

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 98-8054
Exam Date: 09/26/2023

1. Current Owner:
KOOTENAI TRIBE OF IDAHO PO BOX 1269 BONNERS FERRY ID 83805-1269
2. Accompanied by: Nathan Jensen
Phone No: 208-267-3620
Address: Same as above
Relationship to permit Holder: Representative – Conservation Aquaculture Supervisor.

3. SOURCE:
KOOTENAI RIVER
MOYIE RIVER
GROUND WATER

Tributary
COLUMBIA RIVER
KOOTENAI RIVER

Method of Determination: ArcMap and DRG.

B. OVERLAP REVIEW

1. Other water rights with the same place of use: YES Overlap

Water Right No.	Source	Purpose of Use	Basis
98-7670	GROUNDWATER	COMMERCIAL	LICENSE
98-7671	MOYIE RIVER	RECREATION STORAGE	LICENSE
98-7804	SKIN CREEK	MUNICIPAL	LICENSE
98-8041	GROUNDWATER	DOMESTIC	LICENSE
98-7913	Groundwater, Moyie River, Kootenai River	FISH PROPAGATION	LICENSE

Comments:

- Rights 98-7670 & 98-7671 use different PODs than this water right, and water use is related to an RV park co-located with this right's fish hatchery water use, but separate and not a concern for overlap.
- Right 98-7804 is a municipal water right which overlaps this right's POU, but the fish propagation and hatchery operation are not service connected to the municipal system and there is no concern for overlap.
- Right 98-8041 is the child Right from parent Right 98-7913 and uses groundwater for domestic use within the hatchery & for two homes co-located with the hatchery; the groundwater source for 98-8041i has a separate well than this permit's system, and there is no mixing of water between systems for 98-8054 & 98-8041, thus no concern for overlap.
- Right 98-7913 uses the same water system infrastructure for fish propagation that directly overlaps this Right's POU. Condition X35 has been added to describe the combined use volumetric limits between 98-8054 & 98-7913. This permit was filed to secure WRs for the exceeded diversion rate occurring under the applicant's previous permit following the field exam for 98-7913.

2. Other water rights with the same point-of-diversion: YES Overlap

Water Right No.	Source	Purpose of Use	Basis
98-7913	Groundwater, Moyie River, Kootenai River	FISH PROPAGATION	LICENSE

Comments: Licensed WR 98-7913 & this permit share common water system infrastructure and PODs. Condition F06 was added to the Permit and has been carried forward to licensing identifying the shared PODs between WRs. There is no concern for enlargement by diversion rate between the two WRs.

C. DIVERSION AND DELIVERY SYSTEM**1. LOCATION OF POINT(S) OF DIVERSION:**

KOOTENAI RIVER NW¼ NE¼, Sec. 22, Twp 62N, Rge 02E, B.M. BOUNDARY County
 MOYIE RIVER NW¼ SE¼, Sec. 15, Twp 62N, Rge 02E, B.M. BOUNDARY County
 GROUND WATER SW¼ SE¼, Sec. 15, Twp 62N, Rge 02E, B.M. BOUNDARY County
 GROUND WATER SW¼ SE¼, Sec. 15, Twp 62N, Rge 02E, B.M. BOUNDARY County

Method of Determination: GPS. POD(s) located as follows:

- Kootenai River POD -116°11.163, 48°42.926
- Moyie River POD -116°11.041, 48°43.345
- Groundwater Hatchery Well (HW2) -116°11.173, 48°43.204 D0058065
- Groundwater Hatchery Well (HW3) -116°11.169, 48°43.213 D0058099

PLACE OF USE: FISH PROPAGATION

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
62N	02E	15														X	X		

Method of Determination: Field examination and Arcmap aerial imagery.

3.

Delivery System Diagram Attached (required). Indicate all major components and distances between components.

☒ Indicate weir size/pipe as applicable.

Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.

☒

☒ Aerial Photo Attached (required for irrigation of 10+ acres).

☒

☒ Photo of Diversion and System Attached

☒

4.

Well or Diversion ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
KOOTENAI RIVER (INTAKE)		3EA 5			
MOYIE RIVER (INTAKE)		3EA 7.5			
HW2 – D0058065		10			
HW3 – D0058099		10			

D. FLOW MEASUREMENTS**1.**

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
FLOW METER(S)						

2. Measurements: Flow measurement readings were taken using the applicant's system installed flow meters & SCADA system panel. Each POD was operated individually, and the flow measurement recorded w/photographs taken.

E. FLOW CALCULATIONS

Measured Method: flowmeters as follows:

- Kootenai River POD – 3ea 5 hp pump(s), SCADA system reading = 1,300 gpm or 2.89 cfs
- Moyie River POD – 3ea 7.5 hp pump(s), SCADA system reading = 1,650 gpm or 3.67 cfs
- HW2 well D0058065 POD – 10 hp pump(s), SCADA system reading = 333 gpm or 0.74 cfs
- HW3 well D0058099 POD – 10 hp pump, SCADA system reading = 333 gpm or 0.74 cfs.

The largest total diversion rate equals 3.67 cfs (Moyie river) + 0.74 cfs (HW2 well) + 0.74 cfs (HW3 well) = 5.15 cfs. Typically, the 2 wells are operated lead/lag and not simultaneously, but it is permissible and has occurred in the past.

License 98-7903 authorizes 3.85 cfs + 1.17 cfs authorized by 98-8054 = 5.02 cfs. The difference between 5.15 cfs and 5.02 cfs = 0.13 cfs or 58 gpm. 58 gpm is equivalent to 2.3% of 5.15 cfs, which may be considered standard deviation built into flow meters installed on the system for maximum diversion rates of this amount. I don't foresee any concern for enlargement for the applicant's two Rights based on the system pump capacity based on this information.

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation: N/A
2. Volume Calculations for Other Uses: Fish Propagation annual volume for year 2022=
 - 44,300,000 gal (Moyie River) + 128,200,000 gal (Kootenai River) + 77,800,000 gal (HW2 & HW3 groundwater) = 250,300,000 gal or 768.1 af = **768 af** considering department rounding standards.

G. NARRATIVE/REMARKS/COMMENTS

The applicant developed this permit to account for the maximum diversion rate of their water system pumping capacity beyond what existing licensed right 98-7913 authorizes. 98-7913's beneficial use exam was conducted on 7/12/2017 along with a follow up site visit in the summer of 2021, which validated the common diverting works and water conveyance system used by the applicants for this permit's fish propagation beneficial use. As such, the field exam performed on 9/26/2023 accompanied by adequate back file data from 98-7913, aerial imagery, and photographic evidence provides substantiating documentation to enable licensing this permit.

During my exam conducted on 9/26/2023 with the applicant's representative Nathan Jensen, I identified the water system maintains the same components as previously observed when IDWR licensed 98-7913. Water is diverted from the Kootenai River, Moyie River, and 2ea groundwater sources supporting fish propagation at the Twin River Fish Hatchery. The system incorporates flow meters for each source and uses a SCADA monitoring system that enables instantaneous flow rates to be captures as listed below:

- Kootenai River POD – 3ea 5 hp pump(s), SCADA system reading = 1,300 gpm or 2.89 cfs
- Moyie River POD – 3ea 7.5 hp pump(s), SCADA system reading = 1,650 gpm or 3.67 cfs
- HW2 well D0058065 POD – 10 hp pump(s), SCADA system reading = 333 gpm or 0.74 cfs
- HW3 well D0058099 POD – 10 hp pump, SCADA system reading = 333 gpm or 0.74 cfs.

Normal hatchery operations utilize 1 surface source and up to 2 groundwater sources at any given time, switching surface sources and/or groundwater to achieve temperature ratings. The largest total diversion rate used under normal operations equals 3.67 cfs (Moyie river) + 0.74 cfs (HW2 well) + 0.74 cfs (HW3 well) = 5.15 cfs. Typically, the 2 wells are operated lead/lag and not simultaneously, but it is permissible and has occurred in the past. The maximum diversion rate recommended for licensing purposes equals **1.17 cfs**; the applicant is limited by the permit approved fish propagation diversion rate which caps the licensing recommended rate to 1.17 cfs. When Rights 98-7913 & 98-8054's diversion rates are summed, they amount to a diversion rate of 5.02 cfs, illustrating the slight overage in pumping capacity of 5.15 cfs is adequate to fulfill the applicant's recommended diversion rates.

The Fish Propagation POU consists of fish rearing at the Twin River Fish Hatchery. Backfile information for 98-7913 sufficiently details the POU and derived volumetric data reflecting a maximum diversion volume of 637 af observed using year 2020 annual volume data provided by the applicant. Each year's rearing cycles fluctuate depending on Kootenai Tribe of Idaho and Idaho Department of Fish & Game goals, but each year on record has a different annual volume. For this permit, Mr. Nathan Jensen, Kootenai Tribe of Idaho representative, provided volumetric data by email on 2/27/2024 that shows year 2022 had the largest total diversion volume from the three sources in the Permit's development period as illustrated below:

SCADA Annual Volume Data YR2022			
Source	Gal (MG)	Gal	Acre-feet
Moyie	44.3	44300000	136.0
Kootenai	128.2	128200000	393.4
GW	77.8	77800000	238.8
	TOTAL	250300000	768.1

received from Applicant's representative on 2/27/2024

Based on current annual volume records I'm recommending a maximum diversion volume of 768 af considering department rounding standards to license this permit. Condition X35 has been added to this permit during licensing review to mitigate overlap between 98-7913 & 98-8054 describing that when combined the two rights are limited to a total diversion rate of 5.02 cfs and a total diversion volume of 768 af for fish propagation water use. 98-7913's backfile beneficial use report provides detailed information relating to the hatchery's water system and rearing practices.

All conditions on the permit shall be carried forward to licensing. Condition X35 was added as described above to mitigate overlapping water right concerns. Aside from those discussed on PG 1, there are no overlapping water right concerns toward licensing this permit.

Have conditions of permit approval been met? ☒ Yes ☐ No

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use	Rate of Diversion	Annual Volume
FISH PROPAGATION	01/01 to 12/31	1.17 CFS	768.0 AF
Totals:		1.17 CFS	768.0 AF

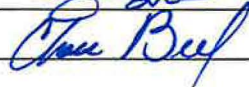
2. Recommended Amendments

____ Change P.D. as reflected above ____ Add P.D. as reflected above X None

____ Change P.U. as reflected above ____ Add P.U. as reflected above X None

I. AUTHENTICATION Luke Bates -

Field Examiner's Name  Date 2/28/2024

Reviewer  Date 2/3/2025

Bates, Luke

From: Nathan Jensen <njensen@kootenai.org>
Sent: Tuesday, February 27, 2024 3:33 PM
To: Bates, Luke
Cc: Jose Ponce; Glenn Owsley; Mark Elliston; Shawn Young; Kevin James; Brycen Lunger; Riley Jones; Nathan Jensen; Twyla Otter; Brian Michaels
Subject: KTOI-H2 annual flow diversions for KR MR GW 2022 2023
Importance: High

CAUTION: This email originated outside the State of Idaho network. Verify links and attachments BEFORE you click or open, even if you recognize and/or trust the sender. Contact your agency service desk with any concerns.

Hi Mr. Bates,

We queried/used SCADA for .lgh files for Kootenai River data and SCADA TRENDS data to calculate Moyie and Groundwater diversion volumes listed below. We have not been using Moyie like years past; however, this is based on all we could query out of our SCADA for KTOI-H2-Twin Rivers.

Have a great day,

	<u>Million Gallons (MG)</u>	<u>Comments</u>
Kootenai river 2021	166.4867096	SCADA LGH files
Kootenai river 2022	128.1885681	SCADA LGH files
Kootenai river 2023	128.168869	SCADA LGH files
Moyie river 2021	No data	
Moyie river 2022	44.3	Based on 57 Days operational (SCADA TRENDS)
Moyie river 2023	27.4	Based on 38 Days operational (SCADA TRENDS)
Ground water 2021	No data	
Ground water 2022 (365 days)	77.8	Based off ground water TRENDS from SCADA from Jan1-Jan1
Ground water 2023 (365 days)	74.6	Based off ground water TRENDS from SCADA from Jan1-Jan1

Totals Combined (Year, MG, Source)

2021	166	Kootenai only
2022	250.3	Ground, Kootenai, Moyie
2023	230.2	Ground, Kootenai, Moyie

From: Bates, Luke <Luke.Bates@idwr.idaho.gov>
Sent: Tuesday, February 27, 2024 8:26 AM
To: Nathan Jensen <njensen@kootenai.org>
Cc: Jose Ponce <jose@kootenai.org>; Glenn Owsley <gowsley@kootenai.org>
Subject: RE: Yearly data flow

Bates, Luke

From: Bates, Luke
Sent: Friday, February 23, 2024 9:33 AM
To: Jose Ponce; GOWSLEY@KOOTENAI.ORG
Subject: FW: Yearly data flow

Jose & Glenn,

Thank you for speaking with me this morning regarding Permit 98-8054. As I stated, I'm requesting Annual volume report information from each of the three water sources: Groundwater, Moyie River, & Kootenai River, for years 2022 & 2023.

In the past, Chris Chaney provided that information as exemplified by the email correspondence below.

In the prior water permit that has been licensed, I finalized using the following volume:

ANNUAL VOLUME DATA DERIVED BY WATER SYSTEM SCADA MONITORING SYSTEM: Fish hatchery facility engineer, Chris Chaney, provided annual data volume for years 2016-2020 in an email received on April 26, 2021, which were captured by flowmeters installed on the system for each of the water sources.

SCADA Annual Volume Data YR2016			
Source	Gal (MG)	Gal	Acre-feet
Moyie	93.6	93600000	287.2
Kootenai	102.17	102170000	313.5
GW	11.77	11770000	36.1
	TOTAL	207540000	636.9

YR2016 was the largest consumption year on record for the fish hatchery's SCADA monitoring system.

Please note, even if year 2022 and 2023 are not as large as YR2016 as detailed above, the current permit shall be licensed with a combined use condition that puts the maximum diversion volume at the 636.9 af. I simply need volume data from within the current permit's development period to prove beneficial use of non-consumptive water for the hatchery specific system.

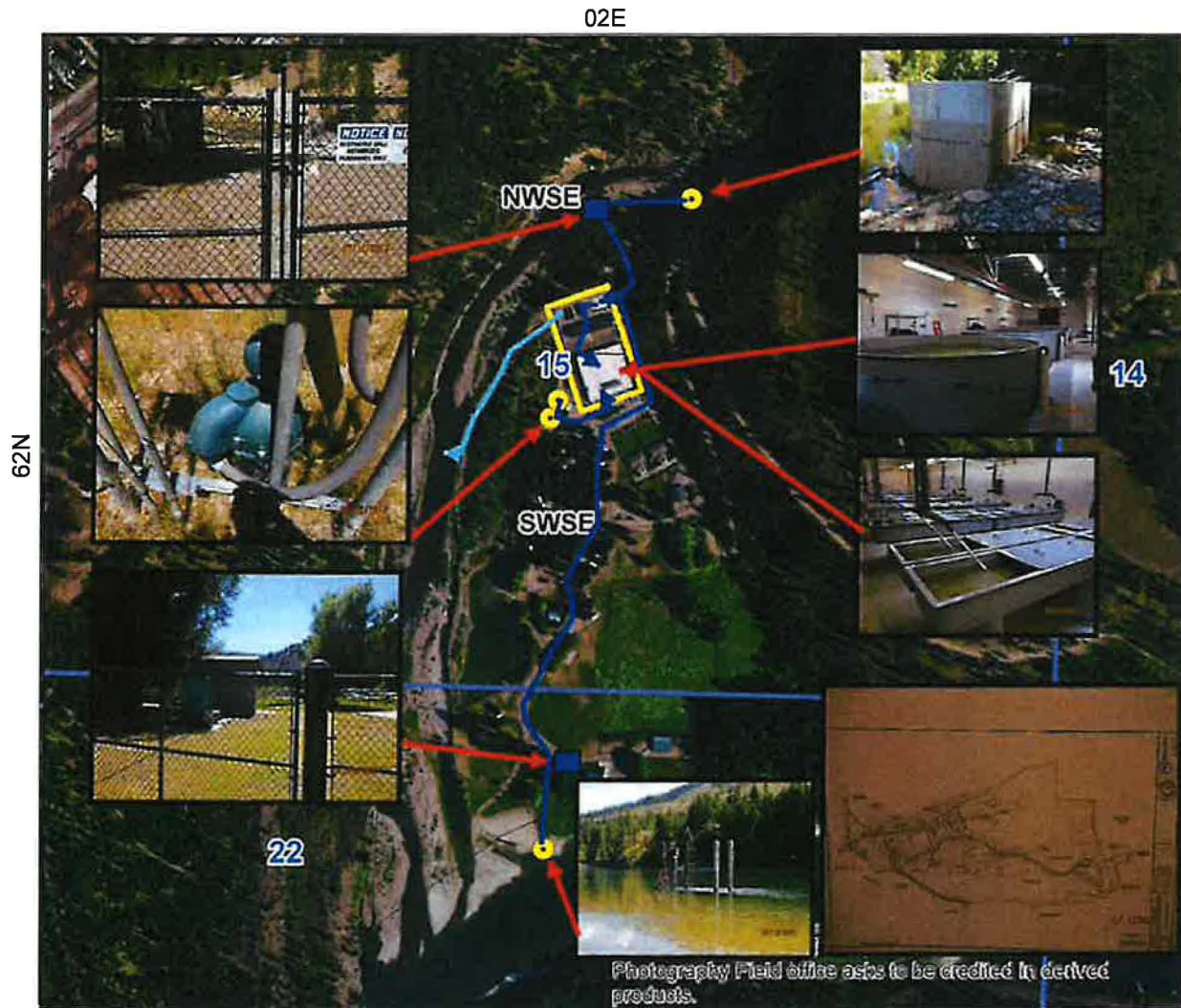
Please do give me a call with any questions, and if we could get this information finalized in the next month, let's say by 31 March, I will be able to finalize for licensing by May.

Thank you,

Luke Bates
Sr. Water Resource Agent
Northern Region
P: 208-762-2817

State of Idaho
Department of Water Resources
Attachment to Field Exam
98-8054

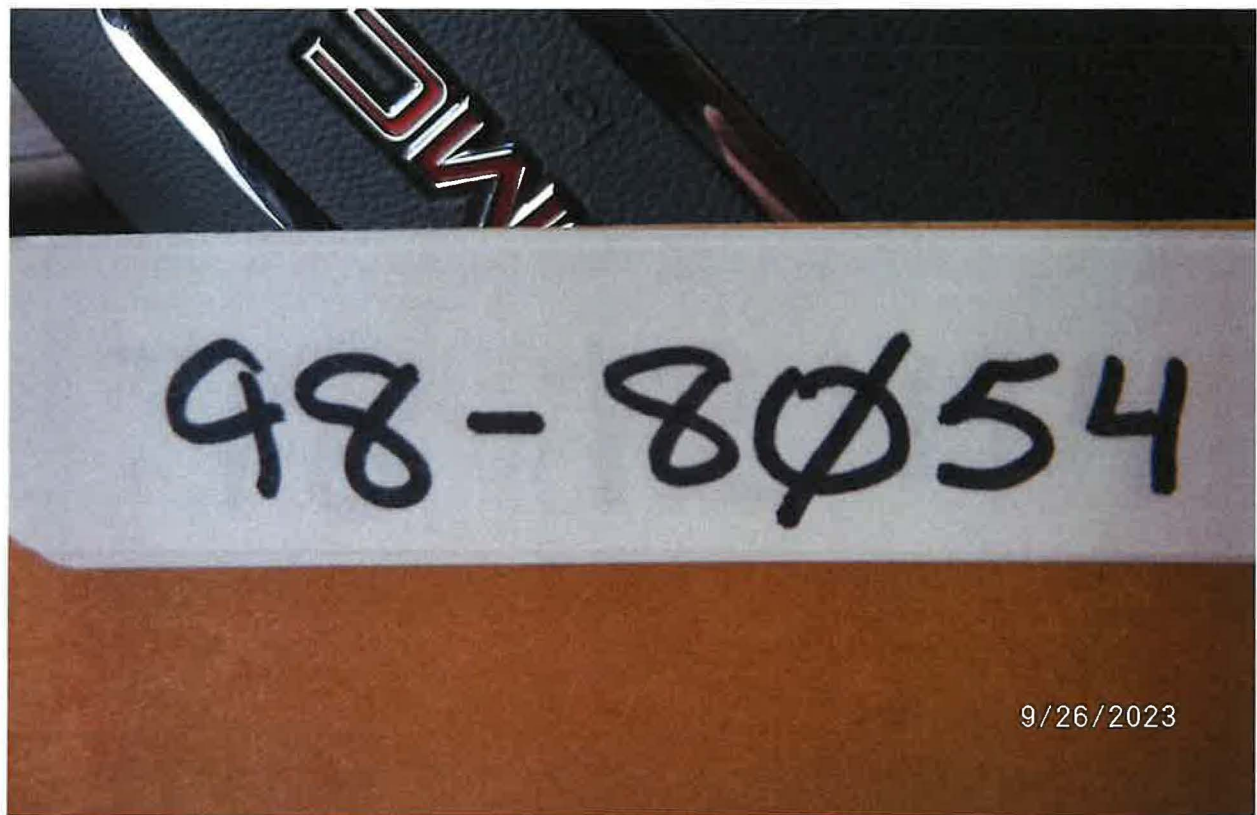
This map depicts the FISH PROPAGATION system diagram.



0 0.075 0.15 0.3 Miles

-  Place Of Use Boundary
-  Townships
-  PLS Sections
-  Quarter Quarters
-  Point of Diversion





FIELD EXAM DATE – 9/26/2023

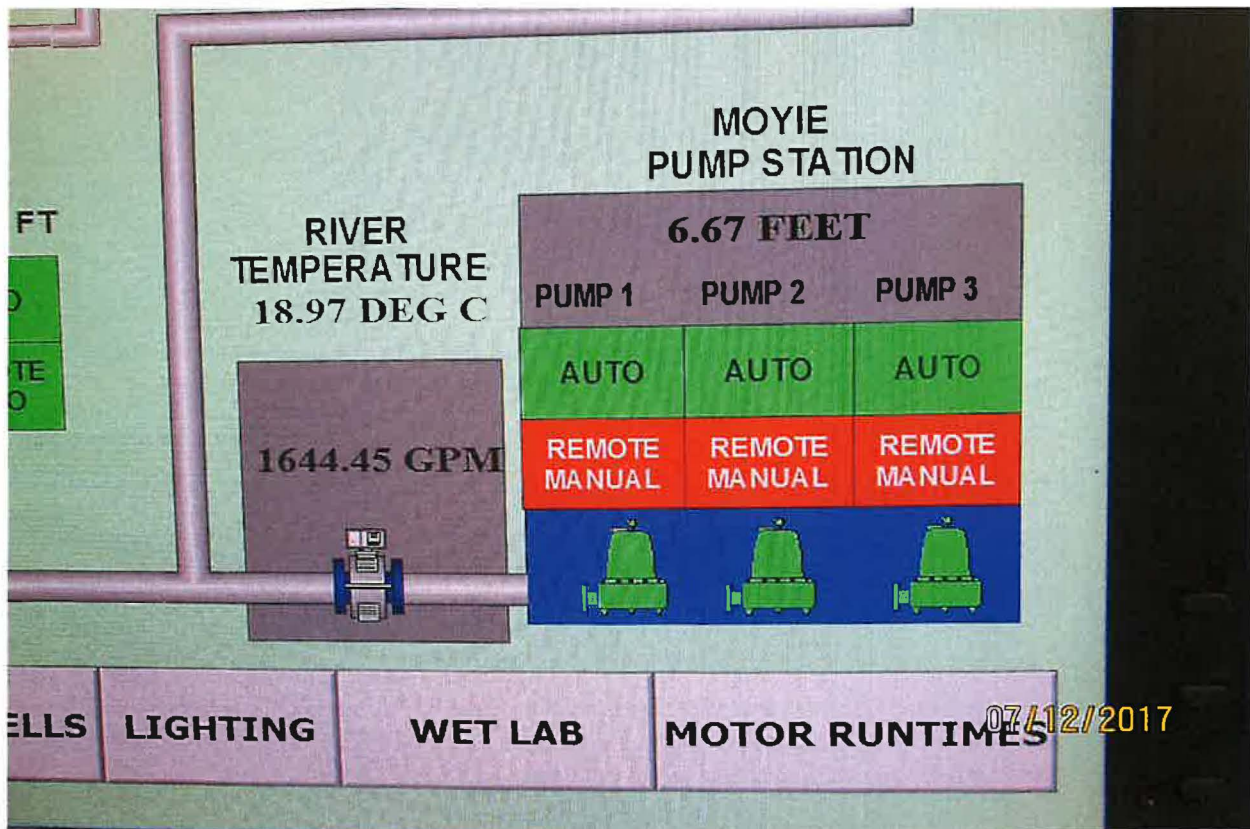
Prior Right 98-7913's Field Exam Photographs used to illustrate the Fish Hatchery water system.



POD – MOYIE RIVER INTAKE WORKS



MOYIE RIVER CONVEYANCE SYSTEM PUMP STATION



MOYIE RIVER PUMP STATION – FLOW RATE = 1,645 GPM



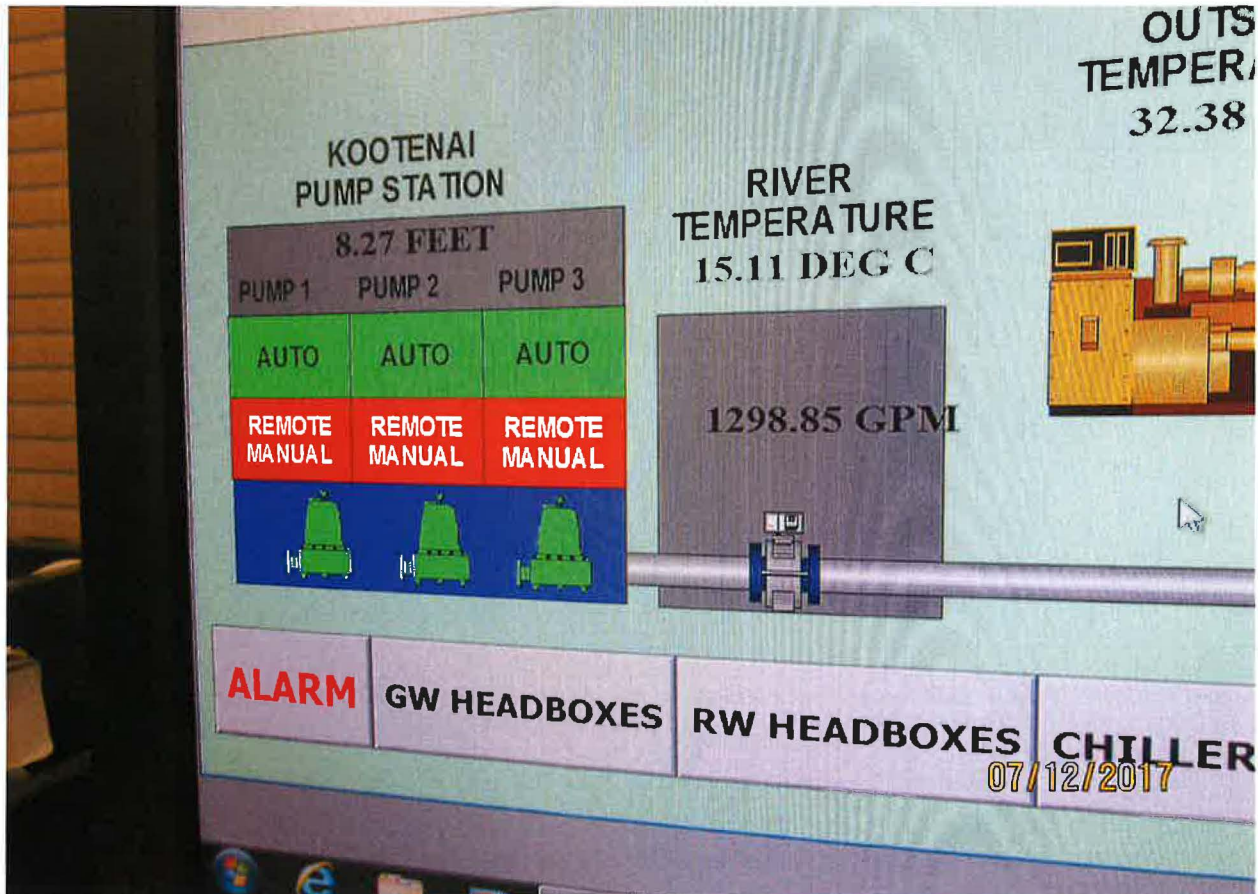
POD – KOOTENAI RIVER INTAKE WORKS



KOOTENAI RIVER CONVEYANCE SYSTEM PUMP STATION



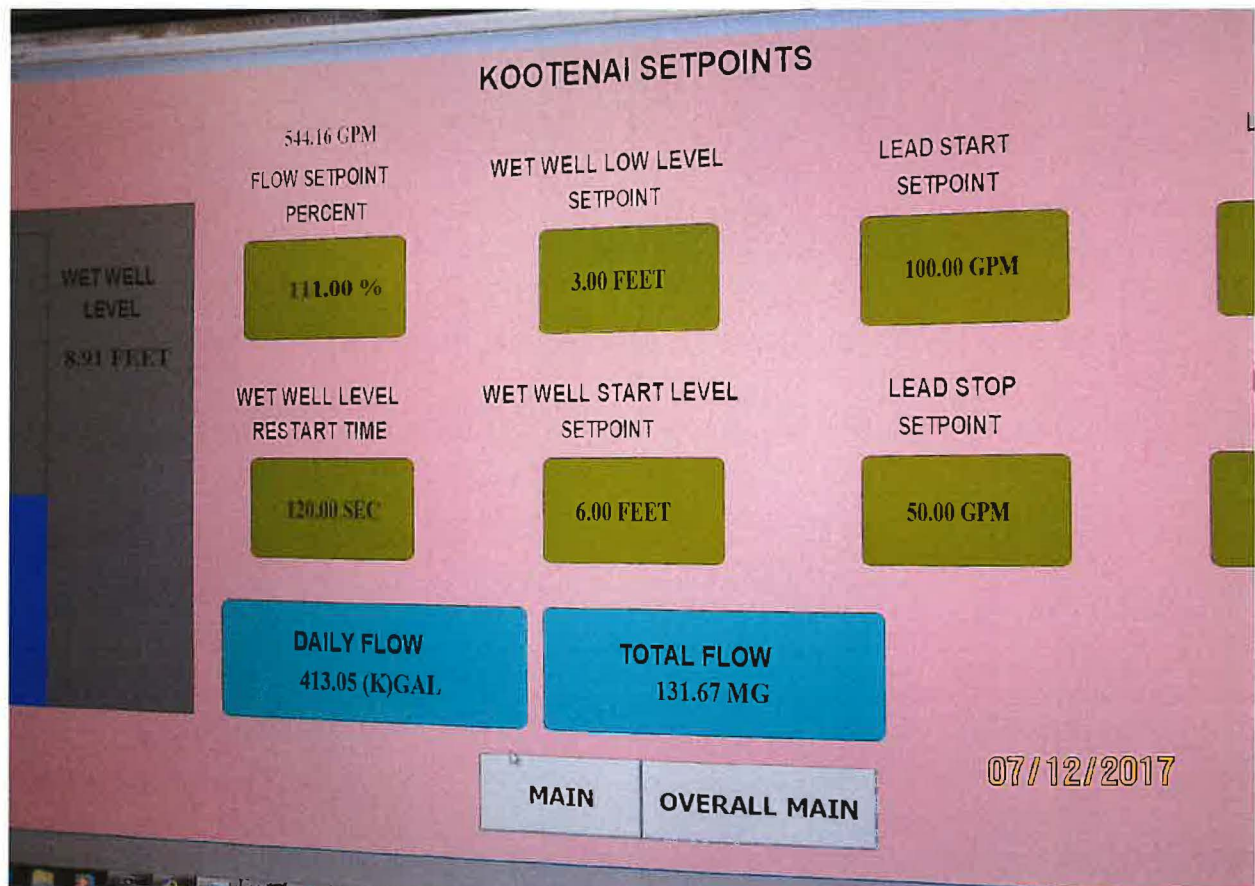
KOOTENAI RIVER CONVEYANCE SYSTEM PUMP STATION PIPE VAULT(S)



KOOTENAI RIVER PUMP STATION – FLOW RATE =1,299 GPM



HATCHERY SCADA SYSTEM – MOYIE SETPOINTS

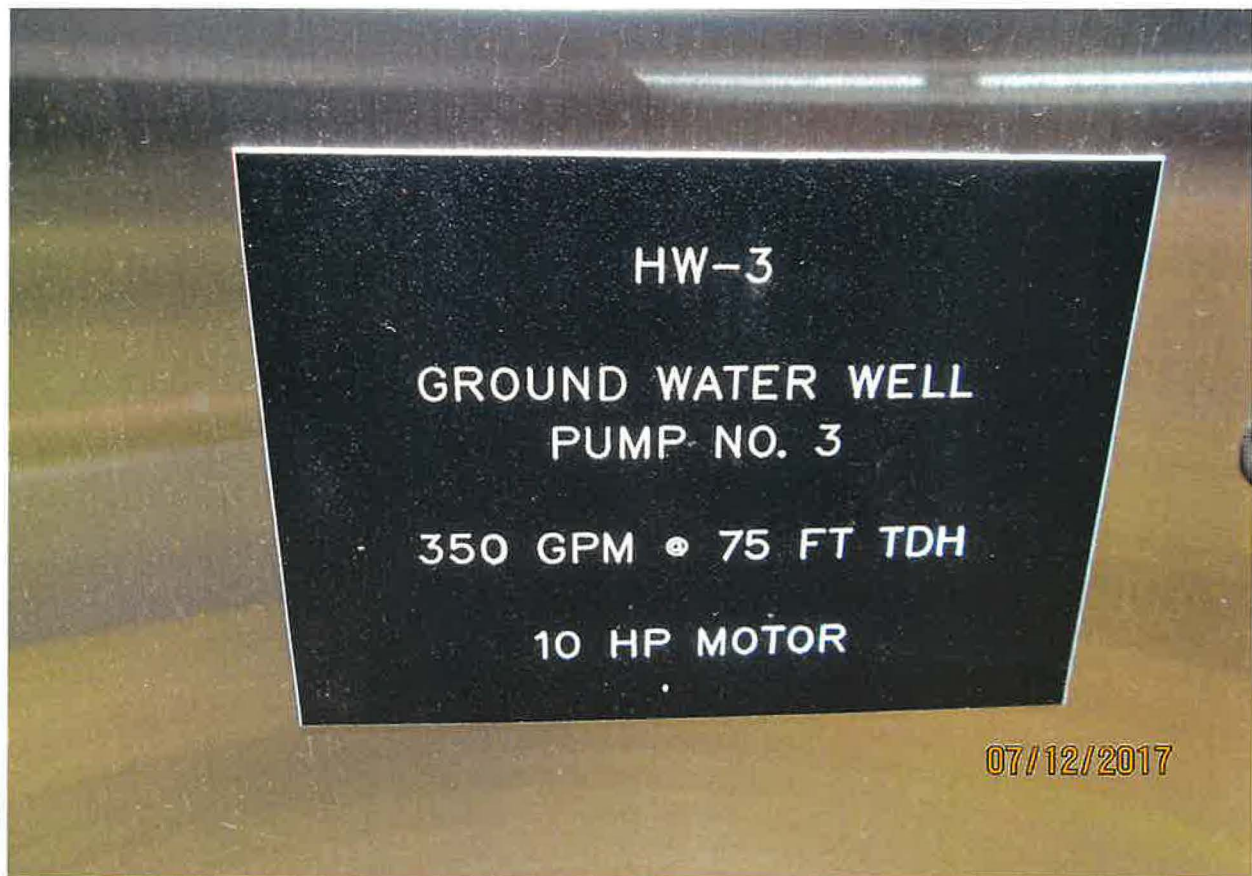


HATCHERY SCADA SYSTEM – KOOTENAI SETPOINTS

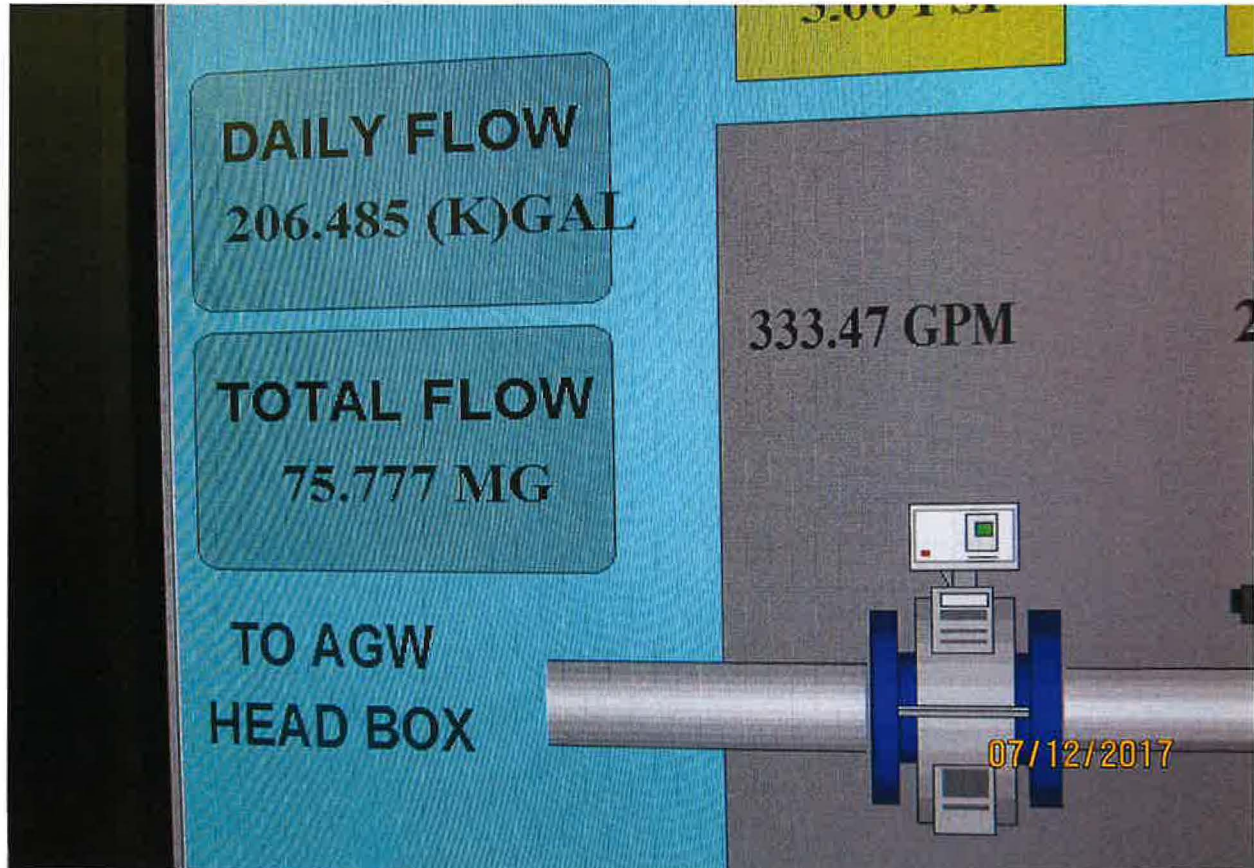


POD – WELL D0058099 (HW3)





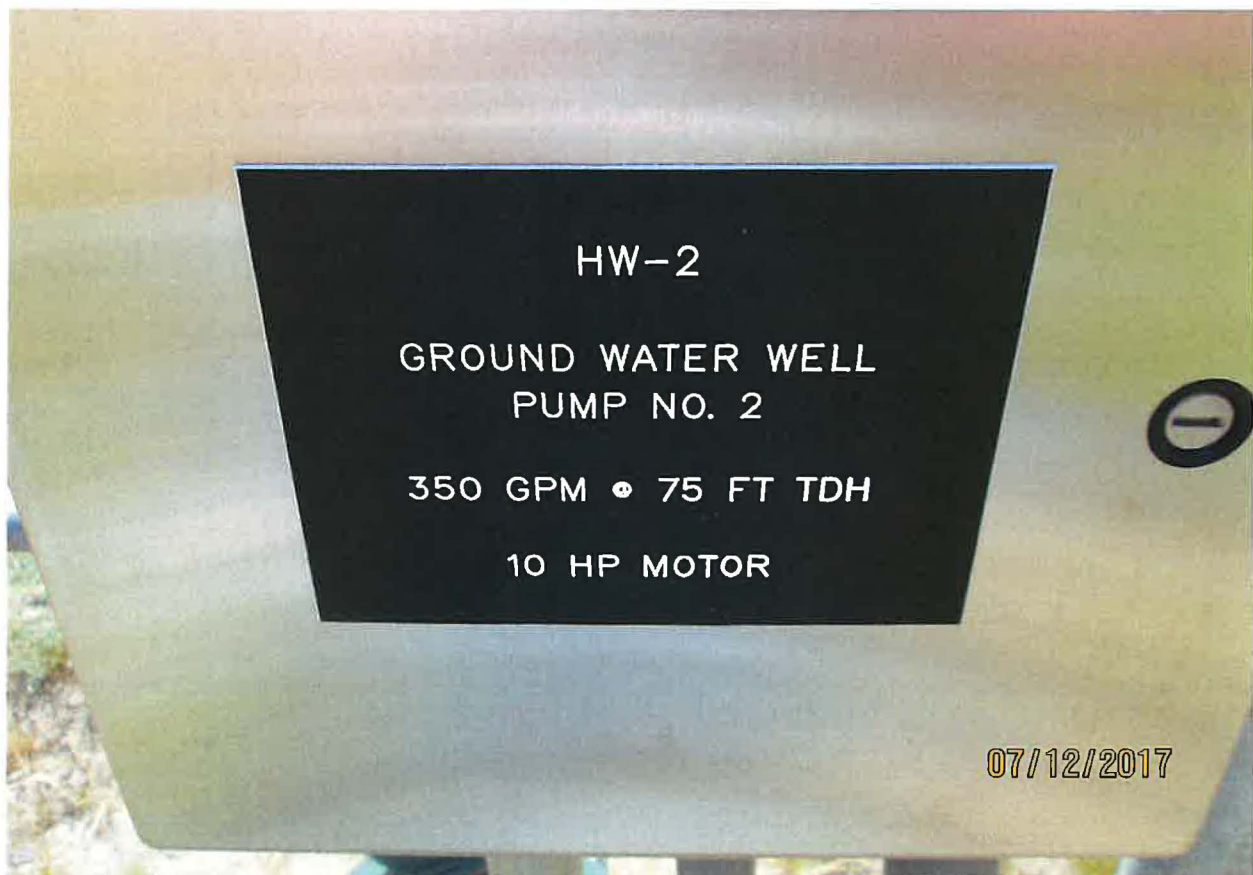
POD – D0058099 – (HW3) 10 HP MOTOR INSTALLED



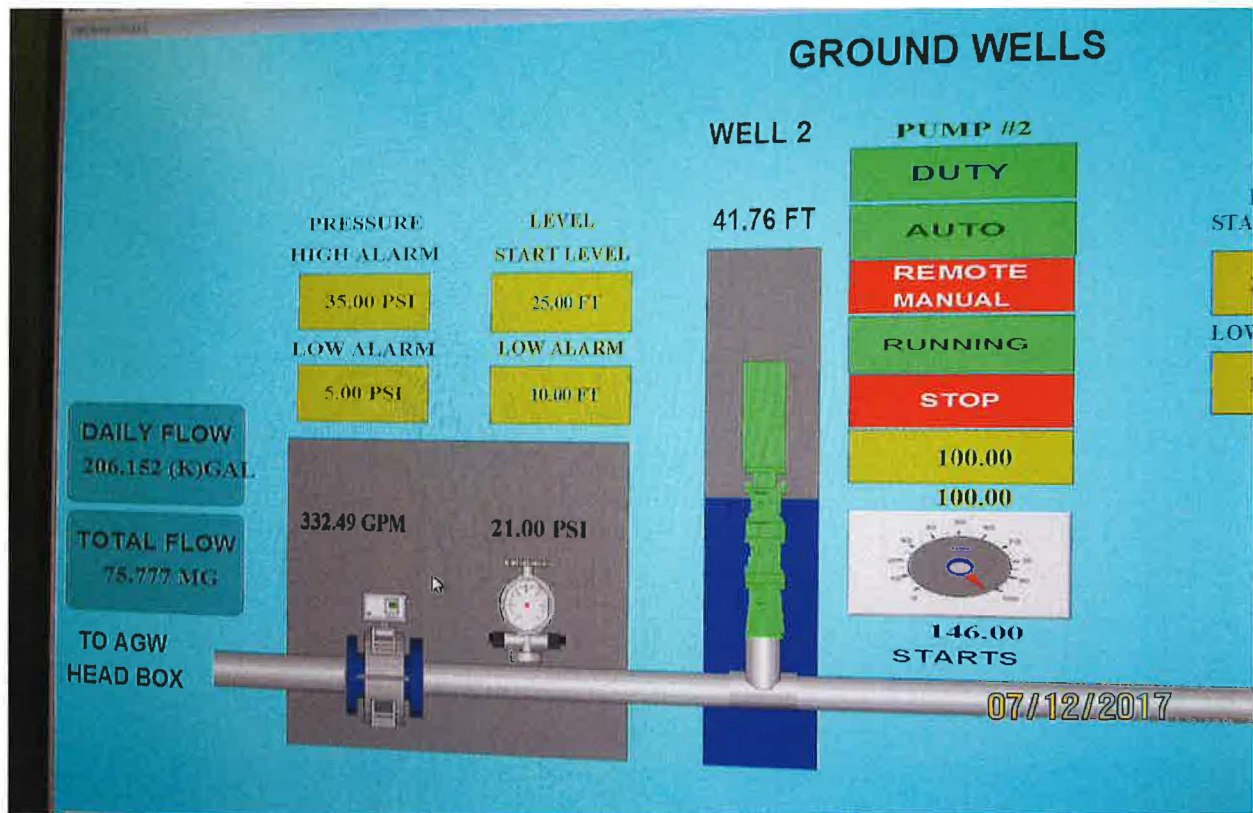
D0058099 (HW3) FLOW RATE = 333.5 GPM



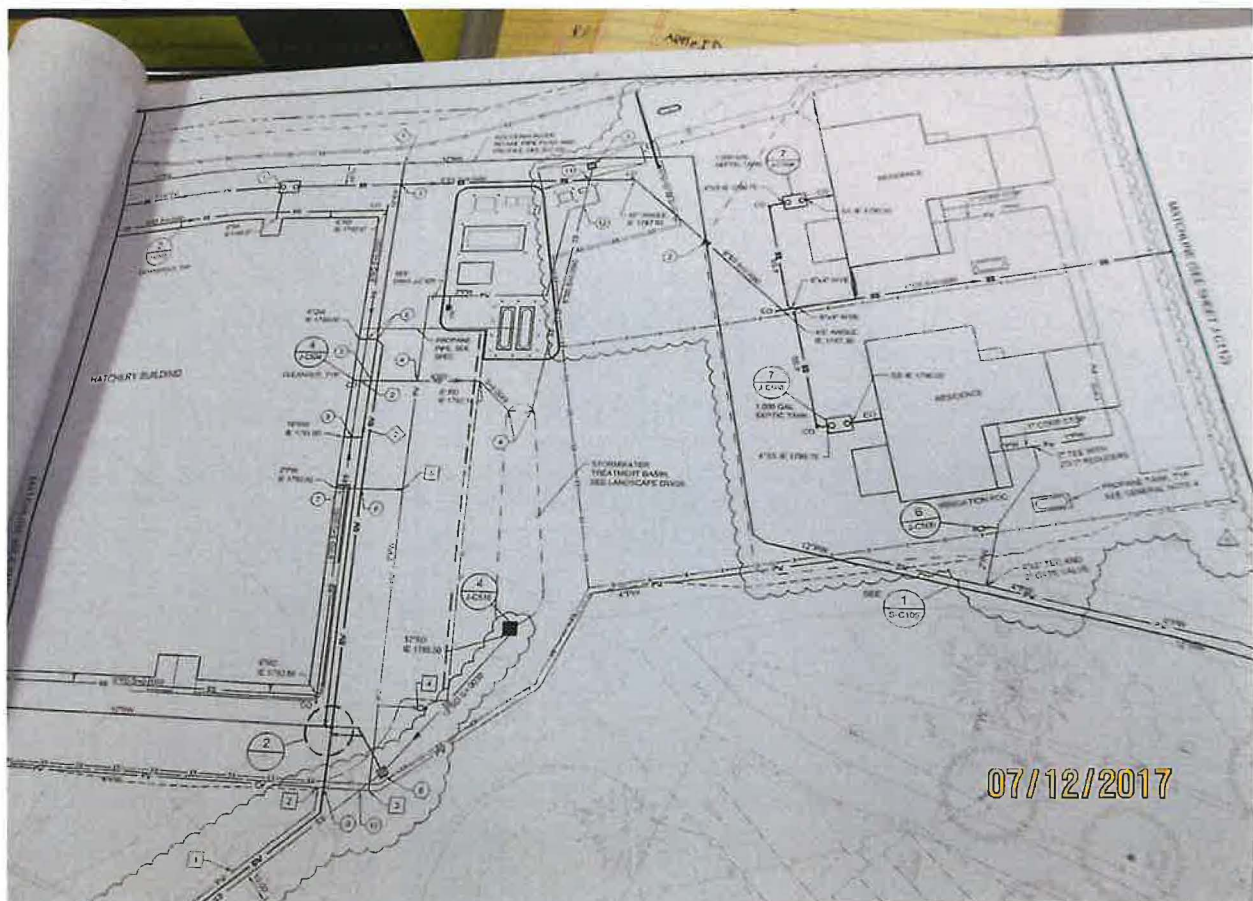
POD – WELL D0058065 (HW2)



POD – D0058065 – 10 HP MOTOR INSTALLED



D0058065 (HW2) FLOW RATE = 332.5 GPM



FISH HATCHERY SCHEMATIC – KOOTENAI RIVER PIPE PLAN AND PROFILE



FISH PROPAGATION POU - HATCHERY OPERATIONS FOR STURGEON & BURBOT





FISH PROPAGATION POU - HATCHERY OPERATIONS FOR STURGEON & BURBOT





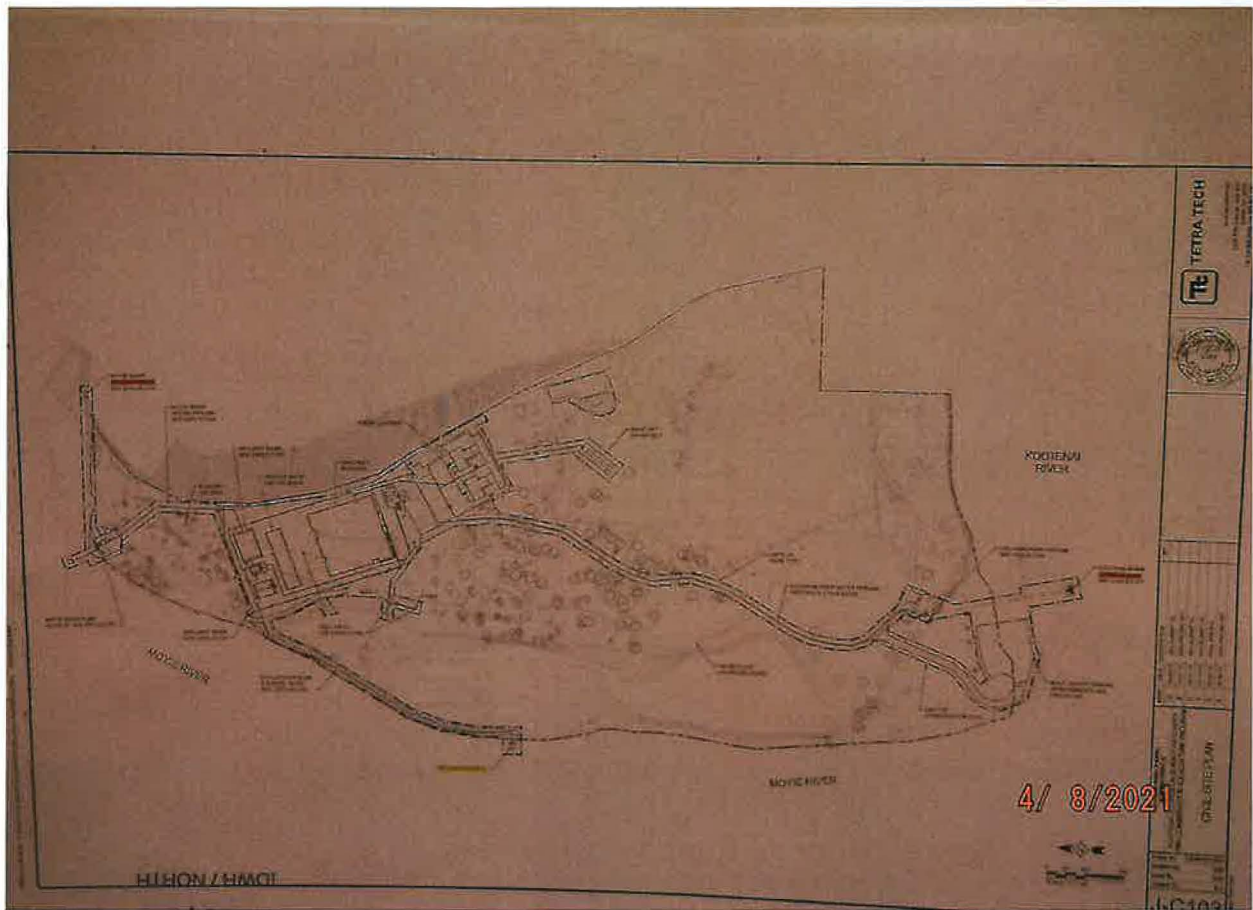
FISH PROPAGATION POU - HATCHERY OPERATIONS FOR STURGEON & BURBOT



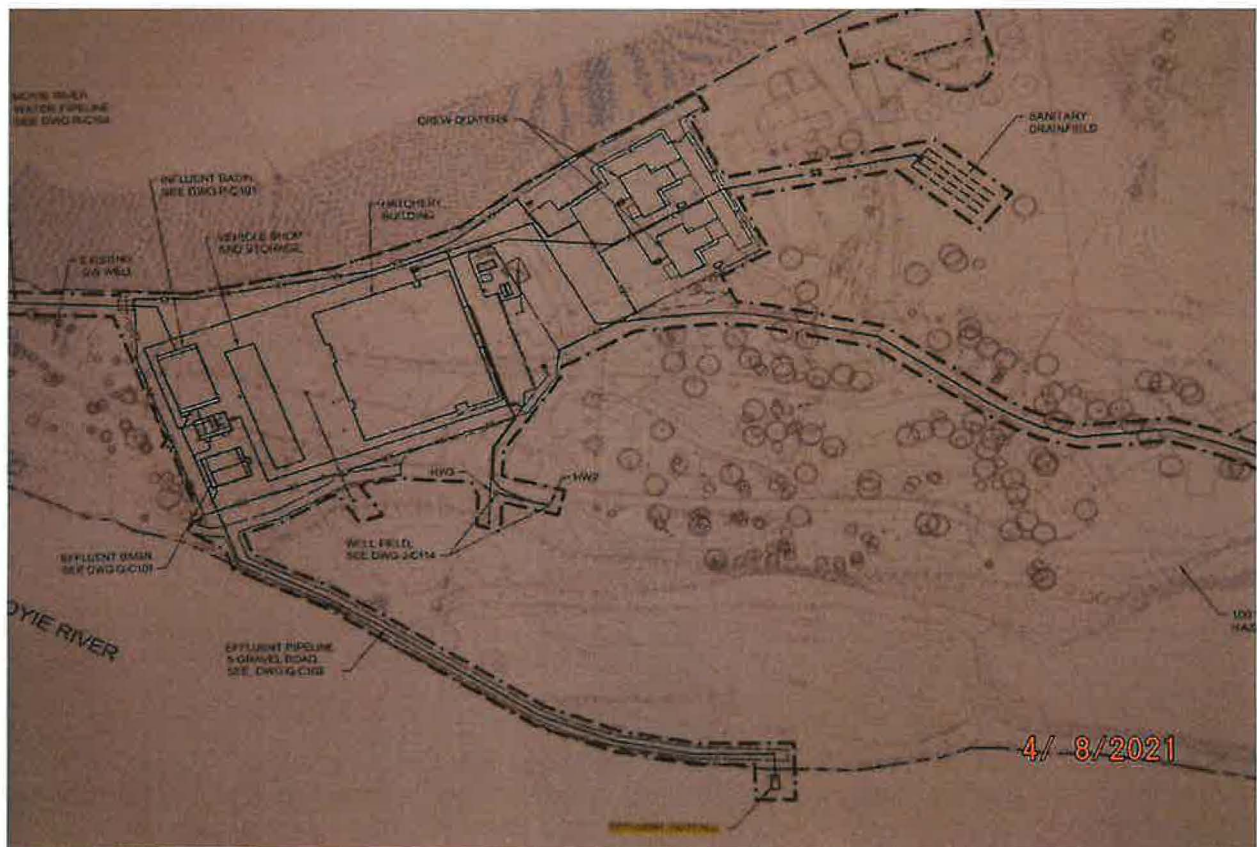


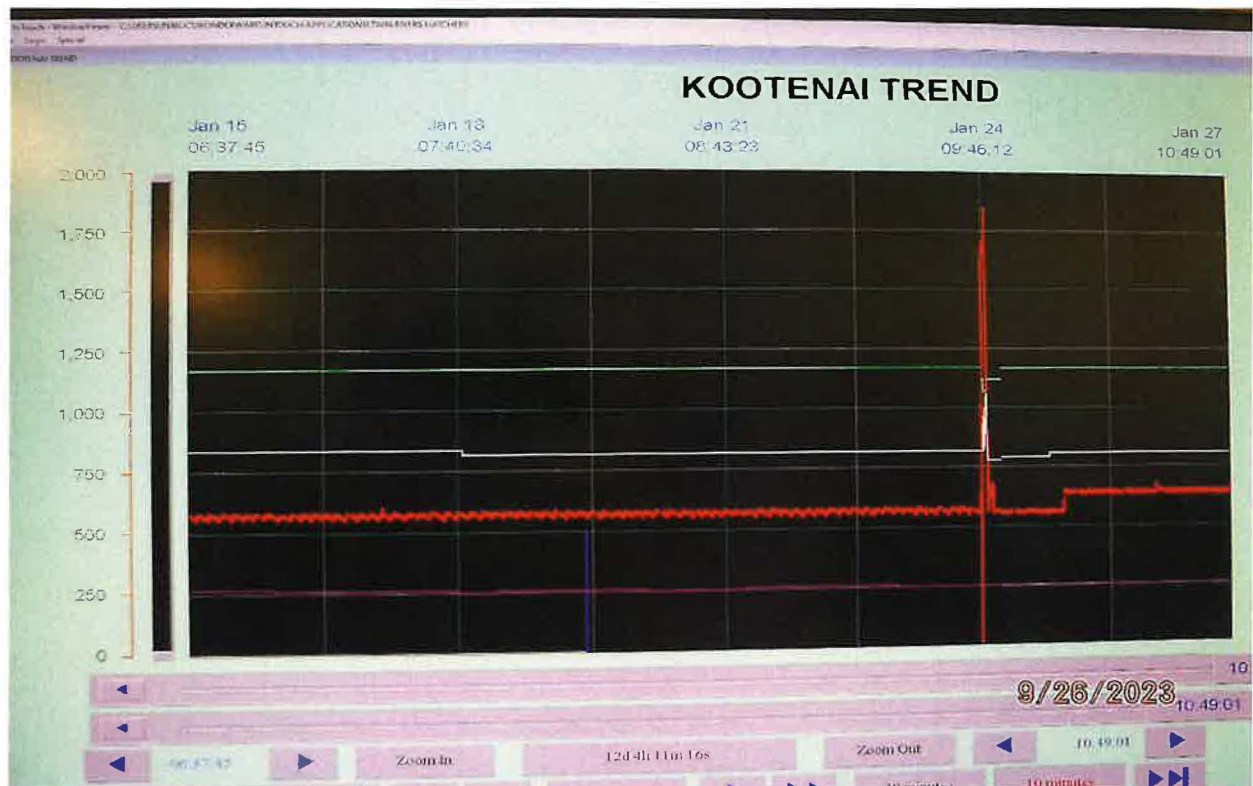
FISH PROPAGATION POU - HATCHERY OPERATIONS FOR STURGEON & BURBOT



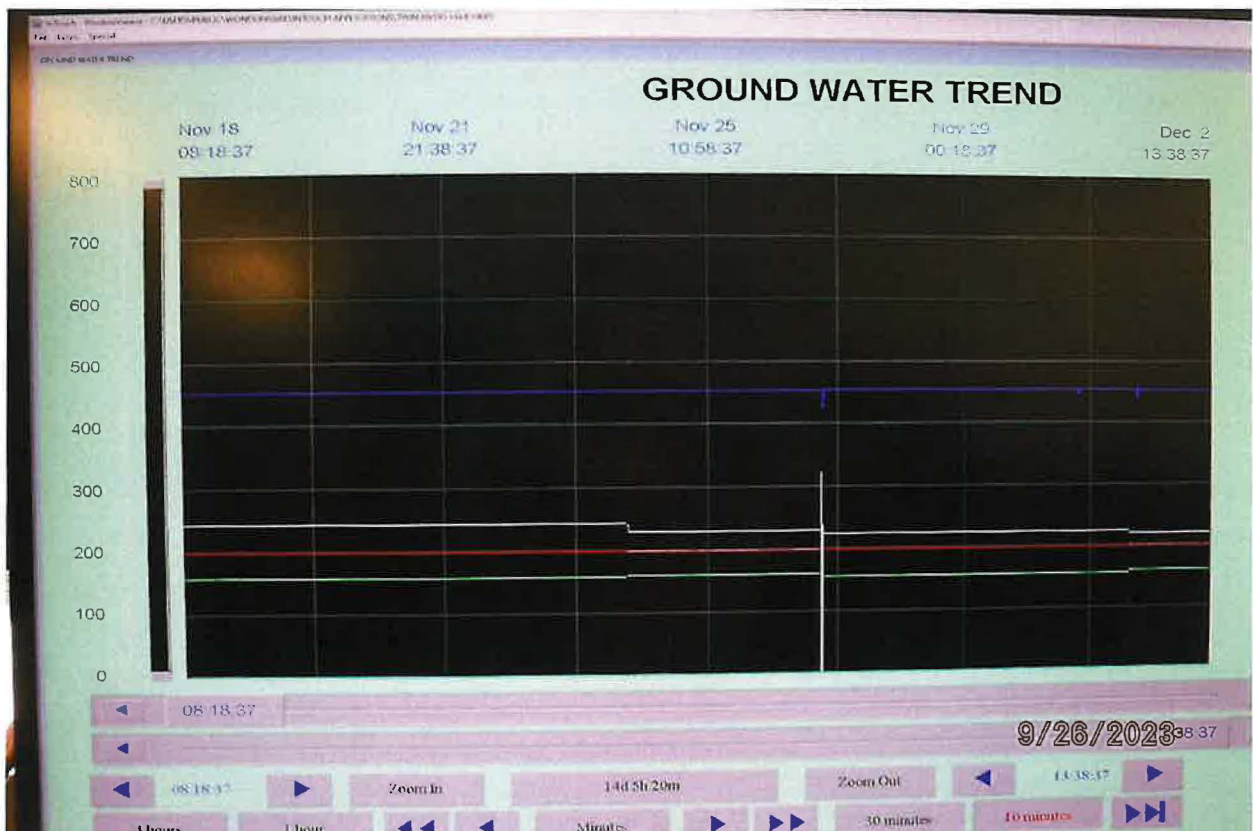


HATCHERY OPERATION WATER SYSTEM DIAGRAM – MOYIE RIVER INTAKE (UPPER L/H), KOOTENAI RIVER INTAKE (MIDDLE R/H), EFFLUENT OUTFALL BACK TO MOYIE RIVER (BOTTOM MIDDLE)





1/24/2023 KOOTENAI RIVER DIVERSION RATE – EXAMPLE OF EXTRAPOLATED DATA RETRIEVED FROM SCADA SYSTEM



11/26/2022 GROUNDWATER DIVERSION RATE – EXAMPLE OF EXTRAPOLATED DATA RETRIEVED FROM SCADA SYSTEM

University of Idaho



Development of intensive culture methods for burbot *Lota lota maculosa*

Nathan Jensen¹, Scott Williams¹, Susan Ireland², John Siple², Matthew Neufeld³ and Kenneth Cain¹
¹University of Idaho Department of Fish and Wildlife and Aquaculture Research Institute, ²Kootenai Tribe of Idaho,
³British Columbia Ministry of Environment



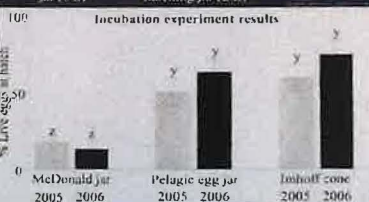
Introduction: Burbot are a species of concern in Idaho USA and Red-Listed in British Columbia Canada (Taylor and McPhail 2000). The University of Idaho, Kootenai Tribe of Idaho and BC Ministry of Environment have collaborated since 2003 to develop fundamental hatchery methods. Systems were designed to maintain critical water temperatures for spawning (4°C), egg incubation (3°C) and larval feeding (8-20°C). Weaning burbot onto commercial diets has been the foremost bottleneck to successful production (Jensen et al. 2008b).
Objectives: (1) control spawning using exogenous hormone (GnRH α) and gender segregation, (2) develop optimal egg incubation method and (3) evaluate larval burbot weaning from live diets to commercial diets.

Spawning: Adults were given one of two forms of exogenous hormone analog and distributed in duplicate gender segregation groups in two separate trials. Different letters indicate significant difference at $p \leq 0.05$.

Trial 1: hormone treatment	Females	Mean days to spawn	% spawned
GnRH α Implant	4	11.3 $\pm$	100
GnRH α Injectable	4	15.5 $\pm$	100
No Hormone	4	25.0 $\pm$	100

Trial 2: group treatment	GnRH α implanted	% released parasites	Spawns observed
2 males	N	100	Undetermined
2 females	N	100	Undetermined
3 females	Y	67	Yes
4 females	Y	100	Yes
1 male	N	100	Yes
3 females	Y	100	Yes
1 male	N	100	Yes
3 females	Y	100	Yes

Incubation: Three incubator types were tested two years with four spawns each year. Each spawn was divided amid the three incubators types in duplicate. Different letters indicate significant difference at $p \leq 0.05$.



Burbot: The only freshwater member of the cod family Gadidae.



Broadcast spawner, eggs 1mm, larvae 4mm, need live feeds 30 d.

Larval weaning: Five weaning regimes were evaluated in year 1, three weaning regimes were evaluated in year 2. Treatments included all live prey and weaning diet introduced at 11, 21, 31, 41 d post hatch year 1. In year 2, frozen prey was included, trial duration was extended from 52 d to 76 d, and larvae stocked per 10 L tank was increased from 25 to 250. Different letters indicate significant difference at $p \leq 0.05$.

Larval weaning experiment year 1						
Treatment	Algae + Rotifer dph	Algae + Artemia dph	Weaning diet dph	Mean survival	Mean length (mm)	Survival (mm)
1	11-20	21-30	31-41	0.0 $\pm$	0.0 $\pm$	0.0 $\pm$
2	11-20	21-30	31-41	0.4 $\pm$	6.0 $\pm$	0.3 $\pm$
3	11-20	21-30	31-41	2.1 $\pm$	13.7 $\pm$	1.3 $\pm$

Larval weaning experiment year 2						
Treatment	Algae + Rotifer dph	Algae + Artemia dph	Weaning diet dph	Mean survival	Mean length (mm)	Survival (mm)
1	11-20	21-30	31-41	0.0 $\pm$	0.0 $\pm$	0.0 $\pm$
2	11-20	21-30	31-41	0.4 $\pm$	6.0 $\pm$	0.3 $\pm$
3	11-20	21-30	31-41	2.1 $\pm$	13.7 $\pm$	1.3 $\pm$

TWIN RIVER FISH HATCHERY BURBOT FISH REARING INFORMATION

University of Idaho



Development of intensive culture methods for burbot *Lota lota maculosa*

Nathan Jensen¹, Scott Williams¹, Susan Ireland², John Siple², Matthew Neufeld³ and Kenneth Cain¹
¹University of Idaho Department of Fish and Wildlife and Aquaculture Research Institute, ²Kootenai Tribe of Idaho,
³British Columbia Ministry of Environment

Introduction: Burbot are a species of concern in Idaho USA and Red-Listed in British Columbia Canada (Taylor and McPhail 2000). The University of Idaho, Kootenai Tribe of Idaho and BC Ministry of Environment have collaborated since 2003 to develop fundamental hatchery methods. Systems were designed to maintain critical water temperatures for spawning (4°C), egg incubation (3°C) and larval feeding (8-20°C). Weaning burbot onto commercial diets has been the foremost bottleneck to successful production (Jensen et al. 2008b).
Objectives: (1) control spawning using exogenous hormone (GnRH α) and gender segregation, (2) develop optimal egg incubation method and (3) evaluate larval burbot weaning from live diets to commercial diets.

Spawning: Adults were given one of two forms of exogenous hormone analog and distributed in duplicate gender segregation groups in two separate trials. Different letters indicate significant difference at $p \leq 0.05$.

Trial 1: hormone treatment	Females	Mean days to spawn	% spawned
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Incubation: Three incubator types were tested two years with four spawns each year. Each spawn was divided amid the three incubators types in duplicate. Different letters indicate significant difference at $p \leq 0.05$.

