q. Can you -- do you remember any of those actions that you can tell us about?

A. I know there is rerouteing of water, basically



rerouteing of Hennessy Creek away from an area of some legacy mine materials so it doesn't move through those materials before it enters the East Fork, South Fork. I know that there is some restoration of lower portion of Meadow Creek. I actually saw that happening when I was on the site in September. And then there's the relocation of many, many truckloads of other legacy mine materials away from some of these stream areas. I know there were specific quantities and locations involved, and I don't recall those.

Q. But do you have an idea of the relative volume of the many, many truckloads that will be moved compared to what is there on the ground? Can you give me a percentage of how much --

A. No, no, I can't.

Q. Okay. Can you identify for me what specific water quality improvements the actions under the ASAOC will result at the site?

A. Earlier I thought I said that overall it's the movement of these legacy mine materials that contain substances like arsenic and antimony. Those are the two primary constituents of concern. Mercury is a concern associated more with Sugar Creek which is largely away from most of the mining activities proposed. So it's the movement of legacy material, but antimony and arsenic that is the part of the ASAOC efforts as I understand it.



Q. Right. But you don't know of any specific water quality improvements such as any data that you've seen or analysis?

A. Well, the site-wide water chemistry work talks about effects of moving some of the materials during the mining. That analysis -- as I recall that analysis didn't include modeling of ASAOC earthmoving, but it will be the same types of results; in other words, the same kinds of benefits that you get from moving the SODA or the Hecla heap would be involved in moving some of the other legacy mine materials. Like, to my knowledge, there's not modeling or unpredicted analysis of what change would be.

Q. Okay. So it's just a general understanding that that's just what happens?

A. That's my understanding of it. There may be more. As I said, I was not part of any negotiations on that or discussions with the agencies, so there could be things and documents that I'm not aware of.

Q. Okay, and just moving way from the ASAOC, but I just had one more question. Mr. Watkins had asked you about the impacts of taking out water to water temperature, and you stated that taking out water doesn't change the temperature of the stream. So if you have sweet tea, you take out some tea, it doesn't make the resulting tea sweeter; is that a fair characterization of your testimony?



A. Yes.

Q. Okay. So if I have two pans of water, and I put them out there on a sunny day and one is an inch deep and the other one is a foot deep, and they start out the same temperature. In your general experience, I don't think you need any specialized knowledge of this, but in general experience would you expect that the pan with shallower amount of water would warm up faster than the pan with a deeper amount of water?

A. Probably. It depends on several things like the color of the pan, material the pan is made of.

Q. They're both identical.

A. Angle of sun.

Q. Yeah, they're both identical. Okay.

MS. THROWER: Okay. No further questions. Thank you.

HEARING OFFICER: Okay. I think that wraps it up. Thank you, Mr. Durbin. You can continue with us. Continue to listen or sign off. We'll talk more generally to the group, then: Mr. Watkins, Mr. Foster?

MR. WATKINS: At this point Perpetua rests its case.

HEARING OFFICER: Okay. Let's go off the record for a second, and we'll talk about where we go from here.

MS. THROWER: Hearing Officer, we are still trying to get the presentation pulled up, if we could have just a moment to do that.

HEARING OFFICER: Yeah.

(Recess.)

(Reconvened.)

HEARING OFFICER: We are back on the record. It is Wednesday kind of late afternoon, and, Ms. Thrower, you're here representing both Save the South Fork Salmon and also Idaho Conservation League. So is this witness for Idaho Conservation League?

MS. THROWER: Yes, that's correct.

HEARING OFFICER: Excellent. If you want to come up and call your witness, and we'll have him sworn in.

MS. THROWER: All right. Mr. Robison, I guess you are going to get sworn in.

JOHN ROBISON

after having been first duly sworn,

was examined and testified as follows:

MR. ROBINSON: I do.

HEARING OFFICER: Thanks. Ms. Thrower, if you put that microphone on. Thanks.

DIRECT EXAMINATION

BY MS. THROWER:

Q. All right. Thank you for coming in on such short notice. Can you please state your name for the record?

A. Sure. My name is John Robinson.

Q. Can you spell your last name, please?



A. R-o-b-i-s-o-n.

Q. Okay. And what's your occupation?

A. I work as the Public Lands Director for the Idaho Conservation League.

Q. How long have you worked for ICL?

A. I've worked for ICL for the last 21 years.

Q. And I guess acronyms, ICL stands for Idaho Conservation League?

A. Yes. Correct.

Q. What are your job responsibilities as a Public Lands Director?

A. So I and my team of three colleagues work on -- much of our work is generated by the Forest Service or the Bureau of Land Management. I try to avoid acronyms. And so we monitor and track databases like the schedule (inaudible) actions or the BLM, Bureau of Land Management, E planning sites to see what projects are coming up for public review. And so we engage in those comments through scoping or commenting on environmental assessments or environmental impact statements. We also work on several forest restoration collaboratives throughout the state, and so I serve on some of those. And also working with the Owyhee initiative on larger BLM management plans down in the Owyhee. I also work on mining issues, as well as sage grouse habitat issues. So most of my work is concentrated



on the Boise and the Payette National Forest and Boise BLM District.

Q. Thank you. Thank you. And just to be clear, you are testifying here today on behalf of ICL?

A. On behalf of the Idaho Conservation, that's correct.

Q. Okay. And you have a slide deck that you want to show us today; is that correct?

A. That's correct.

Q. Okay, and we will just be using that as a demonstrative exhibit so -- and that's your slide deck up on the screen?

A. That's correct.

Q. Okay. So if you could just signal to Allison here, she's running the slide deck. If you need the slide changed that would be great.

A. Sure.

Q. What is Idaho Conservation League?

A. So the Idaho Conservation League --

Q. And you can do your slides at the same time if you want.

A. We can go next slide. The Idaho Conservation League is a statewide conservation organization. We are a 501C3 nonprofit, and as it says here, working to protect the air you breathe, the water you drink, and the lands you



love. Next slide. And this is why we live in Idaho. This is a picture of myself and my daughters rafting down the Cabarton, and this is a -- Idaho we think is a wonderful place to live and raise a family. Next slide. And ICL staff has grown since this picture. We now have a staff of over 32 people offices in Boise, Ketchum, Sandpoint, and McCall. Next slide. And our four major campaigns -- it's much broader than just my work. Next slide. Working on defending our public lands, so our vision is to make sure Idaho's public lands remain in public hands. They're well-managed and provide excellent habitat for our fish and wildlife and all the amenities and quality of life they provide. Next slide.

MR. WATKINS: Objection, Your Honor. At some point could we get a question here rather than the witness just going through the slide deck.

Q (By Ms. Thrower) What is your second campaign for ICL?

A. Sure. (Inaudible) wild fish. In fact, I was going to say that the project --

HEARING OFFICER: The objection is noted on the record. You can continue. I'm not -- I don't have a problem with this.

A. The (inaudible) wild fish, Salmon, Steelhead, as well as West Slope Cutthroat (inaudible) fisheries. Next

slide. Restoring the Snake River, protecting water quality there. Next slide. And uniting against the climate change. That's another one of our major campaigns there. One thing I wanted to note here is that the -- the Stibnite Gold Project, in particular the water right, is the intersection of several of these campaigns, including, you know, wild fish, obviously public lands issues, water quality, recreation, and just the quality of life that we enjoy, and we're also increasingly aware of the threats that climate change can place on the systems. Next slide.

Q. And before you go on, Mr. Robison, I did just want to interject with a couple of questions.

A. Yes.

Q. How many members does ICL have?

A. Sure. We have approximately 11,000 members, and in the Valley County area we have just under 300 members and supporters. And we've been working on the Payette National Forest Issues since we were -- since Nelta Vius (phonetic) started us on that path back in 1973.

Q. Okay. And can you describe in a little more detail about the work that ICL is involved in in Valley County?

A. Sure. Even though we've been involved there for decades, we just opened a field office there to better serve our members, so that was in the spring of 2021.

Q. Excuse me if I interrupt, but how many members in



Valley County do you have?

A. You know, we just have just under 400.

Q. Okay.

A. And we have folks -- however, like many of us here that don't reside in Valley County but go there, and I see a lot of value in our public lands up there. So it provides a huge wealth for us. The other thing I was going to say the work we do, we're involved heavily with the Payette Forest Coalition so that is a group that's working with the Payette National Forest Resolve. Manage wildfire issues and watershed restoration. We've also been involved actually with Midas Gold working with the East Fork or the big creek restoration and management plan, restoration and access management plan. The South Fork restoration and access management plan. These are collaboratives that are designed to try to improve fisheries, water quality conditions, and provide reasonable access. We've also been involved with Little Salmon Headwaters group that's working collaboratively with ranchers in the area to improve watershed conditions of the Salmon River. So that's kind of just a sampling of some of the work involved on public lands up there.

Q. Okay. And has ICL been involved in work on any aspect of the Stibnite Gold Project?

A. Yes. In fact, even before the project was



proposed, we were doing work up in the area on the Golden Hand Mine Project as proposed in the Frank Church, and so I toured the site even before then. And then we've been involved with the project through the scoping process, and then through the first Environmental Impact Statement and then the supplemental draft, as well as the air quality permits and air quality permit and, of course, the water right.

MR. WATKINS: Mr. Hearing Officer?

HEARING OFFICER: Yes.

MR. WATKINS: I don't know that we are online. We are hearing from some people that they're not hearing it, and I notice that the disc in the ceiling is red and not green.

THE CLERK: (Inaudible). Sorry. Where did you see that people couldn't --

MR. WATKINS: There's a disc in the ceiling that should be green, but it's red right now.

THE CLERK: So their microphones are green, so they're on. Everybody should be able to hear us.

MR. WATKINS: People online are saying they can't hear.

FEMALE SPEAKER: Yeah, people online are saying they can't hear.

FEMALE SPEAKER: (Inaudible.)

FEMALE SPEAKER: All right. I'm going to unmute this



room. When I do, if all of you guys can mute your microphones because we're about to get some feedback.

HEARING OFFICER: Including us?

FEMALE SPEAKER: You guys should be okay. If you guys can all mute. Okay. Now those of you online, can you hear us? If someone wants to write in the chat box.

MR. WATKINS: They're good.

FEMALE SPEAKER: Okay. I don't have anybody writing in the chat box.

HEARING OFFICER: Okay. I needed to hear all of it. They were hearing it is okay, but we don't have to go back over what everybody missed.

Q (By Ms. Thrower) Okay. We've still got your slide deck up so --

A. Yeah.

Q. So I think this probably gets to your next slide, but what is ICL's approach to mining projects? If you can go ahead and --

A. Sure. Next slide. So I raced over here in my truck. I got a cellphone that's hopefully on silent. We use metals and minerals everyday, so we need mining. And so just like ICL is involved with forest restoration collaboratives that are designed to work with timber companies on sustainable harvest of timber so that the forest continues to provide ecological services. We are

also engaged in mining projects. We're trying to figure out how to do it better. Next slide.

One thing we figured out is that Idaho -- next slide, actually, and next slide. We've already heard about your truck. This is kind of -- gets to our interest here in that folks and ICL members -- the thing that makes Idaho so special is the clean, clear water that's managed well for a variety of users, and like my friend said right here. So we're trying to figure out how to strike that balance. Next slide. Of course, here is the great seal of Idaho and, of course, you've got mining on the -- on the seal, and, of course, Idaho has a rich mining legacy. Put Idaho on the map, so to speak, but also there's a river running right down the center of the shield. And so that's kind of how we view this is how we actually go about protecting the quality of life. And we know we can do it better. Next slide.

So mining in Idaho, very rich history. Left behind some degraded waterways and landscapes. The current jobs can be very significantly (inaudible) phosphate patch but compared to the actual entire across the straight it's a relatively small portion of Idaho's economy. And then one of the challenges is that these jobs are high paying but also subject to boom and bust cycles. Just look at the price of gold over the years. It goes up and down and all the ghost towns and things. So it's going to be a



challenging industry. Next slide.

It's also, according to the EPA (inaudible) industry, it actually reports more toxic than any other industry, and that's not -- and so that's just something to be very aware of when we're looking at things. Next slide.

So we kind of think of Idaho and the rich mining lore and, you know, how it helped shape the state and our character here and amazing stories from these times. Next slide. But also there's a number of abandoned mines in the west, and large pollution issues that have yet to be addressed. Large clean-up costs, and then we're dealing with the mining elevations that's governing things, and there's some issues from my perspective with that or from ICL's perspective. Next slide.

So, again, this is just a background of (inaudible) 1872. I think folks here mostly know that it's kind of governing the larger project. Next slide. So this is what modern mining looks like in terms of this scale. This is a picture I took of the Thompson Creek Mine. You've already seen pictures, I imagine, on Monday of (inaudible) open pits, but this is very, very large scale that does have significant impacts. And we're always trying to figure out how to work with mining companies to reduce those impacts. And the best thing to do, first, is to avoid them, so that's the first thing, and then next to minimize and mitigate.



One thing I want to point out here with the Thompson Creek Mine is they -- it's been in current operations for several years. It's an open pit molybdenum mine outside of Challis, Idaho. And it's been in current operation, but they are looking at reopening that. And my perspective if you want a source of molybdenum this is actually a pretty good place to do it because you already have existing haul roads, open pit, the mill, other infrastructure, and so we've been engaged to try to shepherd that process through and address the previous issues. But this is a case where we would much rather have a molybdenum mine, molybdenum coming out of this project here than a new greenfield site someplace else. So that's kind of our approach to mining is it's very much a complicated situation, but it's one that warrants some additional scrutiny given the history of the past. Next slide.

So there was a 2017 study of modern gold mines in the U.S., and one thing I wanted to make clear is that you look at the abandoned mines and all the legacy issues and those are often characterized as sins of our father and no one in this room wants to go back there. I think that's pretty clear, but even molybdenum open mines and molybdenum mine practices aren't without issues. And so when we look at this scale, we're not following a line of vein of gold anywhere through a seam. We are actually, you know,



literally crunching and driving entire mountains, and then using, you know, chemical weapon using cyanide to extract the materials we want and that just leaves behind a bigger impact than some of the other operations out there. But the study found in 2017, found that even though the mines with all the modern impacts, all the modern safeguards, we like to call them, whether it's the National Environmental Policy Act, Environmental Impact Statements for permits, state permits, et cetera. Still -- they still had accidents whether it's cyanide, hazardous materials. We had diesel fuel nitrates and that 74 percent in the contaminated water supply in the surface or groundwater. And to be clear, that wasn't deliberate. That wasn't in the permit at all. It wasn't -- these are just accidents that happen for a variety of reasons. Next slide.

And so why is mining associated with pollution? And, again, it goes back to you have an ore body, and you go ahead and just (inaudible) thing, in order to get the material you want that's bound in the rock, you have to crush and grind it, just like a cup of coffee with your coffee beans. And so you've got crush it, and then accidentally we end up mobilizing and liberating a number of other materials that were already discussed earlier today, whether it's antimony or arsenic or mercury, things like that. Next slide.

So, again, the waste pile there, you've got to go through, let's just say, 20 tons of rock, sift that down and -- next slide (inaudible) an ounce of gold. And not to discuss the merits or the value of that gold, but it leaves a very big footprint behind. And that's one of these challenges of managing a big mine like this and managing the water associated with that. Next slide.

So this is your typical Alpine stream. This is actually 4th of July up in the (inaudible). Next slide. Here is another Alpine stream. This is actually -- the stream is in the pipe. It's actually being routed around the pit.

MR. WATKINS: Objection, relevance.

HEARING OFFICER: Any response to that objection?

MS. THROWER: Yeah. I think this goes to -- it will go to his testimony of what ICL thinks about this mine, whether they oppose it and what basis.

HEARING OFFICER: Based on pictures from other drainages?

MS. THROWER: Well, I think he's giving examples of what mines can look like. I mean, I think, you know, we've seen all the pretty pictures that Perpetua has showed us on what restoration looks like on the end, and he's providing examples on his experiences as Public Lands Director who works on mining issues and has worked with a lot of mines on



what these mines can look like even with best laid plans. And I think that forms a basis for what ICL will testify in terms of their opinions on the Stibnite Gold Mine and also on the water right application specifically.

HEARING OFFICER: Anything more?

MR. WATKINS: We've shown pre-pictures of the actual mine at issue. They're showing pictures of other tributaries and other mines. I'm hoping that the Hearing Officer will draw inferences to this mine if we want to talk about this mine that the applications are (inaudible).

HEARING OFFICER: Objection is noted on the record. You can proceed.

A. Just note on here that there was discussion earlier about how I'm going to handle water management and things. I just want to point out that the water is being routed around the pit in that pipe there, so that's actually the pipe. And next slide. So this is a picture of the Blackbird Mine. This is after mining, and this is a situation where they're trying to manage the water to make sure it doesn't mix with contaminated soils. So this is one example of a water management and it's -- and that's not the Meadow Creek (inaudible) at Stibnite, different Meadow Creek. But that's just an example of -- this is a restoration example, too, where from a water qualities perspective it is resulting in less heavy metal



contamination because it's not intermingling. However, so that's good news in terms of water quality perspective, but in terms of shade and protecting water temperature and things like that, the substrate on the site isn't very suitable for that, and that's why you end up with a situation here where you've got kind of a challenging reclamation situation there. And so that's just one example. And I've also seen restoration projects that are much better, and some that are worse. Next slide.

So this is a site from -- a picture from the site, and this was, I think, a really favorable example of what can be done with post-mining reclamation. So this is Meadow Creek when meanders were put back in. This is kind of the gap before the Stibnite Gold Project was fully developed, but you'll notice that you've got a nice riparian cover there. You've got mixed gravels, nice meanders, and so this is an example of what can be done. In terms of our perspective on the project we recognize that streams can be restored, and a lot of components have to fall in place to do that. And it takes a little bit of having a conservative approach for some of these. One thing I will note is I believe that under the ModPRO2 I think that this would actually be rerouted once again. So, next slide. So apologies for this. We can just zoom in on the next slide.

But this is a point where we talked about why



mines are of concern to conservation groups or of concern to folks who value clean water, say treating water supplies, a healthy environment and the like. And this is a map from the Idaho Department of Health and welfare of sites, contaminated sites in Idaho, and there's a strong correlation between these sites and mines. So you've got the Stibnite mine is actually up there already. You've got the McCrae Mine. You've got the Minnie Moore Mine. You've got Jordan Creek as well. So there's a strong associate, and, again, not because necessarily the mining companies were dumping or bringing contaminates on-site. In some cases they were with mercury in Jordan Creek, but really what's happened here is that you've got the mining process itself. Just the process of blasting, crushing, and grinding of waste rock disposal. You're liberating a lot of materials that are naturally occurring, but they're bound and frozen in the rock. So this active mining tends to liberate a lot of materials and also the ground disturbance does affect water or can affect water runoff, water quality, water quantity. And so there's issues in water temperature so that's why there's issues where anytime somebody comes up with a restoration project, we are very excited about it. When someone comes up with an idea for a restoration project and a mining project, that's a little -- can be a little more complicated. And in this case the past -- the

challenges on-site just of the large amount of -- or the contaminates on-site that have already been mobilized and the upcoming proposed actions do make us question about how -- what the effects are going to be downstream. Next slide.

Q (By Ms. Thrower) So, Mr. Robison, let me just stop you there. Does ICL oppose the Stibnite Gold Project?

A. We are opposed to the ModPRO2 and the two actual alternatives we've seen so far. So those were two actual alternatives that were proposed in the supplemental draft EIS. We thought there were unresolved concerns to-date, and we are looking forward to seeing how the final draft, the final record decision resolves this. We did note that in the first plan during our scoping notice we were really intrigued about how the restoration might work on-site, but one of the factors we are looking at is the footprint of the overall site. So we're concerned about that, and thus far from our perspective having dealt with a lot of other restoration projects, we still have so many questions about the unintended effects or the adverse effects that it might actually outweigh the benefits.

Q. All right. I think I may have jumped the gun on your slides a little bit there.

A. That's fine. Yeah.



Q. But I guess, you know, you explained that a little bit.

A. Yeah.

Q. But I think that goes to my question of how ICL approached analyzing this particular mine and other mines, you know, to make that determination whether they oppose it, whether they think they can work with the potential environmental impacts or minimize them, or they don't feel that they're --

A. Right, right.

Q. -- you know, excessive or, you know, that kind of thing. So I'll -- yes, so just please talk about your approach to --

A. Sure. Every situation is different, but one thing when we're trying to figure out where we prioritize our work, one of the issues to focus on is, well, is it a placer mining project and it's low -- relatively low risk of releasing contaminates and also is it self-contained. So in other words, you dig a hole in the ground. It's going to stay there. One of the challenges with this project and others we've been involved with has been -- this is borne out historically -- has been if you have sites, depending where (inaudible) in the headwaters and what the relationship is with surface water and groundwater, is there -- are there any contaminates on-site of concern,



first of all. And, yes, we know there are some contaminants of concern. Are the contaminants of concern and then is there any ability for them to leave the site? Are there any mechanisms to convey them away from the site?

So in this case we have the East Fork, South Fork Salmon River and Meadow Creek, and so the number of ways. And I know that's driven a lot of the mine design to try to address that, but there definitely are mechanisms that can move that off-site. And that's one of the things we've found in the former projects we've looked on is, you know, how far downstream mining impacts can go. And, again, there's what's planned and then what can happen. And so is there enough of a safety margin built in. The other thing is not just the conveyance of what's in the water, but also how the water itself is affected. So certainly water quality, but also water quantity and our ability to use that water. So is this a place that, you know, I like to go camping with my girls, and we usually, you know, like to go for a swim in the creek or at least splash around. And so that's one of those things is I'm always -- have been in this position now, but I'm always like, what's actually upstream? What's around the corner there? And so that is just kind of an example of how we approach the mining issues. We do take and we do try to work throughout the entire process and make suggestions as we go. For example,



in our scoping comments when the Stibnite Gold first came out, we -- the draft -- the scoping (inaudible) came out we wondered if there's an opportunity to backfill some of the pits and so to reduce the footprint of an overburden pile, a waste rock pile, and to backfill some of the pits. When the draft EIS came out, that didn't happen. That alternative didn't become part of that, and we raised additional comments, so did a number of people, and then we found is in the supplemental draft that the Hangar Flats Pit was going to be backfilled and that there's going to be -- that eliminated on the Fiddle waste rock storage pit, and there's going to be some additional caps and liners on that. And so now from our perspective they could have gone and followed the other issues that we have, but that's one example of how we engaged instead of simply saying no. That doesn't actually help that much given the derogatory framework, but instead of saying no, how do we actually make suggestions and then seem to understand the project better. And so what are the real issues, what aren't? And so that was one example of us going through the process.

We also had one just in terms of water quality issues. We were concerned about a mine in the headwaters of the Jarbidge River, which is a Wild and Scenic river, and this is the Newcrest Mine in the Humboldt-Toiyabe National Forest. And we filed an objection to the process. Got an

administrative protest. Worked with the mining company and the Forest Service, and they actually addressed the sediment issues that we had raised and Bull Trout issues by putting in an additional stream passage there for Bull Trout. And so looking at all the risks being factored, we withdrew our objection, and the project proceeded.

One other point that's a little bit closer to hand here is when during an exploration project on the Golden Meadows Project for this same area by Midas Gold, we raised an objection over sediment concerns and fisheries concerns. And we used that administrative process. This didn't go to litigation. We used administrative process to work it out with Midas Gold and the Nez Perce Tribe and the Forest Service on a path forward for that exploration to proceed with mitigation measures for Salmon, specifically road upgrades so that the road surfacing wasn't going to erode and traffic wasn't going to bleed additional sediment as a result of that. And so that was just one example. Of course, it's a much, much smaller scale. One example of our approach, instead of saying no, we said, well, what about this idea. And then oftentimes is does take an administrative process like this to play things out, and then we see where we can go and what we can raise.

Q. Thank you, Mr. Robison. I want to turn briefly to the actual water rights applications in this case. Are you



familiar with those applications?

A. Yes, I am.

Q. And you've seen them?

A. I have.

Q. I'm not going to try and pull them up. Been dealing with that all day, but can you tell me, in your own words, what your general understanding is of those applications?

A. Right. We're looking at a maximum of 9.6 cfs being withdrawn from the East Fork, South Fork Salmon River, partially groundwater, mostly surface water, and this stretch would be just above the tunnel, proposed tunnel. And that's going to be -- that was a maximum. There's additional number of smaller water rights, groundwater throughout the site, and we are concerned about one -- the value of -- not just the fisheries in the area, but the aquatic ecosystem is something where we felt, based on a potential using that full water right and looking at the conditions and terms of conditions, we weren't comfortable with that. And we thought that raised enough questions that we decided to file a protest and learn more about the project and also see if through this process we can figure out are there -- is there a better balance to be struck between protecting the public interest and issuing the water rights. So we're trying to figure that out. Next slide,



actually.

And, again, that's just our skepticism. Keep going. Keep going. Keep going. This is all other stuff. Just keep scrolling through. We've kind of covered all these other things of how we go with that stuff. Yeah. Keep going, next slide. Stop here. Keep going. So that's other stuff we've already covered.

Q. Do you want to go to the stuff specific to the South Fork?

A. Yeah, let's do that.

Q. Can you go to slide 71? I think we are at 71.

A. Thank you. So, like I mentioned, the South Fork of the Salmon River watershed, including the East Fork, South Fork and Johnson Creek, is really this convergence of several of our goals of Idaho Conservation. So we have members, including myself, that have gone to recreate, gone to (inaudible), and I think we'll have a better sense of this. But I used to work as a river guide, and I was just stunned at what an amazing resource with the South Fork and the East Fork, South Fork. And it is -- I've also fished there, and it's an amazing fishery as well. It's just a very special place. In fact -- next slide. It is a -- in the spring an amazing class 5 plus whitewater trip adventure there but also -- next slide. Of course, we've got -- it's been notable, both by the Forest Service and others for



things, but it's one of these places where people go when they're looking to get away and they are looking to basically the closest thing you can get to this combination of class III, IV, V whitewater and the chance of seeing Bull Trout, Salmon or Steelhead. I've had Salmon bump my kayak which is thrilling. And then also having these vast interconnected landscapes. It's right next to the Frank Church. You've got infiltrate roadless areas right there, so you've got the sense of it being super remote, just enough for a trip there. And, again, the fisheries, scenic recreational (inaudible) are there. Some friends of mine actually got married in their kayaks floating down the South Fork Salmon. And in my (inaudible) that's the first and only river wedding I've ever been on. And it was just magical as they are floating downstream, and the water quality is a part of that. The fish, the scenery. And then I was back again. We went to the South Fork Salmon to celebrate my friend's birthday, and somehow my friend -- his wife figured a way to get a piñata down the river with us for our camp. And so it just shows that this is a destination that people go to, not just a crazy whitewater (inaudible) but also folks just like to go camping with their families up there. And it's not just about love when we see a fish but even seeing like dippers on the river, American dippers. They are this wonderful aquatic songbird,

and they rely on aquatic invertebrates. And there's a pair that will live along and defend a territory this segment of river. And so when you camp, you're out there, you can see, oh, here comes the pair again up and down. And so we're concerned about the whole system, not just the big (inaudible) or just the big Trout. But also what else is out there. What else makes up this place. And, of course, water is key to all that, and that's why we're really interested in trying to figure out is there a -- does this water right adequately address these -- the public interest in the area. And water flows downstream, and so that's one of these things where we're really trying -- I've put in just below, not too far, just below (inaudible) but you can put farther down, and so, you know, the difference of some cfs, maybe not a lot, but that makes a difference in terms of where you're -- if you're going to be up at (inaudible) in your kayak or if you're going to get stuck on it. And also if you're fishing, whether, you know, what your run looks like with your fly. And so it's just -- your experience there is tempered by the water. And it doesn't mean that there isn't -- you don't adapt, but it means that you want to be mindful about what the effects are. Next slide.

Q. I was just going to ask you if there was anything you wanted to go through? I'm not very good at forwarding



your slides for you.

A. Let me just go further.

Q. Yeah, go ahead. Go ahead.

A. And Bull Trout -- just -- if you can go back. One thing there, I think we've -- and this is -- (inaudible) field trip out there, and we saw there's the restored section of river on the left there looking down on the site and obviously it's not a pristine area but it does have a lot of still ecological value. Next slide. And, again, out on the site learning about the project. And it's really important we think to -- you know, it's easy to have a knee jerk reaction to things, but it's important to find out what the issues really are, the scale of the project really is. And when you hear the tailings dam is going to be 480 feet high, 400-480 feet high it makes a difference when you are looking up at it and you realize how tall that really is. It's really a big feet of engineering. Next slide.

And, again, one of the things you asked about how we evaluate a project. And at the Idaho Conservation we actually get a fair bit of criticism from our friends who are sometimes a little more strident in that we are willing to, you know, come to the table and negotiate and meet with people and figure out what we can do. And so one of the things that we're kind of known for, whether it's by initiative or why cause or forest restoration collaboratives



or other things is trying to figure out is there any zone of agreement here. And so I think we have some early conversations with then Midas Gold that we figured we'd learn more about each other in the plan and the project. And you know I thought those were important meetings, but one of the things that we are trying to figure out is the balance from our perspective at least. And so that is do the (inaudible) comments, and in this case we've heard a lot about fish passage restoration. I think that's a great thing. So we've been involved with a number of projects including working with mining companies in the phosphate patch on a collaborative to restore fish passage for Yellowstone Cutthroat Trout, and those have been fantastic very rich partnerships.

Q. Mr. Robison --

A. Yes.

Q. -- are you against the fish passage in this case or are you for that?

A. No, I love --

Q. Or ICL.

A. (Inaudible) supports fish passage. We just want to make sure that it works well, and it's protecting the fish. And also that, in this case for the larger site, once the fish get there and in the coming years and decades is it going to be a hospitable environment for them. One of the



things is you get a fish passage, and this is great, but you get up to here. This is upper Meadow Creek, and the very place they're trying to get to in the case of this stretch here on Meadow Creek, instead of being met with this pristine spawning area, there would be a hundred million ton of waste rock piled there. And at the end of the day a very nicely river on top of it, but no fish passage. And so you are placing one blockage for another. And (inaudible) that's good, but if you look at the other issues in terms of the site disturbance, the issues that the Forest Service identified in terms of this is going to be a -- going to localize some contaminates and the mining plans planning on managing those but possibly with water treatment. And so you're going to have a larger area of local -- of contaminates potentially localized that have to be managed, as well as lots of transportation of diesel fuel and things like that to support a mining operation. So we're excited to have the fish passage work. We want to make sure it works, though, but also having a dam with no fish passage, the next place they're trying to get to, at least on Meadow Creek, kind of defeats the purpose in some ways from us, when you look at the whole balance on that.

One other thing I was going to say about this is just the temperature in terms of things where appreciate that the plan of restoration operations talks about the

importance of keeping temperatures cool. But we found enough issues reading the supplemental draft EIS saying that there is going to be a significant lag time before that comes onboard. So the water, the fish -- the water might stay cold in the pipe, which is fine, but that's not actually going to be fish habitat there. There's fish moving downstream, but when you do put the re-engineered channel on top what can happen is it's going to be, according to the EIS some parts there, could be many, many years, maybe decades, before you actually have enough vegetation grow over to shade the stream. And on top of that, there seems to be, at least in one citation, some inefficient soil on-site, so you could have basically that area where there isn't enough soil to promote vegetation, that that is desired. And also there's concerns that the supplemental draft identified about arsenic level in that soil. So even if you were to keep on track, there's concerns that the arsenic might not -- might delay the vegetation growth you want. So what we're looking at is the lag time there. And so you could have maybe ultimately this is the vision you get, but it might be hundreds of years before you get there. And so that's why we're engaged in commenting in the aspect of figure out are there ways to avoid these impacts in the first place or minimize them or mitigate them.



Q. So it sounds like ICL is concerned about what people sometimes label short-term impacts which could still be decades versus long-term impacts which a lot of people tend to focus on because oh, okay, you know, in the end things will be fine, but that might be more years than you or your members are willing to wait.

A. Well, one thing we've learned, too, is we've been involved with several mining projects so far, including Thompson Creek where there's many, many -- a lot of delays probably because of market prices from (inaudible) and so the project was all set to move forward, and then they had -- the phase eight was authorized but they had to put it on hold for maybe seven years now or so, if I recollect. And in that time the ultimate restoration isn't happening, and so that delayed that. The same thing with the Jervois Idaho Cobalt Project, and this is a project that we worked very closely with the company on. It did not result in any appeals for the project or litigation on that because we had a really good sense of their water management and their safeguards for this. It was an underground mining operation. So with this one we are like, hey, this seems like they are managing the best they are able and it's within sort of our comfort zone. And then what we learned, though, we actually were excited to see the project proceed because of the need for a responsible cobalt operation that



is ethical and equitable. But what we found is that because cobalt prices dropped again, the project never went forward, and it's been on hold. And so this is actually the second time that has happened because of market prices. And so they might have a really lovely restoration vision at the end, but what can happen between can delay that significantly.

Now, the other thing I know is that on the Stibnite Gold Project this is -- and this is covered in the supplemental draft EIS, they talk about the potential for additional exploration, particularly in the scout underground exploration. And so the Golden Meadows also was approved (inaudible) exploration drone that can be done there. And so there's a sense that, well, even though there's a 14-mile -- 14-year time life on them, that can be extended and expanded. And the really lovely vision that Perpetua has painted up there gets farther out of reach, and so one of the things we are trying to figure out is in the interim how do we make sure what gauge we can get now. I appreciate the fact that they're front-loading some stuff, and that's good. But, again, we want to make sure it works well and works as intended. And then throughout the process, again this goes back to adaptive management, are there other ways we can do to avoid, minimize, mitigate impacts, and also regarding what happens on-site when



they're done. So we've had situations before where --

MR. WATKINS: Objection, Your Honor. I recognize this lay witness. I recognize the Rules of Evidence don't strictly apply. At the same time I think I've heard about three questions in the last 45 minutes. This is a narrative.

MS. THROWER: I think your impression of what's been going on here is wrong. I have asked more questions in 45 minutes. The witness has been on for about 45 minutes.

HEARING OFFICER: Thank you. Is this the last slide?

Q (By Ms. Thrower) Do you have anymore slides?

A. I do have a couple more, and I'll try to be quick and to the point on this.

HEARING OFFICER: Well, I'm not -- and, look, I'm not trying to rush the examination of this witness. What's going to be most helpful for me is information about the application at hand rather than a lot of comparisons to other mining projects. And just for the witness' sake and, you know, settlement discussions, whatever may have happened up to this point within the Forest Service (inaudible) within their process doesn't really apply here either. So I don't get a lot of value out of that. So just focus on this application I think that would be great.

Q (By Ms. Thrower) Okay. So you talked about fish and fishing water. You talked about the fish

passage. You know, would you -- would you be concerned if there was a fish passage that didn't have enough water to work quite right and, you know, they trap and haul fish to get them upstream? Does that impact your numbers interest and --

A. Yes. One of the things that we are trying to do with, in particular, this case with the fish passage and also how the water is managed through this is to make sure if it works and as intended is a bit generic. And so one of the things there is going back to what is the science in terms of water specifications, et cetera. We know that there's going to be some on-site, you know, adaptation that happens there, but one of the things that we have seen that we are concerned about is managing to the minimum. And we've heard lots of discussions about, well, this should be just good enough. And one of the things that we've seen just for mining operations in general is that things happen and sometimes they dip below. And so in this case I recognize that you've got a -- it might not be a population level is what we heard earlier today, but one of the things that we really want to avoid doing is when our members are up there is coming across a fish mortality in some way. So that's one of these things that our members, the first thing they do, let's go along the creek and see what's in there, so (inaudible) the rocks and check it out. And so fish



mortality is something we really want to avoid. And the other thing is how to manage the water rights in a way that that -- make sure that the fish passage functions as designed and as the science recommends with -- I think a buffer makes a lot of sense in terms of what we've seen. The other thing is we've seen situations where there are mistakes. Dewatering does happen in other systems and other situations and having a rapid response is really, really important. You've seen where, you know, if it's an overnight issue or something happens in the middle of the night, it might be some hours before it's discovered. And that case it might be too late, too long for some of the fish to persist. And so that's one of these things where try to figure out -- you know, as a fly fisherman I've tried to minimize the time hold my fish out of water. And so I know that it's something really sensitive to in trying to make sure that we're operating on the proper time scale for it to correct any issues that come up. And I think that our members really like to have a buffer in there and that we are not just going from minimum amount. But I would love to see conversation about how we optimize operations for the fish.

I know that there's been a lot of statements about how we're going to restore the site, and I think it's a wonderful vision. But the thing that we're seeing here is



can we actually -- is it going to -- is it going to get us where we want to go. And so that revolves around water quantity, about the flow management, and the design features in place. So I think a buffer makes sense to me.

Q. Mr. Robison, I don't know if you were -- I know you've been here in and out, yeah, maybe not the whole time so I'm not sure if you heard the testimony about operational flexibility.

A. Uh-huh (affirmative).

Q. And Perpetua has asked for more water than they can use. That was the testimony from one of their expert witnesses, or maybe it was from the Perpetua -- representing Perpetua. But they -- they would like to have a larger water right so that they have the operational flexibility to withdraw more water in case a pump breaks --

A. Uh-huh (affirmative).

Q. -- or something like that.

MR. WATKINS: Objection, misstates the record.

HEARING OFFICER: Noted on the record. Proceed.

Q (By Ms. Thrower) If they are allowed to have that operational flexibility and, you know, maybe they're normally taken out for cfs side of the whole system, right, whatever, and they all the sudden need to take out 9.6, do you see that as an issue in terms of impacting the public's interest in fish and fishing



and recreation there?

A. I do. I do. I think that it's important to have flexibility on both sides. So in terms of what's a reasonable amount of flexibility to have, but also I would really like to see to make sure that we are not just doing the minimal amount for fish, but trying to -- with the larger goal being fish restoration as stated, fish habitat restoration, really trying to figure out what is optimal for the fish as well. And what we've seen in other situations have been some degree of terms and conditions or some type of design features in place that are early (inaudible) warnings or are triggers that say we are getting done here and let's, before we go any farther, let's doublecheck this. And I think that this is one of these things where we've had situations where -- actually one of the slides for Thompson Creek, they had an emergency need to use water on-site that we supported because of dust issues that came up off the tailings dam. Their operations had to be suspended, like I talked about, and they had an unforeseen dust issue that we notified the company about. And then they respond to that and a call from DEQ and needed to reconfigure the face of the tailings dam. Water is also very important for dust suppression which can have impacts on fish. And so we're not against the use of water, withdraw for water. The question is how much and when and what parameters are in

place. During certain times of the year probably not an issue. Other times of the year that is where we really want to make sure there are some -- based on what I saw -- recall from the initial application, that it didn't address my concerns about the what-ifs could happen on there. And so we thought from the Idaho Conservation perspective that this -- a protest would be ordered to figure out is there a better way to strike that balance to make sure that the fisheries goal that everyone supports actually are realized.

MS. THROWER: All right. Thank you, Mr. Robison. That's all I had for you today. Did you have any other -- you mentioned one more slide. Are you good with --

A. I think I'm good.

MS. THROWER: -- the way we left it? Okay. Thank you. Thank you.

HEARING OFFICER: I would allow questions also from any of the parties, so just keep that in mind as we go through witnesses. But I don't know who's going to take the lead on cross-exam.

MR. WATKINS: I'm probably going to have a good bit of questioning for this witness, so I don't know that it makes sense to start at 5:30 --

HEARING OFFICER: Yes.

MR. WATKINS: -- and go for a while or if you want to -- right now?



HEARING OFFICER: Yeah, let's get started.

CROSS-EXAMINATION

BY MR. WATKINS:

Q. Mr. Robison, how are you?

A. I'm fine, thank you.

Q. I noticed from your rafting picture, did I count four girls in there?

A. So my two daughters and some friends, yes.

Q. Okay. Okay. Well, I've got four, so I got you beat. I didn't get any information on your background. Do you have any degrees or anything like that?

A. Yeah. Thank you for asking. So I have a Bachelor's Degree in biology from Bowdoin College, and a Master's degree in botany from the University of Vermont in Burlington.

Q. And you are here representing ICL today?

A. That's correct.

Q. And you said ICL has approximately 400 members in Valley County?

A. Just under 400, I believe.

Q. Did ICL conduct any polling or questioning of its members in Valley County to assess their approval of Stibnite Gold Project's water right?

A. No, we did not. We have heard from members in the area who have been tracking this, and so we have discussed.



There's no polling, but folks, if they have an issue, they often come to our office and say, what's the latest on Stibnite Gold. And there's lots of different moving parts here, so they'll find out what's the latest with the water rights or (inaudible) and things like that so.

Q. So that's a no to my question?

A. That's correct. Yes, sir.

Q. So there could be ICL Valley County members that are in favor of the Stibnite Gold Project?

A. There could be.

Q. And there could be Valley County members that are opposed to the Stibnite Gold Project?

A. There could be, and there are.

Q. There are some that are opposed, and some that are in favor?

A. Yes. No, I know that there could be some that are in favor, but I know for a fact that -- that there are -- the members that I've interacted with during meetings in McCall are opposed to the project as designed in the ModPRO2.

Q. I believe you said that the Stibnite Gold Project intersects several ICL interests; is that correct?

A. That's correct.

Q. It intersects the issue of climate change, right?

A. Yes.



Q. And it intersects the issue of land access?

A. Land access in the larger public lands management.

Q. Public lands management?

A. Yes, yes.

Q. It intersects issues with potentially clean air, I think you said?

A. Clean air and also fisheries.

Q. Fisheries as well. Does ICL have issue with each one of those categories with respect to the Stibnite Gold Project?

A. You know, regarding this particular issue with Perpetua water rights, it's that the fisheries is the most tactile, the most pressing issue, but there's a larger issue -- there's issues as well just the experience on-site. I mentioned whether it's recreation or birdwatching or dippers or things like that.

Q. So let me --

A. It's mostly a fisheries focus for the purpose of the protest.

Q. Allow me to tighten up my question.

A. Yes.

Q. Does ICL -- is ICL in favor of the Stibnite Gold Project with respect to climate change issues? It's a yes or no question.

A. No.

Q. Is ICL in favor of the Stibnite Gold Project in terms of land management?
A. No.
Q. Is ICL in favor of the Stibnite Gold Project in terms of air quality?
A. No.
Q. So fair to say regardless of what happens with respect to the Stibnite Gold Project's water right, ICL would still be opposed to the mine?
A. Yes, as envisioned in the ModPRO2.
Q. How many mines has ICL given its full-throated approval of?
A. Full-throated is, you would say skeptically or would say cautiously optimistic.
Q. How many mines -- how many mines has ICL wrote a letter in favor of to an agency asking that agency to issue that mine a permit?
A. We have done that with Jervois Idaho Cobalt Project. Let me just paraphrase that. We have -- let me make sure. I'm trying to remember when that came through. We have -- we engaged the process with the Forest Service. Usually the way it works is that we don't say to the Forest Service we support the project. We say we're not going to appeal, and we think that the conditions are fine. What we've done, those written blogs and interviews about the



project and why we think the Idaho Cobalt Project is, from a climate perspective and from a natural resource (inaudible) perspective, one that we support.
Q. So ICL agreed not to oppose the Jervois Idaho Cobalt Project?
A. And we talked about it in the press why we think it's important to support it.
Q. And my understanding is Jervois agreed to pay $125,000 a year for the life of the mine; is that right?
A. They -- could you describe the question?
Q. My understanding was Jervois agreed to pay -- was to pay $125,000 a year to ICL for the life of the mine?
A. That's incorrect.
Q. Did they agree to pay $125,000 a year?
A. I'm sorry?
Q. Was there a monetary component to ICL's support of the Jervois --
A. No.
Q. -- Cobalt Project? If there was documentation or news reporting that said otherwise, we'd just have to look at that?
A. Yes, and I can clarify that the -- if the funding was for conservation action projects, (inaudible) ICL, if that makes any sense.
Q. Okay. That's helpful.



A. Yeah, so --
Q. So in exchange for $125,000 a year spent towards conservation action projects ICL agreed not to oppose the Jervois Cobalt Project?
A. You got it the other way around.
Q. ICL does not oppose the Jervois Cobalt Project and Jervois pays $125,000 a year to environmental works?
A. (Inaudible) that's right. So the basis for this was they issue the project was sound and properly managed, and one of the components for that was this conservation action program.
Q. Is this the first time you've appeared in the hearing like this setting to speak in favor or against a water rights applicant?
A. Myself, this is the first time I have myself.
Q. Has ICL ever come and spoken in other hearings in favor or against a water rights applicant?
A. Yes, we have.
Q. How many of those hearings has ICL appeared in favor of a mine getting a water right?
A. I don't believe any.
Q. How many hearings has ICL appeared in opposed to a large industrial user not receiving a water right?
A. I believe I'm only familiar with one, but there may be more.



Q. You -- you listed a number of general concerns with mining. I think you talked about cyanidation leaching process. You showed pictures of water going through pipes, things like that. Do you generally remember that testimony?
A. Yes.
Q. And some of that was in your slide deck?
A. Yes.
Q. Do you have any data that supports those concerns occurring at the Stibnite Gold Project?
A. The supplemental draft, yes, noted that there's going to be potential globalization of chemicals of concern, and that would be a new source. And so there have to be design features to manage that.
Q. Do you know where that information is found in the supplemental draft EIS?
A. I would have to do a search on that. So I don't recall exactly where that source is for that.
Q. Has ICL generated any data or analysis to suggest that the concerns that you've raised would occur at the Stibnite Gold Project?
A. I'm sorry. Could you rephrase the question?
Q. Sure, sure.
A. Yeah.
Q. Has ICL done any analysis of its own to determine that the concerns it has with mining in general will also be

found at the Stibnite Gold Project?
A. Not that I'm aware of.
Q. Similar question: Has ICL done any modeling to -- predictive modeling to see what will happen in the future at the Stibnite Gold Project to see that its general concerns that it has with mining would occur in the future at the Stibnite Gold Project?
A. Yep.
Q. You showed a number of slides. I think one was of the Thompson Mine and said this is what modern mining looks like. Do you remember that?
A. Thompson Creek Mine.
Q. Thompson Creek Mine.
A. Yes.
Q. And then you showed another slide of a pristine creek, and it said before.
A. Right.
Q. And there's another slide that said after?
A. Right.
Q. And there was a cement channel with a little bit of a stream running through it?
A. Right, right.
Q. And that's at Meadow Creek, but it's not the same Meadow Creek?
A. Exactly (inaudible).



Q. Do you believe that the restoration at the Stibnite Gold Project will look like the slides that you showed of other mines and other streams?
A. The pictures I've seen -- I'm sorry. Say that question one more time.
Q. Sure. Do you believe that the restoration at the Stibnite Gold Project will look like the slides of modern, what you call modern mining, and what the after pictures of mining looks like that you had on your slide presentation?
A. I've -- just to clarify. I showed a picture -- couple pictures of restoration that I thought was done very imperfectly, and one that's done very well.
Q. Sure.
A. And so I would say that we've raised concerns about it looking not the way we want it to. And so we're going to wait for the final Environmental Impact Statement to see how the Forest Service has addressed all issues we raised. So right now I'm hoping that's going to go the way we want it to, but we raise concerns in our comments that the design features and the mine plan may not take us where we want to go. So right now it's a spectrum (inaudible).
Q. So I appreciate that clarification. So as you sit here today --
A. Yeah.
Q. -- you do not believe that the negative pictures or



the less than suboptimal pictures of mine restorations, that that will not be the Stibnite Gold Project? You do not believe that, correct?
A. Got too many negatives in there.
Q. I'll clean up. I'll clean it up. The suboptimal pictures of mining that you showed --
A. Right.
Q. -- you do not believe that that is what the Stibnite Gold Project will look like? In fact, you hope that's what --
A. I'm hope -- I essentially hope (inaudible).
Q. And you have no data to suggest that the Stibnite Gold Project will look like the slides that you showed?
A. No. The supplemental draft EIS points to concerns about the pace of restoration, and so based on that document and, again, there's large amount of uncertainty there. It talked about the delays in timing, and so whether that's going to be year five, year 50, or year 500 is very unclear about how long it would take to that vision. And that's why I think we're waiting to find out how the Forest Service and Perpetua responds to that. So we're hoping to -- wish we could snap our fingers.
Q. But you can't point us to anything in the supplemental draft EIS that actually establishes that, right? You don't have it in front of you?



A. I don't have it in front of me, yes, sir.
Q. And you don't know whether or not the Hearing Officer has made rulings regarding the admissibility of the supplemental draft EIS in these proceedings, do you?
A. I do not.
Q. You talked a bit about rafting, and you said it's class IV, class V rapids, and the pristine nature of the area. Is that a yes?
A. That's correct.
Q. That area that you were describing, do you know how close it is to the proposed mine site of the Stibnite Gold Project?
A. Right. Where my -- the place that we -- my friends and I often go is to (inaudible) to start paddling from is actually at the confluence of Johnson Creek and East Fork, South Fork. And then there's another stretch about five miles up farther upstream on the East Fork, South Fork. So maybe it's 10 miles below the site, something along those lines. So it's within the -- it's on the East Fork, South Fork above Johnson Creek.
Q. And do you know how many tributaries feed in from the mine site, that five miles down or so, to where you and your friends put in?
A. (Inaudible) you've got Sugar Creek, Tamarack Creek, Profile Creek, and Course Creek along those, and actually

Course Creek might be below that stretch so --

Q. And so it would be fair to say -- it would not be fair to say that flow rates in the spots that you and your friends put in are entirely impacted by what occurs at East Fork, South Fork, given that there are other tributaries that would feed in above where you and your friends put in, right?

A. For that particular experience there are other tributaries that provide a buffer. That said, I've also been up to the site and up to -- not kayaking, it's a little rocky up there, but I have friends who have fished right there that would actually have and actually that would actually -- or closer to the potential impacts or benefits.

Q. Do you have any data to show that fishing would be impacted as a result of mine procedures at the mine site?

A. There is -- this is a reference to the supplemental draft EIS, mentions that Bull Trout are not predicted to benefit from mining operations if it proceeds. And so that's the one reference in there if you are -- so that's one of the concerns is that from a fisheries perspective, according to what I've read in the supplemental draft, it says that Bull Trout are expected to have a reduction in quantity and quality of habitat.

Q. Do you fish for Bull Trout?

A. I have caught Bull Trout before and kept them in



the water. They're a threatened species, and so it's one that is a -- it's a pretty amazing local species when you -- I was -- actually had a Cutthroat Trout on, and I was (inaudible) look up, all the sudden, bam, rod doubled over, zimmed off. I was like, what happened? And a Bull Trout had T-boned the Cutthroat Trout and just taken off with it. They're just amazing predators out there really fascinating fish.

Q. That's a great fishing story, so, my question, though, was: I understand you might have caught a Bull Trout.

A. Yeah.

Q. You don't go out looking for a Bull Trout, right?

A. I have done that, actually, before to go look for Bull Trout along the spawning areas along Sugar Creek (inaudible) near the fall.

Q. Let me tighten my question up. Have you gone out to go fishing for the purpose of catching a Bull Trout?

A. I have.

Q. There was a comment that you made, and correct me if I'm misquoting, but I wrote down that you said: There's potential for hundreds of years to occur before we get the restoration or reclamation benefits of the site potentially. First off, is that your position?

A. That's a concern.



Q. That there would be hundreds of years?

A. (Inaudible).

Q. What data do you have to support that there would be hundreds of years of delay in getting those restoration benefits? And I'm looking not anecdotally, but specifically at this site.

A. The concerns I have are based on the growth media on-site that were referenced in the supplemental draft EIS that shows that there are a lot of fines in soils for productivity and generation of soils can take centuries. And so one of the concerns we have is that if you don't have sufficient soil to -- for the riparian areas, you're not going to have the growth in these. And also the changes in hydrology also can affect how much silt accumulates on the side to build that soil. So in some cases, looking back in the photo of Meadow Creek, not your Meadow -- not our Meadow Creek --

Q. The bad Meadow Creek.

A. That other Meadow Creek, and that site, not Stibnite Gold, will take, you know, centuries to really change (inaudible).

Q. So your position is because there are other mines that you believe will take centuries to be restored, the Stibnite Gold Project will also take centuries to repair?

A. That concern was highlighted by the supplemental



draft EIS in terms of some uncertainties about the soil and restoration. I'm hoping it takes quicker.

Q. For sure.

A. But that's a concern. One of the -- yeah, that's a concern.

Q. Are you aware that Perpetua intends to do concurrent restoration along with their mining?

A. I am.

Q. And so you would agree, then, that during the mine process things would be improving along the way?

A. Yes.

Q. And that would include things like putting in a fish tunnel?

A. Yes.

Q. And you recognize that currently there is no fish passage above the Yellow Pine Pit?

A. Yes.

Q. And that would include mitigation efforts at properties outside of the mine plan?

A. You mean like Blow-Out Creek?

Q. No, sir. I'm talking about like the Jones property.

A. Is that on the Salmon? Is that -- which one? I'm not sure if I'm familiar with (inaudible).

Q. It sounds like you're not aware of the extensive

mitigation efforts that Perpetua intends to do?
A. Not fully (inaudible).
Q. Would it be important for you to know in forming your opinion to know that Perpetua is doing other mitigation efforts that will improve drainage throughout the area?
A. Yes.
Q. Do you take issue with the amount of the proposed water right that Perpetua is seeking at this time?
A. Yes.
Q. And what is the issue you take with that?
A. The issue is that full use of that water at what I would say a very sensitive time for fish could have adverse impacts on the fish.
Q. Are you aware of any flow rate conditions that require -- that would mandate when and where -- when Perpetua can take out that 9.6?
A. Yes.
Q. Do you have any data or modeling that says that removing 9.6 cfs would have adverse impacts on fish?
MS. THROWER: Objection. Mr. Hearing Officer, Mr. Watkins keeps asking for data, and this is not an expert witness testimony. This is a fact witness.
MR. WATKINS: The witness certainly testified as an expert, Your Honor. Mr. Hearing Officer. I apologize.
HEARING OFFICER: I disagree. Yeah, I agree. I think



he's stated that as an umbrella statement, that ICL didn't have -- didn't go and do data collection or analysis in this case, so we don't need to have more questions on that.
Q (By Mr. Watkins) Is it -- seeing that ICL did not do any data collection or analysis in this matter, is it fair to say that your concerns with 9.6 cfs water right are purely anecdotal, then?
A. Trying to think of the -- I'd say, no.
Q. What -- so you don't have data or analysis to support that 9.6 removal would be adverse to fish; is that right?
A. I don't have that data, no, sir.
Q. And yet you have concern about that. Is that concern based on what?
A. The concern is based on our discussions with our colleagues at Save the South Fork Salmon and fisheries experts that we work closely with. And they have done independent analysis and that raised concerns about that. That affirmed our -- that affirmed our concerns that we thought that a closer look was necessary.
Q. And who are those fisheries experts that you consulted with?
A. Those are the ones that were listed in the expert witnesses.
Q. Ackerman & Kinzer?



A. Those were for the Tribe, so --
Q. What are the names of your experts that --
A. Cochnauer and that's through the South Fork -- working with the South Fork -- Save the South Fork Salmon.
Q. Just that one?
A. There's others, but that's all I can recall right now.
MR. WATKINS: Mr. Robison, those are all the questions I have for you. Thank you for your time.
HEARING OFFICER: Any questions on redirect?
MS. THROWER: No. Thank you.
HEARING OFFICER: Okay. Mr. Robison -- or, Mr. Lopez, I said you could ask. Go ahead.
MR. LOPEZ: No questions, Officer Cefalo. Thank you.
HEARING OFFICER: Okay. That's fine. Thank you, Mr. Robison.
A. Thank you very much.
HEARING OFFICER: Thank you for joining us in previous days, too. I've seen you in the back. So I'm glad that we got through that because then you aren't obligated to come back tomorrow. You can, of course, if you would like. Okay. So anything else before we close for today? Any another concerns or things we need to discuss? Okay. Then we can go off the record.
MS. THROWER: Just confirming our start time is 8:30.



HEARING OFFICER: Let's start at 8:30 again, yep. So let's go off the record.
(Recess.)
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BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF APPLICATIONS FOR PERMIT 77-14377, 77-14378, 77-14379, APPLICATIONS FOR TRANSFER 85396, 85397, 85398, AND 85399, AND APPLICATION FOR EXCHANGE 85538 IN THE NAME OF PERPETUA RESOURCES OF IDAHO, INC.,

TRANSCRIPT OF THE HEARING
HELD ON THE 14TH DAY OF DECEMBER, 2023

TRANSCRIPT OF THE HEARING
HELD ON THE 15TH DAY OF DECEMBER, 2023

BEFORE: MR. JAMES CEFALO, HEARING OFFICER

TRANSCRIBED BY: KEITH EVANS, RPR, WA & ID CSR NO. 655



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BE IT REMEMBERED that the above-entitled matter came on for hearing December 14, 2023, at the Idaho Department of Water Resources, City of Boise, County of Ada, State of Idaho.

(Thereupon the following oral proceedings were had as follows, to-wit:)

HEARING OFFICER: Get started officially here. Okay, we are on the record. This is the morning of Thursday, December 14th, and we will resume with presentation of evidence this time from Save the South Fork Salmon River, Incorporated. Ms. Thrower is going to be conducting the examination, if you would call your witness.

MS. THROWER: Yeah, Mr. Fred Coriell.

HEARING OFFICER: Okay. Mr. Coriell, let me swear you in.

FREDERICK CORIELL

after having been first duly sworn,

was examined and testified as follows:

MR. CORIELL: I do.

HEARING OFFICER: Okay. You can proceed.

DIRECT EXAMINATION

BY MS. THROWER:

Q. Can you please state your name for the record? Your microphone --

HEARING OFFICER: Push the button. Yeah, there you



go.

Q. (By Ms. Thrower) I'll try that again. Can you please state your name for the record?

A. Fred Coriell.

Q. Can you spell your last name, please?

A. C-o-r-i-e-l-l.

Q. And what's your occupation?

A. I'm an attorney.

Q. Okay. And how long have you been an attorney?

A. Three months.

Q. And what kind of law have you been practicing besides (inaudible)?

A. General practice firm up in McCall, so we do a variety of civil matters.

Q. You've probably been doing a lot of document review right now, right?

A. Correct.

Q. Early in your career. Okay. Where do you live?

A. So I live in McCall, Idaho.

Q. How long have you lived in McCall?

A. I've lived in McCall full time since 2009.

Q. Okay. And can you describe where McCall is in relation to the proposed Stibnite Gold Project?

A. Yes. McCall is about 35 air miles to the east of Stibnite Mining District, or, sorry Stibnite Mining District

is to the east of McCall. By road, you know, there's several ways to get there, but probably the shortest route over the creek, which takes over 7,000-foot pass out north of McCall down into the South Fork Drainage, and then you have to drive up the South Fork and then the East Fork. Probably takes you close to two hours, depending on road conditions.

Q. Okay. And what is your relationship with the Protestants Save the South Fork Salmon?

A. So I'm a board member of Save the South Fork Salmon.

Q. And how long have you been a board member?

A. I've been a board member since November 2019 is, I guess, when we officially filed with the Idaho Secretary of State. Prior to that I would call us -- we had operated, really, as like an unincorporated association would be the best way to describe.

Q. How many Board of Directors do you currently have?

A. We have seven.

Q. And you're testifying today on behalf of Save the South Fork Salmon?

A. That is correct.

Q. Okay. Can you explain what Save the South Fork Salmon is? You kind of did, but just generally what you guys do.



A. So our mission is to preserve and protect the ecological, cultural, and economic resources, and the well-being of the people that use those resources for generations to come in the South Fork Salmon watershed generally. So our group, as I would just kind of like to refer to us colloquially as, we have a lot of diverse interests, people that have used the South Fork for years and years and years. You know, we have -- on our board currently we have a retired fisheries biologist that worked for the Forest Service. Previous we had a retired geologist that worked for the Forest Service. Myself, I have a recreational interest that I've been using that watershed since -- pretty consistently since 2002 for either whitewater kayaking or fishing or camping or hiking, all that, mountain biking, all that stuff. We have other board members that, you know, basically do the same thing. We have other members of our organization, supporters, that are avid fishers so they're in there very frequently fishing. And so we represent -- I guess our advocacy is really geared towards what, in furtherance of our mission, is really supporting the ecological services of the ecosystem and cultural resources of that area.

Q. Okay. And were you one of the founding members of Save the South Fork Salmon?

A. I was.



Q. Do you know how many members or supporters the organization currently has?

A. Yes. We have -- we have an email list that has just about 500 people on it, just under 500 people. In terms of like an official new membership number where people have actually expressed their actual interest in being members, it's closer to 100. And those are primarily people that live in the local area.

Q. Okay. And did -- how did -- how did -- how did these people become official members and was there a membership drive or is this just sort of a --

A. So we periodically reach out or they just on their own volitional reach out to us and say what can I do to support your organization. And so we have -- yeah, you know, I'm not going to say everybody that provides us with funding would necessarily call themselves a member. They might consider themselves a supporter, but I think members are just a lot more active in terms of -- you know, and we put together workshops for commenting on various projects and through the NEPA process that are going on in the South Fork there. More engaged in participating in those workshops and wanting to learn more about the project and using our -- sort of our advocacy work to help them advocate for their interests in the watershed as well.

Q. Okay. You mentioned funding. Where does your



funding come from?

A. We are entirely -- we are a 501C-3 so we take donations. We periodically do membership drives, but we're very small. Like to call us a lean and mean organization. Our board is entirely volunteer. The funding that we do generate goes towards assisting us in commenting on projects, you know, going on, or just activities that are occurring in the South Fork and advocating for our interests there.

Q. Okay. And what kind of assistance do you mean that takes this kind of funding?

A. So with complex projects like the Stibnite Gold Project or this water rights protest, we engage expert -- experts or consultants that have particular expertise in an area that we are concerned about, and so we use funds that we generate to offset the costs to pay them for their work.

Q. Okay. And I want to go back to your members and supporters. You said you have currently about 500. Do you know where those people live or say they live?

A. I mean, yes, I do. Like I said, the majority of sort of the people I would call actual members are local. Definitely within Idaho, and then our broader email and supporter list is nation-wide but it's primarily Northwest. So I think we have a lot of interest from the river community, and I would characterize it as people who enjoy

floating on the river, fishing, and the South Fork is a destination for them. So they are always -- they are, you know, concerned, or they have an interest in what's going on there so they use us to sort of gather information and stay connected to that watershed.

Q. Okay. You said South Fork. I assume you mean South Fork Salmon River?

A. South Fork Salmon River. And when I say that also (inaudible) watershed recognizing that the proposed mine is in the upper East Fork, South Fork watershed.

Q. Okay. So the relationship to Save the South Fork Salmon and what you're talking about South Fork is because the East Fork of the South Fork is in the same watershed. Feeds into that river. Do you know if your members or your recreational activities take you to the actual East Fork of the South Fork?

A. Yeah. So we have members that fish in upper East Fork, and we have members that fish in Sugar Creek. That fish at the confluence of Sugar Creek and East Fork, South Fork Salmon River. We have members that snorkel. Yes, people like snorkeling. I'm guilty of it, but not up there. Down below the lower South Fork, and snorkeling meaning we like to look for fish.

Q. So you said you are one of the founding members of Save the South Fork Salmon. So how or why did Save the



South Fork Salmon start?

A. So Save the South Fork Salmon, our initial group of folks -- it was not -- we were not focused on the Stibnite Gold Project at that point in time, but we knew it was going on. Some of us had participated in the scoping and also with some of the Golden Meadows exploration. Some of those projects that were going on within the Forest Service processes. But generally a lot of us just had -- it's a small community up there so we know each other. We had common interests in the South Fork watershed. Then I think the thing that really got our group together was Midas Gold at the time, but they had proposed, I think it was in the summer of 2018, a community agreement. Wanted the 10 nearest communities to the Stibnite Gold Project to sign onto this document. The document itself created kind of like an advisory council, as well as a foundation, which were funded by stock from the company and various payments that would be, you know, provided at different milestones throughout the permitting project and the life of the mine. And they asked basically county governments, municipal city governments, to sign this document, and our group was concerned that we were -- you know, a lot of us lived in Valley County or McCall, and so we were concerned that our government sign that document. It seemed like they were maybe being bought off a little bit because the funding



promise was potentially significant, you know. It was like at least 8 1/2 million dollars, I think. I think as it's written right now it's like half a million dollars once they go into production it's sort of like the minimum for each year of production. So 12 years of production is (inaudible) dollars. And there's just like -- it was just too much, too close of a connection between city officials. (Inaudible) on the board the city officials and city elected officials appoint board members is my understanding of how that works, and so we were concerned. That was really what coalesced our group was trying to convince the City of McCall not to sign this, as well as the County Commissioners. And our concern with the Commissioners go a little bit further because they did have some permitting authority over the Stibnite Gold Project, and so we just felt like they're going to sign this document. Promise to get funds stock given to them or given to this foundation through them. Just, it was a little too close for -- we didn't think that was good politics, so we opposed it.

Q. And did McCall eventually sign that (inaudible)?

A. They did not. They chose not to.

Q. Did Valley County?

A. No. Valley County or -- sorry. I think Midas Gold (inaudible) Midas Gold at the time withdrew the agreement. I think that was in maybe late January of 2019, but there



was a lot -- it raised a lot of awareness about what was going on. You know, the county and the City of McCall held public forums and really engaged people.

Q. And when you say they withdrew the agreement, was that they withdrew it completely from all the communities?

A. No, no, no. I think they had 8 communities that are signed on, so the Stibnite Foundation and the Stibnite advisory council are operating. And I know the Stibnite Foundation does provide grants annually right now. And McCall did not sign, and then, you know, for whatever reason I didn't -- I'm sure if you Googled it you can find Perpetua's reasons for withdrawing the agreement, but they did withdraw it. So Valley County did not sign it.

Q. Okay. So just withdrew it from Valley County?

A. Yeah.

Q. Okay. So what kind of -- so you mentioned, you know, the group sort of galvanized around this community agreement. What other kind of activities has Save the South Fork Salmon been involved in to further its mission?

A. You mean from -- aside from engaging with the Stibnite Gold Project, like other initiatives in the South Fork?

Q. Yeah.

A. Yeah, so, you know, some of our members and supporters, myself included, have just sort of informally

worked with the Forest Service with float boating users in the lower South Fork really just cleaning up campsites, providing wag bags at the put-in, you know, just really teaching people how to use that place and leave no trace. Just good ethics in the outdoors. It's a very popular section of river, so that's like one thing that we do. Another -- we comment through the NEPA process if there's a Forest Service has a proposed order or some project going on. I know we've commented on the East Fork, South Fork ramp which is a recreational access management plan. We've also commented -- there's an exploration proposal that is just to the north of the proposed Stibnite Gold Project called Horse Heaven Project. We've commented, provided scoping comments for some exploration that may occur up there in the near future. We've commented on the Burnt Log Road investigation which is associated with the Stibnite Gold Project, and our concerns with use in that area which is fairly pristine part of the watershed.

Q. Okay. So you guys didn't pick a lot of things to comment on. Sounds like, you know, pretty much anything that may impact the South Fork watershed. How do you go about deciding which comments to project on -- which projects to comment on?

A. So, you know, it's decided amongst our Board of Directors, and we pick projects that we feel further our



mission. If we're going to comment on something it's -- it's something that we feel our members would have an interest in and want to have a voice. So that's basically our criteria.

Q. Okay. And you mentioned that you have been involved in commenting on the Stibnite Gold Project. Can you provide me a description of your organization's process for writing a comment letter, you know, like the Stibnite Gold Project comment letter on the NEPA process?

A. So, it's a great project. So we spend a lot of time reviewing documents. We have -- we are fortunate on our board to have some expertise, but it's -- you know, we recognize we are not all experts, myself included. I have just very general knowledge of a lot of things that go on there, so we engage either outside consultants or if we feel like we actually need to hire somebody to really help us analyze, say like a water quality metal constituents, things like that, that are way above my level of understanding, we do that. And so we -- NEPA process is you provide comments in the hopes of making a project maybe better, providing other alternatives that aren't considered, things like that.

Q. Right. And you mentioned something about workshops to engage the public in helping them comment. Did you do any of those for the Stibnite Gold Project?

A. We did, yeah, quite a few of those. During the



draft EIS, the first one in 2020, again in 2022, '23 with the supplemental, I guess it was mostly 2022, November, December. So, yeah, we have -- we hold comment workshops. We use the information we get from our experts or consultants, like the reports that they generate that would be submitted with sort of a broader comment letter, to help them craft their own comments. And so I'll have Zoom meetings or potlucks, that kind of stuff, and work with people so they have a voice, and they can advocate well.

Q. Okay. Has your organization ever filed a lawsuit in state or federal court on any proposed project or permit in anything that's going on in the South Fork watershed?

A. We've never filed a lawsuit in state or federal court, no.

Q. Okay. Does Save the South Fork Salmon oppose the Stibnite Gold Mine?

A. So we propose -- we oppose the -- I think people call it the ModPRO2 or the 2021 modified mining plan. So as proposed, we are opposed to that particular project that was analyzed in the SDEIS at this point because we feel it has impacts that go beyond what we are comfortable with or what our consults and experts have kind of given us the information in their assessments or we feel that there are another alternatives that really the Forest Service and Perpetua itself are dismissing that we feel would be like



more protective, less impact, smaller footprint. And really that would be -- you know, that furthers our interest in really supporting what we think is the ecological value of there. I know there's a lot of scientific debate about restoration and all that kind of fancy stuff, but as proposed, we just -- you can -- we have 335-page comment letter on SDEIS that is online. I wrote many sections of that, along with other people. So you can read that online.

Q. I want to turn to the water rights applications that are at issue in this matter. Are you familiar with what rights application No. 77-14378? And if you need me -- I'm not going to introduce -- we've already admitted that exhibit into this proceeding. Just in the interest of time I'm not going to have you pull it up in front of you, but let me know if you need that to refresh your recollection. So the question was: Are you familiar with it?

A. Yes, I am familiar with the application.

Q. Okay. In your own words, what's your general understanding of that water rights application?

A. So it's an application for permit to divert -- put the beneficial use 9.6 cfs of water within the upper East Fork, South Fork Salmon watershed. I think it consists of, I think, about 50 -- or 50 groundwater wells, as well as surface water inversion, and then the application also includes contact water, which I think we know now that it

does not require a water right to capture.

Q. Right. And are you familiar with the other -- there's several other application for water rights or transfer of water rights. Are you familiar with those?

A. I am.

Q. Do you have a general nature of those?

A. Yes. So they are existing water rights in the watershed. I think most of them are groundwater rights. One of them is a surface water -- small surface water right, smaller. And, yeah, I think the idea is to really move them to one, at least the surface water diversions, to one point of diversion, and be able to use the groundwater wells for the various things that are needed for an operating mine.

Q. Okay. Who made the decision to protest these applications?

A. Our Board of Directors.

Q. Okay. And what concerns did the organization have with the water rights applications?

A. So we looked initially at 77-14378 and saw the 9.6 withdrawal. One of our concerns was that it didn't specify in the application where that was going to come from. So we had to assume it was possible that would all be withdrawn from the surface, surface water resources up there. A lot of us are, you know, river people, fisherman. We pay attention to U.S.G.S. gauges so we are well aware that the



flows in the East Fork, you know, whether it's above Sugar Creek, up at the mine site at Meadow Creek, most of the year are very close to that 9.6 number. So that is potentially -- just initially looking at it was like, wow, this is a significant amount that could possibly -- potentially be withdrawn from the resource, and that would -- from the water, and that would have a significant impact we thought, just seeing, on fisheries and aquatics and other recreational resources up there. And so we -- we did engage some -- you know, some others with a little more knowledge and just kind of asked them, what do you think? What's going on here with this water right. Is it possible that they could pull 9.6 out of the surface -- off the surface water all at once, summertime. And so because there was enough uncertainty with that respect and the potential impacts it would have on fish, we decided to launch a protest.

Q. Okay. And you know we've been in this protest process for, I believe, close to two years now. So you apparently still have concerns with the water right applications or else we wouldn't be here. So what other -- you know, you said you engaged other people to kind of look at it to give you an initial assessment. What are your concerns or do you still have concerns?

A. Yes, we still have concerns, and that's based on,



you know, what we've learned from our expert, Tim Cochnauer, who we engaged in this process to really look at the potential impacts from withdrawing that much water on fish habitat and fish species at their various life stages. So, yes.

Q. Okay. And did Dr. Cochnauer, did he provide Save the South Fork Salmon with an expert fisheries report regarding this water right application?

A. He did.

Q. Okay.

A. Yes.

Q. I'd like you to turn to proposed Exhibit 319. And I put those binders up there so you can go ahead and turn to that exhibit.

A. Okay.

Q. Okay. So you have that in front of you, 319?

A. I do.

Q. Let's see if we're on the right one.

A. So, yeah, I'm not sure that this is -- I know he did two reports, so --

Q. Maybe I missed a tab. Sorry, we are a little challenged in McCall with office supplies. Well, what document do you have in front of you, Mr. Coriell?

A. I have one that's labeled rebuttal.

Q. Okay.



A. And then I have a 319, but I don't have the tab. I am very familiar. I mean, I've reviewed this report.

Q. It's okay. I'm sorry. Let's go to 301. That will be in the other folder. Maybe I mislabeled that in my mind. That's -- this is the one --

A. (Inaudible).

Q. Okay. So you have seen this document?

A. I have.

Q. Okay. What is this document?

A. It's an expert report that was prepared by Dr. Cochnauer.

Q. Okay. And are you familiar with this report?

A. I am.

MS. THROWER: Okay. Mr. Hearing Officer, I'd like to introduce proposed Exhibit 301 into the record, Dr. Timothy Cochnauer's expert witness report dated September 11th, 2023.

HEARING OFFICER: Will we have Mr. Cochnauer testify?

MS. THROWER: We were planning to have Dr. Cochnauer testify, but I am introducing this now, so that Mr. Coriell can testify to the organization's continued interest in protesting these water right applications and the basis for that. Mr. Watkins asked Mr. Robison yesterday a lot about data and whether there was any basis for them -- for ICL in opposing water right applications, and so I'd like to

establish that with Mr. Coriell right now.

HEARING OFFICER: Mr. Coriell can refer to 301 and 319. We'll take up admission when we have Mr. Cochnauer on the stand, so but he can freely refer to any of the information in here.

MS. THROWER: Okay.

Q (By Ms. Thrower) So, Mr. Coriell, generally, in your own words, can you explain what Dr. Cochnauer analyzed in his report?

A. So Dr. Cochnauer analyzed potential effects of withdrawing water from the East Fork, South Fork Salmon River. He looked at a couple different -- or several different scenarios, and what effects, impacts that would have on fish and habitat and, in turn, make sense that if you increase fish habitat because of water withdrawals, which I believe is what his report concluded, my understanding of it, you, in turn, are not being very protective of sensitive fisheries use, threatened fish species under the Endangered Species Act.

Q. So did the conclusions in his report cause you to continue to have concerns about the water right applications and their impacts to stream flows and fish habitat?

A. Yes.

Q. So let's turn to Exhibit 319. Okay. So what is this document?



A. This is a rebuttal expert report that was filed. It was filed early November in this process.

Q. And who appears to have written that report?

A. It's written also by Dr. Cochnauer.

Q. Okay. Thank you. Are you familiar with this rebuttal report?

A. I am.

Q. Okay. And can you say, in your own words, what you believe Mr. Cochnauer basically said or concluded in that report?

A. So my understanding of the rebuttal report is that it -- it identified I guess you'd call it minimum stream flows or flows that once you decrease the flow in the river below that point, you have an impact on fish habitat. A decrease in fish habitat that is not protective of the fish species that this report is concerned with.

Q. Okay. And did -- if you remember, did mister -- excuse me, Dr. Cochnauer, did he provide minimum stream flows that he recommended?

A. Yes, he did.

Q. And for what areas of what river did he submit this for?

A. So he identified minimum stream flows in the stretch of river that is in the East Fork, South Fork Salmon River above Sugar, the confluence with Sugar Creek. And my



understanding is that is basically from that point to the output of the tunnel, proposed diversion or whatever you want to call it. And then he also provided a minimum flow at the confluence of Sugar Creek and the East Fork, South Fork Salmon River.

Q. Okay. And do you remember what his conclusion was regarding how the proposed withdraws would impact stream flows relative to his determined minimum stream flows?

A. So my understanding is that the proposed withdrawals, even with -- I think there's a condition that is proposed here, would at critical times during the year for these different fish species would -- without those minimum stream flows the flows in the river at both points would be less than what was necessary to be protective of those fish, even with the proposed condition.

Q. Okay. And so did his conclusions in this report alleviate your concerns about the water rights applications?

A. No.

Q. There's been a lot of testimony about long-term benefits outweighing short-term adverse effects during mining. I believe you have not heard much of that, or I think you maybe just were online for Mr. Robison's testimony last -- yesterday, right? Is that correct?

A. Yeah. I was able to attend yesterday about 4:30 until the session ended, but that's been it.



Q. Okay. So as I said, there has been a lot of testimony about the long-term benefits of the project, of the entire mine project versus short-term adverse effects during mining. Many of those purported long-term benefits or some of the ones that were discussed were from restoration actions. If there's going to be future benefits, like the site is going to be restored, why does Save the South Fork Salmon continue to protest this water rights application?

A. So I think this goes to time. So long-term benefits, potential long-term benefits are great, but we're talking about a water rights application to withdraw water during mine operations, and that's short-term. So in my mind we are concerned here about what is occurring during mining operations to the stream flows, the potential impacts to the fish from decreased stream flows from those withdrawals. It's not this what could happen in the future. So I think for us, as an organization, we've been with respect to this particular water rights protest, we are concerned on the more short-term or during operations during the life of the mine. Water is being pulled out of the river. Long-term benefits are great. I think we all recognize these fish are listed as threatened. They are imperiled. It's my understanding that, you know, stressing them anymore than they are dealing with now, if we do that

too much they may not even be fish to come back to the site to benefit from these potential long-term benefits.

You know, I think some of the stuff we commented on in the SDEIS, I know that's not an exhibit here, and just other, you know, agencies, even the EPA was concerned about Perpetua's proposing this concurrent restoration as they are moving along, but there's definitely concern about, well, what happens during mining operations. We get the fish through. They enter the mine site where active operations are occurring. Is there sufficient safeguards that protect the fish when they're entering these concurrently restored areas that haven't even had time to sort of like take hold. Like what are the conditions there. And so I think if we -- you know, our position of what we understand from Dr. Cochnauer's report, other consultants that we've talked to, you know, people who have worked -- fisheries biologists that have worked in the South Fork Salmon River, stressing these fish anymore than they have, than they are dealing with now, is not good. And if we don't have fish, our members' interests are harmed because they like to -- you know, a couple of them like to snorkel, especially up by the mine site -- or not by the mine site, but in the East Fork up there, look for Bull Trout and other fish. We have members and supporters that fish in that area as well. So if we dewater the river enough even during mining operations



to the point where the fish are impacted where they just aren't there in the future, that really affects the local public interest of being able to use that place to engage in those activities.

Q. Do you know if any of your members derive any income from fishing?

A. We have a couple -- at least a couple members who are fishing guides in terms of deriving income from fishing at the confluence of, like, say Sugar Creek where I think we're concerned here. They don't derive income from there, but I think income is a relative term. We have members and supporters -- I think there's nonfinancial benefit and esthetic benefit, a spiritual benefit, to be able to go to a place like that. Catch fish, see fish. And I think that's equally as important. That's our perspective. It goes back to our mission of ecological, cultural, economic resources. That's all tied together.

Q. You mentioned that you fish. I'm not a fisherman, but if there were less fish and you went there and you couldn't catch fish, would that decrease your interest in, you know, or harm your recreational interest in fishing?

A. Yeah. I mean, if you -- yes, to put it bluntly. I mean, if you can't -- if you go to a place and there's no fish -- you know, it's fun to cast a line for a little while, but at the end of the day you want to move on. So,



yeah.

MS. THROWER: All right. Thank you, Mr. Coriell. I have no further questions.

HEARING OFFICER: Go ahead, Mr. Foster.

CROSS-EXAMINATION

BY MR. FOSTER:

Q. Good morning, Mr. Coriell.

A. Good morning.

Q. Congratulations on the law degree.

A. Thank you.

Q. Just have a few questions for you here. Does Save the South Fork Salmon hold water rights in the East Fork, South Fork of the Salmon River?

A. No.

Q. And does Save the South Fork Salmon contend that the Stibnite Gold Project will impair existing water rights?

A. We contend that it will impact our local public interests.

Q. Were you aware of the population of McCall, Idaho?

A. It's -- I mean, they say 3,000 on the sign, but, you know, it can fluctuate considerably more than that.

Q. So approximately 3,000 people?

A. Correct.

Q. And would you agree with me that the population of Cascade is about a thousand people?



A. Yeah. I'm not exactly sure.

Q. And would you agree with me that the approximate population of Valley County is about 12,000 people?

A. Yes.

Q. And you testified earlier that you have 100 members; is that correct?

A. We have 100 members, yeah, (inaudible) people on the list.

Q. And would you agree with me that 100 people is about .8 percent of the population of Valley County?

A. I think if I do the arithmetic on my iPhone I can figure it out, but that sounds about right.

Q. All right. Are you aware that Valley County is a cooperating agency with the United States Forest Service?

A. I am. They have a memorandum of understanding (inaudible).

Q. And are you aware that Valley County also has permitting authority over portions of the Stibnite Gold Project?

A. I am. Yes.

Q. And would you agree with me that it would be inappropriate for a cooperating agency or a permitting authority to take funding from a project proponent?

A. So, sorry. Just make sure I understand that question. Is do I think it's inappropriate for a

cooperating agency to take funding from a project proponent?

Q. Yes.

A. It depends on the context.

Q. And in what context would it be appropriate?

A. So, for example, with the Forest Service and the NEPA process I think it's appropriate that Perpetua Resources pays for the contractor. I mean, I think that burden of doing all that analysis shouldn't be shouldered on the taxpayers. It's your project, your application. So in that context, yeah, there's an exchange of money there.

Q. So it's appropriate for Perpetua to prepare environmental studies and do the analysis that supports its project?

A. Well, at least in the NEPA process. I believe Forest Service hires an independent contractor to review -- independently review, that's the idea, the analyses that a project proponent could save the burden as the applicant, yeah.

Q. And you testified that you work with consultants and experts, and being a lawyer myself I understand the need for that.

A. Uh-huh (affirmative).

Q. Who are those consults and experts besides Dr. Cochnauer?

A. Well, the easiest way would be to go and look



through our comments. We submitted a lot of supporting, call them expert reports in the NEPA process. So we've had people look at, you know, water chemistry. We've had people look at groundwater hydrology. I think Betsy Semmens is one of those experts who will be testifying here. Wildlife biologists, fisheries biologists. You know, kind of the whole gamut on a project like this because it involves a lot of different aspects.

Q. And are you aware that fish passage is currently blocked at the Yellow Pine Pit?

A. I am, yeah.

Q. And are you aware that the only Chinook Salmon that get above the Yellow Pine Pit arrive by truck?

A. I am aware of that.

Q. Is volitional fish passage better than hauling fish in trucks?

A. I think -- I mean, I'm not an expert. So my understanding is that trap and haul can have impacts to fish beyond -- make it harder for them to survive because it's a bit of a shock to get trapped and trucked around an area of the stream than have volitional fish passage, just as a general statement.

Q. And you testified that Save the South Fork Salmon was founded in 2019; is that correct?

A. That was when we filed with the Idaho Secretary of



State, November.

Q. And would you agree with me that that was about the time that Perpetua was moving forward with the Stibnite Gold Project?

A. Absolutely. Yeah, we were actually anticipating -- one of the reasons that we did form was that we recognize the need -- that there was probably going to be a need to have an independent expert review of the draft EIS, and so we wanted to create a mechanism where we could actually raise some money and provide our own, you know, analysis for ourselves. So, yeah.

Q. And Save the South Fork Salmon currently opposes the Stibnite Gold Project?

A. In its current -- as proposed in the SDEIS, yes. We have major concerns.

Q. And does Save the South Fork Salmon oppose the Stibnite Gold Project on air quality grounds?

A. We filed a protest or a -- we -- as I'm sure you're aware, we have been dealing with the air quality permit to construct. So, yes. We felt -- we feel that that particular permit is insufficient to protect public health as insufficiencies.

Q. And does Save the South Fork Salmon oppose the project on climate grounds?

A. We do. We -- our analysis -- and it's in our



comment letter -- is that it will double at least the greenhouse gas emissions in Valley County, and our position is that everything -- you know, it's sort of all the initiatives like Save the City of McCall wants to do moving towards a less carbon intensive economy up there. So it just gets thrown out the window when all of a sudden we have a project that is going to massively increase the area's greenhouse gas emissions.

Q. So is it fair to say that Save the South Fork Salmon opposes the Stibnite Gold Project not just on water quality grounds?

A. Well, we have -- like I said, as proposed in modified mining plan 2021 or ModPRO2, whatever you want to call it, we have a lot of different concerns with that project. We've proposed other alternatives. We've written a couple letters to the Forest Service, which you guys -- I'm sure you have them -- asking -- you know, pointing out or recommending different alternatives, different ways to look at this project. Why didn't we consider this. Why didn't you consider that, you know. Really in an effort to decrease the project footprint, because we think it's massive. And then, you know, maybe to be a little bit more -- I don't know. So, that's -- I'll stop there.

MR. FOSTER: Ms. Franolich, can you pull up the second page, please?

A. May I just clarify one thing about water rights? So, yes, we oppose this on local public interest ground. I do recognize that the water right that Perpetua is seeking would not be subordinated to the states and stream full rights, so therefore, that's one of the basis why I don't think we don't hold water rights and, you know, I think we wish it was the other way around but we acknowledge the (inaudible).

Q. And are you aware of the drainage area of the watershed in the Stibnite Gold Project area?

A. The --

Q. The drainage area.

A. In the upper East Fork, South Fork Salmon River?

Q. Yes.

A. I'm generally familiar with it.

Q. And do you know what percentage of the South Fork Salmon River that drainage area is?

A. I don't know the exact percentage.

Q. Would you agree with me that it's a pretty small percentage?

A. I have no basis to either confirm or deny that.

Q. All right. Let's look at the -- Ms. Franolich, if you'll scroll down to the first paragraph. I don't know that we can zoom in.

HEARING OFFICER: What is this document, Mr. Foster?



MR. FOSTER: This is the Save the South Fork Salmon website.

HEARING OFFICER: Okay. Is that an identified exhibit?

MR. FOSTER: It is not. This is purely demonstrative.

HEARING OFFICER: Okay.

Q (By Mr. Foster) And, Mr. Coriell, this text is very small and unfortunately I don't think we can zoom in on it, but I'll represent that your website says that if they use an antimony-based battery it will likely come from China. There is simply no getting around the geological luck of the draw that Chinese antimony deposits constitute the largest reserves in the world by far. Is that -- do you believe that?

A. That's what the website says, yes.

Q. Okay. And the Stibnite Gold Project would produce antimony; is that correct?

A. I think that is part of the proposal.

Q. So --

A. I think you guys actually got some funding from DOD for that.

Q. So is South Fork Salmon suggesting that it's better to use China's water to produce antimony than America's water?

A. I think not at all. I think what we're suggesting



there, pointing out -- and if you go to the 2021 bio-feasibility study, I think it's Section 19, but it says -- it looks at all this processing, Asia versus processing that occurs overseas, at least from our understanding from what Perpetua's shown, at least in that final feasibility study, the antimony ore gets shipped across the Pacific.

Q. But you don't know where the processing in this case would occur?

A. I don't think -- no, I would have no idea. You may know, but I think there's a lot of different options. But places that have established antimonies (inaudible), yeah. And I wish we could do it in the United States. Perhaps one day we can. I don't think -- I'm not opposed to processing minerals in the United States.

MR. FOSTER: Thank you. No further questions.

HEARING OFFICER: Ms. Rogerson, Mr. Lopez, did you have any questions for this witness?

MR. LOPEZ: No questions.

HEARING OFFICER: Okay. Ms. Thrower, any redirect?

MS. THROWER: Yeah, just a couple more.

HEARING OFFICER: Go ahead.

REDIRECT EXAMINATION

BY MS. THROWER:

Q. Mr. Coriell, Mr. Foster brought up this tunnel and



volitional passage, and you agreed that volitional passage would be preferable to trucking fish up the river; is that correct?

A. It's my understanding, not as an expert, but, yes.

Q. Is having a tunnel that may potentially provide volitional passage any use if the fish can't get up the river to the tunnel entrance?

A. Well, of course. You know, I know there's been a lot of analysis and probably discussion about the tunnel here. My understanding, looking at -- through the SDEIS and the analysis there is that there's a huge amount of uncertainty about the efficacy of passage up and down with the tunnel. But I'm not an expert, so I don't -- can't testify to that specifically.

Q. And you mentioned even if the tunnel is effective, if fish can get up that tunnel, you said that it doesn't matter if they don't have habitat upstream of that tunnel; is that correct?

A. Yeah. I think, you know, the concern would be during mining operations these fish are going to enter areas of active operation, and so they're -- even if it's being concurrently restored, you know, there's still these conditions on the ground. Like it's not a fully functioning ecosystem, and so it's -- that is just my -- it seems very practical to understand it that way. And so with volitional

fish passage, I know that I've seen Perpetua's media and they say this is the -- mining is the only way to do this. However, we know at one point and 15 years ago there was a idea of creating volitional fish passage without mining. There is clearly other mechanisms to provide the same restoration benefits Perpetua is proposing without mining. Cinnabar, old Cinnabar Mine Site, which is adjacent. It's on -- just to the east of Stibnite Gold Project. You know, there's discussions, again, of listing it on the national priorities list and undertaking pretty major cleanup efforts up there. And we support that. We've written letter to the EPA, formal letter, fully supporting what we view as a comprehensive -- what we'd like to see ultimately is like a comprehensive cleanup plan for that watershed. We just feel like the Stibnite Gold Project, one of the things is it just creates too much risk to make that comprehensive plan just piecemeal, you know, potential for mining to occur 50 years into the future up there. Might be really hard to realize the (inaudible) benefits of fully functioning uses up there.

MS. THROWER: Okay. Thank you.

A. Okay.

HEARING OFFICER: Thank you, Mr. Coriell. Where do we go from here, Mr. Lopez?

MR. LOPEZ: We'll call our next witness but would request just a five-minute break.



HEARING OFFICER: We can do that. Yep, five-minute break, and then we'll get right back to it.

(Recess.)

(Reconvened.)

HEARING OFFICER: All right. We are back on the record. I had forgotten, as we were starting this morning we discussed this before we went on the record, I think we go ahead and just handle this now. There is a cover page to Exhibit 219. So the report found in 219 was sent to the Office of Species Conservation and the Department of Fish and Game, the State of Idaho, and then there was a letter from those two agencies to me as the Hearing Officer in this matter that was -- the letter is dated September 28th, 2023, and it arrived in the Department of Water Resources IDWR, just email service system, it looks like on October 2nd. So I believe that this, for completeness of the record, that this cover page should be in there, too. I know that some of the attorneys wanted to state an objection on the record. So go ahead and do that now, Mr. Lopez or Ms. Rogerson.

MS. ROGERSON: I can do that, Mr. Hearing Officer.

HEARING OFFICER: Go ahead.

MS. ROGERSON: This letter that is going to be used in the record we'd like to note a formal objection on the record. It was not produced during discovery by Perpetua



Resources. It is our understanding that it was in Idaho Department of Water Resource's possession, but we did not see it prior to the hearing. We do believe this letter is prejudicial to our client, so we would just like to have an objection noted for the record.

HEARING OFFICER: Any other comments, Ms. Thrower?

MS. THROWER: No. Thank you.

HEARING OFFICER: Okay. Anything from Perpetua? With that objection noted on the record, I will accept exhibit -- we've marked it Exhibit 219A to separate it from 219. So we would accept 219A into the record at this time. So with that, Mr. Lopez, here on behalf of the Nez Perce Tribe, if you can call your first witness.

MR. LOPEZ: Thank you, Officer Cefalo. The Nez Perce Tribe calls Wes Keller.

WESLEY KELLER

after having been first duly sworn,

was examined and testified as follows:

MR. KELLER: I do.

HEARING OFFICER: Okay, have a seat. Go ahead, Mr. Lopez.

MR. LOPEZ: Thank you.

DIRECT EXAMINATION

BY MR. LOPEZ:

Q. Good morning, Mr. Keller.



A. Good morning.

Q. Will you please introduce yourself and spell your name, please.

A. Sure. Wesley Keller, K-e-l-l-e-r, and I go by Wes.

MALE SPEAKER: Mr. Keller, your microphone is off.

A. Oh, need to push -- there we go. Can you guys hear me okay now?

HEARING OFFICER: Scoot in close.

MR. LOPEZ: I'll repeat the question, Officer Cefalo.

HEARING OFFICER: I think we're good. Go ahead.

Q (By Mr. Lopez) Okay. Where do you live, Wes?

A. I live in McCall, Idaho.

Q. Can you tell us your educational background?

A. Sure. I have a BS in biology from (inaudible) College, and I have a Master's in biology from University of West Florida and it was like an emphasis on marine science and fishery science.

Q. Are you currently employed?

A. Yes, I am.

Q. Who is your current employer?

A. Nez Perce Tribe.

Q. And what is your position with the Nez Perce Tribe?

A. I work for the watershed division. I'm the watershed project leader based out of the McCall office.

Q. And how long have you been employed with the Nez Perce Tribe?

A. I've been with the Nez Perce Tribe for 18 years since 2005.

Q. And in what department do you work for the Nez Perce Tribe?

A. I work for the Department of Fisheries Resource Management, so it's DFRM, and so I work in that division.

Q. Can you please summarize your job duties and responsibilities?

A. Sure. The watershed division kind of specifically what we do is we look for factors. They're called limiting factors. Things that limit the recovery of resident and anadromous fish species, and we try to -- once we identify what these limiting factors are, we look for restoration projects that will help the recovery of these fish species. So some examples, you know, would be like if sediment is a limiting factor we would look for ways to offset that, such as road decommissioning, landslide stabilization, road improvement projects, and things of that like.

Q. Are you testifying today on behalf of the Nez Perce Tribe?

A. I am.

Q. Can you tell me a bit about the Nez Perce Tribe's Department of Fisheries Resources Management, or DFRM as you



call it?

A. Sure. The DFRM, the Nez Perce Tribe has one of the largest fishery -- Native American fishery programs in the United States. They employ about 190 people. They have roughly $27 million annual budget. So it's a large program with a lot of folks and kind of spread out a decent geography area.

Q. Where are the Nez Perce Tribe's Department of Fisheries Resource Management offices located?

A. Sorry, just took a sip of water. They are located -- the main office is located in Lapwai, and then they have offices in McCall. I'm sorry, I got some water in there. They have offices in McCall, Powell, Grangeville, Sweetwater, Joseph, Oregon. So they're spread throughout kind of a wide area with these offices. And I think I said Powell, yeah, so they have quite a few.

Q. And within the Department of Fisheries Resources Management, are there different divisions?

A. There are. Yeah, and the DFRM, they have numerous divisions, things like administration, harvest, production, research, watershed, which I'm part of. So they have kind of a wide array of fishery enforcement as well is one of them, so they have kind of a wide array of things that DFRM oversees and does.

Q. Mr. Keller, why does the Tribe have a fisheries



department?

A. The tribe has a fisheries department really to restore anadromous and resident fish populations. One of the reasons I really enjoy working for the Tribe is they kind of have a holistic way of looking at fisheries from eggs in the gravel to adults migrating out and returning. The Tribe's really looking at what do we have to do within this life cycle to help recover these fish, and a lot of that work that the Tribe does for DFRM, the NPTEC is the Nez Perce Tribe Executive Committee. That's our governing body of the Tribe. And so we report to NPTEC and kind of provide fishery information and backgrounds. They have a better understanding of the fish they're trying to recover.

Q. And where does the Nez Perce Tribe conduct its fisheries management activities?

A. They conduct their activities -- they're largely located in Central Idaho, which covers kind of a wide area. They also are in Northeast and Southwest Washington, Northeast Oregon, but when we're kind of talking about this area, they're from like the Snake River area to the Salmon River to the South Fork Salmon to the East Fork, to Imnaha to -- you know, they have quite -- Clearwater is one of the main areas, so there's a lot of work happening throughout this entire area.

Q. And you mentioned the South Fork Salmon River area.



What are the Tribe's target tributaries in that area?

A. So, and I will have a visual at some point, but that South Fork watershed as a whole -- there's -- throughout that entire watershed, the Tribe is very active. And so some of the main areas they are working in the East Fork is an area that a lot of restoration work happens and a lot of work gets done. The Secesh, Johnson Creek, which is a tributary to the East Fork. It's a trip to the East Fork is where quite a bit of effort from the Tribe has been done as well.

Q. And when you say East Fork, Mr. Keller, what are you referring to?

A. The East Fork is a subwatershed of the South Fork Salmon River.

Q. But I mean the East Fork --

A. Oh, the South Fork Salmon River. I apologize.

Q. Thank you. How much money does the Nez Perce Tribe Department of Fisheries Resources Management expend in the South Fork Salmon River watershed annually?

A. Annually we spend about $2.5 million a year in that watershed through those different, you know, production research watershed, those kind of activities within those watershed boundaries.

Q. And has the Tribe's Department of Fisheries Resources Management participated in a review of the

proposed Stibnite Gold Project?

A. Yes, they have.

Q. And how have they participated?

A. The Tribe has been working in the East Fork area for quite sometime, so I came onto the -- I've been working -- I was working at the Tribe within fisheries research, and I came over to watershed about 2011. That was right around the time that Perpetua seemed to kind of -- at that time it was Midas Gold -- come online, and so pretty much the inception of the project we've been interacting with Midas, slash, Perpetua and trying to understand this project throughout that time period.

Q. Mr. Keller, why are you testifying in this proceeding today on behalf of the Nez Perce Tribe?

A. Well, the DFRM, Department of Fisheries Resource Management has been working in this watershed in the East Fork, South Fork Salmon River for some time, and I've been working for the Tribe a long time and are pretty -- fairly knowledgeable about watershed from my workings. And so they asked me to represent the Tribe, being able to discuss these issues as a (inaudible) potential impacts to fish.

Q. Mr. Keller, are you familiar with the water rights applications at issue in this proceeding?

A. Yes. I've reviewed those.

Q. And what is your general understanding of those



applications?

A. My general understanding is that they're asking for a 9.6 cfs water right, as I think a max of 600-acre feet, annual acre feet. And I believe there's -- it could be taken from groundwater, from surface water, and it has -- I don't believe there's any stipulations over the timeframe that it can be taken or from -- you know, there's no percentage of one of these sources. It's just kind of a 9.6 cfs water right.

MR. LOPEZ: Officer Cefalo, at this time I would like to pull up a short demonstrative presentation. It includes three proposed exhibits, Exhibit 277, 281, and 283. The demonstrative also has some slides, Officer Cefalo, that aren't proposed exhibits. They're designed to assist in illustrating Mr. Keller's testimony.

HEARING OFFICER: With those three identified Exhibits 277, 281 --

MR. LOPEZ: 281 and 283, Officer Cefalo.

HEARING OFFICER: Do you intend to offer those for admission into the record at some point?

MR. LOPEZ: I do.

HEARING OFFICER: I've got concerns because those were all exhibits that were identified after the deadline for disclosing exhibits. Is there a reason why those weren't identified timely?



MR. LOPEZ: Well, we feel like they provide useful information, Officer Cefalo. We believe we disclosed the information previously to Perpetua through discovery, and we believe Perpetua is already aware of and has seen this information in other forms.

HEARING OFFICER: We can save the question of admission for later. If those documents were available at the time of disclosure I feel like they should have been disclosed, but you can proceed with your examination of the witness. And he can -- he can provide testimony about those documents. I don't know if we are going to let them in the record. Go ahead.

MR. LOPEZ: Understood. Thanks, Officer Cefalo.

HEARING OFFICER: You may proceed.

Q (By Mr. Lopez) Mr. Keller, did you prepare this presentation?

A. I did.

Q. And do you have personal knowledge of the content of the presentation?

A. I do.

Q. So looking at this first slide, what is the title of the slide?

A. The South Fork Salmon River Watershed.

Q. And why are you showing this slide to us?

A. I think it just -- I just kind of want to -- I'm a



visual person. I like to understand how -- where this river -- where these rivers are, how it's connected. So when we're talking about the South Fork Salmon River Watershed, that's the area highlighted in blue. You can see where the Stibnite Gold Project is, and you can see the major tributaries from the East Fork of the South Fork to Johnson Creek, how they flow into the main stem of the South Fork and down to the Salmon River. So sometimes I'll be talking about the East Fork, South Fork or the South Fork Salmon Watershed of which that East Fork, South Fork is a sub-watershed. So it's just a better understanding of the water bodies that we're talking about.

Q. Thank you. Next slide, please. And what is the title of this slide, Mr. Keller?

A. These are just the fish species that are in the East Fork of the South Fork. I'm just bringing them up. We've talked about these and other folks have brought these up, but I just kind of want to touch on the fish that are there. And there's obviously more fish species there. There is longnose dace. There is sculpin, and there's white fish. But we're going to really focus on those because that's what, you know, Idaho Fish and Game focused on. And these are fish that are three of the species they're listed as endangered, and one is listed as threatened. And so being the fish guy I am, I'm just going to touch real quick

on each one of those fish and just give a little background.

The Chinook Salmon in the East Fork, South Fork Salmon and the larger South Fork Salmon Watershed, really a neat population in the sense that they say that 60 to 70 percent of all the fish coming back to Idaho historically went back to the South Fork Salmon River Watershed. So it's a really important watershed. The Steelhead, again really unique. We have out of four -- four basins, the Columbia River, these B run Steelhead are really unique. They're the larger fish. They spend more time in the ocean, so really lucky to have those in there. And then the Bull Trout. These are -- we have fluval which means they go to streams to get large, like larger streams, and then resident fish. And then Cutthroat are spread throughout along with the Bull Trout above and below the site. And we'll talk a little more in detail where they're at on the site.

Q. Thanks, Mr. Keller. So there are four species of concern in the East Fork, South Fork that you're going to be focusing on?

A. That's correct.

Q. Go to the next slide, please. And what is this slide?

A. So I'm just going to really just kind of talk about -- this, what you're looking at in the large areas of the Columbia River Basin, the area that's in orange, is the



South Fork Salmon River. And it's just really to highlight how far these fish have to go to get back to the East Fork of the South Fork. So I want to stress, when these fish are returning they have a 700-mile journey. So if you think of these fish as like packets of -- they have a limited amount of food. And you guys know, they don't feed as they start coming back into the stream. So by the time they get to that South Fork Salmon River Watershed, these fish have pretty much exhausted pretty much all they have. And so they're really kind of running on empty, and so they're particularly vulnerable to stressors and, you know, things that can impact them when they reach those spawning grounds.

Q. Thank you, Mr. Keller. Next slide, please. So you testified that the fish will travel 700-miles to come back to the East Fork, South Fork headwaters. And what are we looking at at this slide?

A. Okay. And so this is kind of a busy slide, and I apologize for that. But other displays, you know, there's a lot, kind of when you look at these mining operations, how complicated they are. Well, these life histories are no different. We have these four different fish: The Steelhead and the Chinook are anadromous fish. So I wanted to kind of highlight when these fish return to the East Fork of the South Fork we have different timings. Obviously the Steelhead come in in the spring. The Chinook kind of come



in in the later July time period. And if we kind of look at when those adult fish are in there, we see that there's a lot of times where these adult fish are kind of staggered. As we start getting to the spawning, we start seeing that, again, the Steelhead are more spawning in the spring. The Bull Trout are more in the -- or, I guess, Chinook are in the summer. Bull Trout are in the fall, and then West Slope Cutthroat are more in that kind of March to July time period. I'm not going to go through each one of these, but the main point I'm hoping to make here is that for Steelhead, again, we have juvenile fish in and around the East Fork for the entire time of the whole year. Same with Bull Trout. We have resident Bull Trout that reside in these streams year-round. Chinook juvenile fish are also in these streams, and same with the West Slope. So it's a complicated life history. And one of the things if we really want to understand how water diversions impact fish we kind of need to take it to this level to really understand what is here, what's going on, and what do these life histories need to be able to be productive and thrive.

Q. Thanks, Mr. Keller. Next slide, please. So this is a photo. What is the title of this?

A. It's just there's Chinook Salmon on reds. These are fish in the South Fork of the Salmon River. And what I'm hoping --



Q. What is a red, Mr. Keller?

A. That's what I'm going to talk about because I know from a fisheries standpoint a lot of folks -- we've heard this term, but I kind of want to point out a visual so when we're talking about reds in the past -- and not to get too into the weeds here, but how the female makes this is she uses her tail. Built up this pile of rock, and then in those interstitial spaces lays these three to 5,000 eggs. But one thing to note is these reds get built up high in the water column so they're very close to the surface of the water. You know, and so you just have to have good consistent flow over those reds in order to have those eggs survive. So just a pure nature of how they build these it almost creates a pressure wave over there, but there's not a lot of water over the top of that red.

Q. Thank you. Next slide, please. So you talked to us -- you talked to us a bit about the Tribe's work generally about the species of -- aquatic species of concern, those anadromous species traveling 700-miles to reach the headwaters of the East Fork, South Fork. How do all of those -- and now it looks like how all of that relates to the Tribe's management actions in the East Fork, South Fork area. What is -- what is the title of this slide we are looking at?

A. We're looking at the Nez Perce Tribe management

actions, and I kind of talked of a larger picture of what they do in the South Fork, but I really want to hone in what we're looking at is the Stibnite Mine site, and this is really specific of what is the Tribe doing in and around the Stibnite Mine site. So I'm going to walk you through the legend, and I just kind of realized I don't know if folks can see everything from as far out here. But those -- the pink stars, what we're looking at, those are where Chinook red have been documented to spawn from '98 to 2023. So that red, that image I just showed you, those are those actual -- that's where they're located. So we start seeing there's clusters of where things like to be. Some of the other, the red dots which you're looking at, this is where the Nez Perce Tribe research division is conducting work. Anything from screw traps which catch juvenile fish so we can enumerate how many fish go out, to weirs where they catch adult fish where they can get genetic samples on, to (inaudible), we can get an idea how many Steelhead are coming into the East Fork of the South Fork. Right at the mine site as well our division, the watershed division, has been able to -- we had undersize culverts that weren't passing fish. So they were replaced with large bridges and able to better impact fisheries. Also at the mine site we've been right on Sugar Creek doing what's called road improvement projects. This was a partnership with the



Forest Service looking at how to reduce sediment from Sugar Creek getting to the stream so it didn't impact fish. There's also images of where, you know, we've done road monitoring. The East Fork, South Fork ramp is a large project that will do future restoration work right around that Stibnite Mine site. And then that last thing on the legend is -- the green triangle is just where the Tribe, we talked about the out-planting, and that's where the Tribe out-plants those fish that we see in the river there.

Q. Where, specifically, is that green triangle located?

A. That is up in Meadow Creek.

MR. LOPEZ: Mr. Hearing Officer, this particular slide is proposed Exhibit 281, and I move to enter this into the record.

HEARING OFFICER: Any objections?

MR. WATKINS: These were untimely disclosed. These were never disclosed to us as exhibits. I think they were attached to some discovery. We are just (inaudible) now. They weren't in our exhibit folders and -- yeah, these weren't timely disclosed and should be excluded.

HEARING OFFICER: Exhibit 281 will be excluded. It wasn't disclosed timely.



EXAMINATION

BY THE HEARING OFFICER:

Q. Mr. Keller, I notice that there are observed reds upstream of Yellow Pine Pit. Are those -- are those all from transplanted fish or fish that have been up there?

A. Yes. So anything above that Yellow Pine Pit has been -- you know, when the historic mining activities created a really steep gradient, so the Chinook Salmon weren't able to get over there so in order to supplement that fisheries, but that Meadow Creek area was the historic spawning ground of these fish. So in order to keep this fishery alive, the fish -- excess stock from the South Fork is taken and placed above that Yellow Pine Pit, and then those fish will sometimes move around up there to find the best spawning area.

Q. As those fish hatch and are juveniles, do they then go back over the waterfall at Yellow Pine Pit?

A. They do.

Q. And downstream?

A. It's amazing. Yeah, they make it all the way down, and then the next generation will return back to that area.

Q. Okay. And the reds that are identified up Sugar Creek are all natural?

A. Those would be volitional fish.

Q. Volitional passage?



A. That could come back at their own and right up to the edge we'll see them spawning right in the Yellow Pine Pit as well right there. So that's kind of the boundary of where those fish can naturally on their own volition get to.

HEARING OFFICER: Okay. Mr. Lopez.

MR. LOPEZ: Thank you, Officer Cefalo.

Q (By Mr. Lopez) Next slide, please. Can you walk us through both of these diagrams, including the titles, please?

A. Sure. On the left we have fish presence, and this is fish presence at the site. And then on the right we have proposed point of diversion and the tunnel, and so I'm just going to walk through the legend on the right. And these maps, the reason why they're side-by-side is I really want to show where, you know, the infrastructure for the water diversions are, how does it relate to fish. So let's just kind of take a closer look at where these things are.

So the proposed -- well, if we start kind of in Meadow Creek we can see that we have quite a few groundwater wells right there. This is also where the Chinook -- we have a large amount of spawning from those out-planted fish that we talked about. As we start going down the river we can see we have the surface water diversion and, again, we have fish that spawn below that. We have the fishery tunnel. This will be where the fish in the proposed tunnel

the fish will have to navigate through that to get back. We also, in Sugar Creek, there's -- and West End Creek, there's some diversions there. Again, that's a healthy spawning population of fish as well. And so in that map, this is samples that we've taken. This is samples Idaho Fish and Game have taken, Forest Service and even Perpetua, to try to really understand where are the fish on this site, from Fiddle Creek to West End Creek throughout the site, to have a better understanding. So management actions related to water withdrawals can really, you know if you understand those life histories, you understand where the fish are, you can have -- make a good, you know, conclusion of what could the potential impacts be.

Q. Thank you, Mr. Keller. So is it fair and accurate to say that based on this diagram that the -- there's a fish presence that directly corresponds or overlays in the vicinity or at where the proposed points of diversion are?

A. Yes.

MR. LOPEZ: Mr. Cefalo, these diagrams here correspond with proposed Exhibits 277 and 283, and I move to enter those into the record.

HEARING OFFICER: Any objections?

MR. WATKINS: Same objection. These are untimely. We haven't seen them.

HEARING OFFICER: Go ahead.



MR. LOPEZ: Officer Cefalo, I do want to remark that Perpetua added the legislative resolution, and it was also untimely in exhibit after the deadline, and that was admitted into the record.

MR. WATKINS: If I can speak to that. The Hearing Officer took official notice of that as an official act. We never moved to admit it into the record, but the Hearing Officer can take notice of it. We tried to put public witnesses out, and the Hearing Officer found that those were untimely and excluded us from putting on public witnesses.

HEARING OFFICER: Thank you. Exhibit 277 and 283 are excluded from the record, not disclosed timely as exhibits.

EXAMINATION

BY THE HEARING OFFICER:

Q. Mr. Keller, I notice from this display that there is a lot -- pretty heavy use or a lot of spawning happening on Meadow Creek; is that correct?

A. That's correct.

Q. And -- but only to a certain point, and we had testimony -- it was probably on Tuesday -- that there is a natural barrier in Meadow Creek to fish passage to the upper reaches of Meadow Creek; is that correct?

A. That's correct, for Chinook Salmon, and so the Bull Trout occupy almost the entire reach and really high up into Meadow Creek which is another listed fish species. But the



Chinook, yeah, those adults, the gradient starts to climb to a certain point, and then they don't go above that due to that gradient barrier.

Q. So that's not a passage barrier for Bull Trout; is what you're saying?

A. No. Yeah.

Q. And the Tribe has not undertaken efforts to then plant fish higher or above that barrier?

A. They are not. They release them at that site and let the fish kind of spread out on their own. But the reason why you don't see anymore reds up there is due to that gradient barrier.

Q. Okay. Are you aware of any other barriers to fish passage upstream of the Yellow Pine Pit besides this one that we're discussing?

A. So we've done quite a bit -- it really depends on what species you're talking about. So for Bull Trout above the Glory Hole we've seen Bull Trout up the upper East Fork spread out fairly well. For Steelhead, it's -- they have -- they're located below the Glory Hole as well. And so it's interesting, we've gotten some hits on Rainbow. Rainbow and Steelhead are the same genetic, but there's some real head-scratchers where was that fish that could have been out-planted in some of the lakes by Fish and Game and we're getting -- because what we use is called ED&A. You take a



pump. You filler water through it. It's almost like a crime scene. You can send that in, and they can analyze and tell you what species are in these streams to like, you know, pretty much spot on accuracy. And so from there we can tell where these fish are. And so the Steelhead, we got a hit for Rainbow, but we do believe that could be that those fish are, you know, from stocked fish, and we can't tell if they were, you know, able to come back on their own or not. So we call them Rainbow above the falls. We call them Steelhead below because we're just not sure at that point.

HEARING OFFICER: Thank you. Mr. Lopez, you can proceed.

MR. LOPEZ: Thank you, Officer Cefalo.

Q (By Mr. Lopez) So, Mr. Keller, given the testimony you've provided today, what is the Nez Perce Tribe's Department of Resources Management concern with the proposed water withdrawals?

A. I think they really stem on, you know, the Tribe being actively involved, doing a lot of habitat restoration, a lot of work, spending a lot of money to really restore fisheries. This is a threat to that, and to fishery resources, so I think they are concerned on that front.

MR. LOPEZ: Thank you, Mr. Keller. No further questions, Officer Cefalo.

HEARING OFFICER: Okay.

CROSS-EXAMINATION

BY MR. WATKINS:

Q. Mr. Keller, good afternoon.

A. Good afternoon.

Q. Good morning, I guess.

A. Yeah, exactly.

Q. You and I met for the first time a couple months ago when we toured the SGP; is that right?

A. That's correct.

Q. I wanted to follow-up first on the funding question. You said that the Tribe employs about 109 people in the fisheries department?

A. That's correct.

Q. Did I hear you right that the annual budget for that department is $127 million?

A. No, no, 27 million.

Q. 27 million.

A. Yes.

Q. Okay. 27 million. And of that 27 million, the Tribe spends some 2.5 million in the East Fork, South Fork area?

A. That's correct.

Q. Where does that money come from?

A. That money is largely from the Bonneville Power



Administration who runs the hydro systems on the Columbia River was forced through mitigation to losses for the Tribe to help restore fisheries. And so it's like a fund. You know, they have -- obviously they make a lot of money through the power that they sell, and then there's a council that sets up that so much of the proceeds, the money they make, needs to go to offset the impacts of the hydro systems.

Q. And so without the funding from Bonneville Power Association, the Tribes wouldn't be able to do some of the excellent restoration work that it does?

A. It depends. So, you know, on top of the Bonneville Power Administration we were able to get -- we've been really competitive with grants, and I'll give you an example. In the East Fork of the South Fork of the trib to Johnson Creek, the Pacific Coast salmon recovery fund is, you know, from the Office of Species Conservation, we were awarded a $1 million grant to protect a conservation (inaudible) in there. So there's additional funding sources that we tap into, the bulk of which is Bonneville Power.

Q. And you said Bonneville Power does hydropower, is that right, electricity?

A. That's correct, yes.

Q. Do you know if Bonneville Power has any interest in Perpetua using antimony to create large scale solar



batteries that would be directly competing with hydropower?

A. Oh, I couldn't speak to that.

Q. We've talked a lot about legacy mining issues at the site and how that impacts fish, so I'm not going to go over that with you. I just want to know that since the Tribes have been working in or around this site have the Tribes undertook to fill any of the legacy mining pits that are currently at the site?

A. Fill the pits?

Q. Yes, sir.

A. No.

Q. Have the Tribes taken to remove any of the legacy tailing mounds that are there?

A. No.

Q. Has the Tribes done anything to try to create a passage for the fish to be able to travel volitionally above the Yellow Pine Pit as opposed to trapping and hauling them?

A. Yes, we have.

Q. That was a fish ladder that the Tribes tried to install; is that right?

A. Yeah. So that was in 2008. The origin of our watershed, my position where I oversee -- this is before my time. I came -- 2011 is when I started for the watershed division. But the idea was they got funding from Bonneville Power to, again, conduct designs and create passage so fish



could get back to that 20 plus miles of habitat upstream to do exactly what, you know, folks wanted to see of getting fish back to the traditional spawning grounds.

Q. And so at least at one point the Tribes were in favor of putting in some sort of fish passage so that the fish could travel volitionally?

A. Yeah, volitional passage is a plus.

Q. Volitional passage is better than trap and haul?

A. Yes, I would say it has less risk, but there are no risks, you know.

Q. Sure.

A. Yes, with anything there's problems either way. But, yes.

Q. You're, of course, aware that the Nez Perce Tribe opposes the Stibnite Gold Project?

A. I am.

Q. It opposes the Stibnite Gold Project in terms of air quality?

A. That's correct.

Q. It's opposing the air permit that Perpetua received for the project; is that right?

A. That's correct.

Q. And I believe it also opposes the Stibnite Gold Project on climate change grounds?

A. Yes.

Q. Fair to say that regardless of what this Hearing Officer does with respect to the water right, the Tribes would still be opposing the Stibnite Gold Project regardless?

A. I wouldn't say that, actually. I think -- so I would say that, but I would say that the Tribe has been involved in this project from a pretty early stage, like I said, about 2011. And for a lot of years the Tribe worked with Midas, slash, Perpetua. And, you know, as we gather more information, really analyze the full effect of this project, it didn't come out until about 2018 that's when the Tribe issued a formal resolution in the fall and said they publicly oppose this project.

Q. That's helpful clarification. I appreciate that. So the Tribe, under NPTEC, which is the Nez Perce Tribal Executive Council, they have a formal resolution opposing this project, period?

A. That's correct.

Q. Okay. We've talked about the Yellow Pine Pit and the fish ladder that the tribes tried to install. You would agree that some of the land for the Yellow Pine Pit is on private property?

A. Yes, and that is kind of why those funds were pulled back and redirected to other areas when the renewed interest in mineral occurred.



Q. So it would be impossible to restore fish passage at the Yellow Pine Pit without the cooperation of the property owner?

A. The property owner would be required.

Q. How much -- you said a number, but how much would the fish ladder have cost?

A. You know, that was -- it would be -- the design work would have to evaluate that, so that fish ladder, it wasn't going to be cheap. I would put it -- I'm not going to give you a hard price because it really depends on -- when we looked at it in 2009 it would be millions of dollars, so --

Q. That fish ladder, the proposed one that the tribes were in favor of at the time, that would have been steeper for the fish to climb than the fish tunnel that's currently being proposed by Perpetua?

A. That is correct.

Q. And the steeper fish ladder presumably would have been more stressful for those tired 700-mile traveling fish to go up than going through the fish tunnel?

A. Yes, I would say it would have been steeper, but the offset of that is you wouldn't have the other mineral impacts that are associated with the mine. So it was, you know, a way to get the passage without the corresponding impacts of the surrounding area that will result from the



project.

Q. Speaking of passage, I wanted to -- I hope I didn't misunderstand your testimony. Currently there's no volitional fish passage above Yellow Pine Pit; is that right?

A. There is no volitional passage above Yellow Pine Pit, that's correct.

Q. And so you're a fisheries guy. I'm not.

A. Yeah.

Q. So the way I understand it is that a fish can be born above Yellow Pine Pit, and that small fish can go down essentially the water slide, that is Yellow Pine Pit.

A. Yes.

Q. Go out to the ocean. Come back to spawn, and when they try to get back to their spawning grounds they can't make it up the waterfall?

A. That's correct.

Q. And so then they'll either lay their eggs in suboptimal terrain below Yellow Pine Pit or they'll just die without laying their eggs; is that right?

A. No, that's not correct. What they end up doing is -- so fish are a persistent bunch. You know, they try to get over those falls, and when they can't they search out areas like Sugar Creek, other tributaries, and then they'll end up spawning in those or other parts of the East Fork,



South Fork below the falls.

Q. And that applies to all the fish that we've been talked about, the Chinook and the Steelheads and Bull Trout. They can't get up the Yellow Pine Pit?

A. They can't. It's interesting, the Bull Trout are above the Yellow Pine Pit in decent numbers, surprisingly, and they're probably resident fish that were there before the Yellow Pine Pit was created, you know, in the '30s and so forth. And they have managed to persist in that habitat above.

Q. And that's the helpful clarification I was looking for. So those Bull Trout above the Yellow Pine Pit, they're not migrating; they are resident fish that live up there year-round?

A. They are resident fish, yes.

Q. Okay. And so without the fish tunnel going in, Bull Trout, Chinook, Cutthroat, none of those fish can volitionally pass?

A. That is correct.

Q. Which is why the tribes do trap and haul. Where are the fish that get trapped and hauled above the Yellow Pine Pit? Where do they originate from?

A. They are from that, you know, that larger South Fork Salmon Watershed. That's -- they're from right at that exact -- the watershed that the East Fork is part of.

Q. How many miles drive in a truck is it from where you get the fish to putting them up there?

A. Probably, you know, I would say it's probably 40 miles as the crow flies. You know, it's not that far as a straight line.

Q. But you're doing this?

A. Yeah, you've been up there.

Q. Sure.

A. You know what I'm talking about.

Q. Yep, yep. As a fisheries professional what's the acceptable mortality rate in a trap and haul operation?

A. You know, you want to keep it as low as you can. I guess I wouldn't -- it really depends on the exact -- where you're doing it. But for something like this you would expect it to be very low. Like from this one, yeah, and like I would say, you would expect it to be in the low percentile, like one to two percent.

Q. Has Nez Perce ever exceeded that one to two percent unfortunately in some of those trap and haul efforts?

A. Uhm, you know, they have -- and I can't speak to that. I can't think of any major fish kill they've had or anything like that. These fish are already stressed because they're coming back and spawning. There are fish that I'm sure have perished, but it's a really low percentage.

Q. Are the -- is it the BPA funds, Bonneville Power



Association, that funds the trap and haul program?

A. Yes.

Q. Is trapping and hauling a sustainable method for restoring fish above the Yellow Pine Pit?

A. No. It's something that you have to do given the current conditions on the landscape.

Q. If Nez Perce Tribe were to cease trapping and hauling, those fish populations would dwindle?

A. You would see -- yes, some of the ones that are volitionally returning would be able to volitionally return. The populations above the help, something like that would obviously cause a decrease.

Q. And you said there's some 190 employees with the Nez Perce Tribe in fisheries. How many of those employees are tasked with driving the fish up for trapping and hauling?

A. Really small percentage. I heard -- I think there was a question earlier, but it's -- I think someone said 10 or something like that. It's more like two to three. It's a pretty small thing. You truck the fish up. You know, once you get up there you release the pipe into the stream, and the second they get in there they're usually pretty ready to -- it's a later stage of their life. They are looking for places to spawn and spawning.

Q. Sure. I want to talk about Nez Perce, the Nez



Perce Tribe is a sovereign nation, correct?

A. That's correct.

Q. As a sovereign, you would agree that Nez Perce Tribe enjoys government to government consultation with United States Forest Service?

A. That's correct.

Q. And that government to government consultation includes any decisions that United States Forest Service would make with respect to the Stibnite Gold Project?

A. I wouldn't say that. I think, you know, generally they try not to share, like, draft materials, things like that. Usually what we see is fairly polished stuff that we are able to talk on it with the Forest Service. As -- they're, like you said, they're a federal agency that needs to consult with the Tribe, and so we go through the consultation process.

Q. And that would include this project, the Stibnite Gold Project?

A. Yes, that's correct.

Q. And that government to government consultation would include any sort of mitigation measures for this project?

A. Yes.

Q. And the Tribe also enjoys government to government consultation with Fish and Wildlife Services?



A. Yes, they do.

Q. And that would include any sort of biological opinions that were being prepared for this project?

A. Yes.

Q. Fair to say that Nez Perce Tribe has a seat at the table, so to speak, on this Stibnite Gold Project issue?

A. Yeah. I think as a federal requirement, you know, for projects that could impact tree resources, the applicant has to consult with the Tribe, and so in that sense they -- through the standard process, we were able to convey with those agencies.

Q. So Nez Perce Tribe will play a role in determining how impacts to fish are mitigated through the Endangered Species Act process?

A. The Nez Perce Tribe as co-managers provide their opinion that are taken in by those agencies.

Q. And that's the case regardless of what the Idaho Department of Water Resources does with respect to Perpetua's water rights?

A. Those -- rephrase your question, please.

Q. Sure. All those government to government consultations that we've been discussing and the role that the Nez Perce Tribe will play in fish mitigation and protective measures through the Endangered Species Act process --

A. Right.

Q. -- all of that is part and parcel separate from what the Idaho water -- Idaho Department of Water will do with respect to the water right?

A. That's correct.

MR. WATKINS: That's all the questions I have. Thank you so much.

A. Yeah.

EXAMINATION

BY THE HEARING OFFICER:

Q. Mr. Keller, I can't remember whether you were asked this question: Do you have any sense of how many fish are transported above the Yellow Pine Pit on an annual basis?

A. Yeah. One of the -- my presentation kind of got fairly large, but I had an actual table that I was going to show. And, you know, a high year it would be, you know -- so generally, like I say, a high year in just the East Fork, Johnson Creek is it's own, it's part of the East Fork. There's quite a few fish, but it's, you know, generally around -- I'm going to throw a number out there -- anywhere from 50. Low years it can be, you know -- it's usually when we have excess stock, so it's usually when we have better numbers of years fish coming back. It can range from, you know, anywhere from 25 to, you know, 100 or so.

Q. That are transported and then --



A. Yes.

Q. -- put into this upper --

A. Yeah, and they make about -- depending on the year it can be about 25 percent of that East Fork, South Fork stock coming back to that whole river system.

HEARING OFFICER: Okay. Mr. Lopez, any redirect?

MR. LOPEZ: Yes, please.

HEARING OFFICER: Please.

REDIRECT EXAMINATION

BY MR. LOPEZ:

Q. Hello again, Mr. Keller.

A. Hello.

Q. Can you help us understand why the Tribe wanted to construct a fish ladder versus a tunnel similar to what Perpetua is proposing?

A. Yeah. The fish like it open. Like originally this was before Perpetua Resources was in the picture, but providing that fish passage, you know, opened up a lot of miles of good upstream habitat. The Tribe, you know, with those traditional spawning grounds impacted from historic mining, there's limited areas in that East Fork, South Fork. You have spawning at Sugar Creek. Some of the tribs. There's some kind of spots spawning along the East Fork, South Fork. But really the goal was, let's open that up so that fish can get back and spawn. And I guess the



difference is that would be a natural channel that we know fish, you know, have the ability to navigate. The tunnel is a little harder to speculate on. It's, you know, .9 miles. I don't know if there's an example of that out there to gauge the success of how that will go.

Q. Thank you. Would the -- would the fish ladder be shorter than the tunnel?

A. It would be.

Q. Are you aware of another almost -- I think you answered this, but just to clarify: Are you aware of another almost mile long fish tunnel that works to pass fish?

A. No. We've asked Perpetua for examples, and there's some areas -- Norway there's obviously passage around hydro systems. There's -- the size and scope of this is a pretty -- it's an ambitious project.

Q. It's our understanding from Perpetua's previous testimony, that the tunnel or the proposed tunnel will use lights to attempt to mimic natural light to entice fish to use the tunnel; is that your understanding?

A. That is.

Q. Are you aware of the use of similar lights in other fish passage infrastructure?

A. The only thing I can speak to is for a while I worked for the Army Corp of Engineers at McNary Dam, and one



of the jobs I had to do is we were getting juvenile fish bypassed around the hydro system that were then barged down there. There was lighting and so forth in some of those areas, and so I have seen lighting been used in other areas.

Q. Are you aware, based on your personal knowledge, whether those lights were effective?

A. The lights weren't so much -- this wasn't obviously the same distance. The lights were just to help people see what they're doing and when they're managing the fish and so forth, and so they had a very kind of different use. So, yeah, whether or not these lights work to pass fish or not will be interesting.

Q. As a fisheries professional, would you prefer an open fish ladder or a tunnel similar to what Perpetua is proposing?

A. I think most fishery biologists would say the open fish passage would be preferable.

Q. You testified that you've gotten, I believe, ED&A hits on Rainbow Trout above the fish passage barrier on the East Fork, South Fork; is that correct?

A. That's correct.

Q. And you're not able to tell whether those hits are for resident Rainbow Trout or Steelhead that have passed the barrier; is that correct?

A. Yeah. Quite a large kind of study went on, but it

was fairly inconclusive. We know there are, you know, Rainbow up there, but they don't know if they're the red band version of those fish or the stock version of those fish. So we've always -- a larger study would be really fascinating to see. And we hope Perpetua or Forest Service or ourselves would take that on to be able to answer that question.

Q. Is that because they're the same species?

A. Yeah. It gets really hard. You have the same species, and you get down to a level of -- but they can do it, but you actually have to capture the fish, not just take that water sample. You need to get a fin clip. Send those off for genetic analysis and get further refinement.

Q. And based on your personal knowledge, are you able to definitively conclude that Steelhead are not able to pass the fish barrier on the East Fork, South Fork Salmon River?

A. No. Additional studies are needed.

Q. When did the Tribe first begin out-planting Chinook Salmon with the Idaho Department of Fish and Game in Meadow Creek?

A. Around 2000.

Q. So the Tribe began that out-planting effort before Perpetua proposed its mine?

A. That's correct.

Q. And you testified that three of the species in the



East Fork, South Fork are endangered; is that correct?

A. That is correct.

Q. If Chinook Salmon runs in the Columbia River Basin were to improve, would you have more Chinook available for out-planting on East Fork, South Fork Salmon River?

A. Yes.

MR. LOPEZ: Thank you. No further questions.

HEARING OFFICER: Ms. Thrower, did you have any questions for this witness?

MS. THROWER: No. Thank you.

HEARING OFFICER: Okay. Thank you, Mr. Keller. Did you have -- briefly -- go ahead, Mr. Watkins. I faked you out twice. Sorry.

MR. WATKINS: That's all right.

RECROSS-EXAMINATION

BY MR. WATKINS:

Q. I want to briefly just cover the ED&A issue and then the fish tunnel. Are all the fish that are transported above Yellow Pine Pit hatchery fish?

A. Yes, they are.

Q. So their DNA -- they said there was a resident fish population might be slightly different than those fish?

A. Yeah. So the Tribe really goes out of their way for their hatchery program. They use wild stock. So what they do is they allow fish to go above these weirs to spawn



on their own. You know, once they're released above these weirs to do that. And then when the fish -- repeat your question again, so I just make sure that I have that.

Q. I think you answered it.

A. Okay.

Q. The fish that you would be transporting over would be nonnative fish?

A. They're. They are native fish, but they have hatchery origin, yes.

Q. And that would make -- put them -- strike that. Nevermind. I want to talk about the fish ladder versus the fish tunnel. I think you testified at one of your slides that the fish travel 700 miles to get back to their spawning point?

A. Yeah. Yeah, if you go to that upper East Fork area.

Q. And during that process they go through eight different mines; is that right?

A. No, no, no.

Q. Strike that. Eight different dams?

A. Yes, yes.

Q. So 700 miles, eight different dams. You have concern or you're at least not sure that they'll be able to traverse .9 miles of a tunnel designed for them to pass through?



A. So that's where it really matters, the difference of designing that tunnel. Like if you have additional stressors or fish, it's not designed perfectly, and those fish are, you know, having more obstacles, because it's that later time in life where the (inaudible) are lower, you have to get it right. And if you put additional stressors they are magnified because you just don't have the reserves that you did earlier.

Q. You're not an engineer; is that right?

A. I am not an engineer.

Q. Are you aware that Perpetua received an engineering excellence award for the design of the fish tunnel?

A. I am not.

MR. WATKINS: That's all the questions I have. Thank you so much.

HEARING OFFICER: Okay. This is for real. Thank you, Mr. Keller. Mr. Lopez, Ms. Rogerson, are you calling your next witness?

MS. ROGERSON: I believe Ms. Thrower is.

MS. THROWER: Mr. Hearing Officer, I am. Can we just have a five-minute break?

HEARING OFFICER: We can have a five-minute break. Yeah, to organize, that's fine.

(Recess.)

(Reconvened.)

HEARING OFFICER: All right. Ms. Rogerson, are you --
MS. ROGERSON: Ms. Thrower.
HEARING OFFICER: Oh, Ms. Thrower.
MS. ROGERSON: Yes.
HEARING OFFICER: Okay. Go ahead.
MS. THROWER: Thank you.
HEARING OFFICER: That's fine.
MS. THROWER: I call Betsy Semmens.

BETSY SEMMENS

after having been first duly sworn,
was examined and testified as follows:

MS. SEMMENS: I do.
HEARING OFFICER: Great. Go ahead.
MS. THROWER: Thank you.

DIRECT EXAMINATION

BY MS. THROWER:

Q. Good morning, Ms. Semmens.
A. Good morning.
Q. Thanks for joining us virtually.
A. Of course.
Q. Can you please introduce yourself, just your name. Just your name right now and spell your last name.
A. My name is Betsy Semmens, S, as in Sam, e-m-m-e-n-s.
Q. Okay. And can you tell us about your current



employment and title?
A. Yes. I'm the principal hydrogeologist BAS Groundwater Consulting.
Q. Okay. And how many years of professional experience in groundwater consulting do you have?
A. About 25, 26 years. I started BAS Groundwater Consulting which we call BAS about five years ago. Prior to that I was with Boulder Associates for approximately 16 years, and then I was with a few firms prior to that.
Q. Can you give us a brief overview of your academic background?
A. Yes. I have a Bachelor of Science in geology from the University of Minnesota, and a Master's in geology from Northern Arizona University.
Q. And do you have any professional licenses?
A. Excuse me.
Q. Uh-huh (affirmative).
A. Yes, I do. I'm sorry. I'm a registered geologist in several states, including Idaho.
Q. Great. Thank you. And you reminded me to grab my water. I'm sure I'll need it at some point as well.
A. Excuse me.
Q. Do you belong to any professional organizations?
A. I do. I am a past president and current committee chair for the Colorado Groundwater Association. I'm quite



active with them. I am a past board officer and current member of the Arizona Geological Society, and I'm a member of the National Groundwater Association Professional Geologists of Indiana Association, and the American Water Resources Association.
Q. Can you tell us what kind of work BAS does?
A. Yeah. We do consulting work, all matters of groundwater problems. We do computer modeling, geologic modeling, data management, data review, analysis, field studies, permitting, impact analyses, third party reviews.
Q. And what type of clients do you work for?
A. We have a lot of industry clients mining and utilities. We have clients in municipalities and industrial development. We have clients that are regulatory agencies, and then we do some work for NGOs or environmental groups.
Q. Okay. Can you explain the exact nature of the work you do for your clients?
A. So generally we -- we help define where groundwater is, where it's going, where it came from, if it's impacted with contaminates, where that's going or where they may have come from, how groundwater interacts with springs, streams, how development around groundwater may impact other well owners or a nearby stream or spring. And we do this by analyzing data, developing maps, developing geologic models, groundwater models, water balances. We write reports. We



prepare presentations.
Q. And what kind of documents do you produce for your clients?
A. For the most part technical reports that are largely submitted to regulatory agencies and that's sometimes for compliance schedule reasons and sometimes for state permit applications. We do a lot of presentations for our clients internally and then presentations to stakeholders or those regulatory agencies.
Q. Have you ever been retained as an expert in a judicial or administrative legal proceeding?
A. Yes.
Q. Can you describe that matter and your role in that matter?
A. Yes. We were involved in a federal lawsuit between the Hoosier Environmental Council and Natural Prairie in Indiana. The Hoosier Environmental Council was suing National Prairie over an extended tile soil drainage network for their capital, their confined animal feeding operation, and they argued that (inaudible) wetlands. So we were retained as technical rebuttal experts to review Natural Prairie's modeling analysis of the impacts from their extended tile drainage system. And we were -- we testified by deposition, and that was last year.
Q. In 2022?

A. Correct.
Q. And in this proceeding who are you testifying for?
A. Are you referring to the one I just described?
Q. To this proceeding here right now today.
A. Oh, sorry. We are here on behalf of the Nez Perce Tribe and Save the South Fork Salmon.
Q. And what's the purpose of your testimony today?
A. To present our conclusions with respect to our review of the technical basis and impact analysis of Perpetua's 9.6 cfs water right application.
Q. I think you mentioned earlier you're a registered geologist in Idaho; is that correct?
A. Correct.
Q. Where do you live?
A. I live in Evergreen, Colorado, and I have a cabin in Idaho outside of Warren.
Q. Okay. So you said outside of Warren. Where is that kind of relative to the Stibnite Gold area?
A. I'm going to have a hard time placing a distance from the Stibnite area. Warren is about 10 hours drive from McCall, which we heard about earlier. We are about an hour from Warren. I think it's only about 10 or 15 miles as the crow flies, but by roads it's about an hour. And then we are about 50 miles downstream of the Stibnite Project on the South Fork of the Salmon River.



Q. Okay. And how often do you use your property?
A. We go up in the summer and the fall. It's not open air property, and I typically spend about a month each year up there.
Q. What do you do there?
A. Well, I work remotely. I'm not retired yet, and when I'm not working we're remodeling the cabin and so that takes up most of our time. And when we get (inaudible) from that just general recreation, hiking, swimming, fishing. I don't fish, but my family does, reading, cooking.
Q. Okay. Do you think your connection to Idaho or your property ownership near Warren, Idaho affected your formulation of your professional evaluation in your expert report?
A. No, I don't. Our evaluation is technical in nature, and my connection to Idaho has not influenced my review.
Q. Okay. I'd like to turn your attention to proposed Exhibit 318. Okay. Do you have that in front of you?
A. No. Are we sharing screens?
Q. Okay. Yeah, I wasn't sure if you were pulling it up on your computer, but, yeah, I think we can share. And everybody here can see it as well.
A. Okay. I see it.
Q. Okay. Can you explain what this proposed exhibit



is?
A. Yes. This is BAS Groundwater Consulting's expert rebuttal paper to Perpetua's water rights expert report.
Q. And who authored this report?
A. I co-authored it.
Q. Since you are a co-author on this report, can you explain what your -- or who your co-author is?
A. Yeah. My co-author is my colleague Rochelle Destrampe. Rochelle is a senior hydrogeologist and director of Arizona Operations with BAS Groundwater Consulting, and we've worked together for about 15 years. Rochelle is also a licensed geologist.
Q. Okay. And what were your respective roles in authoring this report?
A. Well, we both reviewed Perpetua's application for water right and the expert report. We focused our review on the 9.6 cfs application, and then we collaborated on what we reviewed. We discussed points of concern. We communicated, and then we co-wrote the report.
Q. Do you feel qualified to speak to all of the expert opinions provided in this report?
A. Yes, I do.
MS. THROWER: And, Mr. Hearing Officer, I'd like to introduce proposed Exhibit 318 into the record. That is BAS Consulting's expert rebuttal report prepared for Protestants



Nez Perce Tribe and Save the South Fork Salmon and filed on November 6, 2023.
HEARING OFFICER: Any objections? Any objections? Let me ask it in the microphone. Hearing none, Exhibit 318 is admitted.
Q (By Ms. Thrower) Thank you. So, Ms. Semmens, I would like to walk you through -- walk through your report with you, but first can you please describe how you came to be an expert witness for the Protestants?
A. Excuse me. We were first asked by Save the South Fork Salmon as not just (inaudible) consultants to review Perpetua's application for water rights. This was earlier this year in 2023, and provide any comments based on our years of experience as hydrogeologists and our experience in mining and with modeling. We were retained as expert rebuttal or rebuttal experts, whatever that term is, by the Nez Perce Tribe and Save the South Fork for this case in October of 2023.
Q. After you were retained as testifying experts, what did the Protestants ask you to do?
A. Save the South Fork Salmon and the Nez Perce Tribe asked us to document our opinions, the technical basis for Perpetua's 9.6 requested cfs requested water right, Perpetua's approaching conclusions to determine the impacts

from that water right on hydrological system, and the technical basis for Perpetua's proposed condition under low stream flow conditions.

Q. Okay. And you had mentioned before that one thing that you do normally when you're preparing a report is to review documents. So what information or documents did you review in this case?

A. For this (inaudible) we reviewed Perpetua's expert water rights report, and we had -- so we reviewed that. We reviewed Perpetua's application for water rights, in particular the 9.6 cfs application, and we reviewed the hydrologic site model, the groundwater model that Perpetua used to model (inaudible) watering and simulated groundwater pumping on the East Fork, South Fork withdrawals, to estimate impacts to the hydrologic system. And just a point of clarification, Perpetua -- we've heard that Perpetua has developed several models that kind of work together, water balance models and (inaudible). And so there's several models up there, but we felt (inaudible) specifically on the groundwater model, the hydrologic site model.

We also have a footnote in our -- in our rebuttal paper that references -- or that cites, rather, the NOAA ESA regulations because they had cited the East Fork, South Fork of the Salmon River as critical habitat fisheries, and so we just have a footnote to that effect because it's relevant to



this water rights application.

MS. THROWER: Okay. Mr. Hearing Officer, I would like to note that Perpetua has already introduced into the record the documents Ms. Semmens reviewed, and just for the record those are Exhibits 206, 209, and 264.

Q (By Ms. Thrower) Okay. Ms. Semmens, did you conduct any independent evaluations or modeling exercises?

A. We did not.

Q. Did you receive any report writing direction from either Save the South Fork Salmon or Nez Perce Tribe?

A. Report writing direction, that was the question?

Q. Yes.

A. Save the South Fork Salmon and Nez Perce Tribe provided us comments on formatting and organization, but not on the content of the document.

Q. Okay. Are there any mistakes or omissions that you made in your report that you would like to describe right now?

A. Yes. In section, I believe, three of our report we make reference to Perpetua's total water right (inaudible). Yeah, in the head. Yes, right there in the instruction paragraph. We make reference to Perpetua's total water right request 11.14 cfs. We now believe that this total is 10.94 cfs. We were -- there was confusion over one of the



transfer applications. So at any rate, we now believe the total is 10.94.

Q. Okay. And does this mistake in that total number of cubic feet per second change or affect your analysis in any way?

A. No. Our analysis was focused on the 9.6 cfs application for water right, and its total water right is 10.94 instead of 11.14. It doesn't impact our conclusions.

Q. Okay. So to confirm, though, you only looked at the effects of the 9.6 cfs application; is that right?

HEARING OFFICER: (Inaudible.)

FEMALE SPEAKER: I think she tried to answer.

Q (By Ms. Thrower) Oh, Betsy, did you need me to repeat that question? We didn't hear your answer.

A. Oh, I said correct. I'm sorry.

Q. No, that's all right. Thank you. So can you walk us through your high level conclusions in your report regarding Perpetua's 9.6 cfs water right application?

A. Yes. We had three main conclusions.

Q. Okay. So let's just walk through each of those points one at a time, then. So let's -- what was your -- what was your first -- what's the first conclusion you would like to talk about?

A. Our first conclusion is that Perpetua has not demonstrated that they have a continuous need of 9.6 cfs of



water for their operations.

Q. Okay. I'd like to turn your attention to Exhibit 209.

A. Will that be shared?

Q. Yes.

A. Okay.

Q. All right. Can you explain what this exhibit is?

A. This is a technical memorandum from Terry Scanlan -- I apologize if I'm saying that wrong -- at HDR and Dan Stanaway from Brown and Caldwell that discusses the justification for the 9.6 cfs water right request. And it was an attachment to the 9.6 cfs water right application.

Q. Okay. Did you reference this exhibit in your report?

A. Yes.

Q. Okay. So can you, please, turn to page 4. I believe it's bates number ending in 2242.

A. And by turn to, I assume you mean --

Q. Well, yeah. Right.

A. Yes.

Q. Okay. Perfect. Thank you. Can you explain figure 1 on this page?

A. Yeah. So there's a lot of lines. The orange, gray, yellow, and blue lines represent the total water needs for general water demand, access to water, and dust control,

and mill diversion demand. And the -- these are the water demands that would be filled by the requested 9.6 cfs water right. The black line is the sum of those four water use. The green line is the ore processing demand.

Q. Okay. What is the difference between total ore processing, water demand, and total diversion demand?

A. Our understanding is that the total -- excuse me. The total diversion demand is the sum of those four water use components that will be filled with the 9.6 cfs water right whereas the total ore processing demand shown in green is the -- includes all of that water plus water that they anticipate getting from water that does not need a water right such as contact water and reclaimed water from the tailings storage facility.

Q. Okay. So just to clarify, the green line shows Perpetua's total water need, and that will be filled using water from water rights, as well as reclaimed water and contact water that's not part of the water right application; is that correct?

A. To clarify, the green line -- sorry. Can you say it again?

Q. So the green line shows Perpetua's total water need. Is that --

A. Uh-huh (affirmative).

Q. Take it in steps. And that total water need, that



will be filled using water from the water rights, as well as reclaimed water, contact -- and contact water?

A. That is my understanding. Correct. The green line is their total ore processing water need, and the black line is the sum of the water need from the 9.6 cfs application.

Q. Okay. So I would like to turn your attention to table 1. I believe that's a couple pages up, so we'll get there.

FEMALE SPEAKER: Up?

MS. THROWER: Yeah. I think I said table 1, so maybe -- is that -- yeah.

Q. (By Ms. Thrower) So based on table 1, what is Perpetua's estimated peak water demands for its various needs?

A. They show those in the second column. So their mill diversion demand they have at 4.5 cfs. Dust control is listed at 0.7 cfs. Drilling water at 0.1 cfs, and excess dewatering water is 4.3 cfs, and those sum to 9.6.

Q. Okay. So the 9.6 cfs is the sum of Perpetua's estimated peak water demand from mill diversion demand, dust control, drilling water, and excess dewatering water?

A. Yes, but not simultaneously.

Q. Okay. What do you mean by, not simultaneously?

A. Based on Perpetua's modeling of their water needs they took the highest diversion rate that would ever be



needed for each of those four water use components and summed them to get their request of 9.6 cfs. So these are the highest diversion rates that would be needed, but they don't occur at the same time.

Q. Do you know what the likelihood is that the peak demand for those four uses would ever occur simultaneously?

A. In their expert report and in their application and as we've heard this week in testimony, Perpetua says it's unlikely that they would need this water.

Q. Can you please explain how Perpetua approached its modeling to determine water needs for those four uses for mill demand -- or, excuse me, mill diversion, dust control, drilling water, and excess dewatering water?

A. My understanding is that they have a -- excuse me -- meteoric water balance model that simulates climatic inputs and does a whole water balance. They're coupled with a feature water balance model for the tailings facility, and then they use their hydrologic site model to initially get an estimate of dewatering water. And they did that by putting conditions into the hydrologic site model or groundwater model. They put boundary conditions in to represent the pits. This gave an estimate of how much groundwater would go to the pits for dewatering and how much they would need (inaudible). They put that back into the water balance model, and from those water balance models



there's a lot of -- site-wide water balance model they determined what their needs would be on that old demand that they would source from groundwater pumping and from the East Fork, South Fork diversions. They then simulated pumping from groundwater and the East Fork, South Fork diversions back into the hydrologic site model or groundwater model. Ran it again, is my understanding, to see if the estimates of pit dewatering would change. If they did, they would repeat the cycle so it was (inaudible) process until everything balanced.

Q. Given that their model is helping them balance their water, the water at the site, would they ever need to pull more water than what they modeled?

A. Uh, operationally?

Q. Yes.

A. Well, their model has average time periods a month, so there could be instantaneous water needs that would vary from what they modeled, but their modeling is providing that monthly average estimate.

Q. Okay. I see we are still on table 1, so let's look at that table again. In that table what is Perpetua's estimated annual average total diversion demand?

A. Their average annual total diversion in the model is shown in column three, and that's 2272-acre feet annual (inaudible). If we convert that to a constant diversion

rate that would be about 3.2 cfs.

Q. Okay. And remind me again what they determined to be their nonsimultaneous total peak diversion demand, and that should be --

A. We see that in column two, and that's 9.6 cfs.

Q. Okay. Thank you. How much water are they asking for in their water right application above their constant average demand?

A. They're asking for about three times more water than they will typically need on average.

Q. Okay. And do you have any concerns over Perpetua requesting 9.6 cfs of water for industrial use?

A. I do. So as I just said, 9.6 cfs is about three times more water than Perpetua typically need. They have stated that they need more than their average need for possibility purposes, and you always (inaudible) for operational flexibility. But this is a significantly higher amount of water than what they will typically need. And that's inconsistent with the conservation of water resources. You know, Perpetua has testified that they would likely never take 9.6 cfs of water. They wouldn't have a use for it. They wouldn't have anywhere to put it, but in reality, water rights are use it or lose it award. So they could find a way to use their full water right for fear of losing it. And Perpetua's requested water right of 9.6 cfs



isn't necessarily the maximum amount that they would need because those -- the number was determined from those peak demands that don't occur at the same time. So, you know, they want to have a contingency of extra water to account for unknowns, but this water right 9.6 cfs would provide them access to a continuous source or continuous access to 9.6 cfs. And that's significantly more water than they need.

Q. So what type of analyses should that contingency of extra water be based on?

A. In my opinion, there needs to be a comprehensive modeling analysis to understand the impacts to groundwater and stream flow resources that would look at water diversions for all planned purposes, not just some, and for the continuous maximum water that they could pull if they chose to over the mine life and this would determine maximum impacts.

Q. And based on your evaluation of their application and the documents that you reviewed, did Perpetua do any analysis of the effects of pulling the entire 9.6 cfs?

A. No, and that's our second concern that we wrote in our rebuttal report.

Q. Okay. Great. So we will turn to your second concern is that they did not provide an analysis of the effects of pulling 9.6 cfs. To do that, let's turn to



Exhibit 264. This has been previously admitted. This is Perpetua's hydrologic site model refined proposed action report.

A. Yes.

Q. And, oh, okay. You are already there. You are faster than me here. So let's -- we're going to look for some tables here in appendix B, starting with table B1, and that is pdf page 301. Is that easiest way, Jean, for me to give that to you?

FEMALE SPEAKER: Oh, yes, please. Thank you.

MS. THROWER: Okay.

HEARING OFFICER: So, and I'll just note for the record, that I believe you -- I'm not sure. Was that admitted as 264 or was it admitted as Exhibit 25B? I know that was one where there was duplication. I think it may have been admitted as 25 -- Exhibit 25B.

FEMALE SPEAKER: It was.

HEARING OFFICER: Okay, it was, so just for the record.

MS. THROWER: Okay, I'll refer to that as 25B.

HEARING OFFICER: It's the same document, Exhibit 25B. Go ahead.

MS. THROWER: All right. Thank you.

Q (By Ms. Thrower) So we're looking at -- we're going to look at tables B1, B4, B5, B6. They're



on separate pages, so we'll just go one at a time here. For table B1 can you explain what each column in that table represents?

A. Sure. My understanding is that this shows by mine year. On the second column on mill demand, that is Perpetua's estimate of mill demand, the water that they'll need to run the mill, in addition to what they can reclaim from the tailings storage facility. And then the third and fourth column, supply wells and East Fork, South Fork Salmon River diversions columns, my understand is that those are the modeled average annual water withdrawals or diversions for supply wells and then the East Fork, South Fork diversions. And then the last column that's headed (inaudible) my understanding is that is the average annual treated water that they modeled that they would return to stream flows.

Q. Okay. And, Jean, if we could go to -- actually, I think we just need to scroll down to table B2, if we could just have that shown. Yeah, thank you. Oops, I'm sorry. I have that wrong. We're looking at table B1, which we did. Let's go to B4, and that's on page 307. Okay. Great. Thank you. Can you explain what each column in table B4 represents?

A. Yes. My understanding is that this table shows by mine year the modeled values that were determined for

watering or dewatering needs for the Yellow Pine Pit. So this is using that under condition in the site or the hydrologic site model, (inaudible) model. This is the model amount of water that was determined it would be needed to dewater the Yellow Pipe Pit for mine year average annual (inaudible). And this shows alluvium versus bedrock and then it sums them in the last column with a header total.

Q. Okay. And let's move down to -- let's see, that was B4. Let's move down to B5. Should be on the same page down there. Great. Thank you. Can you explain what each column in table B5 represents?

A. Yes. This shows more or less the same thing, but for the Hangar Flats Pit. So the modeled estimate of dewatering that will need to occur per mine year average annual for the Hangar Flats Pit.

Q. Okay. And I think the last table I mentioned was B6. That should start on page -- pdf page 307. Can you move to that, please?

A. Yes.

Q. B6, yeah. Okay. Got it. I had the page wrong. Can you explain what each column in table B6 represents?

A. Yes. Similar to the last two, this table shows per mine year the modeled estimated dewatering that will need to occur in the West End Pit similar to the last.

Q. Okay. Thank you, Ms. Semmens. So what are those



tables that we -- that you just discussed? What are those tables summarizing?

A. My understanding is that those tables summarize the water diversions that Perpetua included in their hydrologic site model that was used to determine impacts to their water use, water levels, and stream flows.

Q. Okay. So is it fair to say from reviewing this information that they modeled what they anticipated using, but they never modeled the effects of pulling the full water right application?

A. Yes, I would say that's fair to say. They did not model the facts of pulling the full water right application.

Q. Okay. And what is the total amount of water Perpetua modeled effects for in any given year?

A. Well, it varies from year to year, and you have to get the total year and the average, you have to add together the values on those four tables we just looked at. Their highest year total diversions that they modeled was in mine year five, and that was above 4.4 cfs. That all comes from pit dewatering and that was the highest year.

Q. Okay. And what was the average annual diversion that they modeled?

A. So if you add together by mine year those tables that we just looked at and then take the average, then the average gross that they simulated in their hydrologic site



model or their impact analysis was about 1.8 cfs.

Q. Okay. So if we can go back to table B1. I believe that's on pdf 301.

A. Uh-huh (affirmative).

Q. Okay. And that shows treatment outfall; is that correct?

A. In the last column there.

Q. Did they model annual diversions taking into account water returned from the treatment outfall?

A. Yes. My understanding is they simulated returning treated water to Meadow Creek, and those numbers there in table B1 would be the average annual de-modeled. And that changes their impact analysis from -- to a net value. So they typically reduce that 1.8 average of their gross total diversions by the average evaluation in that last column in table B1 than they modeled averaged net withdrawal of about 1.37 cfs.

Q. So how much less is that average of 1.37 cfs that they modeled compared to what they are asking for in the water right application?

A. 1.37 cfs is about seven times less than 9.6 cfs. I'm rounding.

Q. Okay. So is it fair to say that we understand the effect of pulling 1.37 cfs on surface flows and groundwater?

A. I think it's fair to say that we have an estimate



of the effects of pulling 1.3 cfs on surface flows and groundwater levels as they were modeled, so meaning where they took the water out of the system. I should preface that, that 1.37 number by saying we don't believe that Perpetua included something around or at least South Fork diversions for dust control or drilling water in the hydrologic site model. I don't recall seeing that in the modeling report. And I heard Mr. Stanaway testify that they did model those withdrawals, but it wasn't clear if he was referring to the site-wide water balance model or the hydrologic site model. So we didn't see a description of if that water was removed from the system in their impasse model, their groundwater model. So if they did include dust control and (inaudible) water, if it was modeled at those maximum values that were shown in that industrial water demand table, table 1 of their application, that adds about .8 cfs to what they modeled, so about 2.2 cfs.

Q. Okay. Thank you. Were you able to discern from Perpetua's modeling the cumulative impacts of the 9.6 cfs proposed withdrawal for each mine year?

A. No.

Q. Okay. Oh, go ahead. Did you want to add to that?

A. No. Actually, I was going to ask you to repeat that.

Q. Sure.

A. (Inaudible).

Q. Yeah, no problem. I asked you if you are able to discern from Perpetua's modeling the cumulative impacts of their 9.6 cfs proposed water withdrawal for each mine year.

A. Okay. No, for a number of reasons. So Perpetua didn't model the continuous withdrawal of 9.6 cfs. So we don't know what the cumulative effects would be on groundwater and stream flows if they were to use the full water right. They also didn't model domestic water use, which will have an additive impact on groundwater levels and base flows and added impact, I should say. We don't believe that Perpetua modeled withdrawals to satisfy dust control or drilling water needs should those be sourced by freshwater, and those two would have an added impact. And, you know, we should also point out that one of our conclusions in our rebuttal report was that Perpetua didn't include the diversion of contact runoff in their groundwater model to determine impacts and that, too, would have an added impact. And even though this water doesn't need a water right, you are moving it from the system would remove water that would add to the impacts.

So Mr. Stanaway testified that they did include the diversion of contact runoff in their model. We're uncertain about this because it wasn't clearly described in the modeling report so we are not sure if he was referring



to, again, the site-wide model or the groundwater model (inaudible). So if it wasn't included in the -- in the hydrologic site model that the groundwater model for impact analysis then that, too, would be another way that impacts can't be determined.

And then lastly, Perpetua didn't model cumulative impacts of contingencies, such as if they had to take more water from groundwater, take more water from the stream because of different operational reasons or climatic reasons. You know, they won't be bound by their permit by their water right or the distribution of this use, so we don't know how impacts could change if there's conditions that they need to adjust for.

Q. Okay. So in that question you just answered, I asked you about the 9.6 cfs proposed withdrawal. This question is similar, but it is if you are able to discern the cumulative impacts of Perpetua's total water use for operations from their modeling?

A. Say it one more time.

Q. Are you able to discern the cumulative impacts of their total water use for operations from their modeling?

A. No, for all the reasons that I just spoke to.

Q. Okay. Did they provide any explanation for why they modeled seven times less water use?

A. Well, I believe they modeled what their water



balance indicated would be their water need, and that's what it was. The 9.6 is the sum of peak demands that they don't anticipate actually needing.

Q. Okay. Well, let me ask that a different way. Did they provide any explanation for why they didn't model the full 9.6 cfs?

A. Well, we heard in testimony this week that they determined that to be an unrealistic operational condition; that they would never need that much water. So they apparently didn't think they needed to model the impacts of that.

Q. Okay. Where does Perpetua plan to draw water from under their proposed water right for mine operations?

A. They'll have water that they remove from dewatering wells around the pits. They'll have groundwater supply wells up in the Meadow Creek (inaudible) have domestic wells as well (inaudible) that's not this water right. And then they will diverge from East Fork, South Fork at a point upstream of the Yellow Pine Pit.

Q. Okay. So the priority is pit dewatering, groundwater pumping, and then surface flows from the East Fork; is that correct?

A. That is what they listed as their priority of use in -- I believe I saw that in the hydrologic site model. I cannot recall if I saw it somewhere else as well, but they



did state that the order of priority would be dewatering water, followed by groundwater pumping, followed by stream flow diversions.

Q. Has Perpetua proposed this order of priority of water sources as a condition on their water right?

A. Not that I'm aware of.

Q. Is that the order of withdrawals that they modeled?

A. Uh, yes, yes. So they -- they -- kind of. They said that that's what their priority was. The dewatering water is determined by the model, and then they said they would prioritize groundwater pumping, but then they said that they had to cap the groundwater pumping at a half a cfs, as we heard this week. So they stated that that was a priority, but then I don't think they were able to abide by that.

Q. Okay. Do Perpetua's modeled effects change if they had to change which source of water they pull from?

A. They could, yes. So their model effects, you know, include drawdown of groundwater levels and changes to stream flows. So it may pull in more water out of the ground that could cause greater problems with the water table or they pulled more water out of the stream that would change their estimates of upstream flow.

Q. Okay. And did Perpetua do such modeling to account for changes in how they withdrew their water?

A. Not that I saw.

Q. So why isn't the maximum impact to stream flows simply continuously removing 9.6 cfs?

A. Isn't the maximum -- okay. So ask me that one more time. Sorry.

Q. No, that's okay.

A. I want to make sure.

Q. Yeah. Yeah. Why isn't the maximum impact to stream flow simply continuously removing 9.6 cfs?

A. Okay. If they just took 9.6 cfs out of the stream then it would be easier, I think, to understand or imagine the impacts. And, you know, we know 9.6 cfs is a large impact on current East Fork, South Fork flows, but it's more complicated than that. We know that there will be groundwater diversions at the very least for dewatering because they have to keep the pits dry. So the impacts become more complicated when we involve the groundwater and we are drawing down the water table that can change (inaudible) flows, amounts and locations and, in fact, discharge to seeps and springs and (inaudible). So the impacts are more complicated than just subtracting 9.6 cfs out of the stream.

Q. So in your professional experience, why is understanding the hydrological impact of a 9.6 cfs withdrawal important?



A. Well, as I just said, 9.6 cfs is a significant percentage of flows on the East Fork, South Fork, so it's important to understand that. And a relatively large portion, according to the modeling of their water right, will be diverted from groundwater for dewatering, and this will draw down the water table during mining and after. Change flow directions, impact base flow, and potentially propagate out to seep and spring locations. And with regards to that, that drawdown point, you know, that can be an impact that expands away from the site to a pretty significant distance. And, you know, we can see that in the triggers they show on their modeling report of drawdown.

Q. Okay. You've worked in the industry for a while and with mining companies as well for a while. Is this the type of impacts analysis that you just described typical of what you see with other clients in the mining industry?

A. What I just described that Perpetua did, or that --

Q. That you described that you thought would be important to do?

A. Yes. Yeah, we do a lot of impacts assessments trying and other industries and for my name, yes, we have to evaluate changes to groundwater levels. We have to predict maximum extents of drawdown to a sultan level, and that level is determined by a biological assessment of what's important, how much would be too much. And we have to



relate that back to what is that drawdown impacting. Is it impacting a stream? Is it impacting a spring? What are the implications of that? Is it impacting an adjacent well owner? Yeah, so we do impact evaluations a lot.

Q. Okay. If we could go back to Exhibit No. I think it's 25B, page -- pdf page 54.

A. I'm sorry. What page?

Q. 54. Not yet.

FEMALE SPEAKER: I'm not sharing. Sorry. Let's try that.

Q (By Ms. Thrower) Great. Thank you. So I think this is figure 4-4; is that right? Okay. Great. Thank you. What does this figure show?

A. Well, this figure is showing their modeled estimates of groundwater drawdown for mine year five, and those drawdown models are shown in pink. And you see their kind of squirrel's nest up by Yellow Pine Pit, and then down at the Hangar Flats Pit. And from this figure, I mean, it kind of looks like, all right, well, that's where we're going to have drawdown. It's going to be just kind of right here at these pits, but it's important to note that they are only showing drawdowns to ten feet. That they are not showing model estimated drawdowns or predicted drawdowns below ten feet, and those could propagate out much further from the site. And so you can see Hennessy Creek listed



there and there's another creek. I believe that's Fiddle Creek. So, you know, we can imagine a 9-foot, 8-foot, 7-foot, 6-foot, 1-foot, half a foot drawdowns extending out to the west there and east (inaudible) last potentially intersecting headwaters of at least those creeks that have seeps and springs and wetlands located there. So just wanted to point that out. You know, this impact analysis with regards to groundwater areas is lacking in what it's showing.

Q. In your professional opinion, can the impacts evaluation be used to understand the likely impacts to groundwater and stream flows from a 9.6 cfs water right?

A. Ask me that again.

Q. In your professional opinion, can the impacts evaluation be used to understand the likely impacts to groundwater and stream flows from the water right?

A. Okay. The impacts analysis that Perpetua did cannot be used to understand the likely impacts from withdrawing 9.6 cfs continuously. An impact analysis could be done, but the analysis that we've seen is not appropriate for that.

Q. Okay. And if that analysis had been done, would you expect that the analysis of 9.6 cfs would result in a greater effect?

A. I would, yes. I would expect drawdown impacts to

be greater and impacts to stream flows to be greater.

Q. Okay. And based on your analysis of Perpetua's water rights effects analysis, what are your recommendations with respect to constructing conditions for the water rights application?

A. We recommend that Perpetua do a comprehensive analysis of all of their water diversions at the amount that they would have access to, whatever that permitted amount is, to determine what the maximum impacts to be to groundwater and levels and stream flows. The implications of these impacts to fisheries must be considered in the construction of the water right. We -- it's our opinion that the impact analysis should control -- should include groundwater pumping or -- I'm sorry. Start that over. In our opinion, the impact analysis must include all planned water use. So, for example, this groundwater model did not simulate pumping for potable domestic use, and we don't believe it included pumping for dust control and drilling water, which if sourced from freshwater would also have an impact. And we think that Perpetua's water right should be limited to a number that's more in line with their typical water needs with a reasonable buffer for flexibility rather than a water right that gets them three times more water than they need continuously. The size of the buffer should be determined from an impacts analysis to the system.



Q. Okay. Thank you. We're going to -- we're going to turn to your third point in your rebuttal report, but if I could just take a thirty-second break just to confer with my co-Counsel?

HEARING OFFICER: That's fine.

A. Potentially, can we take a restroom break?

HEARING OFFICER: We can. Let's go ahead and take a five-minute break, then, and be back in just a minute.

MS. THROWER: Okay. Thank you.

(Recess.)

(Reconvened.)

HEARING OFFICER: Okay. We are back on the record. Go ahead, Ms. Thrower.

MS. THROWER: Okay. Thank you.

Q. (By Ms. Thrower) Okay, thank you, Ms. Semmens. I guess you got your bathroom break. Okay.

A. Yes.

Q. So we left off discussing your second conclusion, so we are going to move onto the third conclusion in your report. So can you state your third conclusion, please?

A. Yes. Our third conclusion refers to Perpetua's proposed condition that would apply at low stream flows, and our conclusion is that we believe there are errors in the way Perpetua is calculating their proposed (inaudible) limit in that condition.



Q. Okay. Can we please open up Exhibit 206, which was previously introduced into the record, and I'm looking at, I believe, pdf page 9.

A. 9?

Q. Yeah. You can scroll down a little. Oh, yeah, there we go. Okay. Thank you. So, Ms. Semmens, do you see that proposed water right condition definition section up on the screen?

A. Yes, I do.

Q. Okay. What is the -- and you've reviewed this proposed condition; is that correct?

A. Yes.

Q. What is the purpose of Perpetua's proposed condition?

A. My understanding is this proposed condition is meant to protect East Fork, South Fork flows at low flow conditions.

Q. Okay. And can you describe the proposed condition?

A. Yes. I'll try to do, just reading those words. Perpetua has suggested a water right condition where they can direct flow water right until the stream flow in the East Fork, South Fork below Sugar Creek falls below 25 cfs. Perpetua's proposed condition states that they would not cause more than 20 percent completion to unimpaired stream flow at the point of modification which is East Fork, South



Fork below Sugar Creek when that stream flow is less than 25 cfs. So once the flows are reduced to less than 25 cfs, Perpetua would be limited to 20 percent depletion of the unimpaired stream flow.

Q. Okay. And then I'd like you to go over some of these terms that are used in the proposed condition. Let's start with percent depletion. What does Perpetua mean by that?

A. Using their definitions, they are calculating that depletion -- I'm sorry (inaudible) by dividing net diversion by the unimpaired stream flow.

Q. Okay. And what do they mean by unimpaired stream flow?

A. They are calculating unimpaired stream flow as a gauge flow at Sugar Creek plus the gauge flow at the end of the East Fork, South Fork, so just above Sugar Creek, plus the net diversion from four water rights that are listed under that Section 3.1.

Q. Okay. Do you have any --

A. (Inaudible).

Q. Oh, I'm sorry. Go ahead.

A. Oh, I was just going to say, in other words, they are calculating unimpaired stream flow as the flow that would have been at the point of quantification downstream of Sugar Creek if they weren't removing water.

Q. Do you have any idea how much each river contributes to the flow in the East Fork, South Fork Salmon River downstream of the confluence of Sugar Creek?

A. Yeah, I didn't do any great analysis of that. I did take a peak at the U.S.G.S. sites, and it looked like maybe 40 percent from Sugar Creek, 60 percent from East Fork. I did take a peak yesterday, just curious, and yesterday I believe Sugar Creek gauge was about 10 cfs and East Fork, South Fork was 9. So it varies, I think.

Q. Okay. And let's go back up to a definition or a term we didn't cover yet. So what does Perpetua mean by net diversion?

A. So their definition net diversion would be groundwater pumping and East Fork, South Fork diversions minus the discharge of treated water (inaudible) so in other words the net amount of water use under those four water rights.

Q. Okay. So based on the way that Perpetua defines these terms in the condition, can you summarize how Perpetua is calculating stream flow impacts under this condition?

A. So they are comparing their net water use to flows at those two gauges plus net water use.

Q. Okay. How did Perpetua model the effects of its condition on surface flows in the East Fork, South Fork Salmon River in their groundwater impacts analysis?



A. I don't believe that they did. I know they did some mathematical modeling of stream flow, just numbers, but I don't believe that they included it in their impacts analysis with their ecologic site model. They also modeled such a relatively low diversion rate they don't really -- it's not really typical to what they modeled.

Q. Okay. So given that we don't really have an effects analysis, do you have any concerns about the way Perpetua has written this condition?

A. Uh, yeah, we have several. So our first concern is that unimpaired stream flow is calculated using flows from Sugar Creek. So, you know, if the point of this is to protect East Fork, South Fork flows at below flow conditions, that will be obscured. Impacts will be obscured by adding flows in Sugar Creek. Second concern is how net diversion is calculated. So, Mr. Stanaway testified that net diversion is appropriate because they'll be returning treated water at the outflow locations at, I think he said, at the top or the (inaudible) system, whatever he said. And it will flow down until it reaches the max diversion location, and so it kind of gets recycled. And it's our opinion that this discharged water is double-counted in the calculation at net diversion. And I know it's just Mr. Stanaway testified that he disagrees, but our concern, simply stated, is if you put -- talking about this returned



treated water (inaudible), if you put water in at the top it's going to flow down passed the gauge that they are using to measure stream flows. So it's included in the gauged flow, but then they're subtracting it on the other end of the equation. So that's a double count of the discharged water. The discharged water will not necessarily flow to the next downstream diversion point; AKA, the East Fork, South Fork intake, for a few reasons. Perpetua has stated that the diversion of fresh stream flow will be the lowest use, lowest priority water use. They've also testified this week that use of East Fork, South Fork stream flows will be, I think the words were, significantly less or only occasional after mining or before. So if the water isn't removed from the East Fork, South Fork diversion point, it should flow down passed the lower gauge where it will be measured and counted, and so that's inappropriate.

Another option to be that the discharged water infiltrates, and although if you've (inaudible) time, you could argue it will just get taken back up with dewatering water. But the reality is that's a slow process from the infiltration of that treated discharge to make its way down to the water table and over to a dewatering location, especially if we are moving through bedrock. So that process can be slow, and we're talking about calculations on a three-day running average to protect stream flows at low



conditions. So we think it's inappropriate to count that water.

Our third concern is that Perpetua's station calculation doesn't include their potable water use. This is another impact to the system, so it should be part of what's being counted as water use to protect stream flows.

Q. Okay. So can you just briefly summarize those three concerns that you have with the proposed condition?

A. Yeah, and I know that site model was wordy. But so our first concern is that Perpetua has artificially decreased the current impact of their withdrawals on the East Fork, South Fork under their proposed condition because their point of quantification is downstream of Sugar Creek. It's just illogical to put Sugar Creek if we are trying to (inaudible) in the East Fork, South Fork. Perpetua's method of calculation by counting that treated discharge, we feel that double counts that water. And Perpetua's method of calculation ignores global water use, which will also impact the system.

Q. Okay. Thank you. And do you have any recommendations that you want to share with us today?

A. Yeah. So, you know, one recommendation that we would have is that Perpetua not be allowed to self-report or self-calculate for these stream flow impacts. The water right in our (inaudible) should include a condition that

Perpetua obtain a third party, certified third party to do that -- those calculations and the reporting of them. So that's our first recommendation.

We also think that Sugar Creek should not be added into the calculation of unimpaired stream flow for the impacts evaluation, and we think that total diversion should be used to calculate (inaudible) not net diversions.

Q. Okay. I wanted to go back to one of your recommendations about reporting and that they should use a certified third party for that purpose. Based on your professional experience in the mining industry, what is your experience with third party certification?

A. Well, our experience prior to that with mine's self-reporting, we've encountered problems with -- I mean, mines are just like everyone else, you have issues with staffing. You have issues with turnover of staffing, having trained staff. So we have observed in our experience that quality and speed or efficiency of reporting and data collection decreases if done in-house.

Q. Okay. And can you just very briefly summarize, again, your reports conclusions?

A. Yes, at a high level.

Q. Yes. Definitely high level at this point.

A. Okay. Our main conclusions are that Perpetua's asking for three times more water than they'll typically



need. We don't know what the impacts to water levels and stream flows will be if they have access to 9.6 cfs of water. And we think that there are errors in the way the stream flow impacts are calculated for the low flow condition.

Q. Okay. And then can you, again, at a high level briefly summarize your recommendations and why?

A. The (inaudible) briefly, but so we -- we recommend that there are conditions placed on the water right that would -- can't remember what all of our recommendations are -- that would limit their water right to a continuous withdrawal rate that is more in line with what they'll typically need, plus a reasonable buffer. That that reasonable buffer be determined from an impacts analysis so we understand what the effects will be. That their impacts analysis include all other planned water diversions, so that we understand cumulative impacts at whatever rate would be permitted. And that Perpetua use a third party to do their monitoring and reporting, and that the way that that low flow condition is calculated be reconsidered.

MS. THROWER: Okay. Thank you, Ms. Semmens. I have no further questions for you.

HEARING OFFICER: Mr. Foster, are you planning -- when you get up and get organized.



EXAMINATION

BY HEARING OFFICER:

Q. Ms. Semmens, I'm the Hearing Officer, and over the course of a week we've heard a lot of discussion about this maximum diversion rate. At the beginning of your testimony you testified that you have represented municipalities, I guess. What's your experience working with municipal water rights?

A. Meaning what type of work we do?

Q. Well, right. Yeah, have you done a lot with, say, municipal water rights?

A. Yeah, we've done some. Our involvement is oftentimes in the realm of the impacts analysis, and for municipal, yes, a lot of times it's contested between trying to get, say, new water sources shored up against other interests, so --

Q. Sure.

A. -- the impact analysis comes in that we will either do or review.

Q. With the growth in Idaho, our Department, of course, deals with a lot of municipal rights and municipal applications and municipality would, of course, seek a diversion rate that would represent, say, a summertime use for that diversion right.

A. Okay.



Q. I'm asking you --

A. Oh.

Q. -- from a water rights perspective, a municipality would need a diversion rate that represents the maximum rate they expect to draw from the water source; is that correct?

A. Uhm, yes, I would say that's correct.

Q. And --

A. That they would expect to draw.

Q. And does that maximum diversion rate occur 12 months out of the year?

A. Uh, no.

Q. Okay.

A. It would not.

Q. So it would be common, then, to have a water right where a maximum diversion rate would represent, say, a short-term need, not an every day of the year constant diversion. So there is a difference between a maximum diversion rate and an average annual diversion rate?

A. Yes, absolutely, but you are talking about a municipality, and we're talking about a mine. And this particular water right could be -- provide access continuously to this amount of water, and mines can expand, transfer water rights, sell, you know, so there is -- in our experience, mine plans are constantly changing. They're often expanding, and water rights are -- they typically find

a way to use water rights. This is the amount of water we have, and those water rights get used.

HEARING OFFICER: Okay. Mr. Foster, go ahead.

CROSS-EXAMINATION

BY MR. FOSTER:

Q. Good afternoon, Ms. Semmens.

A. Hi.

Q. So you testified that you have a cabin in Warren, Idaho, correct?

A. Correct.

Q. And --

A. No. I'm sorry, incorrect. We are outside of Warren, Idaho.

Q. Outside of Warren. And how far was that from the Stibnite Gold Project?

A. We are about 50 miles downstream of the Stibnite Project on the east, South Fork of the Salmon River.

Q. So are you personally concerned about the impacts of the Stibnite Gold Project?

A. On my property; is that what you're asking?

Q. Personally or on your property.

A. I'm not particularly concerned about impacts of the Stibnite Gold Project on my property. We're far enough downstream, and there's lots of water. So I'm not real worried about this project on my property. I am always



concerned about mining impacts in the realm of, I think that we need to go into these projects with our eyes wide open. We need to do the best job we can understanding (inaudible) and be prepared for accidents and issues that arise. So those are my concerns.

Q. Have you performed work for Save the South Fork Salmon or Idaho Conservation League in the past?

A. I have provided review of Perpetua's work for Save the South Fork in the realm of public comments.

Q. And what specifically was that review targeted to?

A. So I have reviewed -- let me think. There have been a few. I have reviewed both versions of the brown water model report, and I reviewed the point of compliance application.

Q. Did you review a previous version of the groundwater model for the Stibnite Gold Project?

A. Yes, previous to the one that we were looking at today. Is that what you mean?

Q. Yes, that's correct.

A. Yes. There was a modeling report -- I am not going to remember the date on it, but I think I reviewed that during the COVID time period, so around 2020.

Q. And has the present model improved from the previous model?

A. It has, yes.



Q. Have you performed -- have you performed work for the Nez Perce Tribe --

A. Yes.

Q. -- in the past?

A. Yes. We, again in the realm of public comment, provided comments on the 404 application.

Q. And that was for the Stibnite Gold Project?

A. Correct.

Q. How many water rights applications have you prepared before?

A. I haven't personally prepared water rights applications. I am typically involved with impacts analyses.

Q. So you've never filled out a water rights application or determined the amount of water required to be requested?

A. My involvement was determining the amount of water has been on the side of estimating how much pit dewatering will be needed, what kind of yields can we get from the groundwater wells, that type of involvement.

Q. And have any of those projects been in Idaho?

A. No.

Q. And you testified that you have mining clients; is that correct?

A. Yes.



Q. And are those existing mines or are those proposed mines?

A. Both.

Q. Both. And have any of the proposed mines been permitted?

A. I'm not sure I'm going to be able to accurately call that up. I'm aware of two that have not. One is still in progress, and I'm not sure about the rest.

Q. All right. Would you agree with me that water needs at a mine fluctuate throughout the year?

A. Yes.

Q. And have you ever prepared a mine operations model or mine operations water balance?

A. I have not. I have used some in my work with the groundwater models.

Q. And is that by taking the outputs of the operational model and importing them into the groundwater model?

A. Not myself, but working with people who are doing that, yes.

Q. And would you agree with me that that's what Perpetua did here?

A. That's what it sounds like.

Q. And so you haven't personally prepared a water balance; is that correct?

A. I have prepared water balances. I have not prepared a water balance for, say, some mine facility, but we have prepared water balances. We do not do (inaudible) water balance modeling.

Q. Understood. Generally when preparing a water balance would you agree with me that water balance must balance; inputs must equal the outputs?

A. That would be the hope.

Q. Sorry?

A. Yes, that would be the hope.

Q. All right. Great. And have you reviewed the site-wide water balance that was prepared by Perpetua?

A. Not in detail.

Q. And are you familiar with how the site-wide water balance and the Stibnite hydrologic site model interact?

A. I believe that I am.

Q. And is it fair to say that some of the calculations performed in the site-wide water balance and then the hydrologic site model incorporates those calculations in an iterative process?

A. That is my understanding.

Q. So would it be important to understand how the site-wide water balance works in order to fully interpret the site -- hydrologic site model?

A. Not for the conclusions that we have done.



Q. Are you aware that water demand value in the site-wide water balance is based on a month-to-month basis?

A. Yes.

Q. And, Ms. Franolich, can you pull up Exhibit 209 and go to page 7? 209, page 7. And I'll represent that this was the (inaudible) storage memo that you looked at with Ms. Thrower. It's previously been admitted as part of Exhibit 1G, and you testified to this table at the top; is that correct?

A. That is a graph.

Q. And do you know where the values for this table were derived from?

A. My understanding is from the site-wide water balance model except for the dewatering component which came from the site-wide model.

HEARING OFFICER: So I think you were talking passed each other. You keep saying table, and you had said to go to page 7. So we're not -- that's not page 7. So maybe if you --

MR. FOSTER: This was the graph I was hoping for.

HEARING OFFICER: Okay.

MR. FOSTER: This is the graph we were after.

HEARING OFFICER: There's a separate table that we did look at earlier.

MR. FOSTER: Sorry. I should have said graph.



HEARING OFFICER: I'm not understanding. Okay.

MR. FOSTER: No, this is correct.

HEARING OFFICER: So this is on page 4 of that memo? Okay.

MR. FOSTER: I believe it's pdf page 7.

HEARING OFFICER: Yeah. Okay.

MR. FOSTER: May be the confusion. Apologies.

HEARING OFFICER: Go ahead.

Q (By Mr. Foster) So your understanding is that everything except the dewatering, right, came from the site-wide water balance?

A. Site-wide water balance and/or the tailings water balance. I understand that there is a facilities specific water balance, so I would imagine some of that came from that.

Q. But you haven't reviewed the site-wide water balance in any detail; is that correct?

A. Not in detail, no.

Q. And in the conversation with the Hearing Officer just a minute ago, you agreed that peak diversion demand is different than average diversion demand; is that correct?

A. Correct.

Q. And so could peak diversion demand during a day exceed the average baseline demand?

A. Peak diversion demand in a day exceed the average



demand? Yes, and you didn't remove that peak demand say for an entire day, then it would exceed the average for the day.

Q. And are you familiar with the difference between a volume limit in a water right and a rate limit?

A. Yes.

Q. And can you pull up Exhibit 318, page 3, and let's zoom in on the third paragraph under A.

A. Okay.

Q. In your expert report which we are looking at, you stated that Perpetua reported its anticipated average annual demand volumes for the SGP operations in acre feet per year. Do you see that?

A. Yes, I do.

Q. And would you agree with me that this average demand is not peak demand?

A. Yes, I agree.

Q. And would you agree with me that in the hydrologic site model Perpetua modeled the water demand that it projected it needed from the site-wide water balance?

A. That's my understanding.

Q. Ms. Semmens, how many water models have you built?

A. How many groundwater models?

Q. Yes.

A. (Inaudible)?

Q. Yes.

A. I'm not sure of the number. I have been creating models for, including grad school, almost 30 years, and it's been constant. So I would estimate hundreds.

Q. And would you agree with me that groundwater models can be quite complex?

A. Absolutely.

Q. And would you also agree that different groundwater modelers have differences of opinion of how to build groundwater models?

A. Yes.

Q. And would you also agree that there are different yet equally valid approaches to building groundwater models?

A. Yes.

Q. And is Mod flow the correct platform to use for hydrology model or groundwater model?

A. It is certainly a very widely used platform. I use it. It is part of the industry standard, I would say. It's not the only way, but it's definitely a highly used platform.

Q. And do you -- have you performed any modeling of the Stibnite Gold site?

A. I have not. Performed any modelings? Back in the first -- let me think about this. Back in the first review of the first groundwater model, which was that 2020 timeframe, I did have the model files, and I did test out a



few things with them, yes.

Q. But not in the current version?

A. No.

Q. And so is it fair to say you haven't modeled the effect of diverting 9.6 cfs from the Stibnite Gold Project?

A. I have not.

Q. To model an area like the Stibnite Gold Project, how many determinations of hydraulic conductivity would you typically need?

A. That would really depend on (inaudible) system, how much it changes from point to point, obviously the more the better. You would need, the very least, one value per (inaudible) unit or rock type, and for if not you'd need to be able to estimate hydraulic conductivity value from, say, literature of similar materials. But, of course, if you have more, then you can understand how hydraulic (inaudible) might vary across your site and between units. And so that's not a question that has a number.

Q. So based on your familiarity with the Stibnite Gold Project would 50 be enough?

A. It would depend on where they're located, what geologic units they tap into. So, yeah, I can't answer that.

Q. And the hydrologic site model predicts outcomes on a monthly basis; is that correct?



A. That's my understanding.

Q. And would you agree with me that hydrologic model that reflected daily values would not be significantly more meaningful than one based on monthly time steps?

A. Depends on what question you're asking the model. So monthly time steps are going to give you results that are averaged over a month, but you need to answer a question that that would require a smaller time step, then no.

Q. Would it require significantly more data to model a daily time step instead of a monthly time step?

A. Significantly more data, that would depend on the model. It would certainly require more computational (inaudible).

Q. And you've testified that Perpetua's requested 9.6 cfs but did not model that 9.6 cfs; is that correct?

A. That's my understanding.

Q. But the 9.6 cfs is a rate of withdrawal, correct?

A. Correct.

Q. So you could withdraw 9.6 cfs over a second an hour or a day, correct?

A. That's my understanding.

Q. So would you agree with me that a diversion of water at 9.6 cfs over a period of an hour would not necessarily be reflected in the hydrologic model?

A. I agree with you that the diversion of 9.6 cfs over



an hour would not reflect in the hydrologic model? Well, hydrologic model varies year to year and month to month and everything (inaudible) that was modeled was about 1.8 gross. I would need to know what 9.6 cfs for an hour is and (inaudible) question. Can you repeat it?

Q. That's all right. We can move on. And in your expert report, Exhibit 318, page 3 on the second to last paragraph, can you zoom in on the second to last paragraph?

A. Uh-huh (affirmative).

Q. So you stated that the sum of these average industrial water demands determined by Perpetua's 2272-acre feet were a constant demand of 3.15 cfs. Do you determine that the actual average constant demand -- or you calculated that the actual average constant demand is 3.15 cfs, correct?

A. Yes.

Q. And is that over a year?

A. Correct. If you convert 2272-acre feet per year to a constant rate.

Q. And would you agree with me that the constant demand rate is different than the instantaneous demand rate?

A. Yes.

Q. Now you -- let's go to page 6 of 318. And you stated in your expert report that Perpetua did not include the impacts resulting from the capture diversion and storage

of water runoff in its hydrologic site model; is that correct?

A. That's what we stated there, yes.

Q. If those results or if those impacts were captured in the site-wide water balance, would you know where they were?

A. Would I know where they were?

Q. Would you be able -- if they were in the site-wide water balance would you be able to tell if they were reflected in the hydrologic site model?

A. Uh, so I am assuming that the diversion of contact runoff is included in the site-wide water balance model. The question is if that water -- the removal of that water was represented in the hydrologic site model. I did not see a description of that in the hydrologic site model report. It's a long report. It's possible we missed it, but we did not see that clearly defined in that report.

Q. All right. And let's go to page 7 of Exhibit 318 and let's look at the last paragraph. So you stated in the report that BAS believes it is possible that during times when unimpaired stream flow is less than 25 cfs, Perpetua could decide to divert additional groundwater designated for potable uses thereby shifting the total impacts towards groundwater drawdown which will also have an impact on stream flows.



A. Uh-huh (affirmative).

Q. And I guess what I'm trying to understand here is are you implying that Perpetua could divert water licensed or permitted for domestic uses for other uses?

A. Well, that's what we are questioning, and we understand that it's licensed for domestic use. But there's also kind of a shell game of water on paper. So our question was if there could be more groundwater diversion from domestic use than actually needed for domestic use bestowed in that permit. So it's a question.

Q. Are you implying that if Perpetua's ultimately issued a permit for domestic use, it's going to violate the terms of that permit?

A. No, not necessarily violate, but maybe use up to the maximum even if not necessarily needed in that way.

Q. Are you familiar with how potable water is going to be managed on-site after it's used?

A. Uh, no, I'm not.

Q. And let's go to Exhibit 318, page 7, and let's zoom in on condition No. 3 in the middle. And, Ms. Semmens, I believe you were previously testifying at some length to this condition; is that correct?

A. Yeah.

Q. And are you familiar with the Idaho Department of Water Resources administrative natural flow condition?



A. I don't believe I am.

Q. Based on your review of the hydrologic site model would you agree with me that there will be impacts to Sugar Creek from dewatering the West End Pit?

A. Uh, based on my review of the hydrologic site model do I agree that there will be impacts? I believe based on the hydrologic site model that the West End Pit would have impacts on Sugar Creek, and that pit did not start dewatering until, I believe, the last two years of mine operations. So I do not agree with that statement for the first 10 years of mine operations.

Q. And do you know if the dewatering of the Yellow Pine Pit would have drawdown effects below the gauge on the East Fork, South Fork above Sugar Creek?

A. Below the gauge on the East Fork, South Fork above Sugar Creek, but would have drawdown impacts?

Q. Yes.

A. I would need to look at the maps again, but I would assume, yes.

Q. Ms. Semmens, are you familiar with any third party certification company that would certify water use under a water right for a mining company?

A. Uh, I'm not aware of any by name, and I should probably clarify certified -- I know that we made the recommendation that Perpetua have a -- excuse my throat -- a



certified third party do the calculations. But that could also refer to, say, a licensed consultant. That doesn't have to be something else, talking third party, someone who's qualified to do measurements and make calculations and report them.

Q. Are you familiar with any licensed consultants who would create their -- the report in use form for a mining company?

A. I would imagine that there's plenty of consulting firms who would be willing to do that type of monitoring and calculation reporting.

Q. And when you were answering questions from the Hearing Officer you testified that you're concerned because the Stibnite Gold Project may expand and may use more water than is projected. Is that a fair characterization of your testimony?

A. That is a concern, yes. I think that mine plans change all the time, and so just because the current mine operation plan does not anticipate needing the full 9.6 cfs water right, the 9.6 cfs water right would give Perpetua access to that much water continuously. So given that mine operations change all the time, I think it's logical to be concerned that that water use would be more than currently anticipated.

Q. Ms. Semmens, do municipalities expand over time?

A. I think they can. Obviously if needs change, populations change, yes, but drawing that connection here between municipalities and mining -- I understand the line of questioning, but I'm not quite sure it's apples to apples here. We're talking about this situation.

MR. FOSTER: Thank you. No further questions.

HEARING OFFICER: So, Ms. Thrower will ask you questions on redirect. Almost done, and then we'll break for lunch.

MS. THROWER: Yes, it will be much shorter than the first go-around definitely.

REDIRECT EXAMINATION

BY MS. THROWER:

Q. Okay. So, Ms. Semmens, you testified that you've never prepared a water rights application; is that correct?

A. I have never filled out the form.

Q. Okay. Can you clarify your work that's related to water right applications?

A. Yeah, so we -- we do impacts evaluations that are used to support water rights applications. We do -- they can be called kind of different things. We do a shared water supplies. We do, like I said, impacts analyses. We do estimates for in the case of mining how much pit dewatering will be needed. We do either mining or non-mining, we do estimates of well field deals and so all



of these would be used in support of water rights. We do analyses of stream flow impacts, (inaudible) flow impacts, and how much water is being drawn from what areas for oftentimes contested water rights. What's it called when you have the different levels? I'm blanking on the word. (Inaudible) water rights over more senior water rights and who is pulling what water from where. So these are the types of things that we do with water rights.

Q. Okay. Is part of the work that you have completed to insure that the requested water amount in the client's water right application is appropriate compared to the actual water demand necessary?

A. I'm sorry. Can you hit me with that again?

Q. Yeah. Sure. So thinking about the work you've completed in your career, have you completed work that insures that the requested water amount in the client's water right application is appropriate compared to the actual water demand that's necessary?

A. Yes, yes. We do quite a bit of that work and that can be that a shared water supply or physical availability demonstration type analyses. Yeah, we have to show that if they have "x" amount of water right, that is what that water is going to be available and what will the impacts of withdrawing it be, yeah.

Q. And when you talk about doing work to find out what



the impacts of that water withdrawal will be, are you typically looking at the impacts of water withdrawal, the amount of water on the water rights application, or do you look at other levels of water withdrawals?

A. Uh, you know, we kind of do a variety of things. So, you know, we would certainly look at -- at the -- the water right amount. We certainly do impact analyses of that. We would do impacts analyses that try to get at the question of what are maximum impacts. And so if there was a situation where the water right was more than a water use, kind of like we're talking about here, we would look at the maximum, what are those maximum impacts, even if it is a worse case, what is it, so we know what we're getting into.

Q. Okay. So, for instance, if you were to be doing an impacts analysis on Perpetua's water right application from 9.6 cfs you would have modeled impacts for potentially withdrawing 9.6 cfs?

A. I would have, yes.

Q. Okay. You've testified that you have not prepared a water right application in Idaho, and you haven't done any work for a mine in Idaho; is that correct?

A. Uh, other than the Stibnite work, yes.

Q. Correct. But you have prepared numerous technical support for water rights permitting applications across the Western U.S.; is that correct?



A. Correct.

Q. Okay. Do you feel like this professional experience allows you to accurately assess groundwater and surface flow impacts in Idaho?

A. Absolutely, yes. Our experience is based in the Western U.S. This high altitude (inaudible) bedrock, bedrock alluvial exchange, groundwater systems with surface flow interactions impacts from water use, this is what we do all the time. So, yes, I do feel --

Q. Okay. I just want to confirm, to your knowledge has Perpetua modeled the flow impacts of withdrawing their proposed water right condition -- excuse me. Strike that. To your knowledge, has Perpetua modeled the flow impacts of applying their proposed water right condition to the full 9.6 water right?

A. In the groundwater model?

Q. Yes, in the models that you've reviewed, yes.

A. So reviewed. Uh, no, I'm not aware that they did. I believe the analysis of that condition was just a mathematical analysis that was part of that (inaudible) documented.

MS. THROWER: Okay. Thank you, Ms. Semmens. I have no further questions.

MR. FOSTER: No further questions.

HEARING OFFICER: Okay, and I don't have any other

questions for you either. I have noticed, Ms. Semmens, that you've joined us for different parts of the hearing. You're welcome to continue to do so as we move forward over these next couple days. But thank you for your participation today.

A. Thank you, Mr. Hearing Officer.

HEARING OFFICER: Thanks. So I think we break for lunch, so we'll go off the record and meet back here at 1:40 --

(Recess.)

(Reconvened.)

HEARING OFFICER: All right. Welcome to those of you who are here to --

(Gap in audio file.)

HEARING OFFICER: Spend a few minutes here, kind of explain what we are doing, just in general, and where we're at in the process. So as I think many of you know, Perpetua -- Perpetua Resources Idaho, Incorporated, has filed a number of applications for water rights. Some for brand new water rights. Some to make adjustments to elements to existing water rights. Those water right applications have been protested by Idaho Conservation League, Save the South Fork Salmon, Incorporated, and the Nez Perce Tribe. Anytime a water right application is protested, if the parties are unable to reach a settlement,



the Department conducts an administrative hearing.

I work for the Department of Water Resources. I'm a regional manager out of the Idaho Falls office, so I'm kind of outside of where these applications are located. So I haven't really had any prior involvement with Perpetua or really even these sources, these river sources in my past. I generally am dealing with applications in Eastern Idaho.

But if the parties are unable to settle, the Department conducts an administrative hearing, so that's what we're doing at this time. It's a five-day hearing. We are in day number four of five days. So those of us at the front who have been at this for a while, that's why we look the way we do, but it's actually gone very smoothly. I appreciate the attorneys have been very respectful, and I think it's been good. We've been able to cover a lot of ground in the last four days. There's been a lot of discussion about the proposal and the concerns of the Protestants. We are in the middle of -- at this point we are in the middle of the evidence being offered by the Protestants. And so we're taking a break from that part of the hearing to allow public witnesses.

Under our rules of procedure when the Department conducts an administrative hearing, people can register to offer testimony, so a public witness. And under our rules they needed to provide written notice five days prior to the



hearing, and so we had a number of people that have provided that notice. And so I don't -- I'm happy to go in whatever order. I guess maybe we can -- we have a number of people online. I would ask that when you come to offer testimony that you state your name and your address and just, you know, provide your statement. But as a witness in this hearing, all of you will be put under oath, and so that just means that I will ask you to confirm that the testimony you are about to give is the truth. And then you'll also be subject to cross-examination by any of the parties, Protestants or the applicant. And perhaps we have questions for you, perhaps not. We'll kind of have to see how that plays out.

So with that, why don't we start with those who are in the room. Why don't you -- yeah, come on up. I didn't catch your name.

A. Ted McManus.

HEARING OFFICER: Okay. So if you would have a seat just right here. Oh, no, I'm sorry. Come up here. That way you can be facing the attorneys, too, and if you would touch that button so that you turn your microphone on.

TED MCMANUS

after having been first duly sworn,

was examined and testified as follows:

MR. MCMANUS: I do.



HEARING OFFICER: Okay. You can proceed with your statement.

STATEMENT

MR. MCMANUS: My name is Ted McManus. I live at 1045 Valley River Road in McCall, Idaho, and my statement is I'm here representing not just myself but family and friends in the McCall area. Many of us who have really tight connections with the East Fork of the South Fork and South Fork of the Salmon. We've hiked and fished on the East Fork and the South Fork for many, many years. I can think of experiences like during the COVID pandemic when the East Fork and the South Fork were kind of a respite for us and our family to able to go down there and have a place that we didn't have to think about that kind of thing. I also taught my son how to fly fish on the East Fork of the South Fork. He's 18 now, and he is a whole lot better fisherman than I am, but he learned on that river. We've camped on the East Fork many times and also just passing through there on the way to monumental to go hiking in the Frank Church Wilderness or to Big Creek visiting friends there. So I've spent a lot of time in this area. It's an area of great beauty and even wildness, despite the fact that there's a road parallelling it. And that's a rare thing that you can have a place that is so wild and so spectacular even with a road right there. But it's also, as everybody knows, I'm

sure you guys know this well, it's an embattled place. It's a river that's been working hard to come back from years and years of mining and abuse. However, it is coming back, and people are beginning to trust the river again. It's no longer a place of fear. You know, it's no longer a place of fear of toxicity. It's a place where families and fisherman can go and spend time there. But I believe that that -- that requires -- that recovery of the river requires sufficient water in the river to flush out and dilute any toxicity from any mining. So if a water permit of 10 cfs is issued it probably will imperil the river and its ability to recover from its history of mining and abuse.

I was thinking recently about one September, actually it happened two Septembers, but one in particular where I took my cross-country team from McCall-Donnelly High School out to the East Fork to hike and run, and then afterward enjoy the river. And I remember the teenagers challenging each other to see how long they could stay in the river and starting with seconds and then it got to be minutes and see who could stay in the river the longest. And it is a very cold river, even in September, and it was just a great memory. And it was nice to be able to feel like, oh, this is a safe place where I can take teenagers and have them spend time.

So I think we need to be realistic. Hunting and



fishing and outdoor tourism are greater drivers of the Idaho economy than mining is now, and it's vital for us to consider the long-term health of Idaho's economy. And restoring these fisheries and not taking water from them for short-term gains are really going to pay off in our future.

I want to finish real quickly with a quote from my 18-year-old son who has always loved the East Fork, and he actually -- he started a small company called South Fork Flies where he -- so he sells flies that he ties, and he's named it after this river years and years ago. So he said that the East Fork of the South Fork is a truly natural place, which is rare these days. He says, the fisherman doesn't have to think so much about flow and water temperature because it's free flowing. And there's relatively minimal extraction of water for industry, unlike some other rivers in Idaho and Montana, like the Bitterroot River that are drawn down so far that fish are dieing and fishing isn't allowed on certain days in order to protect the fish. And he says, let's not let that happen in Valley County. Thank you.

HEARING OFFICER: Okay. Hold tight. Any cross-examination?

MR. WATKINS: Just briefly.

HEARING OFFICER: Okay. That's fine.



CROSS-EXAMINATION

BY MR. WATKINS:

Q. Mr. McManus, how are you?

A. I'm doing fine.

Q. My name is Elijah Watkins. I represent Perpetua. Are you also Coach McManus?

A. I am.

Q. All right. Coach, hearing your testimony it sounds like you're pretty strongly opposed to the Stibnite Gold Project?

A. Yes.

Q. You understand that we are here today to see if Perpetua should be awarded a water right in support of the Stibnite Gold Project. You're aware of that?

A. I am, yes.

Q. Given your opposition to the Stibnite Gold Project, is there anything that I could say or show you which would cause you to support Perpetua receiving a water right for the Stibnite Gold Project?

A. I'm not exactly understanding your -- so is there anything that you could say to convince me otherwise; is that what you're saying?

Q. Yes, sir.

A. I don't know. I don't know what you'd have to offer, but, no, I don't think so.



MR. WATKINS: Okay. That's all the questions I have for you.

A. Okay.

MR. WATKINS: Thank you.

HEARING OFFICER: Thank you, Mr. McManus.

A. Okay.

HEARING OFFICER: Somebody -- I saw another person. Are you a public witness?

MR. SMITH: I'm a public witness.

HEARING OFFICER: Come on up. And what's your name?

MR. SMITH: My name is Kyle Smith.

HEARING OFFICER: Kyle Smith. Okay. So, Mr. Smith, same thing.

KYLE SMITH

after having been first duly sworn,
was examined and testified as follows:

MR. SMITH: I do.

HEARING OFFICER: Okay, have a seat. Make your statement.

STATEMENT

MR. SMITH: Okay. My name is Kyle Smith. I live at 2512 West Pleasanton Avenue here in Boise. I guess I'm just here to paint a little bit more of a picture for those people that haven't spent time in the East Fork, South Fork, South Salmon, Johnson Creek, Secesh Drainage. It's a really

special, special place to me. And I don't have anything written down, but it is a really important place I think to say that I like this area would be a huge understatement. I grew up in Southern Idaho in Twin Falls, Filer area, just a stone's throw from here. My great grandparents were potato farmers. I'm a fourth generation Idahoan. As an ER nurse I often joke with my coworkers that I have mashed potatoes in my veins, which if you know anything about medicine that would be a very bad thing. And my wife and I currently have a fifth generation cooking in the oven right now, and it's because of that little spud on the way that I think I'm driven to be here today because I would like to share wild places like this greater drainage with my future child, yeah.

I first discovered the East Fork, South Fork -- South Fork Salmon Drainage as an 18-year-old kid going to school up in Moscow at the University of Idaho, and I have -- it's had its hooks in me ever since. I have spent the greater part of two decades in there, whether I've been kayaking at the highest flows the South Fork Salmon gets in the springtime or I have been fly-fishing, like Mr. McManus and his son, at the lowest flows that it gets from its banks. Camping with friends and family or skiing in the backcountry skiing in the upper watershed area out of the Goat Creek zone, which is very close. And I'm not anti-dam



necessarily. I'm not anti-industry. I'm not anti-mine. I would like to think that I am a very optimistic realist, and I think there's a time and place for all things. I don't know the nuances of everything that's going on in there. I'm no expert witness. I don't claim to be. But I know that there's a lot of people that are working on this project, and I know there's a lot of facts and emotions and money that's tied up in it. And I guess I just want those that are experts and those that do have that experience, to make the best choices for those of us that see a greater value in that area than just what is industrial value, I guess.

So I really appreciate you having me. And, yeah, I just love this area so much, and I want to be able to share it with future generations, whether it's my child or my child's child. I want to be able to continue to kayak. I want to be able to go on mountain bike rides from the Secesh South Fork confluence in the fall. I want to -- I want to be able to spend a good long time bow hunting elk in that area. I have been up and down Idaho a lot. I've driven from Coeur d'Alene to Twin Falls, which is about as north to south as you can get more times than I can count, whether I was going back to school or just going for recreation or to see family and friends that span the entire state. I love this state. I care about it, and I care



about the future of it. So, yeah, that place is truly a gem in this state for many reasons. So, thank you very much.

HEARING OFFICER: Thank you. Any questions?

MR. WATKINS: Appreciate Mr. Smith's time. No questions.

HEARING OFFICER: Okay. Thank you, Mr. Smith. Anybody else here in the room with us? Come on up. And what's your name?

MR. WENZEL: Rich.

HEARING OFFICER: You are Rich Wenzel.

RICH WENZEL

after having been first duly sworn,

was examined and testified as follows:

MR. WENZEL: I do.

HEARING OFFICER: Okay. Go ahead, Mr. Wenzel.

STATEMENT

MR. WENZEL: My name is Rich Wenzel. I live at 1703 North 16th Street here in Boise. I moved to Idaho about 28 years ago now. I moved here after receiving my Bachelor's and my Master's degree in metallurgical engineering. I was in the South Dakota School of Mines and Technology in South Dakota. When I was there I was -- I don't know if you remember, but at the time the Homestake gold mine was the largest in North America. It since ceased operations, but as a student studying extractive metallurgy



for six years I had a unique opportunity to go up there and see the mine. Go down, I think it was like 8,000 feet, way down there, go out in the pits and see all the operations. It was pretty, pretty interesting. And then when I moved here I got a job at Micron. And as luck would have it, I was working for gold wire. So I've been working at Micron for 28 years. We use -- I don't know if you're familiar, but semiconductors use a fair amount of gold in them. So one of my areas of expertise out there has been the use of gold wire. So I've got this industrial background somewhat on gold. I never worked in the gold extraction industry, but certainly studied it.

So my other interest in this is that I do recreate quite a bit in the East Fork, South Fork area. You know, I went up there when I moved here about 28 years ago. Started kayaking up there, doing camping, biking, fishing as best I could, and just absolutely love the area. And now, you know, I've got two daughters. As they're getting older they've heard stories about how we would go up there frequently, and now they're getting into kayaking and they want to go. One of my daughters also is getting into fishing, and we have talked about that and she wants to go enjoy that. So my interest here also lies in them being able to enjoy this area as well. So when I heard about the opportunity to come give a public testimony, I thought I

would take advantage of that. And, you know, I realize obviously the need for mining and the industrial uses of gold. It's definitely there. It's part in my daily life, but I also see the need to balance that with my personal life, how I recreate and what I do outdoors. So I just want to make sure as we look at this issue of I think it's 10 cfs roughly of groundwater, just make sure the due diligence is done to make sure that there's no negative impacts from that.

HEARING OFFICER: Okay. Thank you. Thank you, Mr. Wenzel. Any questions from any of the group?

MR. WATKINS: Thank you (inaudible).

HEARING OFFICER: Okay. Thank you. So those are the three public witnesses in our -- in the hearing room. I see we've got the other five online. We'll take you in the order that I can see. So that would start with you, Mr. Ostermiller, if you want to unmute.

DAN OSTERMILLER

after having been first duly sworn,

was examined and testified as follows:

MR. OSTERMILLER: I will.

HEARING OFFICER: Great. And we can hear you, so go ahead.

STATEMENT

MR. OSTERMILLER: So I'm Dan Ostermiller. I live at



300 Crowley Lane, McCall, Idaho, and my family and I have lived here for 37 years. We moved here after I finished a residency in family practice. I've been practicing family medicine here up until three years ago. One of the determinates for moving here was the beauty of the area, the wilderness, and we all enjoy kayaking and rafting. And that's one of the determinates for moving here, and I think for a lot of people in Idaho that's a big determinate. My wife is a scenic wildlife biology. She graduated from the University of Idaho, and she really kind of invited me up here to see Idaho for the first time. And I couldn't believe how clear the waters were compared to Utah. I was a river guide in Utah, and I was a river guide one year up here on the Middle Fork of the Salmon at the beginning of my medical school career. A year after I was a guide I came back with Lisa to go on a private trip. And we came into Banner Creek and walked up to Dagger Falls, and there were Chinook Salmon jumping on Dagger Falls. There were only four to six, but it was a spectacular view. It was like, oh, this is the way, you know, rivers should be. I'm sure the amounts that were in the past there would be thousands waiting to jump up Dagger Falls.

I also kayak, and I've enjoyed kayaking the East Fork, South Fork. This past summer did a low river South Fork trip, and on that trip I was reminded again how



beautiful this river corridors are. We also camped at an area that was -- there was decreased flow, and the river broadened there. And I could imagine seeing Salmon in that river because we were camped near an Indian camp that they use for fishing. And we could still see where their habitats were, their areas where they had their (inaudible) or whatever, their dwellings, so from the Native Americans. And you sit there and think, how were these rivers at one point in time with hundreds of thousands of fish coming back up and what were they like. All that nutrient being brought from the Pacific Ocean back up here. You know, the wildlife that's present there, it was able to eat, you know, the fish that are dying. Not just bears but wildlife and everything, other fish. I mean, it would have been amazing to have seen that.

So, I enjoy kayaking and enjoy the rapids, but I would also like to see Salmon return in those type of numbers. And I'm hopeful that that can happen. So really what I'm going to ask this board is maybe can you insure that there's adequate amount of water so that the Salmon can return, so that the fry can be raised here and they can return to the oceans. The real gold mine is in our fish and our natural waterways and recreation. So I would tend to support that more than a gold mine. And thank you for allowing me to testify today.



HEARING OFFICER: Thank you, Mr. Ostermiller. Any questions?

MR. WATKINS: Thank Mr. Ostermiller for his time.

HEARING OFFICER: Okay. No questions for you. Thank you for your time.

A. Okay. Thank you.

HEARING OFFICER: You bet. So we'll turn now to Mr. Zach Sears. You are the next one I can see.

ZACH SEARS

after having been first duly sworn,

was examined and testified as follows:

MR. SEARS: I will.

HEARING OFFICER: Okay. So we can see you and hear you. Go ahead.

STATEMENT

MR. SEARS: My name is Zach Sears, and I live at 347 Whitewater Drive in Riggins, Idaho. I was born in Lewiston, and I'm a second generation Idaho guide. I guide Steelhead trips on the Salmon River below the confluence of the South Fork of the Salmon. I interact with clients daily during the season, many of who report that catching an Idaho Steelhead is the single most thrilling act of their lives. Some of these fish that are being caught might very well be heading out to Sugar Creek and the East Fork of the South Fork to spawn. Witnessing one of these mighty fish can have

long-lasting impacts on an angler, and many claim to have caught the fish of a lifetime on the Salmon River. Catching an Idaho Steelhead is something every Idaho angler must experience and not just for this generation but for generations to come. To have these fish in our rivers is world renowned and celebrated, and Steelhead are an intrinsic right of Idahoans. Reducing close to 10 cfs in the headwaters of the East Fork with resulting degradation of fish habitat is a violation of this intrinsic right. Diminishing spawning, incubation, rearing, and migration grounds could have -- could affect river communities like Riggins where fish are essential economic driving force. These fish are a part of our iconic river communities. Steelhead are a part of Idaho and have sustained a way of life for people who have lived here for thousands of years.

I have been recreating year-round in the Stibnite area since 2004. In the summer I enjoy snorkeling and fishing on the East Fork of the South Fork. I have snorkeled with 30-inch Bull Trout in the upper East Fork. I've also observed Steelhead, Chinook Salmon, and West Slope Cutthroat Trout, among other aquatic species. And it is this diversity of incredible fish that I plan to be of great esthetic value.

Reducing flow in the East Fork could have a major impact on a variety of recreation activities. A large part



of why I choose to recreate in this area is because of the water quality in these high mountain streams. I'm able to observe more fish and wildlife high in the watershed where water temperatures are cooler, and fish can find refuge from the warm river temperatures lower in the watershed. I fear that reducing flow in the East Fork without a warming impact and reduced water quality not only in this part of the watershed but for miles downstream. As a resident of Riggins I enjoy the clean water of the Salmon River on a daily basis. I also enjoy swimming and kayaking in spring and summer, fishing in the winter, and teaching rescue classes on the river in the spring. I am greatly concerned that the way of life of many Idahoans is threatened by impairing parts of the upper watershed.

I've lived in the McCall, Riggins area for almost 15 years and have chosen to do so because of the East Fork, South Fork, and South Fork rivers. Having run rivers throughout five continents and seeing firsthand how polluted the rivers of the world are, as well as knowing that clean surface water is increasingly rare, it made sense to me that I live as close to this clean water as I could. I believe many Idahoans choose to live here for the same reasons, and if our high mountain streams can no longer support life then the quality of life for fish, wildlife, and humans throughout the region will significantly decline.



I ask that you please do not issue such a large quantity of water rights to Perpetua or any other body that would degrade this beautiful part of the world. Thank you.

HEARING OFFICER: Thank you, Mr. Sears. Any questions? Seeing none, thank you for your time. So I also saw that we had Gary Brown on. Mr. Brown, if you're still with us. Get him up. There he is.

GARY BROWN

after having been first duly sworn,

was examined and testified as follows:

MR. BROWN: I will, yes.

HEARING OFFICER: Okay. You can proceed.

STATEMENT

MR. BROWN: Okay. Well, thank you. My name is Gary Brown. I live at 964 Ridge Road here in McCall. I'm also a resident of the local Trout Unlimited chapter here called the Reed Gillespie Chapter, which is loosely based out of McCall. We kind of run from Riggins to Counsel, all the way back to Yellow Pine, Cascade, that kind of country, around the west. So if you can imagine this piece of ground is a big deal to us. We consider it an area of special interest. It's in -- it's in our backyard, as everybody else has mentioned, and most of the folks that I know that fish or even recreate, they look forward to it every year into the East Fork and the South Fork. Some of them camp. Some of



them fish, just a variety of things. And I know several people that have set up summer residences in Yellow Pine, and they probably spend the summer running around on the four-wheeler with a fly rod attached to the back. So it's kind of -- it's a good deal for them. There's also -- in our chapter, just kind of back up a little bit, we've got 60 members in our chapter located around from south, north -- yeah, north of Riggins and down to Counsel and whatnot.

The other interesting thing is there's a bit of a commercial aspect to the South Fork as well. There's the local fly shop here in McCall. They do guided trips, fly fishing trips, day trips on the South Fork by the Hettinger Ranch which is below the confluence of the East Fork, South Fork. And then there's probably a daily entourage of UTVs and ATVs that are rented from the local shops that make the trip over Big Creek summit every day just to go tour that part of the world. And, of course, you know, healthy rivers and streams are what they're out there for. It's an important aspect. It's a big draw. You know, and on a personal level it's where I go quite often. Unfortunately, I have to go out there about every August 13th. In my previous life I was a (inaudible) staff officer for the Payette National Forest, and we actually had a helicopter crash right at the mouth of the East Fork of the South Fork right on the road there. So that's hollow ground for myself

and my fellow (inaudible).

So my concern, 9.6 cfs, that's a lot of water. I've looked at the flow levels from last summer, which was a higher flow year because of the amount of rain that we got. And there were a lot of times that that river was down into the lower teens, so you're talking a low river year you could or low water year you could totally dilute certain stretches of the river if that much water is drawn off, and so concerned about that obviously. Trout Unlimited's mission is the cold water species and protecting cold water habitat. And this is a big -- this winter mountain country is some of the best habitat going. Idaho can raise Salmon like nothing else. We just got to get them passed the dams, which is a whole other issue. But, anyway, so that's kind of where we're at as a chapter. Our folks are concerned about the mining -- not so much anti-mining but concerned about the adverse effects. And, you know, we realize that there probably is going to be benefit to the fish down the line, but that's 30, 40 years from now. And we got to get the fish to there, and that's the challenge. So with that, thank you very much for the opportunity to testify, and if you have any questions, by all means.

HEARING OFFICER: Okay. Any questions?

MR. WATKINS: None.

HEARING OFFICER: Hearing none, thank you, Mr. Brown.



A. Thank you.

HEARING OFFICER: So we will move onto Michael Gibson, if he's still with us. I saw that he was on earlier.

MR. GIBSON: I'm here.

HEARING OFFICER: There he is. Okay. Thank you, Mr. Gibson.

MICHAEL GIBSON

after having been first duly sworn,

was examined and testified as follows:

MR. GIBSON: I do.

HEARING OFFICER: Okay. So then you can proceed. Thanks. We can hear you and see you.

STATEMENT

MR. GIBSON: Thanks. My name is Michael Gibson. I live at 1902 North 15th Street here in Boise, Idaho. Policy adviser for Trout Unlimited. Trout Unlimited is an organization of 350,000 members and supporters across the country with over 200 professional staff whose mission it is to bring together diverse interests to care for and recover rivers and streams so our children can experience the joy of wild and native Trout and Salmon. In Idaho we have over 3,000 conservation-minded anglers that are members of our group, and they make up nine chapters across the State of Idaho. I stand before you today to represent our membership and their efforts to conserve, protect, and restore Idaho's



native salmonoids and their watersheds. No one can argue fish need water to survive, not just water, but cold, clean water. As time to change progresses the availability of the proper habitat for Trout and Salmon diminishes, leaving high elevation habitat up the Middle Fork, Salmon thank you for (inaudible) East Fork, South Fork of the Salmon more and more important. In 2021 Trout Unlimited embarked on at least (inaudible). My organization designated priority watersheds in all the states where we work. It was a monumental task looking at species make-up, habitat, condition, future threats, volunteer support, funding availability, and other factors. The South Fork Salmon Watershed made this list. This watershed is important to our local chapter, which you just heard, as well as members statewide. This public land and accessibility make it popular -- a popular fisheries for our members and other anglers in the communities. Its location and habitat make it a strong hold for native Bull Trout, West Slope Cutthroat, Salmon, and Steelhead, and it has historic significance of the indigenous people of Idaho. For these reasons we ask the Idaho Department of Water Resources, take a very careful look at all water right permit applications, the applications for transfer and the application for exchange and proceed only if it can be shown that instream flows in the East Fork, South Fork, and the South Fork



Salmon will not be harmed. I appreciate the opportunity to testify today. I'll stand for any questions.

HEARING OFFICER: Thank you, Mr. Gibson. All right. So, Mr. Watkins, go ahead.

CROSS-EXAMINATION

BY MR. WATKINS:

Q. Mr. Gibson, how are you? My name is Elijah Watkins. I represent Perpetua Resources. Sir, have you --

A. Nice to see you today.

Q. Nice to see you. Have you been able to tour the Stibnite Gold Project site?

A. Yes.

Q. Have you been to the Yellow Pine Pit?

A. Yes.

Q. You're aware, aren't you, sir, that fish aren't able currently to move on their own volition above the Yellow Pine Pit; is that right?

A. Yes.

Q. Is Trout Unlimited in favor of fish being able to have volitional passage to the upper reaches of the East Fork, South Fork of the Salmon River?

A. Yeah, we support connective watersheds for sure.

MR. WATKINS: Thank you. That's all the questions I have.

HEARING OFFICER: Okay. Thank you, Mr. Gibson. So

that brings us to our last public witness, who is Nick (inaudible). I apologize if I'm saying your name wrong. Nick, if you're still with us. I saw that he was on earlier. You still see him on?

FEMALE SPEAKER: Yeah, he's there.

HEARING OFFICER: Okay. So, Nick, if you would unmute yourself.

MR. KUNATH: Can you hear me?

HEARING OFFICER: There we go. Yeah, if you just start talking, bring you up.

NICK KUNATH

after having been first duly sworn,

was examined and testified as follows: I do.

HEARING OFFICER: Oh, there you are. Okay. Now we can see you and hear you. Go ahead.

STATEMENT

MR. KUNATH: My name is Nick Kunath. I live at 403 Floyde Street in McCall, and I'm here, I guess, representing myself certainly and also am a conservation program manager at Idaho Rivers United. So first, I guess, thank you for the timeline, myself and others here today that reach out and provide some additional insight into water rights case in the East Fork and South Fork and the South Fork itself further downstream are truly special places. And as you heard could be why we are all here today. Unfortunately



places like East Fork and, you know, the south Salmon itself are disappearing or being changed beyond recognition. And I hope what you are hearing today is (inaudible) taken to insure that this one is not another one of these areas that is lost. And not only for those of us who look forward to returning every year, but for those who have yet to experience how special a place the East Fork is and surrounding watershed.

When I first moved to Idaho the very first weekend I was here my boss asked me if I wanted to go kayaking, and I immediately said, yes, not knowing where I agreed to go or what I had signed up for. (Inaudible) first place was (inaudible) choice and definitely realized how impactful this first trip to the East Fork would be for me. And driving (inaudible) summit down to the south Salmon to the East Fork drainage I felt like I was transported to what I imaged like driving around the high Sierras in California or other destinations that I had only seen in kayaking films or trip reports. Places that I have only dreamed of being able to paddle or kayak before that but only intensified (inaudible) the banks of, you know, what I can only describe as one of the cleanest rivers I had ever seen. I moved to Idaho from the Midwest. Went to college on the shores of Lake Superior and (inaudible) deep connection to that great body of water (inaudible) know what clean water looks like,



but being on the banks of the East Fork and seeing this amazing cleaner whitewater, these big granite boulders provide some of the whitewater ever paddled. Paddled to something that I'll never (inaudible). And from that time I knew it was a special place and, be frank, I've filled much of my life both professionally and personally around the ability to be able to return to the East Fork and South Salmon canyon. And it goes beyond just hiking to me. (Inaudible) weekends when I head up to Yellow Pine, East Fork to paddle with friends and maybe get a few laps in (inaudible) majority of my time sitting on the banks of the river fishing, just enjoying this place that means so much to me, and it's something that, you know, I can't overvalue. And I know others feel the same way. Yellow Pine is not an easy place to get to and as someone fortunate enough to live in McCall, I find myself playing host pretty much every summer to friends who are joining me from, you know, outside of the state, across the country, frankly, who come up every summer to paddle East Fork of the South Fork and the South Salmon. And whether it's, you know, folks that (inaudible) or have just heard about it from myself or others, that it's a true destination for whitewater boaters and it's vital to part of the recreational economy that is so vital to Idaho. And, you know, I'm here today appearing for myself, but I'm confident if you were to ask any of the hundreds of folks



who have had the privilege of paddling the East Fork and South Salmon every summer, they all have similar remarks truly how special in nature this area is. And whether it's the opportunity to see nature or (inaudible) wildlife, crystal clear waters or having, frankly, some of the best whitewater in the lower 48, it's truly unparalleled. And, yeah, it's just a very special place, and the whitewater (inaudible) kind of highlights that as well. Idaho is home to (inaudible) of whitewater. We are so lucky to have so many rivers in the state that are all within reasonable drive but even because of that, even if we all had our options, I know myself I would still pick the East Fork everyday if I had the option to. And (inaudible) as long as I'm able to, and, you know, to be able to return to the East Fork and South Fork and South Salmon and enjoy it as long as I can, the way I've come to know it. I appreciate your time.

HEARING OFFICER: Thank you, Mr. Kunath. It sounds like Mr. Watkins has a few questions for you.

CROSS-EXAMINATION

BY MR. WATKINS:

Q. Mr. Kunath, good afternoon. My name is Elijah Watkins. I represent Perpetua. You are a conservation associate at Idaho Rivers United; is that right?

A. Correct.

Q. At Idaho Rivers United you work closely with the Idaho Conservation League?

A. Yeah (inaudible).

Q. And you work closely with Save the South Fork Salmon River?

A. That's right.

Q. And when you say you work closely on certain projects, you work closely on this specific project regarding Perpetua's opening of the Stibnite Gold Project; is that right?

A. Yes.

Q. I believe on October 31st, 2022, you sent a joint letter to Linda Jackson of the Payette National Forest that was co-signed by John Robison, the public lands director at Idaho Conservation League and Fred Corriel from the Board of Directors of Save the South Fork Salmon, Inc. Do you recall sending that letter?

A. I would need to know the contents, but we've sent plenty of letters together jointly regarding the Stibnite Gold Project.

Q. You've --

A. I can't tell you exactly what that one was.

Q. And I appreciate that. So you've worked closely with two of the Protestants multiple times to oppose the Stibnite Gold Project?



A. That's correct.

Q. Fair to say that there's nothing I could say or show to you that would convince you that Perpetua should be granted a water right in support of the Stibnite Gold Project; is that fair, sir?

A. As the project's currently designed, as I understand it, no, I'm not, you know, opposed to mining in general or -- I think beyond convincing, but from what I've seen of this project I don't believe it should move forward as currently presented.

MR. WATKINS: Thank you, sir. That's all the questions I have.

HEARING OFFICER: Thank you, Mr. Kunath. So that concludes public witness testimony, unless I've missed anybody. If I have, speak now. I don't see anybody online or in the room saying so. All of you, thank you for your time. You're welcome to stay with us as long as you would like. We're going to jump right back into the nuts and bolts of this hearing. Otherwise, you are free to leave, too. So maybe I'll turn to the attorneys for the Protestants and ask, where are we going from here, who are we calling next?

MR. LOPEZ: Thank you. Officer Cefalo, the Nez Perce Tribe now calls Dr. Kendra Kaiser.

HEARING OFFICER: Okay.



KENDRA KAISER

after having been first duly sworn,

was examined and testified as follows:

MS. KAISER: Yes.

HEARING OFFICER: Have a seat. And, Mr. Lopez, you're going to direct examination so you can proceed when you're ready.

MR. LOPEZ: Thank you. Thank you, Officer Cefalo.

DIRECT EXAMINATION

BY MR. LOPEZ:

Q. Good afternoon, Dr. Kaiser.

A. Hi.

Q. Can you please state your name for the record and spell your name?

A. Kendra Kaiser, K-e-n-d-r-a. Kaiser is K-a-i-s-e-r.

Q. Who are you testifying for?

A. The Nez Perce Tribe.

Q. And what is your area of expertise?

A. I'm a watershed hydrologist.

Q. Will you please describe your educational background.

A. Sure. I received my Bachelor of Science from Montana State University in Soil and Water Science and Environmental Biology. I did undergraduate research there and then proceeded to do my Ph.D. at Duke University looking



at physical watershed hydrology and catchment in Montana, and then I moved to Idaho and did a post-doctorial research fellowship with Dr. Laejo (phonetic) Flores who is a high resolution large scale hydrologic climate modeler, where I proceeded to do a lot of different types of hydrologic modeling, and then I -- so, you said just educational background, not current job.

Q. That's okay, Dr. Kaiser. You were describing your educational and professional background.

A. Yeah. Yeah, so after finishing my post-doctoral research I then moved into a research faculty position at Boise State, and in that position I've kind of focused in on hydrologic modeling, data visualization, how we use diverse datasets to inform decision-making, and a variety of other questions that are informed by various stakeholders that I engage across the state, including irrigators, state agencies, and federal agencies.

Q. Thank you. Please describe the topics of any publications that you have authored.

A. Well, I've written over 20 papers that are peer reviewed, so I won't bore you with all of them, but they include a variety of statistically based modeling, some physically based hydrologic modeling. I have authored seven papers with colleagues from the Dry Rivers Research Coordination Network on low flow regimes and dry rivers,

both here in the United States and globally and a variety of papers around data acquisition and increasing accessibility and reusability of hydrologic data.

Q. Have you ever previously testified as an expert in a judicial or administrative proceeding?

A. I did recently.

Q. And what was that proceeding?

A. It was between South Valley Groundwater District. I think Gallina Groundwater District, and then Irrigation Canal Company vs. the Cities of Hailey, Bellevue, Ketchum, and I think Sun Valley Corporation or something like that.

Q. And do you recall the date of that proceeding?

A. It was in October.

Q. October of?

A. This year.

Q. 2023?

A. Yes, October of 2023.

Q. And what was your role as an expert in that proceeding?

A. I was an expert witness for South Valley Groundwater District and the irrigators, and my role was to write an expert report about the hydrologic connectivity between the Big Wood River and Silver Creek.

Q. And on whose behalf did you participate as an expert in that proceeding?



A. The irrigators, South Valley and Gallina.

Q. And did you provide an expert report?

A. I did.

Q. And what was the conclusion provided in your expert report?

A. That case is actually pretty straightforward, and so the conclusion there was that the -- there's a hydrologic connectivity between the upper reaches of the Big Wood River and Silver Creek because of -- effectively the cities are interested in pumping groundwater in the upper reaches. And so using data and hydrologic modeling I -- my conclusion was that the Big Wood River is connected to the groundwater up in those upper reaches and via that connection the Big Wood River flows are also hydrologically connected to flows in Silver Creek.

Q. Thank you. And what is the purpose of your expert testimony in this proceeding?

A. I was -- the purpose of me doing this was to review and evaluate Perpetua's water rights and the associated impacts on stream flows in the East Fork, South Fork River and to evaluate the modeling that they did that simulates the natural flow conditions so that we could understand those impacts.

Q. Thank you. I'd like to now point you to Exhibit 215. If we can please pull up 215. Dr. Kaiser,



what is Exhibit 215?

A. It is my expert report.

Q. And you're familiar with the contents of that report?

A. Yes.

Q. You're the author of that report?

A. Yes.

MR. LOPEZ: Officer Cefalo, I move now to introduce Exhibit No. 215 into the record.

MALE SPEAKER: No objection.

HEARING OFFICER: Without objection, Exhibit 215 is admitted.

Q (By Mr. Lopez) Thank you. So let's turn to your report, Dr. Kaiser, in this proceeding. I would like to walk through that report with you. Can you please describe your process of how you approached evaluating Perpetua's water right applications and proposed water right conditions on surface and groundwater flows?

A. Yeah. So I reviewed as many of the materials as possible that were submitted by Perpetua in the disclosure, and in that I reviewed figures and discussions throughout, as well as the scientific literature around flow conditions in Idaho, projected changes into the future as a function of climate change. I did some analysis on U.S.G.S. data from



the study area, and then I also did some analysis on some of the model output from Perpetua's reports.

Q. And can you please describe the sources you consulted in preparing that report?

A. So those sources are a bunch of the disclosures that were provided, the scientific literature, and then U.S.G.S. data. And I also, in my expert report, I also used data from a publicly available dataset about climate change impacts. These were produced by Dr. John Abatzoglou.

Q. Were there any sources you were unable to consult in preparation of the report?

A. Yeah. There's data -- there's model output data that Perpetua provided in the appendices of the report. So this is all in pdf format, and so in order for me to really evaluate and confirm some of the figures and analysis they had, it would have been really useful for me to actually have all that data and in machine readable format so I could easily code and evaluate it on my own. And I did receive some of that data, but it wasn't until the middle of August so by the time that the expert report was due I had a pretty short timeframe to use it.

Q. And why would having access to that data for your report been useful?

A. The main thing is that some of the -- some of the figures that were generated in the report made it really

hard for me to evaluate the impacts of their -- both the impacts of the proposed water right on flows in the East Fork, South Fork from their simulated model runs, as well as, you know, just low flow conditions and other statistics that I was interested in looking at.

Q. Great. Thank you. Dr. Kaiser, let's turn to the conclusions in your report. Can you please summarize those conclusions for us?

A. Yeah, for sure. I think the first really big one that's been brought up this week is that the point of quantification that Perpetua proposes in their proposed water right condition is inappropriate.

Q. And can you please explain the analysis supporting your conclusion in this report?

A. Yeah. So when I was thinking about the point of quantification, I needed to understand how that point of quantification and the associated withdraws would impact flows on the East Fork, South Fork. And so in my report I created a table to do that, and I actually can demonstrate how I did that analysis to help clarify that, if that's useful.

MR. LOPEZ: Officer Cefalo, at this time I'd like to pull up some demonstrative slides to assist Dr. Kaiser with her testimony with her explanation of the analysis supporting the conclusion. I'm not seeking to introduce



this information to the record. It's just for demonstrative purposes only.

HEARING OFFICER: That's fine. Go ahead.

MR. LOPEZ: Thank you.

Q (By Mr. Lopez) Thank you. Dr. Kaiser, did you prepare this graph?

A. I did.

Q. And you're familiar with the content of this graph based on your expertise as a watershed hydrologist?

A. Yes.

Q. What is the purpose of this demonstrative graph?

A. Yeah, so we've heard -- we heard earlier in the week from Perpetua that the point of quantification was actually quite easy to understand the impacts on the East Fork, South Fork, so I wanted to show, one, that it might not be as easy as they suggested; and two, how I came to the conclusions that I have in table 3 of my report.

Q. And so let's walk through your analysis here. What are we looking at here? What is this graph?

A. So this graph is just showing one year of data that I pulled out, which is 2015. It was the year that was shown in Perpetua's report when they were explaining their water right condition earlier this week. And on the X axis it's just showing effectively the day of the year. And the Y axis is showing the proportion of the flow at the point of



quantification that's coming from the East Fork, South Fork. And so down in the bottom right I just wrote out that equation, so the Y axis is the East Fork, South Fork above Sugar Creek, plus Sugar Creek flows, so that you can get an idea of what the total flow would be at the confluence. Then divided by the East Fork, South Fork, so you can get a proportion. And then in the top right I just have a bar flat showing the total acre feet of water coming out of the East Fork, South Fork for the period of record. And on there you could see that 2015 is like near the low end, as they said earlier this week. And so the green line is showing 2015. And you can see that the proportion of flow that comes into the POQ is variable. So in this year in particular it can range anywhere from 45 percent up to like 65 or 67 percent, and that variability not only has a wide range, but it's quite variable, you know, from month-to-month, for example.

Q. Thank you. And just to clarify, what data are you using here to develop these graphs?

A. This is U.S.G.S. data.

Q. U.S.G.S. data --

A. This figure is U.S.G.S. data from the East Fork, South Fork above Sugar Creek.

Q. Have the next slide, please.

A. So --



Q. And what is this addition to the graph?

A. Yeah, I just wanted to show a couple other water years to explain what this variability looks like from year to year. So this is showing 2021, which is the lowest water year on record, which was 2021 was actually quite a bit lower than 2015, and you can see that the pattern in the proportion changes. So that's the main takeaway is that this proportion is not consistent through time, as was suggested earlier in the week, and then I also included -- you can show the next slide which is the average water year. And so, again, even on an average water year the contributions from the East Fork, South Fork can drop down to, you know, 42, 43 percent of the total contribution. And then these three years I just wanted to pull out for demonstration, but then if you advance you can see all of the water years, and it's quite variable through time.

Q. Thanks, Dr. Kaiser. And how do these graphs here illustrate the analysis you performed in your report?

A. Yeah. So in table 3 of my report, I had to make an assumption about what proportion of the East Fork, South Fork was being contributed to the point of quantification to evaluate the potential impacts of the water right, and so I took an average of this, which is about 60 percent. And I can actually walk you through how that 60 percent goes into the analysis that is shown in table 3.

Q. Next slide, please.

A. All right. So this is just that same figure. It's showing the average of 60 percent.

Q. Next slide.

A. All right.

Q. So what is this table here?

A. Yeah, so this might be hard for us. I can barely see it, but what this is showing is how we can go about figuring out the impact of the East Fork, South Fork based on the water right condition that's been proposed. So the first column is showing the total flow at the point of quantification for a range of flow values from 11 cfs up to 40. And you can see there that 25 cfs is highlighted in green. The next column is just taking 80 percent of that flow. So in the water right condition they say they can only take 20 percent of the flow once it drops below 25 cfs. And then the third column is showing the difference between those two columns, which would be their max net diversion. So above 25 cfs they can take up to 9.6 cfs instantaneously and below 25 cfs then the proportion or the amount that they can take is -- decreases through time.

Q. Thanks, Dr. Kaiser. And so, you know, based on this demonstrative illustration you did, what is the significance of this? What should we take from this?

A. Well, if you advance once more you can see that



using the assumption of the East Fork, South Fork contributing 60 percent of the flow, this water right condition does not protect flows in the East Fork, South Fork even up to or above 31 cfs at the point of quantification. And so the colors that are highlighted on the slide are showing the values that have dropped below the historical minimum that have been on record from the East Fork, South Fork. You can also see that once you do drop below that 25 cfs threshold, that even with that threshold when the East Fork is contributing 60 percent of the flow, you're dropping below those historical minimums once the point of quantification is about 23 cfs. And then, importantly, because we saw that variability in the previous slide, you can advance once more -- and I did the same thing with a slightly lower proportion, and you can see that it protects even less of the flow conditions in the East Fork, South Fork by using that point of quantification.

Q. Thanks, Dr. Kaiser. So based on this demonstrative here and the conclusions reached in your report, do you have any recommendations regarding Perpetua's point of quantification?

A. I think the point of quantification should be proximal to the point of diversion. That allows you to evaluate the direct impacts on the East Fork, South Fork, and if there needs to be, you know, we know that there's



going to be impacts on Sugar Creek and there's going to be impacts higher in the system, having a point of quantification that's associated with the specific reach would really benefit our ability to assess the availability and impact on water resources in the watershed.

Q. Thank you. Anything else about that conclusion?

A. I think, you know, there are a lot of examples across Idaho of how we monitor water rights, and there are places where having points of quantification far away from where things are getting diverted makes it really tricky for people, including the irrigators in the cases that I've worked with, to really monitor and maintain expectations about flows.

Q. Thank you. Let's go ahead and move onto the next conclusion in your report. And what is that next conclusion?

A. I think the next one was about -- is about how Perpetua is modeling their low flow conditions. So I was trying to see if I could find where -- I think, actually, maybe it's the next one is about their -- even with the water right condition in place, Perpetua will be creating particularly low flows in the East Fork, South Fork.

Q. Okay. Does this relate to the instantaneous use or --

A. Yes, this is instantaneous.



Q. Okay. So let's please turn to table 3 in pdf page 14 of your report, please, Dr. Kaiser. And can you please tell us what this table is?

A. So this table is showing some exceedance flows in the East Fork, South Fork above Sugar Creek, and I chose this location because it is directly downstream of their surface water point of diversion and it's easier to focus on one gauge than all of the gauges at the site. And here what I have done is I have calculated exceedance flows that have come out of the simulated mining results, so both the simulated stream flows that would occur for mining, as well as the simulated stream flows if the mine did not occur based on their calibrated SHSM model. And then I included exceedance flows based on daily historic observations from the U.S.G.S. gauge, and then the associated impact if they were to use their full water right, and then the impact of their full water right with condition when the flows are at those exceedance values. And then I also included the historic minimum for reference.

Q. Thank you. And did Perpetua's experts have any concern with the analysis reflected in their rebuttal report?

A. Yes, they have two. One was that here I was showing 10.43 cfs, and as they have stated this week, that the maximum withdrawal would actually be 9.6. So that was

the first one. And then the second one is that in here the historic observations that I've shown from the U.S.G.S. or those exceedance values were calculated off of daily averages and their results are monthly averages. And so comparing those two values is challenging.

Q. And does using the 10.43 cfs rather than 9.6 cfs in your analysis affect the result in your analysis?

A. No, it does not affect my conclusion. The only time the difference between those values actually impacts this table is in May and June during high flow events when they would actually be able to take the full water right because all of these numbers are low flow exceedance probabilities.

Q. And you also mentioned a concern about daily average and compared to monthly average. Can you expand on that?

A. Yeah, for sure. So their model output is all monthly, which we've also heard this week. I've pulled daily data from the U.S.G.S. standard mechanism to calculate exceedance flows and so the more appropriate thing would be to use monthly averages from the U.S.G.S. record to compare to their monthly values to do those exceedance comparisons. And I did redo that, and the conclusions are also the same.

Q. Thanks, Dr. Kaiser. Let's go onto the next conclusion in your report. Can you please describe what



that conclusion is?

A. Another conclusion is the fact that their simulated stream flow values in their model do not sufficiently capture low flow conditions that have been observed in historical record.

Q. Okay. So let's unpack that a little bit. Let's start with defining the low flow period. What is the low flow period?

A. The low flow period is pretty consistent in intermountain west but if I can show a figure then I can just demonstrate on a hydrograph.

Q. This is the same demonstrative slide as previously shown?

A. Yes.

Q. Can we pull that up? And remind us again what this graph is.

A. So this is a graph of stream flow from the East Fork, South Fork above Sugar Creek. On the X axis is the day of year, and on the Y axis is stream flow and cfs using a log scale.

Q. And how does this graph illustrate the conclusion in your report that you reached regarding -- or any concluding that Perpetua's SHSM simulations do not capture low flow conditions with respect to the historical record?

A. Yes. So in this figure I'm showing the hydrograph



of 2021 is the lowest water year, and at multiple times, both in the rebuttal report to me and throughout this past week, they have articulated that the low flow period or the base flow period is from November to February. And in their model calibration statistics they also only show those calibration statistics from November to February. And you can clearly see in this figure that the hydrograph drops down into its low flow conditions, which is around 10 cfs, starting in the end of August in this low water year. And on top of that, something that they know about the system because they've shown it in their climate model like their climate scenarios, is that there's participation that starts falling in October and November. And so oftentimes we actually have higher flows in October and November after the lowest flow period of the year. And since this is the lowest water year I also added on some additional years just for comparison. So 2015 is the green line, and that is showing another low water year. And you can see that it also reaches into that 10 cfs range in, it looks like, September, and it maintains until about October when you start getting some of those precipitation events. And then here is an average water year, so you can see in 2022 flows were higher throughout the summer, and then it drops down. And we still get, you know, a window in there that there's low flows before there's precipitation events start



occurring again.

Q. Thank you. And, Dr. Kaiser, can you please walk me through the analysis in your report highlighting any assumptions that you had to make regarding this specific conclusion?

A. Well, in my report I had to evaluate -- what I was trying to do was evaluate how well their model was capturing those low flow periods because it's not shown in any of their calibrations statistics, and so since they're only showing from November to February and I know that, you know, September and maybe even as early as August and October can have low flow conditions, then what I did was I used the data that we did eventually receive from that to evaluate the differences between the historical record and their simulated no action model output. And I had to do analysis on this because it's really -- it's really hard to interpret this from the figures they show in their reports, and it would have been great to have had their appendix A, which was a different appendix in that report that showed the calibrated time period and the historical records, so I could directly compare those statistics, but I didn't have that available. And so I used the simulated future conditions based on their assumption that those future simulated conditions are representing the historical conditions.

Q. Thank you. Let's move to why evaluating models throughout the year is important. Can you please explain what led you to this conclusion?

A. Well, when we are calibrating any kind of hydrologic model it's quite important to evaluate it throughout the year. The reason why it's important throughout the year is because the hydrologic processes of interest and that are dominating are variable through time. And so during the snowmelt period you're going to have a lot of water moving through the system and how that's working in comparison to low flow times of the year late in the summer when you have high (inaudible), there's like disconnecting hydrologic flow paths, those all look very different than wintertime conditions when the system is kind of like shut down because the vegetation isn't turned on and evaporating. So evaluating your model throughout the year is a common standard practice in hydrology. That way you can evaluate how well it's actually capturing the hydrologic processes that are occurring.

Q. And was there a concern stated in Perpetua's hydrology rebuttal report about the conclusion you just explained to us?

A. Uh, I think one of them was that in the figures that are in my expert report, figures 3, when I did this comparison about the observed versus model exceedance



statistics, I used that U.S.G.S. daily data in comparison to the monthly data. And this -- you know, I should have -- I could use the U.S.G.S. monthly data. It would show the same results. The numbers would be slightly different, but when I doublechecked them, still significant. And also I think something that's really important to note about that is that when you take a monthly average, you are capturing the general conditions of the system, but you're not actually showing the reality of what the stream is experiencing under the true daily variation. And so when you calculate a monthly statistic, particularly when we're talking about low flows, those are going to be higher than the true variability and exceedance probabilities that come from a daily value.

Q. So even though you calculated a daily average rather than a monthly average, your analysis still stands?

A. Yes, it does.

Q. Are there any other points that you would like to add about this particular conclusion?

A. I mean, I think the big thing is that it would have just been great to have all of the data from the beginning so that I would have had more time. I could have made a lot more figures that they showed in their reports, and so that was definitely a limiting factor to being able to insure that I had dotted my I's and crossed my T's.



Q. Thank you. Let's move to the next conclusion regarding groundwater models. Did you also look at the details of Perpetua's constructed groundwater models?

A. I did. I reviewed Perpetua's groundwater model reports, and then I also reviewed BAS' comments about their groundwater modeling as well.

Q. And what were your conclusions there?

A. The main takeaways from that is that there's a variety of structural components about their modeling that I had questions about and concerns about. Some things like they had a (inaudible) water level or water-head in the streams which would modify how surface water, groundwater interactions occur, and a variety of other small things that I summarized in my report. And I believe BAS has also commented on.

Q. Thank you. Let's move to your next conclusion. I believe you reached a conclusion about climate change. Can you please describe that conclusion to us?

A. Certainly. So in the Pacific Northwest we will continue to see change in stream flow conditions due to climate, and in Perpetua's sensitivity analysis, which I reviewed, they state that they did a sensitivity analysis to evaluate potential impacts on climate, but when I reviewed this material they only modified the total amount of precipitation, and they did not include any changes in



temperature. And this is actually quite problematic because that temperature component does impact the way that snow accumulation and melt occurs, and it's a big driver of how late season low flows occur. And so that was -- that's quite a big problem for using that analysis.

Q. Thank you, Dr. Kaiser. Did you do any climate change analysis in your report?

A. I used data from that publicly available dataset that I talked about. It's produced by John Abatzoglou and his team. He used to work at University of Idaho. He's created this really phenomenal resource that has data and projections from an ensemble of 10 different climate models. And so what I did was I used their tool that's publicly available, and I created figures in my report showing both the anticipated changes in participation. And I also show in here of (inaudible) which is a reflection of changes in temperature. But in this case the (inaudible) is like directly tied into how we think about water movement in the system. And then I also used that same tool to evaluate how stream flow in a nearby system, which is Johnson Creek, will change into the future.

Q. Thanks, Dr. Kaiser. Is there anything else about the climate change analysis or conclusion you would like to explain from your report?

A. The main thing is that I somehow missed to include

the legend on figure 2, and so this is showing three different time periods which are listed in the caption. And so the historical conditions are in red, and they are from the timeframe for this site was 1950. And then this goes through 2023. And then the next time period is 2024 to 2044, which is green, and then the farthest out window which is 2045 to 2100 which is in (inaudible).

MR. LOPEZ: Thank you for that clarification. Officer Cefalo, I have no further questions at this time.

HEARING OFFICER: Okay. Thank you, Mr. Lopez. Mr. Watkins, would you be handling cross-examination?

MR. WATKINS: I will be.

HEARING OFFICER: Okay.

CROSS-EXAMINATION

BY MR. WATKINS:

Q. Ms. Kaiser, good afternoon.

A. Hi. Good to see you again.

Q. Good to see you again. You and I, we met at the October site inspection, right?

A. I think it was August.

Q. August. August, October, same thing. August. It's nice to see you again as well. I think you said that you recently finished off some work, expert work, on the Big Wood River Project; is that right?

A. Yeah, on -- it was about Big River.



Q. You worked with the irrigators?

A. Yes.

Q. Okay. And I think you said that was a simple and straightforward case, and so you were able to find for the irrigators in that case; is that right?

A. Yep.

Q. Would you -- would you consider this case to be a simple or straightforward case?

A. I think that the statistics that I used to evaluate the impact of the water right on flows in the East Fork, South Fork are straightforward. Certainly there's a lot of complexity with all the modeling that goes into Perpetua side of things, but when you are just looking at the statistics from hydrology, it's pretty straightforward.

Q. You're an associate research faculty member at BSU; is that right?

A. Yeah.

Q. When did you start that?

A. I transitioned in faculty position -- into my faculty position in 2019.

Q. 2019. Prior to 2019, I'll just ask it this way: Have you ever developed a groundwater model for an industrial or municipal project?

A. No.

Q. Have you ever developed a surface water model for



an industrial or municipal project?

A. No.

Q. Have you -- whether you've developed it yourself, have you ever implemented a surface water or groundwater model in a real world industrial or municipal project?

A. No.

Q. How familiar are you with Idaho Water Rights Administration?

A. Uh, I have become pretty familiar, I believe, through my experience since being in this position. One of my big goals for my research program is to create data analytics and modeling (inaudible) people that are using water across the State of Idaho and the Pacific Northwest, ideally in the entire Western United States as well, and part of being able to do that is understanding how water rights work. And some of the projects that I work on are directly related to water rights and how they're administered and how we can use hydrologic data to support people that are trying to make decisions based on their water rights and (inaudible) in a given system.

Q. In your work on this case, have you learned and discovered things about Idaho Water Rights Administration?

A. Uh, I don't know if I've learned anything new about administration that I didn't already know.

Q. Have you ever worked directly on an Idaho water



rights issue?

A. Yes.

Q. That's the Big Wood one?

A. Yeah, the Big Wood, the modeling that I'm doing over there is all about water rights.

Q. Have you ever filled out or submitted a water rights application?

A. No.

Q. I want to talk -- you mentioned a couple times during your testimony about data or information that you wish you would have had or at least wish you would have had sooner. Do you generally remember talking about that?

A. Yeah.

Q. Perpetua did send you an Excel spreadsheet of the data you requested; is that right?

A. They sent some of the data. We asked for the data in the appendices, and we received some, the appendix B data.

Q. Do you know what the scheduling order in this case provided in terms of the timing of documents to be exchanged?

A. I don't know any of that stuff.

Q. So you don't know if Perpetua complied with the scheduling order as to when to produce discovery in this case?

A. No, but I mean, the data was not available at the beginning when I was reviewing the documents. So I don't know how that is differentiated.

Q. Did you have the data that you -- strike that. Do you know what the dates are from when you requested the data to when Perpetua produced the data to you?

A. I think we requested in early August, and we got it in the middle of August, but I don't know the specific dates.

Q. You relied on some of the work by Betsy Semmens for her groundwater research; is that right?

A. That's correct.

Q. And I think you even attached Ms. Semmens' research as appendix C to your report?

A. I did. I did append it. I don't know which one it is, but it's in there.

Q. Fair to say if there were any errors in Ms. Semmens' analysis, that might flow through and impact your analysis?

A. Well, the -- I was evaluating -- what I did was I looked at her report to see some of the things that she highlighted, and then I looked at -- then I went into Perpetua's modeling output and evaluated that on my own to confirm.

Q. Can we show you Exhibit 215? And I believe this is



your expert report.

A. Uh-huh (affirmative).

Q. Could we go to page 3, please, and page 3 lists your various conclusions. Let me blow it up.

HEARING OFFICER: Pdf.

Q (By Mr. Watkins) Page 3 of the pdf. My apologies.

A. So it's page 2.

Q. Page 2 (inaudible). Does that appear to be a list of the various conclusions you reached in your expert report?

A. Yes.

HEARING OFFICER: And there is a conclusion on page 1, too.

Q (By Mr. Watkins) Correct.

A. Yeah.

MR. WATKINS: Ms. Franolich, can we blow up the third black bullet point? Actually, can we look at the fourth one, Ms. Franolich? Sorry.

Q. (By Mr. Watkins) It says: Due to Perpetua's failure to account for climate change there could be less water in the East Fork, South Fork River during low flow and less groundwater than Perpetua has predicted. And they could have under-predicted the amount of time it will take for groundwater levels to rise. Did I read that correctly?



A. Yep.

Q. In fact, Perpetua did account for climate change; is that right?

A. They did not account for it correctly.

Q. Can we show you Exhibit 45? Exhibit 45 is a copy of the surface water hydrology report. Have you seen this before, ma'am?

A. Yes, I have.

Q. Can we go to page 165 in the surface water hydrology report? And in the service water hydrology report, if you'll go to page 195, Ms. Franolich.

A. What page? 145?

Q. We're going to get -- what page do you have? That's not it. We'll get it for you in a second. There it is. Looks like page 191, and what's the bates number on that? I can't see it.

FEMALE SPEAKER: 6105, but she goes by the page number at the bottom.

Q (By Mr. Watkins) Exhibit 45, page 191.

A. 191?

Q. All right. There we go. We made it. My apologies for that. Section 9 of the surface water hydrology report is titled climate change; is that right?

A. Uh-huh (affirmative).

Q. And that section goes from 191 to 195; is that



right?

A. Yes.

Q. Now, on the stand today I believe your testimony is that Perpetua did not properly account for climate -- or properly analyze climate changes you would have liked to see. But in your report you talk about Perpetua simply not doing climate change; is that right?

A. Uhm, no. In my report I specifically said how Perpetua analyzed climate, which is that they modified the total amount of precipitation that might come into the system by showing a higher total annual precipitation and a total lower precipitation and they did not account for any temperature change effects.

Q. Could we go back to Exhibit 215, page 3, please, and we'll look at the fourth bullet point again. It says: Due to Perpetua's failure to account for climate change there could be less water in the East Fork, South Fork Salmon River, and then it goes on. Did I read that correctly?

A. You did.

Q. Okay. Can we look at Exhibit 27B, please? This is the site-wide water balance sensitivity analysis.

A. Yep.

Q. And if you'll go to page 11, do you see there at the top where it says climate change sensitivity?

A. Yep.
Q. And, in fact, I think there was a conclusion reached in that. Ms. Franolich, if we could go to page 16, the same document. And if you look at the second paragraph, the first sentence, please.
A. Uh-huh (affirmative).
Q. There it is. Second paragraph, first sentence it reads: Based on climate change sensitivity results, the water management facilities modeled with the site-wide water balance would be adequate for the range of considered potential climate change conditions. Did I read that correctly?
A. You did.
Q. In your analysis you looked at climate change models from 2024 to 2044 and from 2045 to 2100?
A. Correct.
Q. And that, I believe, were those multicolored graphs. I think there's a green and a blue and a red on there?
A. Yep, uh-huh (affirmative).
Q. And you forgot to include the legend, but you explained that on the stand today?
A. Yes.
Q. You understand that Perpetua will need a greater amount of water during the first four years of its mine



life?
A. Yes.
Q. That's when it's charging the mill and before the tailings storage facility comes fully online?
A. Yes, I understand.
Q. And once the tailing storage facility comes online 80 percent or more of the water for operations will come from that facility, not from a water right. You understand that as well?
A. I can't recollect it right off the top of my head, but there's a lot of complications for how you guys and when you will pull water, importantly, in my analysis. I'm evaluating the impact of the water right as written, which has no clarification on where the water will come from, from where and when. And so all of my impact analysis is based on the instantaneous impact, which as I heard earlier in the week, can occur from the use of the full water right can be from one to three days, and a three-day impact on the system would result in what I've shown in table 3. And so whether or not it's beginning, middle, or end of mine life, it is not reported in the water right itself.
Q. You would agree that the first four years of Perpetua's operation will not be in 2044?
A. Hard saying, not knowing.
Q. Would you agree that Perpetua's first four years of



its mine life will not be in the year 2100?
A. It seems unlikely.
Q. Are you able, as you sit here today, to quantitatively determine a downward trend in the East Fork, South Fork of the Salmon River that can be wholly attributed to climate change?
A. Can you repeat that again?
Q. Sure. Are you able, as you sit here today, to quantitatively determine the downward trend in the East Fork, South Fork River that can wholly be determined and attributed to climate change?
A. In the historical record?
Q. No, empirically.
A. Are you saying so from the historical record?
Q. However you would do it in your profession.
A. Yeah.
Q. Can you today say determinatively in a quantitative manner what will happen to the East Fork, South Fork of the Salmon River?
A. Well, the methods that we use in hydrologic research are quite a few, and it's common when we do this is we use observational records when available. And when they're not available we use approximate sites or sites that are close by. Sites that have longer term records, and we also use modeling to evaluate that. And the papers that I



included in my expert report, including the (inaudible) paper, the paper taking granted that Perpetua included in their rebuttal, they all show that there is a downward trend in late summer stream flows across the entire Pacific Northwest. And the statistically significant number, so quantitatively, there is statistics that show that that is a very common situation across the entire region. And with the historical record for the East Fork, South Fork at Sugar Creek, for example, that record is only 10 or 12 years long, which is not really long enough record to be able to base that conclusion on that site alone.
Q. Are you aware that the mine life is 14.25 years?
A. As written.
Q. Can you quantify how climate change will impact the East Fork, South Fork of the Salmon River over the next 14.25 years?
A. Well, when we look at the figure 3 in my expert report -- figure 2, excuse me, that is showing Johnson Creek, and Johnson Creek is a slightly larger drainage. But it is underlaid by the same Idaho (inaudible) so it's a (inaudible) geology with sandy, coarse soils, high elevation, snowmelt dominated. So for all intents and purposes it's a really good analogue for what will be occurring in the East Fork, South Fork. And on this figure, like I said before, the red is historical conditions. The

green is the next 20 years. And then the blue is out to 2400. So in my field using this analogue site is a good option, and that green line shows that the probability there being lower flows increases in the next 20 years.

Q. Not the next 14.25 years?

A. I did not use that timeframe because that is kind of a random number.

Q. Is there a consensus in the scientific community on how to adjust historical climate records to instead represent future climate change within the water models?

A. We don't adjust historical records. We model future conditions using the global climate change example like the global climate change models that went into this is a commonly accepted method across hydrology, as well as many other environmental resource -- research fields. And in this case John Abatzoglou is one of the most well-known climate scientists in North America. And he has published a lot of papers using the dataset that's gone into this analysis. And so I would say that there's consensus that the data that was used to develop this is appropriate.

Q. Is there consensus on the impacts of climate change on the East Fork, South Fork of the Salmon River in the scientific community?

A. There is consensus on impacts to stream flows across the entire Pacific Northwest of which the East Fork,



South Fork is within.

Q. You understand that the needs of mines fluctuate throughout the year in the life of the mine, right?

A. Yes.

Q. Mines might need more water at one point in operation versus another point of operation?

A. Uh-huh (affirmative). Yes.

Q. And you understand that Perpetua is not going to be taking 9.6 cfs every month out of the East Fork, South Fork of the Salmon River?

A. I do understand that Perpetua is not going to use the 9.6 24/7/365, and like I mentioned before, there is no details in the water right about when, how much, or where that water is coming from. So my impact analysis is based on instantaneous use of that water on flows in the East Fork. And so those exceedance probabilities are saying this is the statistically likely low flow, and if the stream was experiencing those statistically flows what would the impact of the water right be. In this case, like I mentioned, we've heard that instantaneous use could be up to three days, which is significant.

Q. And so you modeled the 9.6 cfs throughout the year?

A. No. I used it as an instantaneous -- I modeled it as what the instantaneous effect would be on the East Fork, South Fork.



Q. In every month?

A. Yeah. So if it were to occur in any given month what would the outcome be.

Q. Including low flow months?

A. Yes.

Q. Are you aware of any agreements that Perpetua is under that would prevent them from removing 9.6 cfs during low flow months?

A. Well, I believe the proposed water right condition is proposed, and so I don't know if that is finalized. But that would mitigate some of the water use in lower flow months, but it certainly does not protect the East Fork, South Fork from reaching historically low levels.

Q. You talked about your analysis that Perpetua analyzed monthly averages. You looked at daily averages in your report, but then since your report you've gone back and run those monthly averages; is that right?

A. Correct.

Q. And you said -- I think I got you right. You said the numbers are slightly different, but not enough to change your analysis?

A. Correct.

Q. Did you provide those slightly different numbers to the Hearing Officer or to any of the parties?

A. I can. I have them in that same slide deck that I



was showing you before, if you would like us to (inaudible).

Q. Do you believe that Perpetua should have modeled 10.43 as their flow rate and not 9.6 in August through March?

A. No. You all, in the rebuttal report, explained that 9.6 was the correct number, and so that's how I updated my analysis inline with that response.

Q. Okay. So initially in your report you said 10.43, but then you were corrected on the rebuttal?

A. Yes, and I also pointed out that in that table 3 the only two months where that adjustment would impact my results would be during the high flow months of May and June when we're looking at the water right condition because the water right is only applied in low flows.

Q. Now, I recognize and I think you testified earlier that you've never done this sort of modeling for industry or municipality for real world application, but flows aside are you aware that Perpetua doesn't have the capacity to manage 9.6 cfs of water continually?

A. That -- I understand that that's in the report, but it's not in the water right. And so there's no way for me to evaluate the impacts of that when the only way to evaluate is the full water right in the submission.

Q. And, again, you never filled out a water right application yourself?

A. No.

MR. WATKINS: That's all the questions I have. Thank you so much.

HEARING OFFICER: Mr. Lopez, if you have anything more.

MR. LOPEZ: No redirect, Officer Cefalo.

HEARING OFFICER: Okay, and I don't have any questions either. I appreciate your time.

A. Yeah, thank you.

HEARING OFFICER: Thank you. Why don't we go ahead and go off the record. Take a five-minute break here. People catch their breath and --

(Recess.)

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BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE STATE OF IDAHO

IN THE MATTER OF APPLICATIONS FOR PERMIT 77-14377, 77-14378, 77-14379, APPLICATIONS FOR TRANSFER 85396, 85397, 85398, AND 85399, AND APPLICATION FOR EXCHANGE 85538 IN THE NAME OF PERPETUA RESOURCES OF IDAHO, INC.,

TRANSCRIPT OF THE HEARING
HELD ON THE 15TH DAY OF DECEMBER, 2023

BEFORE: MR. JAMES CEFALO, HEARING OFFICER

TRANSCRIBED BY: KEITH EVANS, RPR, WA & ID CSR NO. 655



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BE IT REMEMBERED that the above-entitled matter came on for hearing December 15, 2023, at the Idaho Department of Water Resources, City of Boise, County of Ada, State of Idaho.

(Thereupon the following oral proceedings were had as follows, to-wit:)

HEARING OFFICER: Good morning. Welcome back. We are on the record. Today is Friday, December 15th, the fifth day of the hearing, and we are still receiving evidence from the Nez Perce Tribe. So, Mr. Lopez, I don't know if you or Ms. Rogerson -- okay, Ms. Rogerson, if you want to come forward and call your next witness.

MS. ROGERSON: Thank you, Mr. Hearing Officer. We'll be calling Ryan Kinzer to the stand.

HEARING OFFICER: Great.

RYAN KINZER

after having been first duly sworn,

was examined and testified as follows:

MR. KINZER: I do.

HEARING OFFICER: Okay. Have a seat.

MR. KINZER: Thank you.

HEARING OFFICER: Ms. Rogerson, feel free to proceed when you are ready.

DIRECT EXAMINATION

BY MS. ROGERSON:

Q. Push the button on your mic. Keep it close to you.

A. Keep it close. Sure.

Q. Thank you. Mr. Kinzer, good morning.

A. Good morning.

Q. Could you state your full name and spell it for the record, please?

A. Yes. Ryan Kinzer, R-y-a-n K-i-n-z-e-r.

Q. And could you introduce yourself, including your current employer and title?

A. Yes. I work for the Nez Perce Tribes Department of Fisheries Resources Management. I'm a fisheries scientist and a data analysis coordinator.

Q. And could you provide us with a brief overview of your academic background?

A. I have a Bachelor's of Science in Wildlife Resources from the University of Idaho, which I received in 2001, and a Master's in Applied Statistics from Colorado State University in 2014.

Q. And how long have you worked for the Nez Perce Tribe?

A. 22 plus years.

Q. And where did you start your fisheries career?

A. I started my fisheries career for the Idaho



Department of Fish and Game. I worked from 1998 to 2000 as a seasonal employee working at the McCall Fish Hatchery, and one of my primary duties was operating the adult Salmon trap on the South Fork of the Salmon River.

Q. And can you please tell us what positions you've held during your 22 plus years with the Nez Perce Tribe?

A. I started as a fisheries technician primarily in the field collecting all sorts of fish data that included -- included adult Salmon and Steelhead data and juvenile data across the South Fork Salmon River, including the East Fork, South Fork Salmon River and other drainages in Idaho on the Clearwater. I went from a fisheries technician into a fish biologist job in about 2003, I believe. At that time as the biologist I was supervising the field activities, and I was responsible for summarizing the data and conducting the analyses of that fish data that was collected in the field.

I believe in about 2010 I took a job as a project leader. That position was with the Idaho Salmon Supplementation Project. It was a collaborative project that included the Nez Perce Tribe, Idaho Fish and Game, Shoshone Bannock Tribe and the U.S. Fish and Wildlife Service. The project was evaluating hatchery supplementation effects across the State of Idaho. We used about 30 streams to do that. After that, I took a position as a research scientist. That duty primarily involved



providing statistical support and data analysis support to the fisheries staff and research division, and it supervised the reporting -- the reporting of our annual reports for all of our projects.

I later in my current position I took that in about 2020, and that job is to evaluate the effects of Salmon and Steelhead in the Snake Basin.

Q. Okay. Can you provide me with just a brief explanation of what your day-to-day tasks are in your current position?

A. Sure. I develop and implement statistical models to estimate abundance and fish survival across the entire Snake Basin. That includes the abundance of adults returning to the headwater streams and the survival of the juveniles going out to the ocean and evaluating the full kind of life cycle effects. One of my duties is doing preseason forecasts in about the late fall, early winter. We are -- we have to provide preseason forecasts of Chinook and Steelhead returning the following -- the next summer. Those numbers are used to set management targets and things throughout the year.

Additionally, I supervise two technical teams within the DFRM. One of them is called the adult technical team. It's really a group of fisheries biologists that we get together to collaborate and discuss various techniques



to evaluate fish and use in the best available science. The other one is focused on juveniles but doing the same thing.

Q. Okay. Great. And you just mentioned the acronym DFRM. Can you remind us what that means?

A. Yes, Department of Fisheries Resource Management.

Q. And that's the Tribe's fisheries department; is that correct?

A. That's correct.

Q. Given all the experience you've mentioned, can you just be precise and let us know if you have any experience analyzing fish habitat or fish passage?

A. Sure. I have experience using an intrinsic potential model. I've had multiple discussions and collaborated with the original author of the interior Columbia River Basin interior potential model. I've used that in some of my work. I've developed branch occupancy models which estimate the probability of fish returning to stream reaches in Idaho. I've also evaluated passage issues and impedence of Bull Trout in the Imnaha River. That was looking at whether Bull Trout were having difficulty passing the adult Chinook weir in the Imnaha and descending the ladder. And we are currently evaluating a passage issue in the South Fork Clearwater River which is a velocity barrier or presumed velocity barrier for Steelhead. So I've been analyzing that data.

Q. Great. And do you have any technical reports or peer reviewed publications to your name specific to fish habitat or fish passage?

A. Yeah. I've authored and co-authored multiple annual reports, you know, primarily summarizing the years' activities of fish data collection and abundance and survival of fish. I've authored or co-authored peer reviewed articles. Those relating to relative success studies which is used in genetics to conduct a parentage analysis to assigns offspring to their parents. Hatchery supplementation effectiveness studies looking at whether hatcheries are actually providing an abundance of use or some boost to the natural population for recovery. Marine derived nutrient studies. Those are looking at whether the adults coming up from the ocean are bringing much needed marine derived nutrients to these Idaho streams to improve juvenile survival. And I've been a part of developing novel statistical models that estimate abundance and survival of Salmon and Steelhead across the state.

Q. Okay. Great. Thank you for that. I'd now like to turn our attention to the East Fork, South Fork Salmon River headwaters specifically. You referenced earlier that you have extensive experience and that you do have some experience in the East Fork, South Fork Salmon River headwaters. Can you elaborate on the work you've done



specifically in that subbasin?

A. Sure. I think I first saw the East Fork, South Fork Salmon River headwater, specifically Meadow Creek, in about '99, maybe 2000, when I was working for Idaho Fish and Game. I actually drove the truck up there to release adult Salmon off of the truck. I've conducted numerous spawning ground surveys for Chinook Salmon and Bull Trout throughout the East Fork, South Fork Salmon River drainage, including Meadow Creek, and the reaches downstream of that. And then also, you know, throughout the rest of the South Fork basin in the state. I've operated fish monitoring traps, adult monitoring weirs, and I've analyzed, you know, all of that data at times in my career. And currently one of my major responsibilities is actually estimating the abundance of Chinook Salmon and Steelhead that return not only to the East Fork, South Fork Salmon River population, but all of the populations across the state.

Q. Thank you. I'd now like to turn to the Tribe's proposed Exhibit 277 to use -- for use as a demonstrative, and I believe Ms. Lebeda is operating the screen today.

HEARING OFFICER: If that's hard for you to see, Mr. Kinzer, there's also the book, too (inaudible). Yeah.

A. Thank you. Okay.

Q (By Ms. Rogerson) Excellent. So I would just note that Mr. Keller used this map yesterday to



assist with his testimony as well. Mr. Kinzer, can you identify what this map shows?

A. Yes. It shows fish presence in the upper East Fork, South Fork Salmon River in the project area. It shows the Meadow Creek drainage, the upper East Fork and Sugar Creek, and, you know, the lower section of the East Fork. It shows a number of different species kind of scattered out around the area or the watershed, starting at the upstream reach in Meadow Creek. We have Chinook Salmon, Rainbow Trout, Bull Trout, and Cutthroat up in that reach. The number of stars in there represent reds that we have observed or counted in that area. The green triangle represents the adult Chinook release location where we out-plant those fish from the South Fork Salmon River. Looks like the red streams in Fiddle Creek are showing different species occurrence and presence in those streams. Bull Trout and Cutthroat and Rainbow Trout are existing in the red. Green shows only Bull Trout having a presence in there. I've collected a lot of this data. This data was kind of a collaborative effort, honestly. It uses data from Idaho Fish and Game, the Forest Service, I believe Perpetua has also collected a lot of this information, and the Nez Perce Tribe has collected a lot of this information.

It highlights the barrier at the Yellow Pine Pit as being blockage to anadromous fish. Anadromous fish here



are the Steelhead and the Chinook Salmon. And the Chinook Salmon are the reds up there above the Yellow Pine Pit are obviously the results of the out-plant of those fish.

Q. Okay. Great. So it sounds like you're very familiar with this map. Did you have a hand in creating this map?

A. I did.

Q. In your professional opinion, does the information displayed in this map reflect an accurate sort of recitation of Chinook, Steelhead, and Bull Trout presence in the East Fork, South Fork Salmon River headwaters, looks like, for the years 1998 to 2023?

A. It does, yes.

Q. So just as a general matter, just sort of set the stage here, can reduced end-stream flows cause harm to fish species?

A. They can, yes.

Q. What are those types of impacts that you sometimes see associated with reduced flows?

A. A primary concern or impact is reduction in fish passage. Another one is reduction in fish habitat. Fish obviously require water, so as we -- as we lower the water levels we also, you know, lower fish habitat. There's some secondary concerns that impact fish survival. Stream temperatures can definitely impact fish survival. There's

been shown in the literature relationship between flow and productivity. Productivity seems to decrease as flows decrease specifically along this reach upstream of the Yellow Pine Pit where we are out-planting the fish there's a concern of red dewatering. Fish do have the ability to move and go into different areas to seek out refuge and can withstand some impacts. Reds do not. Reds are very static and as the water decreases it can affect them and the survival of the eggs inside the red.

Q. Okay. And can you remind us, I believe Mr. Keller testified to this yesterday, but what is a red?

A. A red is essentially a nest. It's where the females put their eggs. They work by the female digs a hole in the stream. She deposits her eggs in that. A female fertilizes those eggs -- or a male fertilizes those eggs. Excuse me. The female moves upstream. Digs up more rocks and places those rocks on top of the eggs, and it creates a pillow in the substrate. And that pillow is designed in a way from the fish to receive kind of the maximum benefit of the flow of the water. It's trying to oxygenate the reds or the eggs inside that. They're typically found at the tail out of a pool right at the head of a riffle where the velocity of the stream picks up. And the reason for that is it's trying to get as much oxygen and water through that red to keep the eggs viable.



Q. And just one other term you used which was, I believe, fish productivity. Can you help us understand what that is?

A. Yeah. Fish productivity, in a simple sense, is a number of offspring per adult spawner. It's measured in kind of two ways. A very common way to look at that is an adult to an adult productivity measure. When it's calculated that way it's typically around a number of one. The one signifies replacement. So you're getting at least one offspring back for every spawner. If it's above one, it indicates that you have a growing population, and if it's below one it indicates a decrease in population. Another way that that is calculated is with a juvenile to adult productivity measure. At that point you're really focused on more of the, especially with Chinook and Steelhead, you're focused on kind of that freshwater habitat rearing phase. The actual metric is much higher than one because you have a lot more offspring at that point that have survived and haven't -- they haven't completed their full life cycle. So that number generally is tied to the fecundity of the female, which is the number of eggs that that female is holding.

Q. Thank you. Mr. Kinzer, let's shift gears slightly. Can you just describe when you first became involved in this particular protest of Perpetua Resources' water right



applications?

A. Yes. I think I first had a discussion with the Tribe's legal staff on August 14th, I believe. At that time they expressed an interest for me to review the water -- the proposed water rights application, and to potentially offer an opinion on fish impacts from them.

Q. And which water right application materials did you first review back in August?

A. The first material that we reviewed was the June 27th, 2022, request for technical assistance memo, I believe, that was sent to Idaho Department of Fish and Game and the Office of Species Conservation. We reviewed that, and we reviewed the request for permit for the water right application for the 9.6 water withdrawal.

Q. And what was your initial reaction to these materials that you reviewed?

A. Initially we noticed that in the letter and the request for technical assistance sent to the Idaho Department of Fish and Game and the Office of Species Conservation, that there was a focus on fish passage downstream of the proposed tunnel. I believe it's stated that they were focusing on the passage through that reach to make sure that fish could return to the high quality habitat upstream. And we also noticed that there was a lack of information on the actual habitat loss that these fish would



experience under the proposed water right.

Q. And when did you agree to write an expert report for the Tribe?

A. A couple days later. I think it was August 17th we agreed. That was after some conversations with my immediate supervisor to make sure that he was approving of me focusing on this and taking me away from my other duties, and then a few other conversations with the Tribe's legal staff.

Q. I'd like to turn your attention now to proposed Exhibit 201. Looks like you found 201; is that correct, Mr. Kinzer?

A. That is correct.

Q. Okay. Do you recognize this exhibit?

A. I do. This is the expert witness report that I co-authored.

Q. And what is the date on that report?

A. September 11th, 2023.

Q. And you said you co-authored this report. Who did you co-author this report with?

A. I co-authored it with a colleague, Michael Ackerman. He is another fellow employee with the Nez Perce Tribe. He's a research scientist in our department.

Q. And what is his position specifically and experience?

A. He's -- he has experience in genetics. He has experience with habitat models. He has experience with estimating abundance of spring summer Chinook and Steelhead to the Idaho populations.

Q. And does he, like you, have experience in the headwaters of the East Fork, South Fork Salmon River?

A. He does. He's spent a period of his career with the Idaho Department of Fish and Game as well, and he conducted snorkel surveys and red surveys up through the East Fork, South Fork, and Meadow Creek.

Q. And what were your respective roles in authoring this report?

A. Highly collaborative. We discussed kind of all the ideas and topics and kind of made sure that we were on the same page and agreed to them.

Q. And do you feel qualified to speak to all of the opinion contained in that report?

A. I do.

MS. ROGERSON: Mr. Hearing Officer, I'd like to move to introduce proposed Exhibit 201 into the record.

HEARING OFFICER: Any objections to 201?

MR. WATKINS: No objection.

HEARING OFFICER: No objections, Exhibit 201 is admitted.

Q (By Ms. Rogerson) So I'd now like to just



briefly discuss your report. So how -- Mr. Kinzer, how did you formulate the scope of your report?

A. We started out the process, like I said earlier, really reviewing the request for technical assistance that was sent to Idaho Department of Fish and Game and the Office of Species Conservation. In that review of that we were seeking to understand the conclusions that were coming into that report and that led us to two technical memos that were authored by Rio ASE regarding the fish passage evaluations downstream of the proposed tunnel.

Q. And apart from -- well, I guess, sort of what questions were you initially asked to consider in this report?

A. Initially we were asked to evaluate the proposed water right and the 9.6 water withdrawal and impacts to fish. I believe there was an ask of if we could precisely quantify what that impact would be and to evaluate if there was any fish passage concerns.

Q. And who -- who made that ask?

A. The Tribe's legal team.

Q. And what sort of assistance did the Tribe's legal team provide you with in developing your report?

A. They provided general guidance on expert reports and what should be in there, kind of formatting and some minor editorial review.



Q. At any point did they direct you to say anything in the expert report or is the expert report fully your own?

A. It's fully my own and my co-author's, yes.

Q. And what was your response to the initial questions posed to you by the Tribe's legal counsel?

A. Initially we were -- we kind of mentioned that it was probably going to be impossible to get two precise estimates of fish habitat loss given the fact that there was missing information. There wasn't information available to us to do that in a way that we thought was going to allow us to really draw that conclusion.

Q. And is that opinion reflected in your expert report?

A. It is. I think we mentioned that multiple times that there's a lack of information to really draw any better conclusion or to really understand it anymore, and I believe we mentioned multiple times recommendations on how you could go about actually getting that information and answering those questions.

Q. But in preparing your expert report did you identify potential harmful effects to fish from Perpetua's proposed water right applications?

A. We did, yes.

Q. Okay. I'd like to again pull up the Tribe's proposed Exhibit 283, which Mr. Keller also used yesterday



as a demonstrative. Is there another binder sitting next to you, Mr. Kinzer, another green binder?

HEARING OFFICER: It's in the one -- Mr. Kinzer, it's in the one right there.

A. Oh, is it. It's because I had it upside down. I apologize. Thank you.

HEARING OFFICER: Yep.

Q (By Ms. Rogerson) Okay. Now that you have the map in front of you --

A. Yes.

Q. -- do you recognize this map?

A. I do.

Q. Did you have a role in creating this map?

A. Yes. I collaborated on the development of this.

Q. And what does this map show?

A. It shows the proposed points of diversion and the proposed tunnel in the project area, a number of groundwater wells along Meadow Creek, and it shows the surface water diversion at the head of the tunnel, and downstream it also shows the proposed point of quantification in the yellow circle.

Q. For Perpetua's proposed water right condition; is that correct?

A. For Perpetua's proposed water right condition, that's correct.

Q. And just generally at a high level, with respect to your report, what were your sort of initial concerns related to impacts to fish from the proposed diversions seen on this map?

A. Focusing on the Meadow Creek area, so kind of upstream and moving downstream, the number one concern was just the impact of all the groundwater wells on fish habitat. We were concerned about just overall loss of water throughout that reach, and the fish that were residing in that area. Those points of diversions of those groundwater wells match up very closely to our Chinook Salmon runs that we see in that area. That's the area that those fish prefer. Moving downstream there is the concern of passage through -- through the tunnel and getting the fish through there in a safely and timely manner. And then we also had concerns below the tunnel to the mouth of Sugar Creek for how passage would be affected in that reach.

Q. Can you just elaborate a little bit more on the fish passage element of that? And I think you just identified two reaches of concern.

A. Uh-huh (affirmative). Yeah, for the fish passage area we were concerned that the flows would drop to a level that the fish would no longer be able to actually volitionally pass up through that reach to where the tunnel is, and whether they would be able to actually safely get



through the tunnel.

Q. Okay. I think I'd now like to turn your attention to your rebuttal report from November 6th, and I believe this is Exhibit 216, or proposed Exhibit 216. It looks like you have it in front of you.

A. I do.

Q. Can you explain what the exhibit in front of you is?

A. Yes. This is the fisheries rebuttal report that I co-authored with Michael Ackerman, again.

Q. And, again, what were your respective authorship roles on this report?

A. The same as before. We collaborated on the topics and agreed to them and made sure both of us fully understood them.

Q. Okay. And you, again, feel comfortable speaking to all of the opinions provided in that report?

A. I do.

MS. ROGERSON: Mr. Hearing Officer, I would like to move to introduce proposed Exhibit 216 into the record.

HEARING OFFICER: Exhibit 216 rebuttal report, any objection?

MR. WATKINS: No objection.

HEARING OFFICER: Hearing no objections, Exhibit 216 is admitted.



Q (By Ms. Rogerson) Mr. Kinzer, what materials did you review to prepare this November 6 rebuttal expert fisheries report?

A. To prepare this report we reviewed Perpetua's September 11th expert fisheries report, and there was references in that report to the draft supplemental Environmental Impact Statement that the Forest Service prepared as providing evidence of fish impacts and limited impacts.

Q. And after reviewing the studies that were provided in Perpetua's initial fisheries report in preparation of this rebuttal report, did your opinions about harms to fish change?

A. No, they did not.

Q. And can you explain why not?

A. The expert fisheries report that Perpetua supplied referenced some SDEIS analyses. That's the Supplemental Draft Environmental Impact Statement that the Forest Service created. I didn't feel that those analyses were appropriate for this task at hand. I wanted to evaluate the full potential benefit or impacts to fish from the proposed water right, and the SDEIS analyses doesn't necessarily do that. Those analyses really evaluate the full effects of the proposed mine, and you can't disentangle all of those mine actions from the actual water right. So it's difficult to



understand what that actually is going to do to fish impacts just from the water right -- from the proposed water right.

Q. Is it also fair to say that it's difficult to disentangle sort of the effects at each stage of the mine given that those evaluations evaluate the full mine action effects on fish?

A. That is true. One of the things I was interested in was understanding the immediate effects to fish. The SDEIS oftentimes, depending on the analysis and in my review of that, is looking out many, many years on how those actions are going to play out, and restoration actions. You know, they take a while to actually provide any sort of benefit to fish, so I was more curious in the immediate impacts.

Q. And in your original report you address fish passage. We just discussed that. Did you spend any time analyzing fish passage through either that downstream reach or Perpetua's proposed tunnel in your expert rebuttal?

A. Not in the rebuttal report, no.

Q. And why not?

A. In the September 11th Perpetua's expert fisheries report they didn't really bring any new information to that reach, so it didn't change our opinions.

Q. Okay. I'd now like to go back to that initial expert report you prepared which is now Exhibit 201 to

discuss fish impacts in Meadow Creek. And I think I'd like to also pull up exhibit -- proposed Exhibit 283 again as a demonstrative, if we have that. Can you sort of identify where Meadow Creek is on proposed Exhibit 283, Mr. Kinzer, just so we are all clear?

A. Yes. Meadow Creek is in that lower left-hand side of that figure. There's a -- in the very lower left-hand corner there's a symbol across for the Meadow Creek U.S.G.S. gauge, and moving downstream you go across all the proposed groundwater diversions, and then eventually it meets -- the mouth of it it meets the upper East Fork, South Fork Salmon River.

Q. And what type of fish habitat is currently available in Meadow Creek? I know you touched on that earlier, but could you elaborate?

A. It's a range of fish habitat. There's definitely some areas that are, you know, severely impacted from previous mining activities, but there's also quality habitat in Meadow Creek that still support, you know, very healthy populations of West Slope Cutthroat Trout and Bull Trout. Those fish are isolated because of the Yellow Pine Pit blocking passage so those fish that have been up there and they've been remaining quite well. We also have Rainbow Trout up there. It's unclear what the Rainbows really stem from, from a genetic sense or lineage. There's been past



out-plants of subspecies of Oncorhynchus mykiss which is the Steelhead species or the Rainbow species and the Golden Trout are a subspecies of that. And there's -- we detected Rainbow genetics up there using environmental DNA, but we've been unable to really assign those fish or those samples to whether they come from the Golden Trout that were out-planted or if they are actually remnants of the anadromous Steelhead prior to them being blocked from reaching that area.

Q. And does spawning still occur in this reach, and if so, what species?

A. Spawning of West Slope Cutthroat and Bull Trout, absolutely. That's an isolated pocket of those fish, so they are up there using it and spawning increasing offspring and persisting. And then, of course, we out-plant adult Chinook Salmon up there because it is a -- it is a quality habitat that those fish used to have access to, and we want to make sure that it's being fully utilized.

Q. And did the materials you reviewed to prepare your September 11th expert fisheries report include any evaluation about the effects of Perpetua's proposed water withdrawals from their water rights application on Meadow Creek fish habitat?

A. It did. We evaluated those impacts in two different ways. One of the ways was --



Q. Excuse me, Mr. Kinzer. Sorry. So I was asking whether Perpetua provided any --

A. Oh, I'm sorry. I'm sorry, I misunderstood.

Q. -- any information with regard to effects on fish habitat?

A. No, they did not. They mentioned in that first technical memo for request for assistance and in reviewing that they mentioned that they were focused on providing passage to the quality habitat upstream, but that was the extent of those evaluations that I saw.

Q. Okay. And I understand from having reviewed your expert report that you did provide some sort of proposed options for evaluating fish habitat loss in Meadow Creek, and I'd like to walk through those with you now.

A. Okay.

Q. So what data or information did you have at your disposal to try to evaluate effects from Perpetua's proposed water right applications on Meadow Creek?

A. At that time we had very limited information to really do that. So, yeah, we just -- we developed two ways to understand and kind of bookend the potential effects.

Q. And what were these two options, just briefly?

A. Yeah. In general, one of them was kind of a simple approach. It basically just assumed a proportional impact. So the proportion of water removed from the stream would



equal the proportion of habitat affected. The other -- yeah, the other method that we looked at was an analysis that was conducted by the U.S. Forest Service in Sugar Creek, which is the drainage downstream of the project area downstream of the tunnel, I guess, and that used analysis called IFIM PHABSIM and that's a way to relate flows to fish habitat in a metric called weighted usable area.

Q. And you decided, I think you testified earlier, that you decided to sort of present these options or walk through these options because there was sort of a lack of other alternative data or information available to you; is that correct?

A. That's correct. Without any other information we wanted to present some evaluation of what those fish impacts could be, and we, like I said, we wanted to kind of bookend and see what could happen or what could happen to those fish in that habitat upstream in Meadow Creek.

Q. Okay. I'd like to look at that first sort of evaluation option that you presented in your report. Can you first tell me sort of what assumptions that that first evaluation option you presented required you to make, and if you need to briefly redescribe that evaluation that you presented, please do.

A. Okay. So the proportional -- the proportional model, I guess, or evaluation that we did it assumed a full

water withdrawal of 9.6 cfs coming out of Meadow Creek. We assumed that that withdrawal would happen from the groundwater wells, and that the groundwater wells would have a one to one and immediate impact on stream flows. That assumption was based on the -- a statement in the technical memo, the technical assistance -- or the request for technical assistance that Perpetua sent to Idaho Fish and Game and the Office of Species Conservation.

And then the last assumption is kind of the basis of the entire evaluation is that the reduction in water would have the same proportional effect and reduction in fish habitat.

Q. And I'm sorry, could you just briefly explain what assumption you found in that, I believe it's the June 27th, 2022, request for technical assistance that --

A. Yeah. In that document they made a statement as far as the groundwater withdrawals would have an immediate and one-to-one impact on stream flow. So we made the same assumption when assessing those water withdrawals in Meadow Creek.

Q. Okay. And can you explain your assumption that there -- that you had to make in this particular evaluation option that there's a one-to-one relationship between flow reduction and fish habitat reduction?

A. Yeah. Yeah, it's a simple approach. I mean,



essentially you can equate it to water in a fish bowl. The fish has access to all that water in the bowl, and when you remove water from the bowl that fish no longer has the same amount of area and habitat left. It's a pretty simple approach.

Q. And why did you assume the full 9.6 water withdrawal versus sort of what Perpetua had, you know, modeled as their mine need use?

A. We wanted to understand the full impacts to fish, and that was the number that was being requested in the water rights -- proposed water rights application, so I wanted to understand that.

Q. Can you turn to table 1 in your expert report in Exhibit 201? I think it's on page 5.

A. Yep, I got it.

Q. Can you describe the table that's in front of you? And I believe -- yeah, we have it up on the screen as well.

A. Yeah. These are Meadow Creek stream flows. These were accessed from the U.S.G.S. gauge that is upstream of the groundwater of -- the proposed groundwater wells on Meadow Creek. These are calculated by month, and these are rolling kind of three-day average of those monthly flows. And we summarized it into 95 percent exceedance values, so that's your low flow kind of period. The 50 percent is kind of the average median flow, and the 5 percent is a high flow



type condition.

Q. And using this table can you help me understand what you concluded from that first sort of proposed evaluation method that we've been discussing?

A. We concluded that the full 9.6 water withdrawal, proposed water withdrawal, if that were to occur in Meadow Creek with our assumptions, that would essentially remove all of the water from Meadow Creek. And that's even under the high flow condition of the 5 percent. In most months Meadow Creek at that stream gauge is below 9.6 by quite a ways.

Q. Okay. I'd like to turn to the second evaluation option that you presented in your report. This was the use of the IFIM model for Sugar Creek.

A. Uh-huh (affirmative).

Q. Can you just briefly explain, what is an IFIM model?

A. Yeah. IFIM stands for the instream -- instream flow incremental method. It's a type of aquatic habitat survey. You go out and you collect data following that protocol, and you use PHABSIM, which is the physical habitat simulation models. It's a suite of models to basically understand the flow relationship to fish habitat, and it calculates depths and velocities as one of those outputs.

Q. And remind me, where did the data come from that



was used in that model?

A. It was collected by the U.S. Forest Service. The data was collected in 1980, and it comes from Sugar Creek. They collected the data, and they also did the analysis. We took their information and basically just plotted it.

Q. And what do you mean by, plotted it?

A. Created a figure from that information.

Q. And what assumptions did using that information require you to make?

A. Similar to -- two similar assumptions, as the previous method. The first one was, again, we were interested in the full proposed water withdrawal, so a 9.6 withdrawal from Meadow Creek. And, again, we had to assume that that withdrawal was coming from the groundwater wells along Meadow Creek, and that it would have an immediate and one-to-one impact with the stream flows. And then, additionally, this data is coming from Sugar Creek, so it's trying to use that to infer what might happen in Meadow Creek.

Q. Can you now turn to figure 2 in your report, which I believe is page 7?

A. Uh-huh (affirmative).

Q. That's also up on the screen. Can you explain this figure?

A. Different figure.

Q. From what's up on the screen? What do you have in front of you?

A. Figure 2 is what I have in the exhibit, and this figure 2 is showing the relationship of discharge in Sugar Creek to the weighted usable area for Chinook Salmon. It's showing that relationship for kind of four different life stages of Chinook Salmon. And the waited usable areas, it's kind of a metric of available habitat. It doesn't necessarily assign to, you know, any sort of like actual area of habitat. It's just -- it should be thought of as an index, so that as you change on that Y axis, a weighted usable area that would be kind of the same kind of change in the actual habitat of those fish at that life stage.

Q. Okay. And then using that figure can you just help me understand what you concluded from the second evaluation option you presented in your report?

A. Yes, of course. Looking at similar flows to what Meadow Creek has and a 9.6 reduction, we actually, using this Forest Service data, it was only calculated in increments of, I think, whole numbers so we had to just look at a 9, by reduction cfs at 9, 9 cfs instead of 9.6, but it's close. And what we see is that for the juvenile life stages, you know, you would have an 80 percent reduction in habitat in Sugar Creek. And for the adult spawning life stages of Chinook Salmon it would be up to about a



90 percent reduction in habitat in Sugar Creek.

Q. And why do you think that this loss of habitat in Sugar Creek could help us understand habitat loss in Meadow Creek?

A. Similar species. So they definitely are using similar types of habitat and requiring similar types of flows to stay alive and keep their -- keep their reds -- keep water over the reds and keeping the eggs viable. But Sugar Creek is, you know, downstream, and it's an assumption that we had to make because there's a lack of information upstream to really try to draw a comparison. So we're making this assumption that it's a similar relationship.

Q. And are there methodologies that allow you to more precisely measure the effects of Perpetua's 9.6 water rights application on habitat, fish habitat, in Meadow Creek than what you identified here through these two evaluation options you've presented?

A. Yeah. You know, there's a number of different ways to do that in the scientific literature. There's life cycle models that you can use. There's habitat suitability models. There's -- you could conduct an IFIM PHABSIM evaluation in Meadow Creek specifically if you wanted to get at the true relationship of flows to habitat in Meadow Creek. But those methods are kind of impossible for us to do with the data that we had in-hand.



Q. And what additional data would you need or information would you need to actually conduct the type of analyses you just described?

A. Depending on the models that you wanted to use, it would be some sort of, you know, habitat surveys that were conducted in Meadow Creek to actually understand what are the existing conditions up there. Those would probably be cross-sectional surveys of the stream similar to what was done in the downstream reaches by Rio ASE. Hydraulic models constructed to understand kind of what the flows and depths would be in the stream reach, velocities of flow, and relating that to actual habitat. You would need all that information.

Q. Okay.

MR. FOSTER: Mr. Hearing Officer, I think we lost video (inaudible).

HEARING OFFICER: Okay. It appears that we were able to hold onto all of the participants, too, so you can proceed, Ms. Rogerson.

MS. ROGERSON: Thank you.

Q (By Ms. Rogerson) Mr. Kinzer, I believe you were just describing the type of fisheries habitat evaluations that could be conducted in Meadow Creek to determine impacts from Perpetua's water right application if we had additional data or information;



is that correct?

A. That's correct.

Q. Okay. In the absence of that information, did sort of one-to-one flow reduction to habitat reduction assumption that you had to rely on in applying that Forest Service, you know, IFIM analysis from Sugar Creek to Meadow Creek, allow you to develop a reliable opinion regarding Perpetua's water right applications effects on fish habitat in Meadow Creek?

A. I think it did, yes.

Q. And why is that?

A. I think they were reasonable assumptions to make given the fact that we had, you know, no information on Meadow Creek. We wanted to provide some sort of -- some sort of a bookend effect of what the potential impacts to fish could be. So this was -- this is what we came up with as a way to try to understand that.

Q. Okay. And can you just sort of summarize what both your evaluations led you to conclude regarding potential effects from Perpetua's water right application on fish habitat in Meadow Creek?

A. We concluded that, you know, the full 9.6 water withdrawal would come out of Meadow Creek and that that truly had a one-to-one effect from groundwater to surface water. That the impacts would be severe to fish. Meadow Creek just doesn't have that much flow in it to support that

sort of water withdrawal.

Q. Okay. I'd now like to turn to Perpetua's November 6 rebuttal fisheries report and their critique of your September 11th expert fisheries report. I believe that's Exhibit 63, and that's going to be among the black binders, Mr. Kinzer.

A. Okay.

Q. You found it?

A. Yep.

Q. Okay. In their rebuttal report Perpetua's experts take issue with your use of a linear relationship between flow reduction and habitat reduction. My understanding is this is because they are saying the relationship isn't straightforward. And I believe that you will find that on page 4-2 of their report. That would be -- do we have report up? I believe that would be pdf page 31.

A. Uh-huh (affirmative).

Q. Are you familiar with that passage?

A. I am.

Q. And what is your response?

A. I don't disagree. Relationships of flow to habitat are extremely complex. They're not always linear. They're not always a one-to-one effect. However, in the absence of information or any other information, I'm not sure what that relationship in Meadow Creek is exactly, so I'm forced to



use other information and make assumptions and try to draw conclusion from that.

Q. And with regard to your second -- the second sort of proposed evaluation option in your September 11th report, Perpetua states in their rebuttal report that because you looked at Sugar Creek data, you should have done a, quote, transferability assessment in order to sort of apply that data to Meadow Creek. And I believe this is on page 4-3, so probably be the next or the previous -- next page, and that would be 32 in the pdf. Are you familiar with that critique?

A. I am, yeah.

Q. And what is your response to that critique?

A. Yeah. I mean, transferability studies you should be -- if you truly want to understand that impact, you know, you need to know information from both sides to see how they actually relate to each other, and then you can kind of scale your models and findings appropriately. But in the absence of information on that Meadow Creek area and what habitat is up there existing, I can't make that connection. I just have to assume that Sugar Creek is going to supply us a similar reduction in habitat.

Q. So is it fair to say you would need additional habitat information from Meadow Creek in order to conduct a transferability --



A. Absolutely.

Q. -- assessment?

A. You can't form a correlation between those two locations if you don't have information on them.

Q. So do these critiques in Perpetua's expert report change your opinions about sort of the bookends, as you referred to that, the bookends of potential effects from their 9.6 water right application on fish habitat in Meadow Creek?

A. No. I didn't see any other information presented in the rebuttal report that would give me a change in my opinion, no.

Q. What conditions do you believe would address potential fish habitat loss upstream in Meadow Creek, specifically what water right conditions might address that?

A. Understanding the habitat and flow relationship better would be helpful. Thinking about setting minimum endstream flows that would allow fish habitat to persist at a suitable level for fish and make impacts minimal. I'm a fish biologist, so I want to protect fish.

Q. All right. Thank you for that. I would now like to turn our attention to the fish passage reach downstream of Perpetua's proposed tunnel. Could we go back to proposed Exhibit 283 for use as a demonstrative?

A. Okay.



Q. Mr. Kinzer, can you remind us of the sort of the passage reaches of concern in the East Fork, South Fork Salmon River?

A. Yeah. They're on the East Fork, South Fork Salmon River downstream of the proposed surface water diversion at the head of the proposed tunnel.

Q. And there are sort of two segments of that, right, there's the tunnel, and then there is sort of that daylighted or reach below the tunnel going down to the confluence with Sugar Creek on the East Fork, South Fork; is that correct?

A. Yeah. I think that's fair to kind of look at those separately.

Q. Okay. I would like to start first with your conclusions regarding the reach downstream of the proposed tunnel, and I'm just going to refer to this as the downstream reach for clarity going forward, if that works for you.

A. Yeah.

Q. Did you evaluate fish passage in this downstream reach in your expert report from September 11th?

A. Yes. In the September 11th report we reviewed the Rio ASE technical memos regarding fish passage, yes.

Q. And how did you evaluate the effects of Perpetua's water right application on fish passage in this downstream

reach?

A. We reviewed the findings of Rio's hydraulic modeling and the criteria -- criteria they were using to evaluate fish passage. And then we used some of the citations that they were referencing and started looking into those documents to also kind of understand the underlying intent and purpose of those criteria.

Q. And are there any additional materials you used in addition to the Rio ASE evaluations?

A. Yeah. The two they referenced the California Department of Fish and Wildlife document from 2017, but then that document goes onto reference another one called Thompson from 1972, and we looked at both of those.

Q. And can you just briefly describe both of those documents that you just mentioned were referenced by Rio?

A. Uh-huh (affirmative). The California Department of Fish and Wildlife document really was establishing criteria to evaluate stream riffles, so this is endstream riffles, natural stream reaches, and determining or recommending criteria to use to establish safe passage of fish. The criteria they recommended was .9 feet in the CDFW document. That actually stems from the Thompson '72 document, and the original authors intended for that criteria to not just be a minimum depth of .9 feet, but they also recommended an additional criteria that should be followed for safe



passage.

Q. Okay. Can you turn to Perpetua's Exhibit 32, which I believe is Rio ASE's March 21, 2023, technical memorandum, which is titled Stibnite Gold Project updated fish passage flows?

A. Did you say 32?

Q. I believe it's 32, yes. Next binder.

A. Okay.

Q. Is this document familiar to you?

A. Yes, it is.

Q. Is this one of the Rio ASE evaluations that you -- that you used to evaluate fish passage at this downstream reach?

A. Yes, it is.

Q. Can you just briefly explain what this technical memorandum from Rio ASE says?

A. Yes. They were evaluating stream conditions in that reach downstream of the tunnel outlet to the mouth of Sugar Creek. They conducted analysis or an evaluation of going out and collecting stream habitat data doing cross-sections of the stream, and then they developed a hydrologic model, hydraulic model to essentially evaluate flows going through that stream reach and what the depths and velocities would be for the different fish species and the times that they would be expected to be there. And then



they evaluated it against depth criteria and velocity criteria.

Q. Can you now turn to Exhibit 33, which I believe is the other Rio exhibit?

A. Uh-huh (affirmative).

Q. And can you explain how this one differs from the one we were just looking at?

A. This one uses some flow data that is, I would say, not exactly -- not as current. I think the other one actually uses updated flow information. They both are doing a similar thing. They are trying to understand the flows that are going through that reach and then evaluating whether those flows would be -- would meet the criteria, the established criteria, for fish passage.

Q. Okay. Great. And are the data and analyses contained in these -- in both of these Rio ASE technical memorandums of the type that you would generally rely on in your field?

A. Yeah, yeah.

Q. Okay. Let's go back to 32 and let's start there. And could you go to table 3, which I believe is on pdf page 6. Are we able to pull that up?

A. Okay.

Q. So it looks like you have table 3 in front of you. What does this table show?



A. This table is summarizing the 95 percent and 5 percent exceedance values of stream flow discharge from, looks like, 2011 to 2022 for the different areas, the different stream reaches, and for the different species and kind of life stage periods.

Q. Great. And then could you also flip to table 4?

A. Yep.

Q. Which I believe is on the next page.

A. Yes.

Q. And what does table 4 show?

A. Table 4 shows the same sort of information. However, the flow period has been extended, so it is now starting in 1997 and going to 2022. That is using Johnson Creek data to make a relationship to the flows in these reaches, and extending the period of record. That's a suggestion by NOAA on how to develop these exceedance values, I believe.

Q. And can you remind us where Johnson Creek is with relationship to the project area?

A. Johnson Creek is a tributary to the East Fork, South Fork Salmon River, and it is downstream of the project area approximately 10 miles.

Q. Okay. And can you now flip to, I believe, the next page, which is table 5, and tell us what table 5 shows?

A. Yes. Table 5 shows the 95 percent exceedance

values with and without the proposed water rights conditions applied for the various species and life stages of concern.

Q. Okay. Thank you so much. Would you now turn back to Rio -- Exhibit 33, which is Rio's other technical memorandum?

A. Uh-huh (affirmative).

Q. And can you remind us how did Rio in this technical memorandum analyze fish passage? And that would be through that, I take it that would be through that downstream reach of the tunnel?

A. Yes, the downstream reach, below the tunnel and above the mouth of Sugar Creek. Again, they collected stream cross-sectional data, and then developed a hydraulic model to basically estimate the depths and velocities of flows through that reach, that downstream reach at the existing conditions and under the proposed conditions with the proposed water right. They then used that to gauge or estimate kind of the percentage of the stream that is meeting the established criteria that they were using.

Q. And remind me, what criteria were they using to assess what the percentage of the stream that was in or out of compliance with the stream -- with the fish passage (inaudible)?

A. They were using a .9 depth for Chinook, and that depth was coming from the California Department of Fish and



Wildlife document, guidance document, for streams and riffles. And, yes, that's how they did that.

Q. And so is it fair to say that the Rio analysis simply assesses the amount of the natural stream reach or that downstream reach that is out of compliance with the California -- with the California -- or California Department of Fish and Wildlife 2017 criteria?

A. Yes, it assesses and calculates the percentage of that stream reach that either meets the criteria or doesn't.

Q. Okay. And can you remind me, does Rio reference a 6.6 cfs flow rate in this analysis?

A. Yes (inaudible) 6.6 is the 95 percent exceedance that they have for Chinook Salmon during their adult life stage and when they're passing through the reach, and that 6.6 cfs is that 95 percent exceedance when the proposed conditions are applied. So that's below the actual 95 percent exceedance that fish are currently experiencing.

Q. And how does the 6.6 relate to their evaluation specifically of quantity of the reach that's in or out of fish passage compliance?

A. For Chinook that is the flow that they modeled to understand the percentage of the stream that was either in compliance or out of compliance.

Q. So is it fair to say that 6.6 cfs is not a minimum flow to insure passage -- fish passage to that reach?



A. That's correct. They essentially established a 6.6 cfs based off of subtracting off the proposed water rights conditions from the 95 percent exceedance level prior to that or before the water rights is applied. And then they modeled that flow through that stream reach and calculated a percent of the stream that met compliance. It's not a minimum flow by any means. It is more of a single modeled flow that they looked at just to understand whether that stream was reaching compliance or not.

Q. And can you just remind us, what were their conclusions about the percentage of the stream that was reaching compliance with that California criteria or not?

A. The conclusions initially were that -- I don't have it in front of me, but it's 90-ish percent, a fairly high percent of the stream was in compliance initially, and then it would drop down maybe 10 or so percentage points.

Q. At 6.6 cfs flows?

A. At 6.6 cfs flows, yeah.

Q. Shifting gears slightly, what concerns did you identify in your report with the way Rio ASE conducted its analysis of fish -- this sort of fish passage analysis they did for the downstream reach?

A. The concern that we had was that they were really determining compliance and whether the stream reach or the cross-section was in compliance or not based off of, for



Chinook as an example of .9 depth, and that particular criteria was being evaluated against a single point in the cross-section meeting .9 depth of feet of water. The concern that we had was that in our evaluations and reviewing the literature that they cited, we discovered that the original intent of the authors that produced that criteria had some additional items that they wanted considered to meet compliance for passage. And what those were was that total stream length or the total cross-section or length of that stream reach, that 10 percent of it in a continuous fashion needed to be above .9 feet. And that 25 percent of that cross-section length needed to be above .9 feet. So a little bit more stringent, I guess you could say, instead of just looking at a single point along the cross-section. It required some additional kind of hurdles to get over before it would meet compliance for passage.

Q. Were you able to raise or discuss these concerns with Rio ASE?

A. We were. I believe we met with them at a conference call with them at the end of August, maybe the 29th, maybe. We discussed this concern that, you know, we thought that these criteria were being evaluated incorrectly. They understood what we were talking about, I guess, or at least at that time they listened to our concerns. We asked for the information so that we could

re-summarize it and summarize that data based on the more stringent criteria, and they supplied that information for us.

Q. And what did you do with that data that they supplied?

A. We re-summarized it and put it into our expert report.

Q. Let's go back to your expert report, Exhibit 201.

A. Okay.

Q. We're looking for table 2, which is on page 10, pdf page 11, I believe. It looks like we have it up on screen.

A. Okay.

Q. Mr. Kinzer, what does table 2 show in your expert report?

A. It shows the results of the Rio ASE's analysis or evaluation using the more strict guidelines as intended by the original authors of those criteria.

Q. So this is your updated analysis based on the updated Rio data that was supplied to you?

A. That's correct. This is the updated analysis and the findings from that, a summary of that.

Q. And what were the results that you arrived at after conducting that updated analysis?

A. We saw that the percent of stream that was actually in compliance to those more strict criteria as intended



was -- it dropped by quite a bit. I think the East Fork reach downstream of the tunnel went from, you know, 90 percent in compliance down to this 59 percent. So it dropped a fair amount.

Q. And that's at that 6.6 cfs flow?

A. That's at the 6.6 cfs flow, which was established as the 95 percent exceedance flow during the period of Chinook Salmon passage with the proposed conditions applied.

Q. And is there any way to determine from this analysis you did how many fish would be expected to pass through this reach given the percent that appears to be out of compliance with the criteria?

A. No, not necessarily. Really, the way that I think about these summaries, it's kind of a relative risk in how much it changes. So, for instance, you go from an existing condition in the East Fork downstream of the -- downstream of the tunnel from being 59 percent kind of in compliance for that reach, so 59 percent of the stream being in compliance, and then it drops to 46.4. So it's kind of just an idea of how much does the stream change. It's not necessarily a guarantee of passage, but it's also not -- it doesn't mean that passage won't occur either. It's just how much does the stream change at that particular flow.

Q. Is it fair to say that the greater the percentage of stream that's out of compliance the harder it will be for



fish to pass that reach?

A. It definitely suggests that. You know, as the stream reach becomes more shallower and shallower, for instance, it's going to get harder and harder for fish to get passed that. These fish are -- you know, physically they are getting to the end of their life, and they're depleting their energy reserves and every additional stress or jump past a rock or burst through a velocity, you know, area of the stream gets taxing for them. So, yes.

Q. And so is it fair to say that your updated analysis using the Rio ASE data does not enable you to sort of definitively determine a minimum flow that would insure fish passage to that reach?

A. No, it does not.

Q. Can you remind us what's methods you identified in your expert report for quantifying minimum stream flows through this downstream reach, like potential ways of actually going about quantifying minimum stream flow through that reach?

A. Yeah. The Thompson paper, the Thompson 1972 paper, actually recommends a way to do that. And there's another paper that we referenced as a possible way of discovering or figuring out minimum flows for passage, and that was the Baxter 1961 paper that we referenced.

Q. Can you just describe briefly for us the Thompson



methodology that you first mentioned?

A. Yeah. The Thompson methodology, again, they were -- they were the ones that really discovered and recommended the criteria for passage as being a 10 percent continuous section of a cross-section being above the minimum depth, and that 25 percent needed to be at that depth. What they recommended to do was for each one of your cross-sections to actually calculate the flow that got you to compliance, that put you over that benchmark, and then you would do that at each cross-section across the stream reach. And then take an average of those flows, and they mention or recommended that as a minimum stream flow that would meet passage criteria.

Q. And remind us, how does that sort of recommended methodology differ from what was used by Rio ASE?

A. Rio ASE evaluated that single flow for that species in life stage. So they didn't look at multiple flow ranges. They just looked at a single flow and gave us an idea of the percentage of the stream in compliance. So a different -- a different evaluation.

Q. Okay. Could you at least theoretically use the Thompson methodology to determine a minimum stream flow for this reach of the East Fork, South Fork for fish passage?

A. Yeah, absolutely. I think they have all the cross-sectional data to do that. It would probably involve

rerunning their hydraulic model a number of times to establish which flow actually meets the criteria for each of those, and then taking the average of it.

Q. And then could you briefly describe the Baxter methodology you mentioned earlier as sort of an alternative way of assessing minimum stream flows for passage?

A. Yeah. The Baxter methodology is definitely more coarse, but it's looking at average annual flows and essentially said that the 30 percentile and the 50 percentile of the average annual flows could be used as a minimum instream flow for stream reaches that are downstream of the headwaters so that the larger stream areas, and then for the headwater streams they actually recommended a 70 percent average annual flow.

Q. And how could this Baxter methodology theoretically be applied to this downstream reach to determine a minimum flow for fish passage?

A. Theoretically, I mean, calculate the average annual flow and apply those percentages to it. Calculate it (inaudible) 70 percent of it.

Q. Great. So is it fair to say based on that that Perpetua could have calculated a minimum instream flow for fish passage for this downstream reach using either the Thompson or the Baxter methodology?

A. Yes, yep, and there's other ways of doing it, also.



Those were just two ways that we presented as options.

Q. Okay. And it's your understanding, however, that they did not?

A. Yeah. I don't believe they did that, no.

Q. Okay. Mr. Kinzer, I'd like to now turn to your specific concerns with the tunnel, with Perpetua's proposed tunnel with regard to fish passage. Can you remind us, did you evaluate passage through Perpetua's proposed tunnel in your expert report?

A. We did not. In the expert report we didn't.

Q. I believe you testified earlier that you originally, when you were writing that first expert report, relied on representations about the tunnel meeting fish passage criteria and Perpetua's I believe it was maybe the June 2022 request for technical assistance?

A. We did. In that original review of the request for technical assistance memo, it stated that passage in the tunnel was being maintained, and it was being maintained by meeting NOAA criteria. And I believe they were referencing an 8 cfs flow through the tunnel at that time.

Q. Let's turn to that technical memo. It was appended to the letter in Exhibit 206.

MR. WATKINS: Objection, Your Honor, to the extent this witness did not address passage through the tunnel in his expert report but is now getting ready to testify about



passage through the tunnel, that wasn't (inaudible) undisclosed expert.

HEARING OFFICER: Ms. Rogerson, any response to that?

MS. ROGERSON: Our witness -- Mr. Kinzer -- it's my understanding that Mr. Kinzer has gone back and looked at Perpetua's materials with respect to passage through the fish tunnel, and he is ready to testify to that today and it's based on his expert opinion.

MR. WATKINS: And our experts would have never had an opportunity to rebut that, Mr. Hearing Officer, because it wasn't in his expert report because he's an undisclosed expert on this topic.

HEARING OFFICER: Is there anything, Ms. Rogerson, in the rebuttal report that speaks to passage through the tunnel in Mr. Kinzer's rebuttal report?

MS. ROGERSON: I do not believe it does. I would have Mr. Kinzer speak to that. I believe that this testimony would be rebuttal expert testimony that Mr. Kinzer would be providing to the testimony that we've heard earlier in this proceeding that Perpetua's witnesses have provided.

A. Yeah, in our expert rebuttal report we did not address passage.

HEARING OFFICER: Okay. Objection is noted on the record. You can proceed.

MS. ROGERSON: Thank you.



Q (By Ms. Rogerson) Mr. Kinzer, what model flows reported out in the June 27, 2022, technical review memo to maintain fish passage through Perpetua's tunnel? And that would be Perpetua's June 27, 2022, technical memo.

A. I don't have that pulled up in front of me. Which exhibit is that? I remember --

Q. That's 206. Sorry. We were going to pull up Exhibit 206.

A. Yeah, 8 cfs, I believe, was the model flow that they said maintained passage through the tunnel following those criteria, and I think they said that was the lowest model flow, I believe. 206. Yes, yeah.

Q. Thank you, Mr. Kinzer. And you stated when preparing your original September 11th expert report you assumed this representation to be true?

A. That's correct. We did.

Q. And since preparing your expert report have you evaluated the effect Perpetua's 9.6 water right application on fish passage through the proposed tunnel?

A. We have.

HEARING OFFICER: Well, this is sounding like additional expert testimony. You said that it was going to be rebuttal to things that we've already heard as part of this hearing, so I'm not -- I guess I'm not tracking. It

sounds like there was additional analysis performed. I guess, Mr. Kinzer, when was that done?

A. It was after our rebuttal report.

HEARING OFFICER: But prior to this hearing?

A. Prior to this hearing?

HEARING OFFICER: Okay. I'm not connecting that, right, Ms. Rogerson. If you're saying he's here to rebut something that I've heard already this week, then let's speak to the testimony that was offered this week not to analysis of who has performed prior to the hearing.

MS. ROGERSON: Okay. I understand. Thank you, Mr. Hearing Officer.

Q (By Ms. Rogerson) Mr. Kinzer --

A. Can I stop? I'm not sure I fully understand your recommendation here, sir.

HEARING OFFICER: It's all right. We'll continue with questions, and I think it will be (inaudible).

A. Okay.

Q (By Ms. Rogerson) Mr. Kinzer, I believe that we heard -- you've -- it's my understanding that you've been listening to testimony in this proceeding, is that correct, at least some of the time?

A. That's correct. I've been calling in, I believe, everyday and kind of having it on in the background.

Q. Can you tell us what you heard Perpetua's witnesses



testify to with regard to flows through their proposed tunnel?

A. I heard that there was passage being maintained at various flows through the tunnel, and that there was, I believe, four established flows that they evaluated for that.

Q. And do you remember what those established flows were?

A. I think -- I believe it comes from the McMillen document, but I think it was 8 cfs and maybe a 7.1, 6.6, and a 5, I think. There was four flows that were modeled to evaluate passage.

Q. And what is your understanding based on their testimony of which of those flows would allow fish passage through the tunnel based on their own analysis?

A. It's my understanding that it was -- they reported that a flow of 6.6 cfs would allow Chinook Salmon passage through the tunnel when they were there during their time of migration.

Q. And do you -- do you agree with that assessment based on your review of their testimony and the materials that were provided?

A. No, I don't.

Q. And why is that?

A. Because I think that suggestion was made based off



criteria from CDFW and it's not actually following the criteria established by NOAA for fish passageways.

Q. And can you remind me why you don't believe the California Department of Fish and Wildlife criteria applies to the tunnel?

A. During our review of the passage conditions downstream of the tunnel we reviewed that document, and it states very clearly that that is for natural stream reaches and riffle areas. And I believe that also mentions a gradient less than 4 percent.

Q. And what is your understanding based on Perpetua's own technical memorandums of what would be required to insure fish passage through the tunnel -- through the tunnel as they've designed it?

A. To me NOAA's guidance and criteria which is for Chinook Salmon, you need a depth over the weir of one foot, and my understanding is that is achieved at flows greater than 7.25 from their modeling efforts.

Q. Great. Thank you, Mr. Kinzer. I'd like now to turn to the point of quantification that Perpetua proposes in their proposed water right condition.

A. Okay.

Q. Can we turn back to demonstrative 283?

A. Okay.

Q. Can you just remind us where Perpetua's proposed



point of quantification is on this map, Mr. Kinzer?

A. Downstream of the mouth of Sugar Creek below the proposed tunnel. It's the yellow dot on the map.

Q. Thank you. Could you turn back to your expert report, Exhibit 201, which I believe you still have in front of you.

A. Partially in front of me. Okay.

Q. And can you turn to figure 3? And I believe this is actual page 12 of your report, and that might be pdf page 13.

A. Okay.

Q. Can you explain to me what this figure represents?

A. Yeah. First off, it represents the low flow condition or the 95 percent exceedance flows. It's calculated using a three-day moving average. What we were doing with this was attempting or showing that what the flow is at the proposed point of quantification that's shown in the lower figure, and the blue -- dark blue line. And then we described the flow in the East Fork, South Fork upstream of the mouth of Sugar Creek, also in the dark blue line on the figure on top. The light blue line represents the percent of water being withdrawn from the stream at those locations based on the proposed conditions that have been supplied. It shows that although the 20 percent reduction in stream flow is maintained downstream at the proposed

point of quantification for much of the year, it does actually go above a 20 percent impact in that month of July. And then if you actually move upstream, that actual impact on flows and impacts to fish importantly, is greater than 20 percent for most of the year. Those reach out or acquaint to about a 30 percent impact across most months. Obviously in the high flow period that drops down because the proposed condition -- proposed water right gets capped at 9.6, but in the month of July we have a spike in the proportion of water that's possible to be withdrawn during these low flow conditions, and that reaches all the way up to 55 percent. That's an important month for us. That is a month when the majority of our Chinook Salmon are moving up to stream and trying to navigate through these waters.

Q. So based on the evaluation that you just described, what concerns do you have with the location of Perpetua's proposed point of quantification for their condition?

A. The concern that I have is that it kind of hides or masks the actual true impacts that these fish are experiencing in the waters that they're residing in. The condition, you know, sets a limit at 20 percent for a low flow kind of condition, and those fish in the East Fork are actually experiencing something much greater than that depending on the year.

Q. And by much greater than that, you mean greater



than a 20 percent sort of flow reduction?

A. Greater than a 20 percent flow reduction. You know, similar to our proportional habitat evaluation of Meadow Creek that we talked about earlier, that works out to kind of a 30 percent habitat loss for those fish during those times of years in that stream reach.

Q. Thank you, Mr. Kinzer. I'm now going to turn to the concerns you articulated in your expert report with respect to fish stranding. Can you just briefly tell us what is fish stranding?

A. Yeah. Fish stranding happens when you have water withdrawals. Essentially you pull out water fast enough and the fish don't have time to react, and they get disconnected from the stream flow and end up in small little pools along the stream edge, get isolated and can't get out. Oftentimes that results in those pools heating up quickly. It results in increase predation. They are easy to get at. They have no place to go hide and escape.

Q. And remind us, what is the concern with respect to increased temperature in the water, just sort of generally?

A. Generally, I mean, water increases (inaudible) smaller volume of water with solar radiation it heats it up much faster.

Q. And in your experience how do water diverters typically prevent fish stranding when diverting water from a



stream or a river?

A. It's -- they implement things called ramping rates is a way to do that and essentially it's turning on the faucet or turning off the faucet in a slow fashion so that you take small increments of water and allow the fish to react and go find kind of safe harbor. And you keep turning it on until you get to your desired water withdrawal.

Q. And what recommendations did you make in your report concerning ramping rates and fish stranding?

A. That it wasn't necessarily fully understood for that reach, and that it should be kind of evaluated to see what those potential impacts would be. Given the fact that this proposed water right is for 9.6 cfs that's, you know -- we saw in a previous graph that's up to 30, maybe 55 percent of the stream flow. It's reasonable to assume that fish might have an issue with that. Might get stranded.

Q. Could we turn to Perpetua's fisheries rebuttal report that's Exhibit 63? And that would be in a black binder in front of you, Mr. Kinzer.

A. Okay.

Q. Could you take -- excuse me. Could you turn to page 4-4? Are you familiar with this passage? I believe it criticizes your citation to studies based on flow fluctuation at hydraulic facilities and larger hydro systems.



A. That's correct.

Q. What is your response to this criticism?

A. I think it's true that, you know, ramping rates generally are applied to hydroelectric facilities when large amounts of water are being taken out of the stream. I kind of disagree with the fact that it doesn't apply here, though, because we have a large amount of water being taken out of the stream in the East Fork, South Fork Salmon River or being proposed to be removed from the stream.

Q. Do the criticisms contained in that passage of the rebuttal report change your concerns and recommendations with regard to ramping rates?

A. No. I think it should be more understood.

Q. Did you identify any analysis of ramping rates in Perpetua's water right application or their associated materials?

A. No, I did not.

Q. Do you consider the analysis of ramping rates necessary to fully understand potential effects from Perpetua's proposed water rights on fish and fish habitat?

A. I think we should understand, you know, the fish stranding issue in that reach of river. That probably depends on the habitat that's available out there, and ramping rates are one way to mitigate that.

Q. I think I'd like to now turn to the final concern

in your expert report, which I believe related to instream temperatures and fish productivity. So if we could go back to your expert report in 201.

A. Okay.

Q. Mr. Kinzer, how does water temperature affect fish generally? I know you spoke to this earlier, so just briefly.

A. Different species have different kind of temperature ranges that they prefer. Essentially you have warm water fish species. You have cold water fish species. The fish that we have residing in this area are salmonoids. There is some other resident fish up there that we haven't been discussing, but the salmonoids up there are considered a cold water species.

Q. Okay. Can you turn to table 4 of your expert report? And this is page 14, I believe, and pdf page 15.

A. Yep.

Q. What does this table show?

A. It shows these temperature ranges that are in the literature. It shows them for different life stages of Chinook, spawning kind of life stage a juvenile, and also Steelhead and Bull Trout temperature ranges.

Q. And what does the term optimum on this table mean?

A. Optimum is the temperature range that those fish prefer to be in. It gives them kind of the best chance of



survival.

Q. And what does the term maximum mean?

A. Maximum in this context is considered a sublethal temperature. That's a temperature that as stream temperatures get above that, fish start to experience increased stress. Fish will start to seek out thermal refuges which oftentimes are side drainages that are coming in with cooler, colder water, and they will go find that to kind of weather the storm, per se.

Q. And what does acute mean?

A. Acute is a lethal temperature. I mean, at that level we start to experience high levels of mortality. Fish just can't withstand that for long periods of time.

Q. And can you summarize or state, then, what those various ranges for temperature ranges are for fish, according to this table?

A. Yeah. Generally the optimum temperature range for Chinook is 7.2 to 14.5. It looks like 7.2 is the lowest number for Chinook spawning, and the highest number is kind of for Steelhead at 18. So it's kind of in that range for optimum.

Q. Okay.

A. And that's in Celsius.

Q. Can you now flip to figure 4, which is I believe on page 15 of your report, pdf page 16?



A. Yes, I can.

Q. What does this figure show?

A. It shows the five U.S.G.S. gauges that are in the area, and this shows the temperatures that we have observed at those gauges from, it looks like, 2011 to 2023 across the year. The X axis is the Julian day, so that highest point on that graph is kind of mid-summer-ish. The Y axis is what's called the mean weekly maximum temperature. So you calculate the daily maximum temperature, and then you take kind of a seven-day average of that to get kind of a week period. That's a common, really common metric for fish biologists to use to understand temperatures and what fish are experiencing out there. The yellow band on this figure is showing temperatures that are above the optimum level for Chinook. We just use that range. And then the red is showing kind of the start of the maximum or that sublethal temperature range for Chinook. It shows that we are at, looks like, two, three of the gauges we are definitely above that optimum range in a lot of years, most years, at a few of those sites. And it seems like we're approaching kind of that maximum level.

I think it's important also to note that this sort of figure is -- and this look of temperatures across the entire Snake Basin is very similar, so there's nothing really unique here. Fish are experiencing these



temperatures all the time across the basin, yeah.

Q. Thank you. So given the information that you just discussed in table 4 and then more recently in figure 4, what concerns do you have about the effects of Perpetua's proposed water rights applications on instream water temperatures for fish?

A. The concern that I have is that the water -- the water withdrawals would drive temperatures up and, you know, consequently kind of push these lines up higher up onto that Y axis and into that red level where fish are going to have a harder time surviving out there.

Q. And do you have concerns about surface water temperatures for fish as a result of both surface water and groundwater diversions or withdrawals?

A. I do. There's a -- the water withdrawals I think are -- it's established in the literature that generally water withdrawals will drive temperatures up. So I think that's a pretty common, common thing. I think groundwater has a way to reduce that. Groundwater brings in cooler water so the connection between the groundwater and the stream flow for fish is important to reduce that. The Chinook Salmon reds are also -- there's a fair amount of literature on the fact that Chinook Salmon seek out areas in the stream where they (inaudible) zone of the groundwater, and that helps those eggs survive.

Q. What data gaps concerning instream temperatures for fish did you identify in Perpetua's water right applications or the associated materials that you reviewed?

A. Data gaps, we didn't review any temperature data from their materials that they provided for the water rights application.

Q. And that's because you didn't see any temperature information?

A. We didn't see any.

Q. What recommendations concerning instream temperatures do you make in your report with regard to Perpetua's water right applications?

A. I think we suggest that we should consider thresholds, temperature thresholds, that would eliminate or reduce water diversions as these streams start to approach these temperature thresholds for fish.

Q. And do you believe that Perpetua's proposed water right condition addresses or adequately addresses increased or decreased stream temperatures?

A. No. No, I don't think they mentioned temperatures.

Q. So I'd now like to turn to Perpetua's rebuttal report, and we're turning back to pages 4-5.

A. Was that 20 -- what was the number again?

Q. I believe the rebuttal report was 63; is that correct? Let me check.



A. Okay. There's a lot of binders up here. Okay.

Q. Are you looking at the rebuttal report?

A. I am.

Q. Did I get the exhibit number right, there?

A. You did.

Q. Okay.

A. You did.

Q. Are you on page 4-5?

A. Okay.

Q. So I believe that there's text on this page that says, quote: Limiting water right withdrawals at the Stibnite Gold Project will be largely ineffectual to address stream temperature within the project site because the surface water diversion is at the down gradient end of the site limiting effected stream length, close quote. Have you located that text?

A. I haven't located it, but I do recall it.

Q. Okay. I'll give you a second to locate that text. And I apologize, I think I failed to make a note exactly where it is on that page.

FEMALE SPEAKER: It's under 2.5.

A. 2.52.

Q (By Ms. Rogerson) Beginning with limiting water withdrawals. I believe it is the last sentence, Mr. Kinzer.



A. Oh, there we go.

Q. The first paragraph.

A. Yes. Okay, found it.

Q. Does this statement change your concerns regarding temperature increases related to Perpetua's water withdrawals?

A. No. The way that I understand this -- the way that I understand this sentence is that they're referring to the surface water diversion at the head of the tunnel, and that downstream of that tunnel is a short river section. And it would be limited, I guess. I disagree with that because the temperature effects will go onto -- throughout the East Fork, South Fork to some extent, reaches even below Sugar Creek. I don't know what extent, but temperatures, conditions will flow downstream. And then on top of that, I think it's not referencing the fact that these temperatures, increased temperatures, could occur in Meadow Creek as a result of the groundwater wells and reductions of water up there.

MS. ROGERSON: Jean, are you on Exhibit 63?

FEMALE SPEAKER: Yes.

Q (By Ms. Rogerson) Okay. Great. I just wanted to make sure. I wanted to make sure we were referencing the right exhibit. Thank you. And, finally, Mr. Kinzer, do you consider instream water



temperature analysis necessary to fully understand the potential effects of Perpetua's proposed water rights on fish and fish habitat throughout the East Fork, South Fork, and Meadow Creek?

A. I think it would be prudent to understand that better. As I mentioned earlier, salmonoids are considered a cold water species, especially Bull Trout, and increased temperatures can affect them.

Q. And so just finally I wanted to turn to your concerns regarding fish flow productivity.

A. Okay.

Q. I think you defined fish productivity earlier. Can you give us just a very brief reminder of what fish productivity means?

A. Yes. Productivity is the number of offspring per kind of adult spawn and can be measured in different ways. The two common ways are like an adult to adult metric and obviously there's another one called juvenile productivity, and that's juvenile to adult.

Q. And is there specific scientific support for a relationship between flows and fish productivity?

A. There is, yeah. There's examples in the literature. We referenced two examples in our expert report that shows that relationship exists.

Q. Do you have your expert report still in front of

you?

A. I do.

Q. On page 16, can you flip to page 16 for me of your expert report?

A. I'm on it.

Q. You're on it. Okay, great. I believe you say on this page the amount of water in a stream environment has a direct relationship with fish population productivity. Do you see that?

A. Again, yes, yep.

Q. Can you explain what you mean by a direct relationship?

A. A correlation between flow and productivity. This particular one that I'm referring to is that there's a positive correlation. So as flows increase, productivity generally increases, and as flows decrease, productivity generally decreases.

Q. And remind us how did you specifically evaluate in your report the potential effects of Perpetua's proposed water rights on fish productivity in the system?

A. We used two methods. Well, the first one we just referenced scientific literature. We referenced a report by Jim Morrow who is a NOAA scientist who has done this with Johnson Creek data, and he found that there was an adult to an adult relationship of productivity to flows. We also



referenced intrex (phonetic). It's a contractor that worked in the Lapwai Creek Watershed, and they found a relationship between flows also for Steelhead. And then we actually evaluated this ourselves given our own data, and we accessed the Johnson Creek juvenile abundance data. And we created our metric based off of Johnson Creek juveniles to Johnson Creek adults, and looked at that in relation to average September flows and found a significant relationship.

Q. And why did you use Johnson Creek, given that it's not directly in sort of the proposed project area or the proposed area where diversions will be taking place?

A. It was the closest location to the project site that has this type of data that we could evaluate.

Q. Okay. And what conclusions did you ultimately draw from your evaluation?

A. We drew that productivity would decrease as -- with this sort of water reduction.

Q. So I want you to turn back to Perpetua's rebuttal report, which I believe you still have in front of you.

A. I do.

Q. And could you go to page 4-6?

A. Okay.

Q. Are you on that page?

A. I am on the page, yes.

Q. I believe that this page states that, quote: Flow



to productivity relationships are rarely, if ever, direct and are often confounded by complex relationships between habitat conditions, population levels, competitive relationships, density dependent mortality, water quality, temperature, and other factors. Are you seeing that passage?

A. Not at the moment.

Q. It starts with flow productivity.

A. Which paragraph?

Q. That I did not make a note of, and I apologize for that.

A. Flow productivity. I'm not seeing that right at the moment. I remember that sentiment, even though I'm not seeing it at the moment.

Q. Okay. I'll have you speak just to the sentiment, then. So do you agree with that statement? I'll read it for you again: Flow to productivity relationships are rarely, if ever, direct and are often confounded by complex relationships between habitat conditions, population levels, competitive relationships, density dependent mortality, water quality, temperature, and other factors.

A. I do agree with that. It's similar -- similar relationship to habitat to flows. Productivity to flows is -- oftentimes it's not linear. Sometimes it is. It just kind of depends on the stream. Depends on the species.



Depends on, you know, a number of different factors, yes.

Q. In your review of Perpetua's expert reports and the other associated materials, were you able to find any sort of flow to productivity analysis or data?

A. No, I did not.

Q. But you consider this sort of analysis helpful for understanding the potential effects of water withdrawals on fish; is that fair to say?

A. Absolutely, yeah. It's helpful to understand those impacts for sure.

Q. So, Mr. Kinzer, I'd like to conclude with your recommendations. So based on your analysis of all of these materials that we've been discussing here today, what are your sort of overall conclusions?

A. I think overall one of my biggest impressions is that there's an overall lack of information to really establish precise ideas of what these impacts will be. Given our -- our evaluations, it certainly suggests that these impacts could be quite large, and that's a concern to me. I would recommend that we use the information that we have or collect additional information to establish minimum instream flows that would be protective of fish. As I mentioned before, that's where my mind is at is I want to protect those critters that are out there.

And I think another reasonable recommendation

would be limiting the diversion rate so that we can -- you know, so the fish don't experience conditions at any point in a year or any instantaneous point that's drastically different than what they would be experiencing otherwise.

Q. And can you just briefly remind me how we might go about establishing that minimum instream flow for, say, the fish passage reach downstream of the tunnel?

A. I think there's data that is currently existing that Rio ASE has collected and developed that could be used to gain an understanding of that. And then additionally, I think there's other ways to go about it, but it would require a larger effort to actually go out and collect the data and then model that.

Q. And how might -- and how might one might go about figuring out what an instream flow for the Meadow Creek area look like for fish habitat?

A. The IFIM PHABSIM type modeling effort and data collection effort is a way that that has been done in the past and is still being used quite extensively today. There's habitat suitability models that you can get at that stuff that requires a number of stream surveys. It requires hydraulic models to go out and calculate depths and velocities and relate that to fish. So there's various ways that you can start to tackle that question if you -- yeah.

Q. And, finally, can you remind me what your



recommendation was with respect to any point of quantification for water right conditions?

A. Yeah. I think it's important to understand the true effects to fish at all their impacted reaches. I would suggest that there's a monitoring device so the water diversions and what stream flows are in each reach that the water diversion may occur.

MS. ROGERSON: Thank you, Mr. Kinzer. I have no further questions.

HEARING OFFICER: Okay. Thank you. We'll go ahead and take a break at this point, and then come back and proceed with cross-examination.

(Recess.)

(Reconvened.)

HEARING OFFICER: Okay. We are back on the record. Mr. Watkins, you can proceed with cross-examination of Mr. Kinzer.

CROSS-EXAMINATION

BY MR. WATKINS:

Q. Mr. Kinzer, good morning.

A. Good morning.

Q. My name is Elijah Watkins. I represent Perpetua. I just wanted to clarify a few things. You've been with the Tribe for 22 plus years?

A. That's correct.



Q. In that time have you ever testified like you are testifying today in some sort of official proceeding or anything like that?

A. No, first time.

Q. First time for everything. You are doing great. Keep it up. You have issued reports, though, and scholarly papers before?

A. Co-authored, yeah, authored technical documents, yeah.

Q. And has all of that been while you were at the tribes or with the Tribe? Excuse me.

A. Yes.

Q. You've never done any work on behalf of a mine or a large commercial water user, have you?

A. No, I have not.

Q. There was quite a bit of testimony that you gave with Exhibits 277, 283. Those were those maps that you prepared.

A. Oh, yes.

Q. The pink dots. One has a fish tunnel on it. Do you remember those?

A. That's correct.

Q. So yesterday the Hearing Officer kept those out of evidence, so I'm not going to spend a lot of time talking about those, okay.



A. Okay.

Q. And you also referenced Exhibit 266, which I believe was your rebuttal report?

A. I believe so, yeah. I don't remember the exhibit number exactly.

Q. And your rebuttal report focused largely on the SDEIS and whether or not you thought it was appropriate, and there was some critique in there. Is that generally what your rebuttal was over?

A. Yeah, generally.

Q. Now, earlier on in this case the Hearing Officer issued an order as to the weight that he would give the SDEIS given that no one has come in to lay a foundation for it, so I'm not really going to talk too much about Exhibit 216, your rebuttal report to the extent it focuses a lot on the SDEIS, okay.

A. Okay.

Q. I do want to focus, however, on your main report, which is Exhibit 201. Can we pull that up? And I think there will be a binder in front of you that should have 201 in it. All right. And this is your expert report, correct?

A. That's correct.

Q. All right. Very high level, very generally speaking, your report generally concludes that Perpetua's proposed water right will have a negative impact on fish in

or around the Stibnite Gold Project; is that right?
A. That is correct.
Q. And you are a -- let's see. You have a Master's in applied statistics; is that correct?
A. Uh-huh (affirmative).
Q. You do not have a degree in engineering, right?
A. I do not.
Q. Do you have a degree in biology?
A. I have -- no, not biology directly.
Q. Okay. Are you a hydrologist?
A. No.
Q. And then Mr. Ackerman co-authored that with you. We went ahead and looked at his Linked In profile. Would you agree with me that he has a Bachelor of Science degree in natural resources?
A. Yes, I believe that's true.
Q. And an MS in fish science?
A. That's correct.
Q. And on his Linked In profile he lists himself as a data scientist. Is that a phrase that means anything to you?
A. Yes, it does.
Q. Is it someone who looks at data and crunches numbers?
A. Yep, yeah.



Q. A statistician?
A. No, he doesn't have a statistics -- formal statistics background, but it's a similar role, yes.
Q. That's an interesting comparison you make. He may do types of tasks that statisticians do, but he's not credentialed in that area?
A. He doesn't have a formal degree.
Q. It's important to have a formal degree if you're going to strictly do some sort of technical aspect; is that right?
A. I disagree.
Q. As a statistician you look at data and draw conclusions based on that data?
A. That's correct.
Q. You would agree that having accurate data is critical to drawing conclusions as a statistician?
A. Correct.
Q. If you have bad data you might end up with a bad conclusion?
A. That's possible, yes.
Q. Garbage in, garbage out, correct?
A. Correct.
Q. Let's go to page 3 of your -- well, actually, pdf 3, I think it's going to be page 2 in the Word document in front of you, and I'm looking at the section that says 1.2



data limitations. Do you see that?
A. I do.
Q. We'll go ahead and blow that up on the screen for those playing along at home. And I want to walk you through this bit by bit. As I read the first sentence it says: We conducted our evaluation of the potential impacts to aquatic species and their habitat in a data limited environment; i.e., there was a scarcity of data for us to use for some analysis decision-making and modeling purposes to fully evaluate impacts to fish. Did I read that correctly?
A. I believe so.
Q. So data limited -- a dated limited environment means that you didn't have all the data you needed to do a full analysis?
A. That is correct.
Q. And as a result you were not able to fully analyze the impacts on fish?
A. We couldn't analyze the precise impacts on fish in the effected stream reaches. We had to use other data and make assumptions.
Q. Okay. Now, you didn't go out and gather any data that you thought was lacking, right?
A. No, we did not.
Q. You've been, I think you said, working in that area for 20 some odd years?



A. I've been collecting data in that area for a while now, yeah.
Q. And certainly the tribes, with the excellent work it does with restoration and habitat work in the area, the tribes have been -- the Tribe has been gathering data in that area for sometime as well?
A. Yep, that's correct.
Q. But you didn't -- you did not go and gather that data for this project?
A. We didn't gather any additional data to answer this question, no.
Q. Okay. I'm going to look at the second sentence. It says: Where possible, we used local data from the East Fork, South Fork Salmon River headwaters or from adjacent watersheds. However, when local data were not available, our assessment leveraged nonlocal EG regional data reviews of the scientific literature and/or expert judgment. Did I read that correctly?
A. I believe so.
Q. What were the adjacent watersheds that you pulled data from?
A. Johnson Creek was a watershed that we used, and we also used data from Sugar Creek, which is inside the mine area and -- and, yeah, downstream of that reach and possibly affected from wells in West End Creek.

Q. I think you said that earlier in your testimony Johnson Creek is some 10 miles away from the area?
A. Approximately, yes.
Q. And Johnson Creek might have a different flow rate, a different cfs?
A. Yes.
Q. And Johnson Creek, is that a different elevation?
A. Yes.
Q. And Johnson Creek might have different habitat potential such as holes or woody debris?
A. Yep.
Q. Different biodiversity?
A. It could, yes.
Q. It could have different amounts of shade?
A. Vegetation and habitat is different, yes.
Q. And that might impact the temperature of the stream?
A. It could.
Q. Might have different things of different chemistry like alkalinity or PH?
A. It could.
Q. Did you do anything in your report to reconcile these differences from Johnson Creek and Sugar Creek with the actual at-issue streams that are the subject of this water right?



A. No.
Q. And when you say you pulled data from different regions, what regions were you referring to?
A. Different regions, I guess, looking at the -- we reference the Baxter report which, you know, I believe is looking at streams in Scotland. We referenced the intrex report which looks at flow productivity from Asotin Creek and --
Q. I'm sorry, what was that creek?
A. Asotin Creek.
Q. Asotin Creek. Where is that at?
A. It's outside of Lewiston and Clarkston, Lewis-Clark Valley.
Q. Okay. Any others?
A. We used the various five stream gauges that are all in the project site. I may be missing a few.
Q. If I were to ask you the same questions about the creeks in Scotland and the creeks in the Lewis and Clark Valley that I asked you about in Johnson Creek in terms of habitat, elevation, et cetera, would your answer be the same that it would be different than the at-issue streams?
A. They could be different, yes.
Q. And would your answer also be the same that you didn't do anything to reconcile that dataset's differences with the at-issue data?



A. That is correct.
Q. Did you, by any chance, review the stream functional assessment prepared by Rio ASE?
A. I'm familiar with it, but I didn't formally review it for this process.
Q. Are you aware of the data contained in the SFA?
A. I'm aware of some of it, but, again, not -- not specifically.
Q. And so to the extent that data could have assisted in your analysis, that was not part of your analysis, right?
A. It was not. It wasn't referenced in the original memo, the technical assistance memo that we reviewed.
Q. In that same sentence you talk about when there was a lack of data you used what you call expert judgment. What does that mean, expert judgment?
A. Relying on reasonable assumptions to draw conclusions.
Q. Is that typical in the statistician world when there is a lack of data to use an assumption of what you think the data would show?
A. Yes. Assumptions are common to every statistical model, yes.
Q. In the statistical field, do statisticians ever have an absence of data and use their expert judgment to draw conclusion where there is no data?



A. At times depending on the question or the objective.
Q. Okay. Let's go -- so those assumptions could be wrong if the data shows otherwise, right?
A. If you had the data for, in this case the stream reach, you could potentially evaluate and correlate it to the assumptions that you're making to see if they're valid, yes.
Q. That would be like a hypothesis once you prove the hypothesis with data, you can prove it or disprove it, correct?
A. Yeah. Correct.
Q. And in your report you make assumptions or hypotheses, but you're not able to challenge them with actual data in some instances, right?
A. That's correct. The data that we had available to us didn't allow us to do that.
Q. Okay. And in the last sentence it says: Our evaluation of the effects of PRII's -- I think that's how you refer to Perpetua; is that right?
A. That's correct.
Q. Our evaluation of the effects of Perpetua's proposed water withdrawals on ESA listed fish -- that's Endangered Species Act listed fish, and other species was rigorous when possible; however, for some of our evaluations

the necessary information or data was lacking -- were lacking to fully evaluate potential negative effects; is that right?

A. That's correct.

Q. Because you lacked data to fully evaluate potential negative effects, is it fair to say that you also lacked data to fully evaluate potentially positive effects on fish?

A. Without data, I can't tell.

Q. Now, I think you testified that you've been working in the area for 20 some odd years, and that the Tribe has been working there longer than that, right?

A. Yes, that's true.

Q. Can you help myself and the Hearing Officer understand that how is it that after decades of Nez Perce surveys and decades of Perpetua baseline information, as well as readily accessible and surveyable topography that is viewable from the roadway, how is it possible that you were unable to obtain the data you would need to make a fully informed analysis?

A. Previous work didn't work in that area. We didn't -- our contracts didn't have us going in there to collect that information.

Q. Are you aware that as part of a communications agreement with the Nez Perce Tribe, Perpetua has supplied the tribes with all of its baseline studies for the area?



A. Yes, I am aware of that; however, I didn't review all of that information.

Q. Can we go ahead and show the witness that Excel spreadsheet, Ms. Franolich? On the screen, which I'm guessing is going to be impossibly small to see, is an Excel spreadsheet of different reports that have been provided to the Nez Perce Tribe. Mr. Hearing Officer, would it be okay if I approach the TV monitor?

HEARING OFFICER: That's okay. Yeah, it's a little bit hard to see.

Q (By Mr. Watkins) It's difficult for you to see this, but on row 11 it says aquatics. It gives a number. Final aquatics baseline study report pdf, and that was given to the tribes on July 13th, 2017. You didn't review that data?

A. No.

Q. Ms. Franolich, can you scroll down to the next (inaudible)? On rows 50 and 51 there's two aquatic baseline study reports addendums, as well as addendum equations from July 25th, 2017. That was not reviewed, correct?

A. No.

Q. Go ahead, Ms. Franolich. On June 14th, 2018, there's a draft fisheries and aquatics resources mitigation plan, a draft stream design report, and a revised stream functional assessment methodology report. Those were not



reviewed as part of your analysis?

A. They weren't reviewed for this purpose, no.

Q. Go ahead, Ms. Franolich. I then see a draft Stibnite Gold Project detailed rationale for scoring of stream reaches using the stream functional assessment approach for baseline, interim, and restored conditions. And that was on August 8th, 2018, communications exchange between Perpetua and the Nez Perce Tribes and the fisheries department. As a member of the fisheries department you didn't look at this?

A. No, I didn't. My daily duties don't -- this is the first time I've actually gotten involved in participated in reviewing any of the mine project.

Q. And I appreciate that.

MS. ROGERSON: Officer Cefalo, I would just like to note for the record that we've never seen this spreadsheet and can't vouch for its authenticity. It also appears that it is referring to documents shared as part of the SDEIS for the Forest Service review of the mine proposal.

HEARING OFFICER: Mr. Watkins, any response?

MR. WATKINS: It's a demonstrative exhibit, Mr. Cefalo, if the tribes want to put somebody on to question the credibility they're welcome to do so. I'm just asking this witness what information he did or did not review.

HEARING OFFICER: I'm not getting a lot out of this.



I think you've made your point, so maybe we can move on.

Q (By Mr. Watkins) When you were reviewing the water -- when you were reviewing work for your analysis was your goal to look at the water right in isolation?

A. Yes.

Q. You wanted to see what impact the water right and just the water right would have on fish in the area?

A. Immediate impacts, yes.

Q. Immediate impacts. So do I take that to mean that you did not also analyze how the other features of the mine plan might have caused impacts on fish?

A. Correct.

Q. So you didn't do any analyzing on whether or not removing legacy tailings to clean up arsenic, mercury, or antimony in the water would be helpful to fish?

A. Did not.

Q. And there was no analysis done in terms of vegetation planting and how that might affect shade?

A. No.

Q. Moving Meadow Creek, as well as the East Fork, South Fork of the Salmon River on top of the tailings storage facility of the Yellow Pine Pit after reclamation?

A. No.

Q. And it sounds like you did do some analysis on the fish tunnel, but that was done after your report?

A. When we found some discrepancies in flows and how that was presented, yes.

Q. Okay. You would agree that some of these mine activities I just mentioned, like removing arsenic from the water, increasing shade, things like that, that these would be positive outcomes for fish, right?

A. They have the potential to be positive, yes.

Q. And you --

A. My goal was to evaluate the immediate impacts.

Q. Well, you understand, don't you, sir, that the water right that's being requested would be hand-in-hand with these other positive fish steps?

A. I do understand that, and I also understand generally that many of those actions don't come into play for a number of years.

Q. But you didn't look at that to actually know what that schedule is, did you?

A. When we reviewed the SDEIS evaluations for our rebuttal report it looked like a number of those positive benefits don't happen for decades.

Q. And do you have a document that you're relying on for that information, sir?

A. Just my knowledge of my rebuttal report and when we wrote that.

Q. And you said this was the first time you'd reviewed



the Perpetua mine in relation to your work?

A. Yeah.

MR. WATKINS: Ms. Franolich, can we go back to the expert report, please, and could we go to page 4, which is, I think, page 3 in the document.

Q. (By Mr. Watkins) And if we look at the first paragraph, I'm interested in that first sentence up there. It says: Perpetua has also provided no information on how proposed water withdrawals are expected -- are expected to influence stream temperatures particularly during summer and winter months and in the context of climate change. Did I read that correctly?

A. Yep, I believe you did.

MR. WATKINS: Ms. Franolich, can you show the witness Exhibit 58, please?

Q. (By Mr. Watkins) And this is a technical memorandum dated September 11th, 2023, from Brown and Caldwell. Did you have an opportunity to review this as part of your work?

A. What's the title of it? I can't see it. I can maybe find it.

Q. We can blow it up here for you. The title is the summary of the water quality conditions associated with the Stibnite Gold Project.

A. Okay.

Q. Did you review this document?



A. I didn't. I don't believe so.

MR. WATKINS: Ms. Franolich, can you go to page 4, please?

FEMALE SPEAKER: Talk into your mic.

A. Oh, sorry.

Q (By Mr. Watkins) If you go to page 4 and look at the last paragraph, and actually it grows over to the next page as well. But I'll read you this one. It says: To evaluate potential changes in temperature a detailed computer modeling effort was conducted. Model development and calibration are described in the stream and pit lake network temperature model or splint existing conditional report and the splint proposed action report. To address increases in temperature associated with the original proposal, Perpetua Resources developed a modified proposal for the SGP, referred to as the ModPRO2, and it goes on listing various other reports. Fair to say you didn't look at any of those temperature related reports prior to doing your analysis?

A. Nope.

MR. WATKINS: Can we go back to his report, Ms. Franolich?

Q. (By Mr. Watkins) And I want to take you to page 5 in the pdf, which is going to be page 4 in the actual



document.

A. Okay.

Q. And if we blow up that title in the first sentence in there this says major concerns. Do you see that?

A. I do.

Q. So these are the major concerns that yourself and your co-author has with the Stibnite Gold Project's water usage, right?

A. That's correct.

Q. It says: Fish habitat upstream of surface water diversion proposed tunnel -- and you say concerns. The potential for fish habitat loss in the stream reaches upstream of Perpetua's proposed surface water diversion, but below its various other proposed water withdrawals is of major concern. Did I read that correctly?

A. That's correct.

Q. And if we can go to the next page, Ms. Franolich, and if you look at the next page there's some text there at the top that I want to -- so that was your concern. This will now explain how you get to that concern. You say: In the absence of fish habitat we can alternatively assume that flow reductions in this reach of the East Fork, South Fork of the Salmon River have a linear relationship with overall fish habitat loss in the reach; i.e., we can calculate potential loss of habitat as being equal to the proportion

of surface water removed from the stream reach of interest. For example, removing one cfs upstream with 10 cfs of discharge would result in an estimated 10 percent reduction of available habitat. Did I read that correctly?

A. That's correct.

Q. So you assume as part of your analysis a one-on-one relationship between cfs and habitat?

A. For this particular evaluation, yes.

Q. And in your direct examination you talked about a fish in a fish bowl, if you remove some water fish in the fish bowl, okay. You would agree with me, though, sir, that habitat is not the same thing as cfs, correct?

A. Correct. That relationship is oftentimes not linear.

Q. A lake has maybe zero cfs but lots of fish living in it?

A. Totally different environment.

Q. And you would also agree with me, and I think we've already established that all streams are not the same in terms of bows and bends and holes and woody debris and things like that?

A. Absolutely.

Q. And so table 1, which uses this analysis, meaning stream is a one-to-one relationship with cfs to stream habitat, that's an academic consideration but not really



real world scenario, correct?

A. Could you rephrase that? I guess I'm --

Q. Sure. If we've established that in the real world a removal of one cfs does not mean actual removal of an equal amount of habitat. That's not a real world application. So your analysis would be a theoretical or an academic application of your hypothesis, right?

A. I think that can go either way. You can -- we don't have evidence to say that, you know, the relationship isn't linear, but we also don't have evidence to say that it isn't in Meadow Creek. I don't have that data to evaluate. I can't answer that question.

Q. So you're guessing? It could be linear? It could not be linear?

A. It's an assumption.

Q. Okay. Can we look at the second paragraph on that page, Ms. Franolich, and about halfway down I'll read out loud. You can follow along. It says: Under low flow 95 exceedance conditions, all months except May are at or -- are at or below 10 cfs, and that's figure 1 which we just discussed, given the location of the proposed amount of water that is possible for diversion under Perpetua's proposed water rights, approximately all of Meadow Creek's surface water could be removed with the exception of the spring months May and June. This would result in an



almost -- in an assumed 100 percent loss of critical habitat for ESA listed species. Did I read that correctly?

A. Yes, you did.

Q. So based on your assumption that there is a one-to-one relationship between cfs and habitat, you conclude that there would be a 100 percent loss of habitat by Perpetua using its water right?

A. Given these observed flows in Meadow Creek and the assumptions that we made, yes.

Q. One of those assumptions is that Perpetua will actually be using a 9.6 withdrawal?

A. That is the assumption, yeah.

Q. And you also assume that that withdrawal will be every month of the year?

A. I assume that it could be.

Q. How long would there need to be withdrawal of 9.6 before Meadow Creek was sucked dry?

A. Uhm, I guess I don't understand the question exactly.

Q. Let me ask you this: Did you do any sort of temporal analysis to determine how long a user would need to take 9.6 of water out of the river before it would have an impact on the river?

A. The assumptions that we made -- and I think we stated them clearly -- was that removing 9.6 from the



groundwater would have an immediate effect of one-to-one on Meadow Creek. So if Meadow Creek's flows are below 9.6 and you pull 9.6 out, I think I agree with that, it would have a serious reduction.

Q. Okay. So maybe I'm not asking my question clearly. I understand cfs means cubic feet per second, right?

A. Correct.

Q. So if I push a button and in one second 9.6 worth of water jumps out of the river and nothing happens after that, you are saying there would be a critical loss of habitat?

A. I'm saying that if you pull 9.6 out of there and that's all it has currently, it seems like that's reasonable. I'm not a hydrologist so I don't know exactly those time delays.

Q. Well, I mean a hydrologist knows that water flows in a river. So if you take 9.6 out for just one second, the next second more water would replace that water, right?

A. That tracks, yes.

Q. So there has to be an amount of time that the 9.6 is being withdrawn for it to have some sort of impact?

A. That tracks.

Q. But you didn't do that analysis?

A. No.

Q. You've been listing in on the hearing. You

understand, then, that Perpetua is not taking out 9.6 cfs 24 hours a day, seven days a week, right?

A. I've heard that in the hearing. My task at hand, though, was to evaluate the full water impact to understand what potential effects could happen to fish.

Q. Even if those aren't -- even if that's not a real world possibility, right?

A. I believe in the water rights application 9.6 is possible.

Q. Sir, I'm assuming you have showers, sinks, faucets, in your house?

A. Yeah.

Q. Okay. If I'm wanting to determine your household's use of water to see how it might impact your neighbor's water, you have the right to turn on your shower and sink and faucet at full blast 24 hours a day, seven days a week. Would it be fair for me to assume that you would do that in my determination of how your water might impact your nextdoor neighbor?

A. I guess I could do that.

Q. You have the right to do that, correct?

A. Uh-huh (affirmative).

Q. As a statistician or a town planner trying to plan for water, is it reasonable for me to assess that in calculating your usage of home water on the water system in



your area?

A. I'm not sure how municipalities do that. I don't know.

Q. So if I'm tracking your assumptions, you assume that 9.6 is going to be used 24 hours a day, seven days a week, 12 months a year, all through surface water diversion, is that right, all from Meadow Creek?

A. No. Those assumptions were that that water be pulled from groundwater, and that that would have an immediate and one-to-one impact on surface water.

Q. My mistake. Excuse me. 9.6 24 hours a day, seven days a week, 12 months a year, all from groundwater, right?

A. Correct.

Q. One might call that a worst case scenario. Is it -- is that a yes?

A. Yeah. Sorry.

Q. Is it typical as a statistician when trying to do real world modeling to only model the worst case scenario?

A. It's often common to model out worst effects, especially in a situation like this when we're trying to understand what could potentially happen to fish, yes.

Q. Did you hear testimony from witnesses throughout this hearing saying that Perpetua wouldn't be able to use all that water, not just use it but would have to manage it, they have to put it somewhere?



A. I heard testimony of that. I don't understand it because I'm, again, not a hydrologist.

Q. Well, much like you, I mean, if you ran your shower and sink and bathtub 24 hours a day, seven days a week, stuff might start overflowing, right?

A. If the drains were keeping up, maybe not.

Q. You didn't run any analysis to try to determine the realistic usage of water, the water that actually be used by Perpetua, right?

A. No. I evaluated what was applied for.

Q. Can we go back to table 1, please? On table 1 you relied on U.S. gauge 13310850; is that right?

A. Yes, that's correct.

Q. And you used that to establish the 95 percent flow exceedance for Meadow Creek?

A. That's correct.

Q. Are you aware that Chinook Salmon are known to spawn in the reach immediately downstream of Blow-Out Creek?

A. Yes. They also spawn upstream of that.

Q. Okay. And you're aware that that gauge, gauge 850, is located almost one mile upstream from this reach, and therefore, does not include the flows from Blow-Out Creek which represents approximately 40 percent of the basin area contributing to flow in that reach?

A. Yes. I'm aware that Blow-Out Creek contributes a



portion of water. I'm not exactly sure on the exact amount.

Q. Did you consult with the hydrologist as part of your work prior to selecting U.S. gauge 850 to construct table 1?

A. No.

Q. Have you ever used the U.S.G.S.' stream stats web tool?

A. No. I'm aware of it, but I've never used it.

Q. Is there any reason that you didn't use the stream stats tool to make sure that you were selecting the appropriate gauge when picking gauge No. 850 for table 1?

A. Is there a reason I didn't do that?

Q. Yes, sir.

A. I used different techniques to access the U.S.G.S. data.

Q. Can we go to the next page -- or, strike that. Do you believe that Perpetua failed to account for climate change in its work?

A. I didn't see any mention of climate change in the water rights proposal or in the documents that I reviewed to establish my evaluations. I'm not sure how much climate change was included in other mine project analyses.

Q. Do you believe that climate change can change the conditions of the Stibnite Gold Project?

A. I think climate change has the potential to

severely alter stream flows and temperatures, yes.

Q. You know that the mine life of the Stibnite Gold Project is 14.25 years?

A. Uh-huh (affirmative).

Q. And so do you have a belief or an opinion as to whether or not climate change would impact the life of the usefulness of the water right over the next 14.25 years?

A. I have a general opinion on that. That in my knowledge we are seeing stream temperatures get warmer and warmer, and we often are seeing environmental temperatures get hotter and hotter.

Q. Can we go to page 7 on the pdf, page 6 in your report, sir? And I'm looking at a sentence in the middle that says we generated.

A. Page 7, you said?

Q. Page 6. I'm sorry.

A. Page 6.

Q. Page 6 in the document. About halfway down, I blew it up here on the screen, it says: We generated figure 2 using habitat data collected by the U.S. Forest Service in lower Sugar Creek approximately one half mile upstream from its confluence with the East Fork, South Fork Salmon River in 1990. Did I read that correctly?

A. Yeah, that's correct.

Q. You used over 30-year old data to measure the



weighted usable area for Chinook; is that right?

A. That's correct.

Q. Do you have an opinion as to whether or not climate change would have impacted data from 30 years ago to today such that that data would no longer be applicable to today's conditions?

A. It's certainly possible, yeah.

Q. Do you have sufficient climatological data to predict climate change impacts at the Stibnite Gold Project over the next 14.25 years?

A. I do not.

Q. Do you have concern that Perpetua's use of its water right will impact Endangered Species Act listed fish?

A. I do.

Q. I went ahead and looked at your report. If you exclude the title page and the references, so just look at substantive text, your report is 17 pages long. Any reason to disagree with me on that? You're welcome to count if you would like.

A. No.

Q. I'm sorry -- yeah, 17 pages long. Out of those 17 pages, I did a word search. You used the term ESA listed fish at least 16 times. Does that sound accurate?

A. I'm sure three of the four species up there are listed on the ESA list.



Q. You would agree with me, sir, that agencies other than the IDWR have regulatory authority over this project as it relates to ESA listed fish?

A. Yes.

Q. So while you and I might have an academic conversation regarding 9.6 and flow rates, ultimately different agencies will be deciding the issue of how the project would impact ESA listed fish, right?

A. My understanding is there are other agencies that will be reviewing it also.

Q. Could we go to page 17 of the report on the pdf, 16 of the document?

A. Page 16, you said?

Q. Yes, sir. And the paragraph in the middle there you did some analysis regarding the productivity of juvenile Chinook Salmon?

A. That's correct.

Q. You said that we found juvenile productivity of Chinook Salmon in Johnson Creek was significantly correlated with average flows in September.

A. That's correct.

Q. For each unit increase in discharge an additional 3.7 juveniles were expected to survive incubation and rearing. Using the developed model and assuming the relationship -- and assuming the relationship is similar for



fish within the project area, we can estimate the potential reduction in juvenile productivity based on proposed water withdrawals. Do you see that?

A. I do.

Q. And so we talked about this previously, but Johnson Creek's some 10 miles away, right?

A. Correct.

Q. And we've talked about how Johnson Creek is likely different than the creeks in the project area?

A. We did.

Q. And I think you even talk about that in your report. If you'll flip over to the next page and if you look under 2.62 data gaps and recommended analysis it says: Our analysis assumes a similar flow to Chinook Salmon juvenile productivity relationship in the headwaters of the East Fork, South Fork Salmon River as in Johnson Creek. This assumption may be invalid due to Johnson Creek having a much larger flow conditions and different fish densities and habitat quality. Did I read that correctly?

A. You did.

Q. So to the extent that your analysis on how an increased flow or a decreased flow would change the area at the project site is based on Johnson Creek data, you and your co-authors acknowledge that those assumptions may well be invalid?

A. Yes, we do. With the absence of any other information or similar information we have to make assumptions.

Q. The last part of that sentence you say: It is well documented that positive relationships exist between fish productivity and flow, and any reduction in flow will have a negative effect on fish. Did I read that correctly?

A. You did.

Q. You take an issue with Perpetua's application because it doesn't include ramping rates; is that right?

A. We mention that that should be a consideration.

Q. Have you ever filled out or submitted a water rights application, sir?

A. No, I have not.

Q. Do you know if the regulations of IDWR requires an applicant to include ramping rates as part of their water right application?

A. I don't.

Q. What types of things affect fish habitat?

A. Large number of things: Substrate, vegetation, lots of things.

Q. Is habitat a function of both quality and quantity?

A. Yes.

Q. So quality would be things like woody debris, boulders, velocity, right?



A. Yes.

Q. And quantity would be how much habitat there is?

A. Yes.

Q. Your statement that any reduction in flow will have a negative effect on fish, does that apply to both quality and quantity of habitat?

A. No, this relationship is just purely based on flow to productivity.

Q. I think during your direct testimony you were testifying about different impacts to fish, and you mentioned removing velocity barriers. What's a velocity barrier?

A. A velocity barrier is a section in the stream reach where the water is flowing at a speed that's too great for the fish to pass.

Q. And so in the instance of a velocity barrier reducing the flow would actually be positive to fish?

A. In that case, specific case, yes.

Q. So it's not the case that any reduction in flow will have a negative effect on fish?

A. A reduction in flow has a negative effect on productivity, not passage.

Q. In your report did you do any analysis in terms of the quality of habitat which might occur in low flow situations, especially for juveniles?



A. No.

Q. And did you consider any of the proposed habitat improvements that would be added as part of the mine plan?

A. We did not.

Q. Such as adding large woody debris, putting in pools, boulder clusters, or the removal of passage barriers?

A. We did not.

Q. In fact, your report doesn't consider any of the positive improvements that are part of the ModPRO2 that would come along with Perpetua receiving a water right?

A. No, that was not our objective.

MR. WATKINS: Sir, that's all the questions I have for you.

A. Thank you.

HEARING OFFICER: Ms. Rogerson? Ms. Rogerson, while you're getting set up, I'm going to ask a question or two.

EXAMINATION

BY THE HEARING OFFICER:

Q. Mr. Kinzer, if you would -- well, we don't need the binder. You've been on-site, and you've been at Meadow Creek. You've been at the location where the fish are released back into the stream?

A. Yep.

Q. And that's fairly close to Blow-Out Creek?

A. That's correct.



Q. But there is a section, it sounds like, above the confluence of Meadow Creek and Blow-Out Creek, there's a section even above that where Chinook spawning has occurred?

A. Yes.

Q. But moving up Meadow Creek there it sounds like other witnesses have testified there's natural barrier at that location that prevents --

A. That's correct.

Q. -- the Salmon from continuing upstream?

A. Yeah.

Q. In your earlier testimony you had used the phrase that there are sections of Meadow Creek that are good habitat, but that there are sections of Meadow Creek that are severely impacted still.

A. Correct.

Q. Talk me through what -- where are those severely impacted sections of Meadow Creek? Is it above that natural barrier, that passage barrier, or is it downstream?

A. It's downstream of that. Downstream closer to the -- sorry. I keep forgetting about the mic. Downstream closer to the historical mining operations and impacts.

Q. And you had characterized that area as severely impacted. What --

A. Pretty degraded.

Q. -- what makes it that way?

A. Streams been channelized through that reach, to some extent, so it no longer meanders. The actual substrate in there is less quality for spawning. The vegetation is very limited through that reach. So, you know, it warms up, and it doesn't provide a lot of cover for the fish.

Q. And this is a section, then, between Blow-Out Creek and the East Fork, South Fork --

A. Yes.

Q. -- moving downstream?

A. Yep.

HEARING OFFICER: Okay. Thank you. Ms. Rogerson, you can proceed with redirect.

MS. ROGERSON: Thank you, Mr. Hearing Officer. I have conferred with my co-Counsel, and we have questions for Mr. Kinzer about tunnel passage that directly rebut testimony from Mr. Bosley and Mr. Leonard yesterday, as well as Mr. Bosley's expert report. Specifically, Mr. Bosley testified about his conclusions regarding the 6.6 flow meeting fish passage criteria through the tunnel and his expert report, which is Exhibit 60, I believe, as well as in Perpetua's July 23 -- excuse me, I believe that was the July 11th follow-up letter, which is Exhibit 219. Mr. Leonard also testified to these representations in that Exhibit 219 that was sent to the Governor's Office of Energy and Mineral Resources. I have a very narrow line of questioning that I



would like to pursue to rebut that testimony.

HEARING OFFICER: Okay.

MR. WATKINS: So --

HEARING OFFICER: We'll take it a question at a time.

MS. ROGERSON: Okay. Thank you.

MR. WATKINS: If I can just for the record, Your Honor. Objection, Counsel is testifying to the extent that the redirect is outside the cross-examination it would be improper, but I understand the Hearing Officer's ruling that we'll take a question.

HEARING OFFICER: Go ahead.

MS. ROGERSON: Thank you, Mr. Hearing Officer.

REDIRECT EXAMINATION

BY MS. ROGERSON:

Q. Mr. Kinzer, did you hear Mr. Bosley provide testimony on fish passage to Perpetua's proposed tunnel?

A. Yes.

Q. And did you hear Mr. Bosley testify about his tunnel passage conclusions and his September 11th expert report, which I believe is entitled water management or water conservation of the tunnel, or something to that effect?

A. I do remember that, yes.

Q. And I believe that is Exhibit 16 for the record. Did you also hear Mr. Bosley testify about the same



conclusions in the July 11th follow-up letter that Perpetua sent to the Governor's Office of Energy and Mineral Resources that he testified, as I understood it, he had a hand in authoring?

A. I do recall that, yes.

Q. Did you understand Mr. Bosley's testimony as asserting adult fish passage to the proposed tunnel at 6.6 cfs would occur?

A. Yes.

Q. Or that is the minimum flow that would allow fish passage through that tunnel?

A. I do remember that, yes.

Q. Can you go to Mr. Bosley's expert report on Exhibit 60? I think I would like to go to page 2. Do you still have that in front of you?

A. 60? What was the exhibit number?

Q. I believe it's 60. Yes.

A. Okay. Yes.

Q. And are you on --

A. Page 2?

Q. You are on page 2? Yeah.

A. Okay.

Q. Are you familiar with Mr. Bosley's conclusion on page 2 of his report that the modeling in the McMillen report, which was one of Perpetua's reports with respect to



their tunnel, quote: Demonstrates the ability of the tunnel fishway to maintain water depths and velocities meeting the first passage design criteria for Chinook Salmon down to 6.6 cfs of flow and for Bull Trout and Steelhead down to 5 cfs?

MR. WATKINS: Objection. Undisclosed expert, outside the scope of the cross-examination.

HEARING OFFICER: Your objection is noted on the record. So you can answer that question.

A. I'm familiar with it, yes.

Q (By Ms. Rogerson) And can you just briefly describe what your concerns are with the conclusions in that passage of text?

A. From my review of the McMillen Jacobs reports they recommended a minimum flow of 7.25 through the tunnel that would provide passage.

Q. And McMillen Jacobs is the company or the contractor for Perpetua Resources that they retained to evaluate flows through the tunnel; is that correct?

A. That's my understanding, yes.

Q. I would now like him to turn to Exhibit 219A, which we introduced into the record a couple days ago, and I believe I have that letter.

A. I don't know if I have that.

Q. You don't have it because it wasn't (inaudible) here is the letter.

HEARING OFFICER: Go ahead.
MS. ROGERSON: Okay.
Q (By Ms. Rogerson) Mr. Kinzer, can you -- can you just describe what you have in front of you, please?
A. It looks to be a letter from the Office Species Conservation, Idaho Department of Fish and Game. It is dated September 28th, 2023, and addressed to Hearing Officer Cefalo.
Q. Can you go ahead and read the last line of the letter?
A. The last line says: Attachment water rights technical assistance review follow-up, Perpetua Resources.
Q. I would just like to note for the record that you, Officer Cefalo, stated when you provided us with this letter a few days ago that appended was actually the July 11th, 2023 letter --
HEARING OFFICER: Correct, correct.
MS. ROGERSON: -- that Perpetua Resources sent to the Governor's Office of Energy and Mineral Resources.
HEARING OFFICER: Yes, that's correct.
Q (By Ms. Rogerson) So based on that information, would you interpret the last line of that letter as suggesting that it was that July letter that was appended to that -- to the letter that you were



looking at today?
A. Yes, I would.
Q. Can you read the first bullet -- bullet point on the letters in front of you?
A. Surface water diversions and infrastructure will not at any time impede the passage of any life stage of Chinook Salmon, Steelhead, Trout, Bull Trout, or Cutthroat Trout from the confluence of the East Fork of the South Fork Salmon River and Sugar Creek upstream passed the point of diversion.
Q. And do you believe that Perpetua's proposal to maintain 6.6 cfs through their proposed tunnel will achieve IDF&G and OSC's recommendation in that bullet with respect to fish passage?
A. I do not.
Q. And can you help -- can you explain why not?
A. Because I think from the material that I reviewed from McMillen Jacobs, the 6.6 cfs through the tunnel wouldn't provide a depth necessary for Chinook to pass.
Q. Thank you, Mr. Kinzer. Referring back to the Rio ASE analysis that we discussed earlier, did they use data from Johnson Creek in their assessment to some respect?
A. They did. They used Johnson Creek to extend their flow conditions.
Q. And did you determine that that was sort of an



appropriate use of relevant information in the broader area?
A. Yeah. Without -- without any additional information in the project site, yeah, can use that data.
Q. Finally, Mr. Kinzer, I wanted to ask you about your assessment of habitat Meadow Creek. I think we heard testimony from Perpetua's witnesses that Perpetua has plans to line Meadow Creek which could, in theory, disrupt the hydrologic connectivity between surface and groundwater flows. Do you know when that liner, based on your review of the materials, might be put in place by Perpetua or when it's proposed to be added to the landscape?
A. I think from the testimony I've overheard this week it was a number of years after the project (inaudible). I don't recall exactly how many.
Q. And do you have concerns about flow diversion impacts on fish habitat up until the point that that liner is installed?
A. I think the connection between groundwater and surface water isn't fully understood in my mind, but going off the assumption that was presented in the earlier memo for technical assistance, it stated that there was a groundwater assumption that it would have an immediate and one-to-one impact to stream flows.
Q. Thank you. Finally, I believe Hearing Officer Cefalo asked you some questions about whether Blow-Out Creek



is a natural barrier to Chinook Salmon passage; is that correct?
A. I believe Officer Cefalo's question was upstream of Blow-Out Creek on Meadow Creek.
Q. Oh, I see. Thank you. Does that natural barrier upstream of Blow-Out Creek on Meadow Creek only apply to Chinook Salmon or does it apply to other species as well?
A. Chinook can't get over that, so they stop spawning at that point.
Q. And can you just remind us what other fish are present and spawning in Meadow Creek?
A. Throughout Meadow Creek we have West Slope Cutthroat Trout, Bull Trout, and as I mentioned earlier, we do have evidence of Rainbow. However, we're not sure what the subspecies is, whether it's a lineage to the original anadromous Steelhead or whether it's a remnant from the Golden Trout out-plants.
MS. ROGERSON: Thank you. Mr. Hearing Officer, I have no further questions.
HEARING OFFICER: Okay.

RECROSS-EXAMINATION

BY MR. WATKINS:
Q. Mr. Kinzer, do you agree that volitional fish passage above the Yellow Pine Pit is of critical concern because of the higher quality habitat upstream that fish

currently cannot get to?

A. I think volitional passage is always the preferred outcome for fish for sure.

Q. And we've had multiple witnesses already testify that there are no Steelheads above Yellow Pine Pit, right?

A. Not officially confirmed, correct.

Q. And the extent that there are Chinook or any other fish up there, it's either because the tribes are trapping and hauling fish up there or it's a resident population that is hanging out up there, right?

A. That's true. The Tribe -- the Nez Perce Tribe trapping and hauling fish up there, it's not just the Nez Perce Tribe. It's a collaborative agreement across all the comanagers and approved by NOAA.

Q. You would agree that supplementing native populations of fish by trapping and hauling nonnative populations of fish is not a panacea because it does not correct limiting factors that may be preventing volitional fish passage?

A. I'm going to have to break that question down a bit. Volitional passage is good. Trapping and hauling nonnatives up there, is that what you said?

Q. Yes, sir.

A. That's a little bit incorrect. The South Fork Salmon River fish are in that basin, so we don't refer to



them as nonnatives.

Q. Can we show (inaudible), Ms. Franolich? Go to the next page, please. I'm showing you an article entitled effects of hatchery supplementation on abundance and productivity of natural origin Chinook Salmon two decades of evaluation and implications for conservation programs. Do you see that?

A. Okay. Yeah.

Q. And if you look underneath at the authors under that title -- can you blow that up, Ms. Franolich? Is -- you are the named, the second one in there, Ryan N. Kinzer?

A. That's correct, yep.

Q. So this is an article that you co-authored?

A. It is, yeah.

MR. WATKINS: Ms. Franolich, can you show the first sentence of the abstract, please?

Q. (By Mr. Watkins) All right. That reads: Hatchery supplementation, which I understand to be like trapping and hauling; is that right?

A. No.

Q. What's hatchery supplementation?

A. Hatchery supplementation is when we operate hatchery programs using either a local brood stock --

Q. Uh-huh (affirmative).

A. -- or nonlocal brood stock for the hatchery. Those



brood stock are then raised in -- you know, we spawn those fish. We raise them in the hatchery. We release them as juveniles. They return as adults, and the supplementation part of that is we allow those adults to spawn naturally and contribute to natural production.

Q. If there's -- we've heard witnesses previously testify that if there's an abundance of those hatchery fish they are sometimes trapped and hauled above the Yellow Pine Pit.

A. Above the Yellow Pine Pit, the hatchery fish are trapped and hauled up there, correct.

Q. So you say hatchery supplementation has been developed to conserve salmonoid populations and provide fisheries. Ms. Franolich, can you show the last sentence of that abstract, please? And then you say: Supplementation alone is not a panacea because it does not correct limiting factors which must be addressed to achieve population levels capable of sustaining ecological function and harvest. Did I read that correctly?

A. You did.

Q. Would you consider the Yellow Pine Pit, which prevents fish from being able to swim up it, a limiting factor?

A. Yes, I do.

Q. And would you consider a fish tunnel or fish



passageway, excuse me, that would allow the fish to swim on their own volition a removal of that limiting factor?

A. Yes, provided it provides passage.

Q. And you just testified that Mr. Bosley mentioned that 6.6 flow was sufficient and McMillen and Jacobs you claim say that a 7.5 flow is needed. Is that what you just testified to?

A. I believe McMillen Jacobs found a 7.25.

Q. Excuse me. 7.25. And that's your opinion, right?

A. That's based off of the criteria that McMillen Jacobs was using to evaluate fish passage.

Q. And we've established that you're not an engineer, correct?

A. That's correct.

Q. And to the extent that McMillen and Jacobs report also talked about the flow or the hydrology of the tunnel, we've established you're not a hydrologist, correct?

A. That's correct.

Q. And you don't have a degree in biology; is that right?

A. Wildlife resources, but not directly biology, correct.

Q. You also questioned whether the liner between -- the liner placed under Meadow Creek would interplay with the hydrology beneath Meadow Creek such that there was an

exchange between surface water and groundwater?
A. That's my understanding, yes.
Q. But you're not a hydrologist, right?
A. No.
Q. And you -- in response to Mr. Hearing Officer's questioning, you said that the stream between Blow-Out Creek and the East Fork, South Fork of the Salmon River is, and I think you said, quote, very impacted?
A. Sections of it.
Q. Are very impacted?
A. Sections of it are impacted, yes.
Q. And those very impacted sections, you said, are closer to the mine site, correct?
A. Yeah. It's the remnants from the historical mining that's in the area.
Q. But as part of your analysis, you did not do any analysis as to what Perpetua will do to fix those very impacted sections and take care of those remnant mine issues?
A. I think that's true. We've established that.
Q. And you would agree that if those very impacted issue areas that were impacted by legacy mining could be resolved, that would be good for fish?
A. Yes.
MR. WATKINS: Thank you. That's all the questions I



have.
HEARING OFFICER: Is that all?
MS. ROGERSON: The Tribe rests, Mr. Hearing Officer.
HEARING OFFICER: Okay. Thank you, Mr. Kinzer. Why don't we go off the record for a moment and --
(Recess)
(Reconvened)
HEARING OFFICER: Back on. Okay, we are back on the record after a quick lunch break on the fifth day of the hearing, Friday. And, Mr. Watkins, have you decided, are there any witnesses you would like to call back?
MR. WATKINS: Mr. Hearing Officer, I recognize that I am the one guy standing between everyone getting on their phones and putting on sweatpants, so I think we have communicated with the client and at this point Perpetua would rest. I would just like to say thank you, Protestants.
HEARING OFFICER: Okay. I thank you for that signal. That's all right. Let me -- I forgot because we were going to have a discussion on the record. So, Ms. Thrower, we had a witness that was not available, and we were going to talk -- make sure that was on the record. Go ahead.
MS. THROWER: Yeah. So, Mr. Hearing Officer, Save the South Fork Salmon and Idaho Conservation League rests on the testimony from Mr. Kinzer from the Nez Perce Tribe.



HEARING OFFICER: I appreciate that. And so Mr. Timothy Cochnauer is not able to testify, and so we are unable to accept his expert reports that have been prepared into the record.
MS. THROWER: Yes.
HEARING OFFICER: Thank you. So go ahead, Mr. Watkins. You were --
MR. WATKINS: Back to my sweatpants speech. I just wanted to say thank you, Mr. Hearing Officer. I know it's been a long week for everyone. We appreciate Jean and her helpful assistants in this case. Appreciate the Protestants. The parties might disagree on a few things, but I think everyone can agree on the necessity of taking care of these vital public resources, and so we're thankful for the interest of the Tribes and the Protestants and the good work they've done in this area. And we remain open as always to come to resolution, but we look forward to your ruling, Mr. Hearing Officer.
HEARING OFFICER: Okay. Thank you, Mr. Watkins. Anything from the other parties? Hearing none, let's talk while we're on the record about post-hearing briefs. At our lunch break right before we left off the record we had discussed the parties -- giving the parties an opportunity to file post-hearing briefs in this matter. And I agreed with the suggestion, because of some other hearings and



conflicts that I have, a proposal was made to allow 45 days for that, and I think that would work best for me. And so I will accept simultaneous post-hearing briefs on -- we'll just make it simple, January 31st. That's a Wednesday. So last day of January and simply addressing or answering the question of whether the evidence that is in the administrative record satisfies the criteria under those relevant statutes for applications for permit is Idaho Code 42-203A(5) and for applications for transfer Idaho Code 42-222.
One other thing that I would like to do while we're on record with the parties is to review what we have. Jean has been taking notes here, too, as far as exhibits that have been admitted into the record, and I've taken my own notes and make sure that my -- our understanding of what's been admitted matches what the parties have. So, Jean, can I actually use -- we met between -- or at our lunch break, and we matched. Jean's notes and my notes matched, and so mine are a little bit out of numerical order so I will use hers.
MS. THROWER: Mr. Hearing Officer?
HEARING OFFICER: Go ahead, Ms. Thrower -- Mr. Lopez, I apologize. I apologize.
MR. LOPEZ: I've got a procedural question --
HEARING OFFICER: Yeah.

MR. LOPEZ: -- about the preparation of the transcript or as part of the record and when that will be available to the parties just because it forms the time. It sounds like you want to start the 45 days, but we'd like to get the transcript and other things (inaudible).

HEARING OFFICER: I appreciate that question. So within these -- within our administrative proceedings the Department does not prepare an official transcript. We can make audio recordings. Make those available immediately and immediately here beginning of next week. We'll download those and make those available, and then the parties at their own cost are free to have those transcribed.

MR. LOPEZ: Thank you for that clarification.

HEARING OFFICER: Yep. You bet. So for the --

MR. LOPEZ: My apologies. Are there any reply briefs that you would like or just the initial brief?

HEARING OFFICER: No reply briefs, I appreciate that. No response briefs, just a single round of post -- post-hearing briefing is fine. Thank you. So for the exhibits I show that Exhibits 1A through 1H have been admitted. Exhibits 4 and 5 were admitted. I show that Exhibit 18 was excluded. Exhibit 22 was admitted and 23, but only part of 23. There were page numbers 1 through 40 and 60 through 65 for Exhibit 23. Exhibit 25B was admitted. 26 was also admitted but with page limitations. I show that



they were pages 1 through 36 and 80 through 185. 27A was admitted. 29, 34 was also admitted. I show that Exhibits 46 and 47 were admitted. Exhibit 52 was excluded from the record. Then Exhibits 58, 59, 60, and 61 were admitted. I have Exhibit 63 and 64 were admitted. Exhibit 68 was admitted. I show that Exhibit 71 was excluded from the record, but Exhibit 72 was admitted. I could have taken official notice of Exhibit 72 anyway. We simply assigned an exhibit number to that document. That was that house joint resolution. I show that Exhibit 201 was admitted and 206. 215 and 216 were admitted. 219 and 219A, which was a document added in the middle of the hearing, 219A. I show that Exhibit 238 was admitted. Exhibit 246 was excluded from the record. Then Exhibits 259, 260, 261, 262 were all admitted. I show that Exhibits 277, 281, and 283 were excluded. And, finally, I have Exhibit 318 was admitted into the record. So all of the other exhibits were not offered, is the way that I have it. As you've compared your notes, are there any errors or things that I've missed? Any questions?

MS. ROGERSON: Mr. Hearing Officer, I made a note of Exhibit 6 being admitted, which I believe was the water engineering mitigation plan, and I had it noted as being admitted during Mr. Scanlan's testimony. I don't know if that was in error or not.



HEARING OFFICER: Go ahead, Mr. Foster.

MR. FOSTER: I believe we may have discussed Exhibit 6. It's also attached to Exhibit 1G as part of the application package. So that may be -- I believe it is in the record. It's just 1G.

HEARING OFFICER: I appreciate that. Thank you. And that may have been what we had discussed at the time. I don't, in my notes with Mr. Scanlan's testimony, I don't have Exhibit 6 in that, but we may have recognized it was in another place in the record already. Thank you, Ms. Rogerson. Any other concerns?

Okay. Well, I also appreciate the respectful manner that the attorneys have conducted themselves. I think that we have covered a lot of ground, but I think we've heard a lot of important things from all of the witnesses. And I really appreciate Jean. A lot of the ability to do the video tech, the video hearing and videoconferencing. That's something that's fairly rare in the Department. I think it worked actually pretty smoothly for this go-around. So, thank you all.

And, again, I will -- once those post-hearing briefs are filed, I then at my -- as time allows will go back through the record and issue a decision. My decision will come out as a preliminary order in all of the matters, and with that you will receive a description or an



attachment that describes how the appeals process works from there. There are possible appeals back to me as a Hearing Officer or to the Director of the Department, or like I said, once it becomes a final order on (inaudible). So, thank you all, and we'll break there.

I just note for the record that then the administrative record is closed except for the post-hearing briefs which will receive from the parties by on or before January 31st next year. Thank you.

MALE SPEAKER: Thank you, Officer Cefalo.

FEMALE SPEAKER: Thank you.

(Hearing concluded)

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CERTIFICATE OF TRANSCRIPTION

The undersigned does hereby certify that he correctly and accurately transcribed and typed the foregoing transcript from the RECORDING of the hearing which was RECORDED in the above-entitled action or proceeding.

Dated this 15th day of January, 2024.

Keith M. Evans, RPR, CSR NO. 655
Court Reporter

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**THE CLERK: [16]** 7/20 12/10 12/12 97/22 136/10 136/13 319/13 325/22 330/9 365/18 485/3 485/6 485/8 495/8 791/14 791/18
**THE COURT: [1]** 65/12
**UNKNOWN PERSON: [1]** 297/21

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**$1 [1]** 906/18
**$1 million [1]** 906/18
**$125,000 [5]** 826/9 826/12 826/14 827/2 827/7
**$127 [1]** 905/16
**$17 [1]** 115/9
**$17 million [1]** 115/9
**$2.5 [1]** 888/20
**$2.5 million [1]** 888/20
**$24.8 [1]** 23/22
**$24.8 million [1]** 23/22
**$27 [1]** 886/5
**$27 million [1]** 886/5

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**'16 [1]** 380/3
**'17 [3]** 379/19 598/2 772/3
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**'18, and [1]** 349/11
**'20 [1]** 458/7
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**25 [49]** 56/24 137/11 138/6 154/10 157/1 157/17 172/2 180/1 180/3 231/5 250/9 250/15 251/1 251/11 272/20 274/9 283/15 301/24 319/13 319/14 337/4 337/9 343/11 355/9 355/10 355/15 355/16 379/25 380/1 384/14 479/21 524/12 612/6 612/7 612/8 643/11 643/13 917/24 926/6 943/16 959/22 960/1 960/2 981/21 1029/13 1029/16 1029/19 1029/20 1030/9

## 2

**25 percent [5]** 138/4 154/10 918/4 1108/12 1112/6
**25-year [2]** 499/17 739/10
**2512 [1]** 996/22
**2521 [1]** 274/17
**254 [1]** 312/19
**259 [14]** 596/13 596/19 597/25 598/3 598/7 605/10 607/8 612/5 614/3 771/23 771/25 775/21 777/4 1190/14
**25B [17]** 210/17 210/18 211/8 212/5 212/7 245/24 268/20 269/2 274/11 274/12 278/13 943/14 943/16 943/20 943/21 955/6 1189/24
**25th [2]** 481/15 1150/20
**26 [19]** 418/14 418/15 420/22 420/23 420/25 421/4 421/20 421/22 422/9 422/19 425/18 426/6 433/23 434/1 440/25 530/19 530/22 926/6 1189/25
**260 [3]** 714/16 714/21 1190/14
**261 [9]** 3/4 264/4 568/4 714/9 714/16 714/21 843/4 1060/4 1190/14
**262 [9]** 3/5 264/5 568/5 714/9 714/16 714/21 843/5 1060/5 1190/14
**264 [5]** 319/3 319/3 934/5 943/1 943/14
**266 [1]** 1140/2
**27 [19]** 57/1 98/15 101/14 101/19 103/1 158/15 300/7 300/16 300/24 301/3 301/11 303/18 306/9 488/3 530/12 530/14 562/18 1116/2 1116/4
**27 gallons [2]** 131/3 172/18
**27 million [4]** 905/17 905/18 905/20 905/20
**275 feet [1]** 414/21
**277 [7]** 890/12 890/17 901/20 902/11 1070/19 1139/17 1190/15
**27A [8]** 191/16 192/4 192/5 192/13 259/11 412/18 412/20 1190/1
**27B [1]** 1048/21
**27th [5]** 101/8 103/4 103/4 1075/10 1089/15
**28 [4]** 738/18 999/19 1000/7 1000/15
**28-ish [1]** 13/5
**281 [6]** 890/12 890/17 890/18 898/14 898/22 1190/15
**283 [11]** 890/12 890/18 901/20 902/11 1079/25 1085/2 1085/4 1099/24 1119/23 1139/17 1190/15
**28th [2]** 882/13 1177/8
**29 [9]** 351/18 351/21 635/19 635/19 635/20 636/24 637/5 637/6 1190/2
**29,340 acres [1]** 21/11
**29th [1]** 1108/21
**2A [1]** 606/5
**2nd [8]** 98/9 101/6 101/10 101/16 178/9 487/20 714/3 882/16
**2x2 [1]** 359/23

## 3

**3,000 [4]** 207/7 871/20 871/22 1010/22
**3-24 [1]** 45/3
**3.1 [4]** 233/16 319/8 319/10 960/18
**3.15 [2]** 980/12 980/14
**3.2 [8]** 153/8 153/22 170/18 170/20 303/22 318/22 482/8 941/1
**3.2.2.1 [1]** 678/17
**3.23 [1]** 276/5
**3.3 [1]** 282/15
**3.5 [2]** 270/24 273/4
**3.7 [1]** 1167/23
**3.7.9 [1]** 41/20
**30 [40]** 25/18 59/8 288/2 289/16 289/18 357/5 370/23 371/1 429/9 440/15 481/13 483/13 483/22 483/23 483/24 484/25 485/2 485/16 485/20 485/21 485/23 487/2 559/21 645/20 645/21 703/4 706/17 706/19 707/3 707/5 709/14 710/9 739/14 740/7 977/2 1009/19 1066/24 1113/9 1123/14 1166/4
**30 degrees [2]** 620/4 620/5
**30 feet [2]** 624/23 625/3
**30 percent [6]** 157/2 284/4 547/6 559/20 1121/6 1122/5
**30,000 [4]** 66/21 66/22 109/8 109/14
**30-acre [1]** 146/2
**30-inch [1]** 1005/19
**30-year [2]** 248/22 1165/25
**30.2-acre [1]** 125/9
**300 [2]** 789/16 1002/1
**300 million tons [1]** 76/18
**300,000 [1]** 77/10
**300,000 tons [2]** 107/4 107/5
**300-acre [1]** 134/2
**301 [6]** 745/23 864/3 864/15 865/2 943/8 947/3
**305 [5]** 2/15 263/15 567/15 842/15 1059/15
**307 [2]** 944/21 945/17
**30th [1]** 674/9
**31 [8]** 345/11 483/13 483/22 484/12 573/24 573/25 1030/4 1097/16
**318 [14]** 152/11 152/11 152/24 236/12 236/12 930/19 931/24 932/4 976/6 980/7 980/23 981/18 982/19 1190/16
**319 [5]** 863/12 863/16 864/1 865/3 865/24
**31st [9]** 148/9 148/10 148/10 148/22 149/5 674/10 1017/12 1188/4 1192/9
**32 [10]** 59/22 357/20 357/21 484/12 788/6 1098/10 1102/2 1102/6 1102/7 1103/20
**33 [10]** 686/1 686/1 691/6 691/21 736/25 742/10 753/13 753/16 1103/3 1105/4
**335-page [1]** 860/6
**34 [21]** 60/16 60/16 350/11 351/9 351/15 351/15 351/18 358/13 390/5 390/7 394/14 658/14 658/21 670/8 670/13 702/22 703/4 703/5 706/19 740/15 1190/2
**347 [1]** 1004/16
**347-acre [2]** 149/11 149/12
**35 [10]** 14/6 17/8 62/20 181/7 358/19 358/20 359/18 359/18 645/21 848/24
**35 percent [1]** 410/13
**350,000 [1]** 1010/17
**36 [7]** 41/3 41/3 422/3 422/10 422/11 422/19 1190/1
**365 [5]** 131/18 140/25 161/13 417/16 1054/12
**37 [4]** 194/18 199/20 362/13 1002/2
**37.03.08 [1]** 150/4
**37.03.0840.05 [1]** 321/25
**38 [1]** 199/20
**39 [1]** 200/25
**3A [10]** 598/23 601/7 601/14 601/18 603/21 603/24 603/25 604/2 604/5 610/23

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**3D [4]** 367/19 367/21 367/25 368/1

## 4

**4 percent [6]** 506/14 507/25 690/6 713/12 713/13 1119/10
**4-14 [1]** 279/22
**4-15 [2]** 278/12 278/15
**4-4 [2]** 955/12 1123/22
**4-5 [2]** 539/14 1129/22
**4.1 [3]** 661/23 661/24 662/7
**4.15 [1]** 279/2
**4.2 [1]** 21/12
**4.3 [6]** 139/21 157/22 158/4 158/7 161/19 938/18
**4.4 [3]** 274/15 274/21 946/19
**4.5 [8]** 139/5 158/1 158/7 158/10 170/4 538/18 538/21 938/16
**4.5 million ounces [1]** 22/3
**4.6 [1]** 275/16
**4.9 [1]** 493/21
**4.96 [1]** 276/6
**40 [22]** 19/15 19/16 19/25 20/15 54/22 149/23 150/5 150/7 202/2 211/21 469/12 631/23 632/17 662/4 662/5 707/5 709/1 710/9 961/6 1009/19 1029/13 1189/23
**40 miles [5]** 706/17 706/19 707/3 709/14 913/4
**40 million [1]** 366/25
**40 percent [5]** 60/8 227/15 283/6 746/13 1163/23
**40-acre [1]** 139/18
**40-year [1]** 54/23
**40.05 [1]** 150/4
**400 [4]** 393/13 790/2 822/18 822/20
**400-480 feet [1]** 810/15
**400-foot [1]** 448/3
**4005 [1]** 323/1
**403 [1]** 1013/17
**404 [12]** 61/4 64/2 64/6 347/18 389/16 459/7 460/2 461/10 465/10 465/13 623/22 971/6
**4065 [1]** 672/5
**4067 [2]** 658/17 658/25
**41 [3]** 41/20 41/20 202/12
**42 [4]** 8/5 719/19 722/25 1028/13
**42-203A [1]** 1188/9
**42-222 [1]** 1188/10
**428-acre [3]** 153/19 166/7 191/1
**43 [3]** 742/19 742/21 763/23
**43 percent [1]** 1028/13
**44 [4]** 199/14 203/1 220/15 220/17
**44 million tons [1]** 47/4
**45 [12]** 42/3 224/8 224/11 726/24 816/5 816/8 816/9 1047/5 1047/5 1047/19 1188/1 1189/4
**45 percent [1]** 1027/14
**46 [31]** 378/18 378/21 379/16 379/17 381/12 484/20 484/21 484/21 484/24 485/2 485/3 485/4 485/7 485/9 485/16 485/19 485/19 485/22 486/17 486/21 486/22 486/23 487/3 497/1 510/1 513/22 513/22 674/15 674/19 710/1 1190/3
**46.4 [1]** 1110/19
**47 [29]** 378/19 381/11 381/19 381/20 381/21 381/21 382/1 382/3 382/5 382/7 484/20 484/21 484/21 485/4 485/6 485/7 485/9 486/21 491/4 491/4 496/24 497/1 497/2 511/22 511/24 512/1 676/13 710/1 1190/3
**4703 [2]** 301/14 472/19
**4706 [2]** 233/10 233/12
**4708 [1]** 303/22
**4710 [2]** 682/4 682/11
**47110 [1]** 681/19
**48 [4]** 187/21 466/10 466/16 1016/6
**480 feet [2]** 408/5 810/14
**487 acres [1]** 21/13
**4:30 until [1]** 867/25
**4th [1]** 797/9

## 5

**5 degrees [1]** 60/15
**5 percent [18]** 207/4 301/23 480/8 500/4 671/16 697/23 699/5 709/17 737/11 739/16 740/3 757/5 758/21 758/24 759/1 1090/25 1091/9 1104/2
**5,000 [1]** 896/8
**5-1 [1]** 202/10
**5.3 [1]** 203/1
**5.4 [2]** 199/13 199/16
**50 [25]** 22/18 42/8 42/8 126/14 226/15 355/13 355/17 394/3 414/23 414/23 414/23 440/13 440/14 440/15 440/15 576/12 722/25 831/18 860/23 860/23 881/17 917/21 978/20 1113/9 1150/18
**50 feet [1]** 751/9
**50 gallons [7]** 129/13 131/16 172/16 175/9 321/3 321/10 439/24
**50 miles [2]** 929/24 969/16
**50 percent [6]** 43/1 50/4 208/21 393/21 410/12 1090/24
**500 [13]** 181/7 382/18 382/18 382/21 383/7 383/10 383/11 383/15 391/23 831/18 851/4 851/4 852/18
**500-acre [4]** 154/20 155/2 166/16 166/19
**500-year [4]** 379/4 382/13 382/15 560/18
**501C-3 [1]** 852/2
**501C3 [1]** 787/24
**50th [1]** 133/19
**51 [2]** 227/2 1150/18
**52 [14]** 8/5 124/15 138/12 188/9 459/24 459/24 460/20 461/5 462/5 464/4 466/17 737/15 737/16 1190/3
**539 [3]** 20/3 20/7 20/9
**54 [10]** 203/13 355/17 370/18 371/1 371/24 379/1 560/4 560/17 955/6 955/8
**55 [3]** 190/21 190/22 203/14
**55 percent [2]** 1121/12 1123/14
**56 [8]** 203/13 205/17 227/4 227/6 325/15 326/7 326/8 326/21
**565 [5]** 3/5 264/5 568/5 843/5 1060/5
**566 [5]** 3/6 264/6 568/6 843/6 1060/6
**57 [3]** 133/7 133/17 204/15
**57-acre [1]** 132/9
**5700 miles [1]** 578/17
**58 [7]** 227/21 575/1 575/12 575/14 586/24 1154/15 1190/4
**59 [10]** 77/20 77/21 77/24 78/17 78/18 78/19 78/21 79/3 146/21 1190/4
**59 percent [3]** 1110/3 1110/17 1110/18
**5:30 [1]** 821/22
**5th [5]** 480/4 480/5 549/8 670/22 671/1

## 6

**6,000 miles [1]** 578/20
**6-foot [1]** 956/3
**6-inch [2]** 467/14 467/17
**6.5 [1]** 371/6
**6.5 feet [1]** 369/23
**6.6 [69]** 252/12 252/22 286/21 287/8 287/10 287/12 289/5 290/5 310/7 310/8 310/13 310/25 311/9 312/13 369/24 373/19 373/24 373/25 381/6 381/7 474/9 492/4 492/16 493/22 493/25 494/2 494/4 494/6 494/8 496/20 497/4 498/1 499/21 500/5 501/5 501/6 501/6 513/13 514/16 514/19 515/18 517/3 542/23 542/24 543/5 543/6 678/20 681/4 685/4 767/18 768/1 1106/11 1106/12 1106/15 1106/18 1106/24 1107/1 1107/17 1107/18 1110/5 1110/6 1118/10 1118/17 1173/18 1175/7 1176/3 1178/12 1178/18 1184/5
**60 [28]** 20/5 20/10 20/13 20/15 20/21 20/25 71/17 228/21 228/22 347/20 347/20 348/1 348/3 348/5 406/5 406/5 417/25 495/5 495/8 893/4 961/6 1008/6 1173/20 1175/14 1175/16 1175/17 1189/24 1190/4
**60 miles [1]** 183/8
**60 percent [5]** 1028/23 1028/24 1029/3 1030/2 1030/10
**60-acre [1]** 429/9
**60/40 [1]** 469/12
**600 [4]** 51/9 51/11 56/11 56/16
**600 feet [2]** 46/13 46/14
**600-acre [6]** 132/14 165/20 166/4 166/6 168/10 890/3
**608-acre [3]** 139/21 141/16 170/11
**61 [9]** 118/14 119/13 119/16 161/25 186/17 186/18 312/21 312/22 1190/4
**6105 [1]** 1047/17
**614 [5]** 2/10 263/10 567/10 842/10 1059/10
**62 [2]** 43/13 43/14
**63 [31]** 234/19 234/24 234/25 235/2 235/5 235/19 235/21 251/12 251/13 251/14 282/12 310/18 311/4 337/3 337/8 337/9 643/9 643/9 643/13 645/9 645/10 702/11 702/18 717/1 724/23 728/3 1097/5 1123/18 1129/24 1131/20 1190/5
**64 [13]** 234/20 235/6 235/19 235/21 235/23 236/1 236/5 250/17 251/1 251/12 296/21 327/14 1190/5
**64th [1]** 73/15
**65 [4]** 20/13 20/16 1027/15 1189/24
**655 [6]** 1/25 262/25 566/25 841/25 1058/25 1193/9
**66 [1]** 361/4
**66 feet [1]** 361/3
**67 [2]** 8/5 1027/15
**68 [15]** 427/19 450/23 450/25 451/13 451/15 451/15 451/17 465/24 466/18 467/6 471/9 661/22 661/24 661/25 1190/5
**6th [1]** 1082/3

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**7,000 [1]** 141/18
**7,000-acre [2]** 141/13 154/12
**7,000-foot [1]** 849/3
**7-foot [1]** 956/3
**7.1 [1]** 1118/10
**7.1-acre [2]** 125/7 146/10
**7.2 [2]** 1126/18 1126/18
**7.25 [10]** 207/8 207/10 209/17 234/11 516/4 680/4 1119/18 1176/14 1184/8 1184/9
**7.25 feet [1]** 515/13
**7.5 [1]** 1184/6
**70 [3]** 893/4 1113/13 1113/20
**70,000 [1]** 56/21
**700 [3]** 212/7 421/23 421/24
**700 miles [2]** 923/13 923/22
**700-mile [2]** 894/4 910/19
**700-miles [2]** 894/14 896/19
**71 [12]** 67/19 67/19 68/7 68/16 68/20 68/23 69/10 69/10 69/14 807/11 807/11 1190/6
**7122 [3]** 125/6 146/8 171/3
**7141 [5]** 125/5 128/5 128/8 128/10 129/4
**72 [14]** 69/10 69/11 69/12 72/3 72/3 72/7 72/11 72/15 72/19 72/21 72/23 87/18 1190/7 1190/8
**720 [2]** 379/3 560/17
**721 [1]** 382/14
**7285 [4]** 125/8 145/14 171/3 171/8
**7293 [3]** 125/10 171/4 171/9
**74 percent [1]** 796/11
**75 [1]** 576/9
**76 [1]** 259/15
**77 [1]** 223/18
**77-1437 [1]** 700/14
**77-14376 [1]** 519/22
**77-14377 [7]** 1/4 128/1 129/4 262/4 566/4 841/4 1058/4
**77-14378 [19]** 1/4 7/16 124/12 132/6 142/4 165/20 168/9 171/4 171/7 187/14 262/4 535/24 562/22 566/4 592/5 592/9 841/4 861/19 1058/4
**77-14379 [8]** 1/5 7/16 130/13 130/17 262/5 566/5 841/5 1058/5
**77-7122 [3]** 125/6 146/8 171/3
**77-7141 [4]** 125/5 128/5 128/10 129/4
**77-7285 [3]** 125/8 145/14 171/3
**77-7293 [3]** 125/10 171/4 171/9
**78 [1]** 519/22

## 8

**8 feet [1]** 751/23
**8,000 feet [1]** 1000/2
**8-foot [1]** 956/2
**8.0 [2]** 310/8 384/11
**8.2 [6]** 384/7 481/1 481/5 481/9 481/10 485/14
**8.6 [1]** 485/12
**8.8 [1]** 158/1
**80 [11]** 216/6 321/6 321/11 410/9 422/4 422/13 422/19 440/2 440/3 440/3 1190/1
**80 acres [1]** 238/5
**80 feet [1]** 409/1
**80 million tons [2]** 42/21 394/3
**80 percent [10]** 139/2 243/5 250/7 346/25 355/11 372/8 410/18 1029/14 1050/7 1093/23
**800 [2]** 217/8 246/17
**81 [3]** 206/17 206/20 208/1
**82 [1]** 207/23
**83 [2]** 44/7 209/5
**83540 [5]** 2/15 263/15 567/15 842/15 1059/15
**83638 [5]** 2/10 263/10 567/10 842/10 1059/10
**83701 [5]** 2/19 263/19 567/19

## 8

**83701... [2]** 842/19 1059/19
**83702 [5]** 2/6 263/6 567/6 842/6 1059/6
**840 [5]** 3/6 264/6 568/6 843/6 1060/6
**841 [5]** 3/7 264/7 568/7 843/7 1060/7
**850 [6]** 217/7 217/21 275/5 1163/20 1164/3 1164/11
**85396 [8]** 1/5 7/17 146/6 146/18 262/5 566/5 841/5 1058/5
**85397 [8]** 1/5 7/17 145/8 145/21 262/5 566/5 841/5 1058/5
**85398 [9]** 1/5 7/17 143/16 143/22 144/8 262/5 566/5 841/5 1058/5
**85399 [7]** 1/6 7/17 128/8 262/6 566/6 841/6 1058/6
**855 [1]** 143/20
**85538 [9]** 1/6 7/18 142/7 143/4 143/7 262/6 566/6 841/6 1058/6
**86 [2]** 213/14 214/8
**87 [1]** 213/3
**88 [2]** 45/3 82/1
**8:30 [2]** 839/25 840/1
**8th [2]** 674/8 1151/7

## 9

**9-foot [1]** 956/2
**9.6 [205]** 62/15 93/25 132/13 140/2 140/23 153/4 153/13 153/15 153/20 153/22 153/24 154/5 154/11 154/15 160/19 161/2 161/14 161/20 162/7 162/18 163/3 164/1 165/13 165/21 165/23 166/15 166/18 167/22 168/9 169/20 177/3 179/3 179/9 181/18 181/23 209/15 209/19 237/2 237/8 242/14 251/25 271/15 272/23 272/25 273/8 273/10 273/13 273/15 292/11 292/13 292/15 292/19 292/20 292/21 315/17 315/19 318/3 391/25 417/3 417/7 417/11 417/16 417/18 463/20 519/23 535/25 537/2 537/17 537/17 537/20 537/22 538/1 538/7 538/12 541/6 542/17 542/20 543/10 543/22 544/4 544/5 544/15 544/17 544/22 545/1 547/15 547/18 547/25 548/1 548/3 592/16 642/13 650/9 699/10 699/14 699/21 806/9 819/24 837/16 837/19 838/6 838/10 860/21 861/19 862/3 862/13 890/3 890/8 929/10 931/17 932/24 933/11 935/6 935/10 935/18 935/25 936/11 936/12 937/2 937/9 938/5 938/18 938/19 939/2 941/5 941/12 941/13 941/21 941/25 942/5 942/7 942/20 942/25 947/21 948/19 949/4 949/6 950/15 951/2 951/6 953/3 953/9 953/10 953/12 953/21 953/24 954/1 956/12 956/19 956/23 966/2 978/5 979/14 979/15 979/17 979/19 979/23 979/25 980/4 984/19 984/20 987/16 987/17 988/15 1009/2 1029/19 1032/25 1033/6 1054/9 1054/12 1054/22 1055/7 1056/3 1056/6 1056/19 1075/14 1078/15 1089/1 1090/6 1091/5 1091/10 1092/12 1093/18 1093/21 1094/14 1096/21 1099/8 1116/19 1121/9 1123/13 1159/11 1159/16 1159/22 1159/25 1160/2 1160/3 1160/8 1160/12 1160/17 1160/20 1161/1 1161/8 1162/5 1162/11 1167/6
**9.7 [5]** 139/3 140/10 141/12 153/12 160/20
**9.86 [2]** 161/5 161/7
**9.9 feet [2]** 280/5 280/15
**90 [1]** 671/7
**90 gallons [1]** 131/2
**90 percent [5]** 60/5 537/5 537/8 1094/1 1110/3
**90-ish [1]** 1107/14
**900 [1]** 165/20
**94 [2]** 433/23 434/1
**9446 [1]** 740/11
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