

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 78-12291

Exam Date: 6/9/2020

1. Current Owner: STEVEN AND/OR LINDA SCHWEICH

2. Accompanied by: Linda and Steve Schweich

3. SOURCE: LITTLE SALMON RIVER

TRIBUTARY: SALMON RIVER

Method of Determination: Visual – Field Exam

B. OVERLAP REVIEW

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

Water Right No.	Source	Purpose of Use	Basis
78-12315	Little Salmon River	Stock water	Decreed

Comments: The stock water use does not occur on the permit holder's property. A tiny piece of irrigation use for the City of Riggins occurs within the same QQ, but does not occur on this property.

2. Other water rights with the same point-of-diversion: NO Overlap

Water Right No.	Source	Purpose of Use	Basis

Comments:

C. DIVERSION AND DELIVERY SYSTEM

1. Location of point of diversion:

LITTLE SALMON RIVER

NE¼ SE¼, Sec. 21, Twp 24N, Rge 01E, B.M.

IDAHO County

Method of Determination: PLSS layer, field exam.

2. Place of Use: IRRIGATION

Twp	Rng	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
24N	01E	21													0.9				0.9

Total Acres: 0.9

Method of Determination: Field exam, aerial imagery

3. Delivery System

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

X 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.

X

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

X Photo of Diversion and System Attached

4. Diversion Pumps:

Well or Diversion ID No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
Main pump	Honda GX240K1		WABJ-1128320	Honda WT30XT	3 inches
Booster pump	Honda WH20XK1			Honda WH20X	2 inches

D. FLOW MEASUREMENTS**1. Equipment:**

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date
None						

2. Measurements: No measurements were taken.**E. FLOW CALCULATIONS**

X Additional Computation Sheets Attached

Measured Method: Calculated

In order to understand this system, I contacted the Department engineer to assist me with determining the flow rates for this system. Please see the attached emails with the Department engineer. The system was not operating during the field examination, so no measurement was possible at the time of the field exam. Based on the engineer's analysis, the following possible flow rates (table below) were determined. With this system, the two upper pasture sprinklers cannot run when the lower sprinkler or hoses are running. The larger of the two upper sprinklers is the highest flow rate condition in this system, so that will be evaluated first. Of the two limiting factors, the first is the maximum flow rate that the main pump can deliver to the booster pump, and the second is the water that sprinkler #3 can deliver.

Based on the pump curve and head loss at different flowrates, the first pump will be able to achieve a flow rate of approximately 40 gpm. Maximum total head lift capability of the pump = 89 ft.

Flowrate	50 gpm	45 gpm	40 gpm
Head loss due to Elevation	23	23	23
Head loss due to friction 150 ft (3.0")	1.1	0.8	0.6
Head loss due to friction 500 ft (1.5")	108	88	63
Total head loss (ft)	132.1	111.8	86.6

If the booster pump has the potential to pump at a higher rate than what the main pump can deliver, that would cause either the hose to start collapsing, or create a vacuum resulting in cavitation, so a flow rate of 40 gpm leaving the booster pump will be assumed.

The second limiting factor is the amount of water that Sprinkler #3 can deliver:

With the 200 ft 1.5 inch hose from the booster pump to the sprinkler, the head loss at 40 gpm would equate to a pressure loss of 15 psi per 100 feet (graph attached), which would equal a total loss of 30 psi to the sprinkler. The maximum pressure the main pump can produce is 39 psi. According to the sprinkler specifications, the lowest flow rate at which this sprinkler can operate is 40 gpm/29 psi. Although the booster pump could deliver 40 gpm, the friction loss in the hose means that the sprinkler does not have enough pressure to operate.

Flow Rate	10 gpm	15 gpm	20 gpm	25 gpm	30 gpm	35 gpm	40 gpm
Head loss (ft of water)	1	2.5	4.6	7	10	14	7.7

Sprinkler #2 in the upper pasture can operate using any size nozzle at 40 gpm. However, the friction loss at 200 feet of ¾ inch hose would result in an unusable pressure (see attached graph).

Flow Rate	10 gpm	15 gpm	20 gpm
Head loss (ft of water)	51	114	203

Sprinkler #1 in the lower pasture is at the same elevation as the main pump and is capable of delivering enough water to irrigate: 24 gpm. The Flow Rate Calculation sheet for this sprinkler is included in this report.

Based on the lack of capability to irrigate the upper pasture, and the lack of evidence that water has been beneficially applied in that area, my recommendation is for irrigation of the orchard and lower pasture:

Orchard = 0.7 acres Lower Pasture = 0.2 acres Total acres = 0.9

Per Administrative Processing Memo #17: 0.03 cfs/acre for irrigation up to 5 acres is allowed.

Permit authorizes: 0.2 cfs

System is capable of 0.09 cfs (40 gpm).

0.9 acres x 0.03 cfs (maximum allowable for irrigation of less than 5 acres) = 0.027 cfs (rounded to 0.03 cfs).

I recommend 0.03 cfs for irrigation of 0.9 acres.

F. VOLUME CALCULATIONS

1. Volume Calculations for irrigation:

$$V_{IR} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = 0.9 \times 4 = 3.6$$

$$V_{DR} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = .03 \times 289 = 8.67$$

$$V = \text{Smaller of } V_{IR} \text{ and } V_{DR} = 3.6$$

2. Volume Calculations for Other Uses: N/A

$$V_{DR} = [\text{Diversion Rate (cfs)}] \times (\text{Days}) \times 1.9835 =$$

G. NARRATIVE/REMARKS/COMMENTS

Proof of Beneficial use was submitted on September 15, 2017 just prior to the expiration of an extension approved on October 11, 2012. The property is located along the east bank of the Little Salmon River just outside of Riggins. Most of the property is on a plateau about 25 feet above the river that is somewhat rocky but fairly level. The main pump is located at river level and it pumps up to the plateau to a booster pump and then to 2 movable sprinklers. In between the main pump and the booster pump, about half way up the incline to the plateau, there is a split in the hose to two 1 ½ inch hoses. One of these hoses goes back down to river level to a small grassy pasture and a moveable sprinkler. The other split goes on up to the orchard on top of the plateau (prior to the booster pump). The water delivery system for the orchard consists of a hand line and some drip irrigation. Most of the trees in the orchard are planted in buckets (hand line irrigation) with a few of the trees planted in the ground (drip irrigation). The 1 ½ inch line (after split #2) proceeds past the orchard to the booster pump which feeds two movable sprinklers. The sprinklers are set in an area of scrub used as a pasture for horses. There was no evidence of a crop or pasture grass. All lines are above ground. The weather had been cool and wet during the prior week, and the system was not running at the time of the field exam.

Examination of aerial and satellite imagery, and Landsat near-infrared imagery shows no indication of the pasture area having been irrigated at any time in the past. See attached satellite imagery. A comparison was made with two nearby irrigation rights. The existing rights showed clear evidence of irrigation through the years. This property shows none. Based on the field exam and lack of evidence of beneficial use of water for pasture, my recommendation is for irrigation of the orchard area and lower pasture only.

Have conditions of permit approval been met? X Yes No

Permit holder has installed a fish screen.

H. RECOMMENDATIONS

1. Recommended Amounts

<u>Beneficial Use</u>	<u>Period of Use</u>	<u>Rate of Diversion</u>	<u>Annual Volume</u>
IRRIGATION	2/15 to 11/30	0.03 CFS	3.6 AF

Totals: 0.03 CFS 3.6 AF

2. Recommended Amendments:

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☒ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☒ None

I. AUTHENTICATION

Field Examiner's Name


Paula Dillon - GIS Analyst II

Date

7/8/2020

Reviewer


Dan Nelson, Water Allocation Analyst III

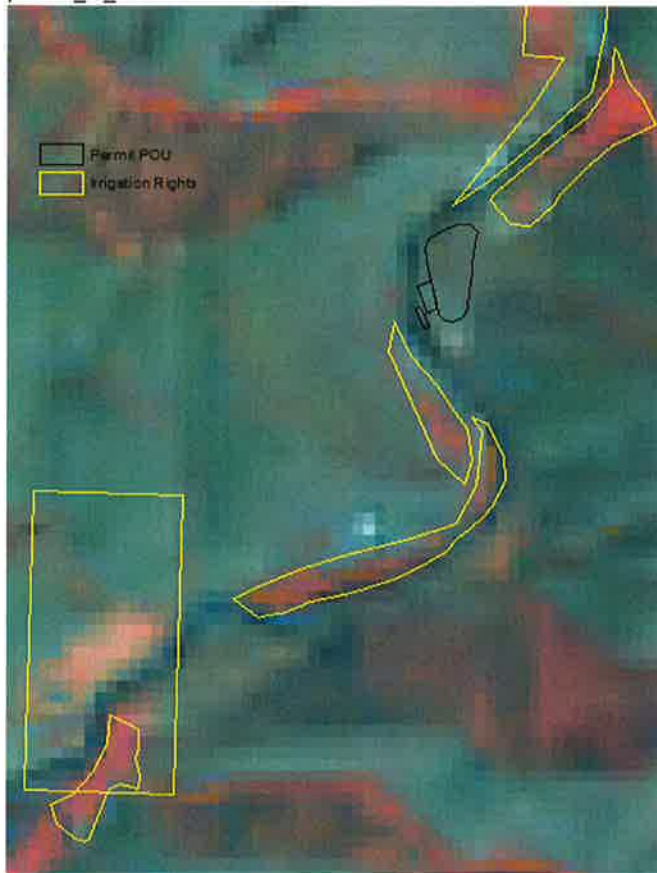
Date

8-27-20

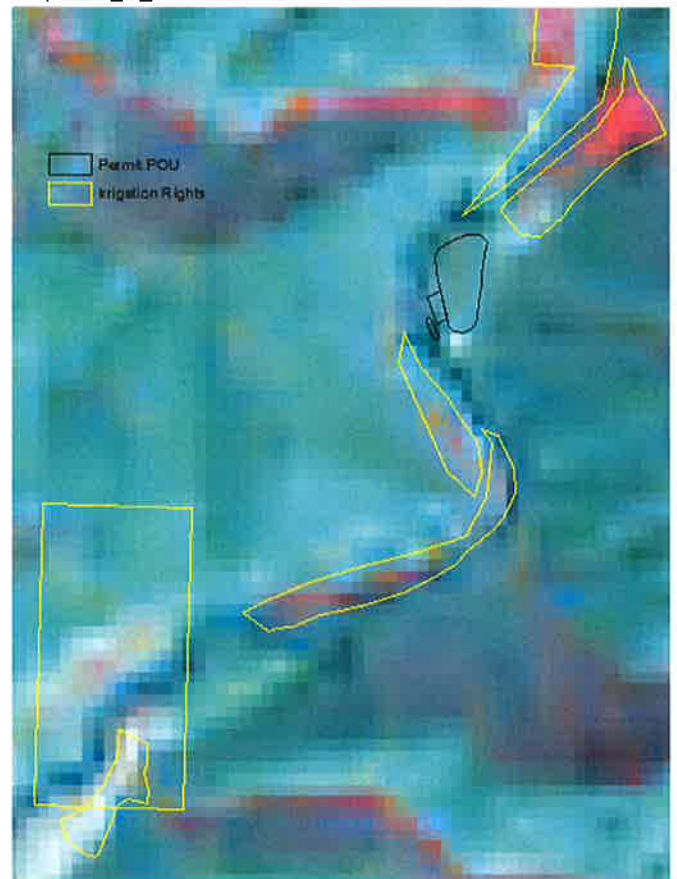
Map



Landsat Infrared Imagery
p42r28_i8_20160613



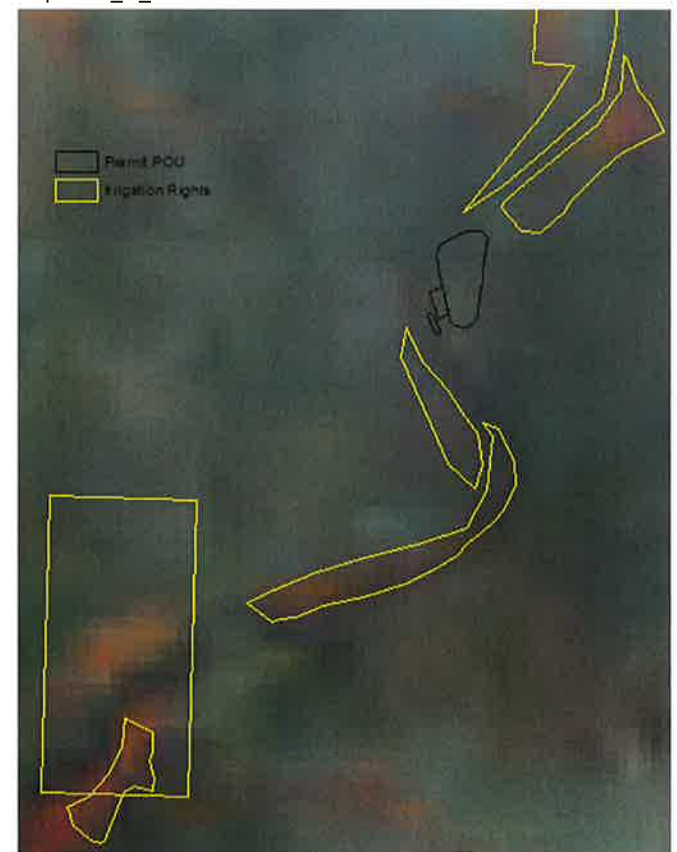
p42r28_i7_20170624

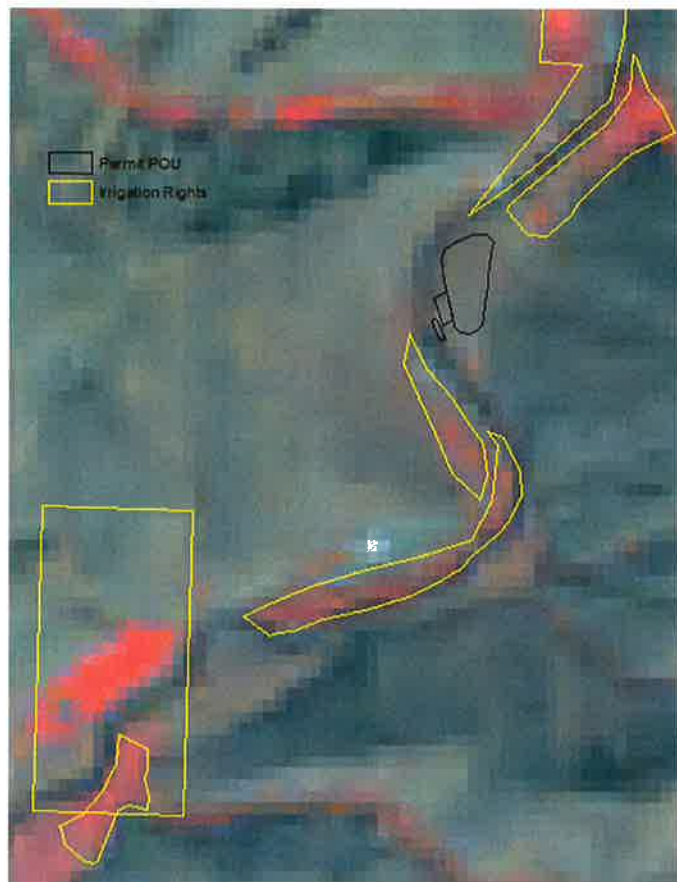


p42r28_i8_20160731



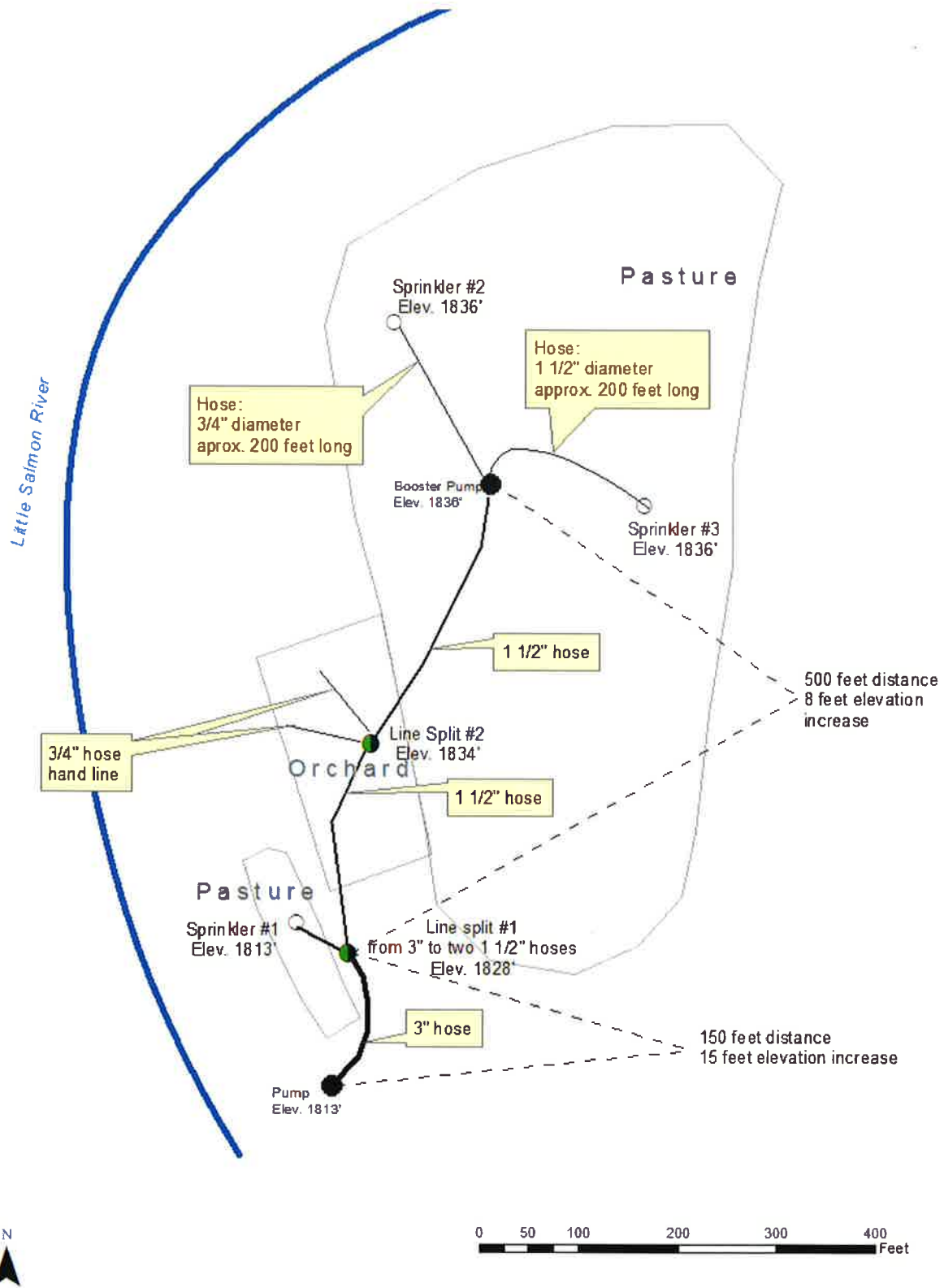
p42r28_i7_20170726

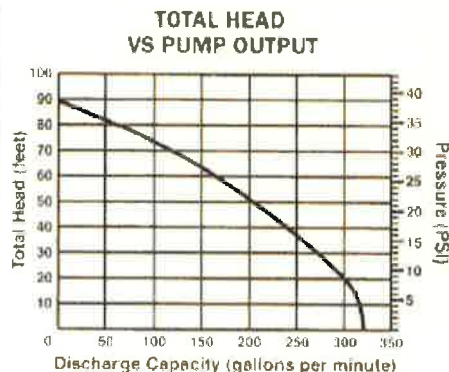




The color red in the above multispectral images indicates the presence of vegetation, in this case, due to irrigation.

Delivery System Diagram



Measurement Calculations**Main Pump Specs and Pump Curve****Honda WT30 3" trash pump**

HONDA

GENERATORS & PUMPS

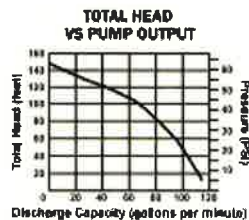
Honda 4-stroke, single cylinder, air cooled engine	GX240
Displacement	242 cc
Bore and stroke	2.9" x 2.3"
Compression Ratio	8.2:1
Oil Alert	Yes
Pump type	Trash Centrifugal Self-priming
Volute	Rigid Mounted Cast Iron w/ Stainless Wear Plate
Impeller	Conical Cast Iron
Mechanical Seal (pump case/impeller)	Silicone Carbide/Silicone Carbide
Priming time	100 sec. @ 16.4 ft.
Drive system	Direct
Discharge capacity	319 gal./min.
Suction port diameter	3"
Discharge port diameter	3"
Total head lift	89 ft.
Suction head lift	26 ft.
Maximum pressure	39 psi
Solids handling	1 1/16 inches
Dimensions (LxWxH)	26.0 x 19.5 x 20.3
Dry weight	132 lbs.
Strainer Part #	78325-YG1-003

Booster Pump Specs and Pump Curve

**WH20XTAF**

- High-pressure (64 psi max.), centrifugal, self-priming 2" pump
- 119 gal/min capacity
- Easy-starting Honda OHV commercial-grade engine
- Lightweight aluminum case
- Cast iron impeller & volute

- Full frame protection



Sprinklers #1 and #2

1000F Sprinkler Cart Performance Chart

Nozzle Size	PSI	GPM	Jet Length/Feet (One Direction)	Wetted Circle (Diameter/Feet)
5 mm (0.20")	22	5.3	42	84
	29	6	46	92
	44	7	50	100
	58	9	54	108
6 mm (0.24")	22	7	43	86
	29	8.5	48	96
	44	10	54	108
	58	12	58	116
7 mm (0.28")	22	10	46	92
	29	11	50	100
	44	14	56	112
	58	16	61	122
9 mm (0.35")	22	16.4	50	100
	29	19	54	108
	44	23	61	122
	58	26	64	128

Sprinkler #3

1500H Sprinkler Cart Performance Chart

Nozzle Size	PSI	GPM	Jet Length/Feet (One Direction)	Wetted Circle (Diameter/Feet)
12 mm (0.47")	29	40	65	130
w/ 5 mm (0.19")	44	48	78	156
Diffuser Nozzle	58	56	88	176
	73	62	98	196
14 mm (0.55")	29	52	69	138
w/ 5 mm (0.19")	44	63	82	164
Diffuser Nozzle	58	73	95	190
	73	81	101	202
16 mm (0.63")	29	65	72	144
w/ 5 mm (0.19")	44	80	85	170
Diffuser Nozzle	58	93	98	196
	73	103	108	216
18 mm (0.70")	44	100	92	184
w/ 5 mm (0.19")	58	115	101	202
Diffuser Nozzle	73	128	112	224

Head and Friction Loss (from Department Engineer Manuel Rauhut)

Paula –

The headloss will depend on the flowrate.

For the 0.75 inch diameter hose it would be approximately as follows:

Flow Rate	10 gpm	15 gpm	20 gpm
Headloss (ft of water)	51	114	203

So realistically they may be able to pump 15 gpm or less through that sprinkler. The sprinkler performance chart doesn't provide information for flowrates that low, but you wouldn't need a very high psi to push out water at those rates. Of course the jet length would be very short, too.

For the 1.5 inch diameter hose it would be approximately as follows:

Flow Rate	10 gpm	15 gpm	20 gpm	25	30	35	40
Headloss (ft of water)	1	2.5	4.6	7	10	14	7.7

Based on the pump curve, the headloss, and desirable pressure at the nozzle, this sprinkler should be able to flow at 40 gpm (40 gpm is the max because the lower pump wouldn't be able to deliver more flow than that).

Hope this helps.

Please let me know if you have any other questions.

Thanks,

Manuel

From: Dillon, Paula

Sent: Monday, June 22, 2020 11:32 AM

To: Rauhut, Manuel <Manuel.Rauhut@idwr.idaho.gov>

Cc: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>

Subject: RE: Permit 78-12291

Manuel,

The hose length from the booster pump to sprinkler #3 is 200 feet (1 ½ inch diameter). The hose length from the booster pump to sprinkler #2 is 200 feet (3/4 " diameter). What would the head loss be for these 2 sprinklers?

Thank you for your efforts.

Paula

From: Rauhut, Manuel

Sent: Thursday, June 18, 2020 10:01 AM

To: Nelson, Dan <Dan.Nelson@idwr.idaho.gov>

Subject: Permit 78-12291

Dan –

Based on the information you provided I come up with the following conclusions:

- The maximum flow rate that the **first pump** can deliver to the second pump is the first limiting factor..
 - If the second pump has the potential to pump at a higher rate than what the first pump can deliver, then that would cause either the hose to start collapsing or create a vacuum resulting in cavitation.
 - Based on the pump curve and headloss at different flowrates, the first pump will be able to achieve a rate of approximately 40 gpm.

Flowrate	50 gpm	45 gpm	40 gpm
Headloss due to Elevation	23	23	23
headloss due to friction 150 ft (3.0")	1.1	0.8	0.6
headloss due to friction 500 ft (1.5")*	108	88	63
total headloss (ft)	132.1	111.8	86.6

*as you can see headloss in a 1.5" diameter hose is significantly higher than in a 3" diameter hose (almost negligible), so the length of the smaller hose strongly affects the total headloss.

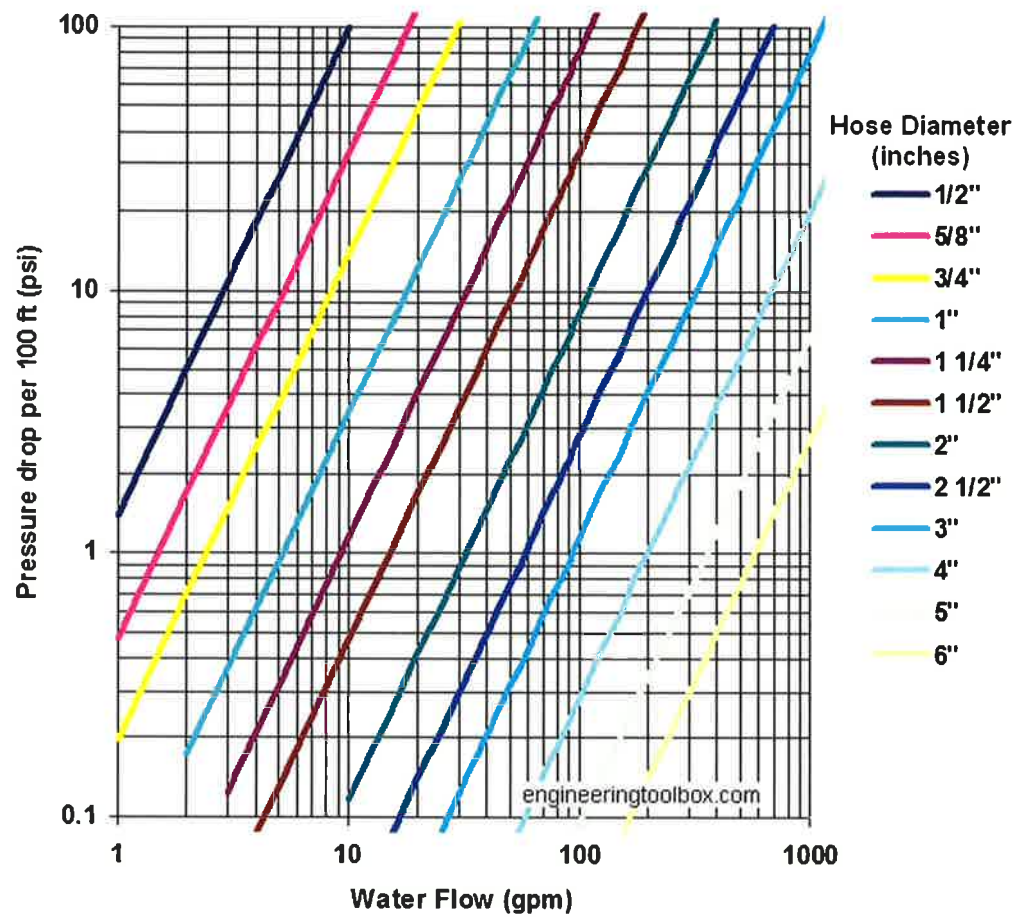
- To determine if the **second pump** is able to continue moving the same amount of water that the first pump can deliver (40 gpm), I would need additional information, specifically the length of the hoses to Sprinklers #2 and #3.
 - Note for example that for a 50 ft long 0.75" diameter hose the headloss at 40 gpm is 115 ft.
 - In other words, to determine if the second pump is a limiting factor (beyond the 40 gpm of the first pump) the hose lengths to sprinklers #2 and #3 is important to know.

Hope this helps. Please let me know if you have any other questions.

Thanks,

Manuel

Water flow through hoses and pressure loss due to friction:



Flow Rate Calculation Sheet for Sprinkler #1

Flow Rate Calculator Summary

Sprinkler Nozzle Flow Rate Calculator

Summary of Methodology

This spreadsheet tool supports the estimation of the flow rate from a sprinkler nozzle or series of sprinkler nozzles. The user can specify up to three different sprinkler nozzle types, and the total number of each of the three types of nozzles. The equation used to calculate the flow rate(s) is a simplified form of the Bernoulli Equation, which along with several supporting relationships, were developed from Hagan et. al. 1987, Jensen 1983, and Undeburg 1999.

Summary of User Input

	Nozzle Type 1	Nozzle Type 2	Nozzle Type 3
C Value:	1	1	1
Nozzle Press.:	44	0	0
Nozzle Diam.:	0.35	0	0
No. of Nozzles:	1	0	0

Summary of Results and Output

Type 1 Nozzle(s):	24.26	gpm
Type 2 Nozzle(s):	0.00	gpm
Type 3 Nozzle(s):	0.00	gpm
Combined:	24.26	gpm

References

Hagan, R.M., Haise, H.R., & Edminster, T.W., Irrigation of Agricultural Lands, Agronomy No. 11, 5th Printing. American Society of Agronomy, Madison, WI, USA, 1987.
 Jensen, M.E., Design and Operation of Farm Irrigation Systems, Revised Printing. American Society of Agricultural Engineers, 1983.
 Lindeburg, Michael R., Civil Engineering Reference Manual. Professional Publications, Belmont, CA, 1999.

Applicant: Linda and Steve Schweich

Date: 6/9/2020

WR Number: 78-12291

Notes: This calculation is for sprinkler #1 only. This sprinkler is at the same elevation as the main pump so there is no head loss.

Photos



Pump sitting next to Little Salmon River.



Pump model: Honda Trash Pump WT30X.



Fish screen around outside of can on suction hose.



Pump serial number.



Lower pasture near river.



Sprinkler #1 in lower pasture.



Sprinkler #1 – BIG 1000F.



Sprinkler #1 nozzle.



Hose split #1. 3 inch hose from pump is split into two 1 1/2" hoses. Left split goes down to sprinkler #1 in the lower pasture.



Lower pasture and sprinkler #1 viewed from split #1.



Approaching the orchard.



The potted trees are watered via hose; the trees that are planted in the ground have drip irrigation.



Hose split #2. The hose from split #1 is on the left; the line going on to the pasture is on the right. The two $\frac{3}{4}$ " hoses are used for the orchard.



Booster pump – Honda GX160. The line in the background is the input line coming from the orchard. The $1\frac{1}{2}$ inch line in the fore ground goes to sprinkler #3; the black $\frac{3}{4}$ " goes to sprinkler #2.



Booster pump.



Booster pump serial number.



Sprinkler #2 – upper pasture.



Sprinkler #2 – close up of nozzle.



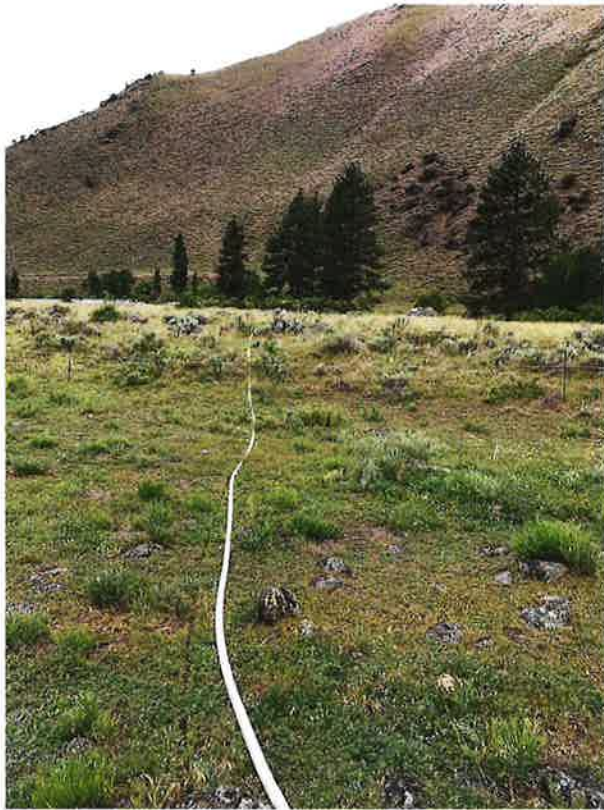
Sprinkler #3 – BIG 1500H.



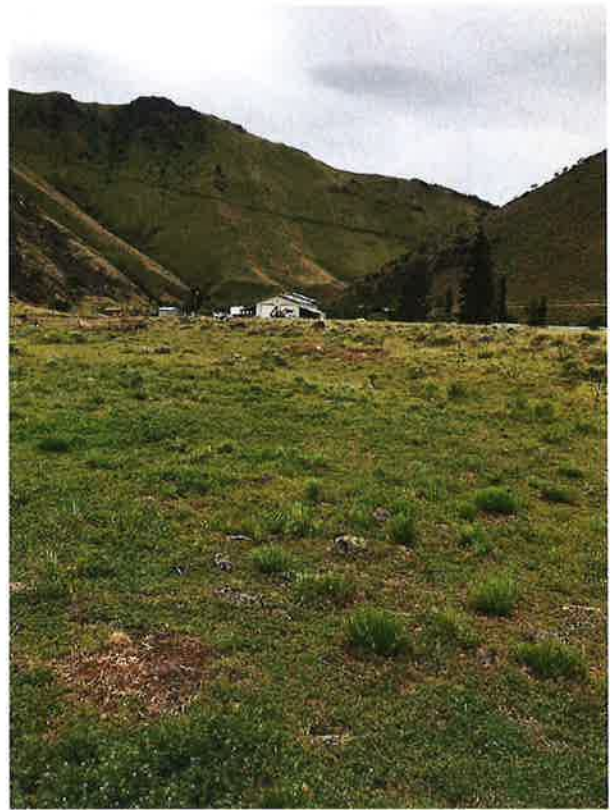
Sprinkler #3.



Sprinkler #3 nozzle.



Looking SW toward the orchard from the booster pump. The hose is the input to the booster pump.



Looking south from the booster pump.



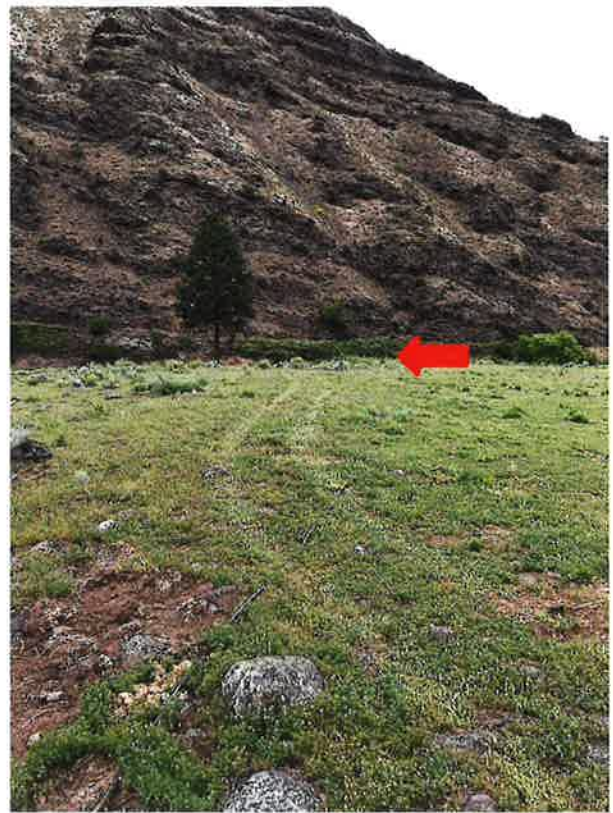
Looking ESE from the upper pasture.



Looking to the east from the upper pasture.



Looking NNE from the booster pump. The hose goes to sprinkler #3.



Looking NNW from the booster pump toward sprinkler #2.

MEMO

Date: June 2, 2020
From: Paula Dillon
RE: Water Right Permit 78-12291

I call Steve Schweitz this morning and scheduled a field exam with him for Tuesday, June 9 at 11 am.

Directions to house:

From northbound on Hwy 95, turn right at MP 194 before Riggins. Cross the bridge and drive past the house nearby like you are going out into the field.

MEMO

Date: 3/10/2020
From: Paula Dillon
RE: Water Right Permit 78-12291

I called Steve Schweich about scheduling a field exam. We agreed that I would call him mid-April to get something scheduled for the end of April.

He said he has a temporary system in place because the system he installed during the development period broke. He also has a broken hand and a broken back hoe.

MEMO

Date: 9/4/2019
From: Paula Dillon
RE: Water Right Permit 78-12291

Steve Schweich called this afternoon. He had questions about what we need to do and see when we come for the field exam. He said he has about 5 acres in pasture and 5 in trees. Some of the trees are being irrigated from his well, not the river, because the hoses won't reach. He has had some setbacks with contractors and equipment. I agreed to wait on the exam until March or April and will contact him in February as a reminder.

MEMO

Date: August 12, 2019
From: Paula Dillon
RE: Water Right Permit 78-12291

Steve Schweich called this morning and said his system is out of order so it may not be worth our time to come for a field exam. He is in the process of pulling up pipe to fix it, but his back hoe is broken. He should have the system fixed by spring, perhaps later this season – it depends on the back hoe situation. He will call as soon as it is up and running.

His contact info:

Telephone: 702-592-3701

Address: 141 Salmon Run Road
Riggins, ID83549



State of Idaho

DEPARTMENT OF WATER RESOURCES

322 E Front Street, Suite 648 • PO Box 83720 • Boise ID 83720-0098

Phone: (208) 287-4800 • Fax: (208) 287-6700

Website: idwr.idaho.gov • Email: idwrinfo@idwr.idaho.gov

BRAD LITTLE
Governor

GARY SPACKMAN
Director

August 1, 2019

Linda Schweich and Steven Schweich
P.O. Bo 81
Riggins, ID 83549

RE: Scheduling Field Exam for Water Right Permit No. 78-12291

Dear Linda and Steven,

We would like to schedule a time to conduct a water right licensing examination of the above-referenced permit. An examination is needed to verify the water use in order to issue a water right license.

Please be advised that you will need to operate your system under normal operating conditions during the examination. You will also need to provide a person who has a knowledge of the water system to accompany the water right examiner during the field examination. The permit authorizes the diversion of water from the Little Salmon River for irrigation of 10 acres. The water right examiner will need to take pictures of the existing system, the points of diversion, the place of use, and verify that everything is in place. Due to the complexity of the system this process can take between 1 - 2 hours.

In order to conduct your exam as efficiently as possible we ask that you call this office to schedule a day and time that is convenient for you. **Please call me at (208) 287-4939 by August 14, 2019 to conduct the exam during the week of August 26th or September 2nd.**

I appreciate your attention to this matter and look forward to hearing from you.

Sincerely,

A handwritten signature in black ink that reads "Paula Dillon". The signature is written in a cursive, flowing style.

Paula Dillon, GIS Analyst II
Idaho Department of Water Resources
Phone: 208-287-4939
Email: paula.dillon@idwr.idaho.gov

Enclosures: Computer-Generated Copy of Water Right Permit 78-12291