

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 12/30/2014
 FROM: Groundwater Section Michael Thoma / Gerald H. Grondin
 SUBJECT: Application G- 17924 Reviewer's Name Supersedes review of
 Date of Review(s) _____

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525. Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. This review is based upon available information and agency policies in place at the time of evaluation.*

A. GENERAL INFORMATION: Applicant's Name: J. C. Watson Company County: Malheur

- A1. Applicant(s) seek(s) 2.67 cfs from 3 well(s) in the Owyhee Basin,
Snake / Lower Owyhee subbasin Quad Map: Adrian
- A2. Proposed use Supplemental Irrigation (380 acres) Seasonality: March 1 – October 31 (245 days)
- A3. Well and aquifer data (**attach and number logs for existing wells; mark proposed wells as such under logid**):

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	MALH 52787	1	Fluvial and lacustrine sed. of Idaho Group	0.89	21S/46E-16 SE NE	2560' S, 25' W from NE1/4 of S16
2	PROP	2		0.89	21S/46E-16 SE NW	1381'S, 3900' W from NE1/4 of S16
3	PROP	3		0.89	21S/46E-16 NE SW	2812'S, 3900'W from NE1/4 of S16
4						
5						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	2430	135	135.6	10/18/2005	225	0-155	+2-225		165-215	400 / 150 ^b	32	Pump
2	2380	135 ^a	135 ^a		250	0-100	+2-160		160-250	400 ^b		
3	2430	135 ^a	135 ^a		250	0-100	+2-160		170-250	400 ^b		

Use data from application for proposed wells.

A4. **Comments:**
^a Wells #2 and #3 are proposed. Based on similar construction with existing well and nearby wells (MALH 52787; MALH 52651), wells #2 and #3 will encounter similar conditions (first water, SWL, unconfined conditions) and sediments (lacustrine and fluvial sediments; stratified sand, gravel, and clay).

^b The proposed well yields are 400 gpm for each well but the well log for MALH 52787 listed a yield of 150 gpm. The proposed well yields of 400 gpm are higher than what is encountered by nearby wells in similar sediments. Median well yield from logs in surrounding sections is 25 gpm with only a few >100 gpm and none > 300 gpm. These are mostly domestic wells (i.e., small diameter) but a recently drilled 12 in, 250 ft well (MALH 54147) with similar open interval as the proposed PODs yielded only 50 gpm. Therefore, 400 gpm may not be available from any single well.

A5. **Provisions of the Owyhee (OAR 690-511)** Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water are, or are not, activated by this application. (Not all basin rules contain such provisions.)

Comments: _____

A6. Well(s) # _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: _____
 Comments: _____

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. Based upon available data, I have determined that groundwater* for the proposed use:

- a. is over appropriated, is not over appropriated, or cannot be determined to be over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. will not or will likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. will not or will likely to be available within the capacity of the groundwater resource (see B3); or
- d. will, if properly conditioned, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. The permit should contain condition #(s) 7B (interference condition); 7F (proposed well location); 7N (annual measurement condition); 7P (well tag condition); 7T (measuring tube condition); "Large water use condition"
 - ii. The permit should be conditioned as indicated in item 2 below.
 - iii. The permit should contain special condition(s) as indicated in item 3 below;

- B2. a. Condition to allow groundwater production from no deeper than _____ ft. below land surface;
- b. Condition to allow groundwater production from no shallower than _____ ft. below land surface;
- c. Condition to allow groundwater production only from the _____ groundwater reservoir between approximately _____ ft. and _____ ft. below land surface;
- d. Well reconstruction is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. Groundwater availability remarks:

Regarding Appropriation: There are few wells in the area that have long-term water level data. The closest is MALH 2147 which is > 4 mi to the north of the proposed PODs. This well shows stable long-term water levels (see Figure 4) but may not be representative of the area near the PODs.

Regarding Injury: There are few existing groundwater rights in the vicinity of the applicant’s proposed PODs (e.g., G16074, G16893) but taking into account the typical yield of the aquifer, unconfined nature, and fine-grained sediments of that may be of limited areal extent, it is unlikely that the proposed use will severely impact nearby users. Regardless, standard interference and drawdown conditions should be applied if the permit is issued.

Regarding Capacity: The existing well (MALH 52787) and proposed wells will produce from lacustrine and fluvial sediments assigned to the Glens Ferry formation by Ferns et al. (1993) and part of the Lake Idaho Group. These sediments consist mainly of lacustrine silt and clay but contain numerous lenses of mixed coarse sand and gravel deposits – which make up the most productive parts of the aquifer. Although considerable silt / clay layers may exist, the sediments are generally unconfined to leaky-confined based on first-water vs. SWL and according to Gannett (1990). Well yields in these sediments and within the same Township and Range as the proposed PODs range from < 10 to 300 gpm but 90% had yields <100 gpm. The applicant’s existing well, MALH 52787, reported 150 gpm on the well log and a recently drilled well, MALH 54147 (12 in well, 250 ft deep, < ¼ mi away), only yielded 50 gpm. It is unlikely that the proposed new wells will yield 400 gpm with the proposed construction.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	Sand/gravel of Lake Idaho Group	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	"	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	"	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: Well log for Well #1 (MALH 52787) and nearby existing wells (MALH 53653, MALH 54147) show SWL similar to depths of water bearing zones. Additionally, Gannett (1990) determined that the aquifer system in the area is, in general, unconfined to leaky-confined.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Snake River	2300	2190	7600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Snake River	2250	2190	11400	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Snake River	2300	2190	10600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Owyhee River	2300	2230	12500	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Owyhee River	2250	2230	8600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2	Owyhee River	2300	2230	8700	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: Well #1 is closer to the Snake R. which is east of the PODs and Wells #2 and #3 are closer to the Owyhee R., which is located west and north of the PODs (see Figure 3). The aquifer is unconfined to leaky-confined and limited head data imply that general groundwater flow is from west and south flowing north and east toward the Snake R. In general the aquifer in the vicinity of the PODs is probably more strongly connected to the Snake R. than the Owyhee R. as it is the regional groundwater discharge. However, as there is no WAB for the Snake R. and since the Owyhee R. has lower flows, interference with the Owyhee R. was investigated in C4a below.

Water Availability Basin the well(s) are located within: Owyhee R > Snake R – At Mouth (ID# 31111001). Although the wells are located within this WAB, as described on the preceding lines, they are also and perhaps more directly hydraulically connected to the Snake River through the regional groundwater flow system. The Snake River is not associated with a WAB.

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be hydraulically connected and less than 1 mile from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% natural flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be hydraulically connected and less than 1 mile from a surface water source. Complete only if Q is distributed among wells. Otherwise same evaluation and limitations apply as in C3a above.

	SW #	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: None of the applicant's wells are within 1 mile of surface water so C3a and C3b do not apply.

C4a. **690-09-040 (5):** Estimated impacts on hydraulically connected surface water sources greater than one mile as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2	2	%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS				2.35	2.35	2.35	2.35	2.35	2.35	2.35	2.35		
Interference CFS				0.29	0.60	0.80	0.94	1.06	1.14	1.21	1.28	1.10	0.82
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.				0.29	0.60	0.80	0.94	1.06	1.14	1.21	1.28	1.10	0.82
(B) = 80 % Nat. Q				736	1360	1190	518	298	230	170	156	232	303
(C) = 1 % Nat. Q				7.4	13.6	11.9	5.2	3.0	2.3	1.7	1.6	2.3	3.0
(D) = (A) > (C)				No	No	No	No	No	No	No	No	No	No
(E) = (A / B) x 100		%	%	0.04%	0.04%	0.07%	0.18%	0.36%	0.50%	0.71%	0.82%	0.47%	0.27%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: The full annual duty (380 x 3 = 1140 af) divided by the period of use (245 d) was used to determine the average well pumping rate (2.35 cfs). The Hunt (1999) model was used to evaluate impacts to the Owyhee River under the "worst-case" scenario, which was considering the full rate produced from the closest well to the river, leaky-confined conditions, and using conservative parameters. This model and these results also assume that there will be no interference to the Snake River, which is of similar distance to the wells and so would likely absorb some of the impacts from pumping. Even under this worst-case scenario, interference is < 1 % of flows in the Owyhee R. and so will not trigger PSI. PSI to the Snake River was not modeled but historic low flow values in the Snake R. are much greater than 1% of the full rate (see Figure 2) and so PSI would not be triggered under any amount of interference.

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

- C5. **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:
 - i. The permit should contain condition #(s) _____;
 - ii. The permit should contain special condition(s) as indicated in "Remarks" below;

C6. SW / GW Remarks and Conditions:

The three proposed PODs are located on a sloping plain extending out from the sedimentary and volcanic uplands near the Owyhee Reservoir and sloping northeast toward the Owyhee and Snake Rivers (Figure 3). There is limited groundwater data available in this area but these data and a general conceptual model suggests that groundwater flow mimics topography and flows out of the uplands east toward the Snake River and north-northeast toward the lowest section of the Owyhee River. The proposed PODs are within the Owyhee R. WAB but there is a 200-400 ft ridge separating the PODs and the Owyhee R. at the shortest distance between the proposed PODs and the river. It is more likely that the wells are more directly hydraulically connected to the Snake R. owing to this ridge and general groundwater flow direction. However, impacts and PSI were still evaluated for the Owyhee R. and the model results indicate no PSI under a worst-case scenario (i.e., full rate from one well, using the well closest to the river, conservative parameters, impacting only the Owyhee R.). Impacts and PSI to the Snake R. are also not substantial as minimum daily discharge from the past 36 years in the Snake River at Nyssa (USGS Gage #13213100) is 4240 cfs (Figure 2). 1 % of this minimum flow (42.4 cfs) is far greater than the full rate requested on the application so there will not be PSI with the Snake R. under any amount of interference.

If issued, this permit should contain the following permit conditions: 7B-well interference condition; 7F-proposed well location condition; 7N-annual water level measurement condition; 7P-well tag condition; 7T-measuring tube condition

References Used:

Gannett, M. W. 1999. Hydrogeology of the Ontario Area Malheur County, Oregon. Oregon Water Resources Dept. Ground Water Report No. 34. 39p.

Ferns, M.L., H.C. Brooks, J.G. Evans, M.L. Cummings. 1993. Geologic map of the Vale 30x60 minute quadrangle, Malheur County, Oregon and Owyhee County, Idaho. Oregon Dept. of Geology and Mineral Industries Geological Map Series 77.

Hunt, B., 1999, Unsteady stream depletion from ground water pumping: Ground Water, v. 37, no. 1, p. 98-102

Well Logs Attached:

- MALH 52787 (applicants Well #1);
- MALH 52561 (test well near applicants Well #1);
- MALH 54147 (nearby well with similar construction).

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

D2. **THE WELL does not appear to meet current well construction standards based upon:**

- a. review of the well log;
- b. field inspection by _____;
- c. report of CWRE _____;
- d. other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** _____

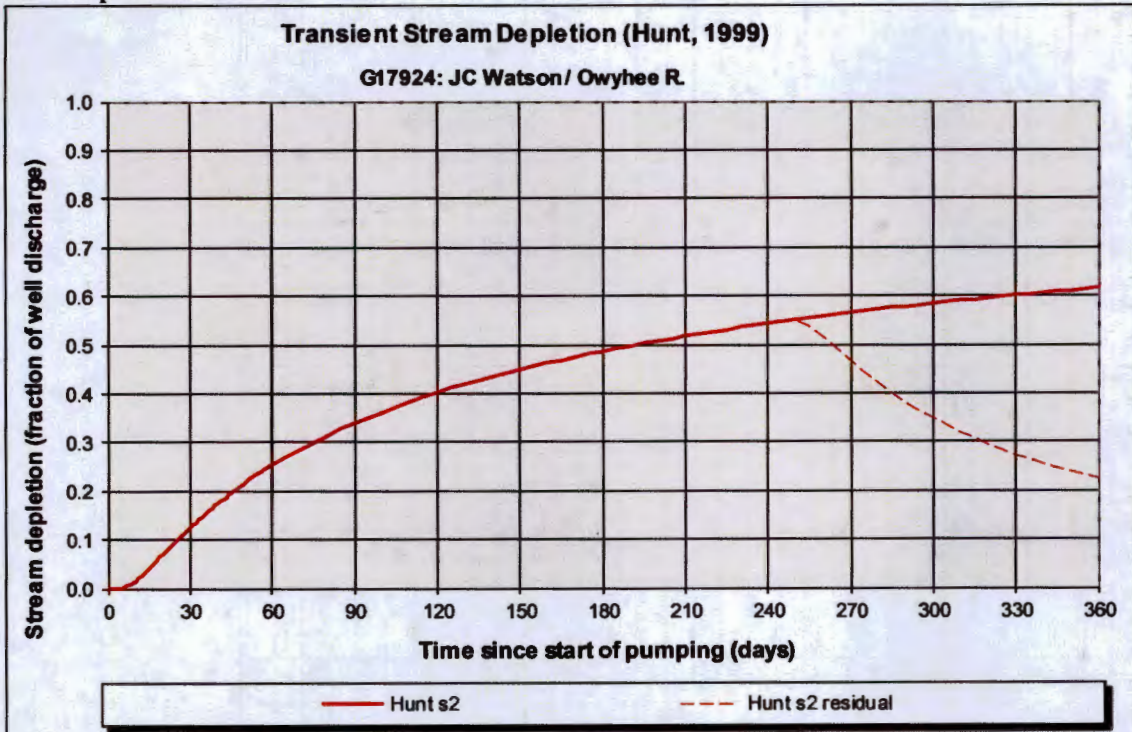
D4. **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Tables

Below is the Water Availability Table for the Owyhee River. The Snake River is not associated with a WAB but minimum daily discharge for the Snake River at Nyssa (USGS gage #13213100) is shown in Figure 2.

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
OWYHEE R > SNAKE R - AT MOUTH						
Watershed ID #: 31111001		Basin: OWYHEE		Exceedance Level: 80		
Time: 11:51 AM				Date: 12/30/2014		
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	264.00	714.00	-450.00	0.00	0.00	-450.00
FEB	636.00	1,090.00	-453.00	79.40	0.00	-532.00
MAR	736.00	1,440.00	-707.00	380.00	0.00	-1,090.00
APR	1,360.00	1,750.00	-390.00	459.00	0.00	-849.00
MAY	1,190.00	2,210.00	-1,020.00	79.20	0.00	-1,100.00
JUN	518.00	1,890.00	-1,370.00	0.00	0.00	-1,370.00
JUL	298.00	1,500.00	-1,200.00	0.00	0.00	-1,200.00
AUG	230.00	1,310.00	-1,080.00	0.00	0.00	-1,080.00
SEP	170.00	875.00	-705.00	0.00	0.00	-705.00
OCT	156.00	460.00	-304.00	0.00	0.00	-304.00
NOV	232.00	396.00	-164.00	0.00	0.00	-164.00
DEC	303.00	569.00	-266.00	0.00	0.00	-266.00
ANN	694,000	857,000	106,000	60,000	0	45,800

Figure 1: Hunt (1999) model results for stream depletion between the nearest proposed POD and the Owyhee R. assuming the full rate produced from this well.



Output for Hunt Stream Depletion, Scenario 2 (s2):

Days	30	60	90	120	150	180	210	240	270	300	330	360
Hunt SD s2	0.13	0.25	0.34	0.40	0.45	0.49	0.52	0.54	0.47	0.35	0.27	0.22
Qw, cfs	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350	2.350
H SD s2, cfs	0.29	0.60	0.80	0.94	1.06	1.14	1.22	1.28	1.10	0.82	0.64	0.52

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	2.35	2.35	2.35	cfs
Distance to stream	a	8600	8600	8600	ft
Aquifer hydraulic conductivity	K	5.5	5.5	500	ft/day
Aquifer thickness	b	200	200	200	ft
Aquifer transmissivity	T	1100	1100	100000	ft ² /day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	150	150	150	ft
Streambed hydraulic conductivity	Ks	0.1	0.05	0.05	ft/day
Streambed thickness	bs	10	20	10	ft
Streambed conductance	sbc	1.5	0.375	0.75	ft/day
Stream depletion factor (Jenkins)	sdf	67.24	67.24	0.74	days
Streambed factor (Hunt)	sbf	11.73	2.93	0.06	

Figure 2: Minimum daily discharge in Snake River near Nysa

00060, Discharge, cubic feet per second,												
Minimum of daily mean values for each day for 36 - 38 years of record in, ft ³ /s (Calculation Period 1974-10-01 -> 2014-09-30)												
Day of month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	7,470	7,850	7,640	6,560	5,080	4,930	4,480	4,900	5,630	7,100	7,770	7,490
2	7,670	7,250	7,450	5,640	5,080	4,800	4,760	4,900	5,440	6,790	7,960	7,590
3	7,490	7,610	7,570	5,310	5,060	4,880	4,690	4,930	5,530	6,540	8,100	7,470
4	7,520	7,380	7,550	5,820	5,290	4,640	4,700	4,790	5,430	6,810	7,830	7,850
5	7,240	6,930	7,670	5,840	5,560	4,510	4,680	4,750	5,550	6,680	7,890	7,640
6	7,610	7,350	7,540	5,450	5,430	4,250	4,800	4,760	5,750	6,900	8,170	7,990
7	7,340	7,590	7,560	5,250	5,350	4,240	4,980	4,530	5,940	7,260	8,240	7,590
8	7,600	7,370	7,500	5,130	5,700	4,820	4,900	4,600	6,020	7,720	7,600	7,400
9	7,670	7,600	7,360	5,290	5,500	4,800	4,800	4,740	6,620	7,480	7,560	6,950
10	7,340	7,360	7,540	5,270	5,300	4,500	4,920	4,820	5,900	7,890	8,030	7,240
11	7,660	7,690	7,460	5,250	5,200	4,580	5,030	4,840	6,150	7,800	7,850	7,390
12	7,540	7,570	6,790	5,680	5,400	4,460	4,940	4,850	6,340	8,010	7,700	7,290
13	7,310	7,480	6,800	5,840	5,510	4,740	4,840	4,910	6,340	8,150	7,980	7,300
14	7,420	7,490	6,490	5,660	5,670	5,010	4,920	4,880	6,540	8,090	7,590	7,110
15	7,110	7,350	6,480	5,460	5,410	5,110	4,860	4,880	7,040	8,360	7,410	7,300
16	7,470	7,530	6,500	6,050	5,520	5,020	4,960	4,810	7,180	7,800	8,060	7,250
17	7,350	7,520	6,590	5,300	5,480	5,170	4,900	5,030	6,900	7,650	7,810	7,180
18	7,580	7,550	6,570	5,410	5,490	4,980	4,960	5,070	6,990	8,340	7,940	7,470
19	6,820	7,110	6,520	5,530	5,420	4,820	4,980	4,980	6,600	8,280	7,990	7,300
20	7,560	7,190	6,620	5,740	5,400	5,160	4,700	5,430	7,300	8,240	7,690	7,390
21	7,320	7,410	6,730	5,670	5,440	5,250	4,650	5,160	6,750	8,000	7,510	7,280
22	7,490	7,620	6,710	6,230	5,520	5,300	4,590	4,890	6,550	8,180	7,360	7,770
23	7,520	7,210	6,700	5,980	5,660	4,700	6,700	5,030	6,810	7,690	7,760	7,950
24	7,530	7,480	6,720	6,350	5,630	4,920	4,550	5,630	7,090	7,780	7,390	7,710
25	7,330	7,580	6,630	6,520	5,640	4,480	4,580	5,610	6,720	7,900	7,760	7,660
26	7,160	7,610	6,660	6,450	5,300	4,720	5,110	5,490	6,900	8,030	7,780	7,710
27	7,400	7,470	6,840	5,620	5,370	4,650	5,120	5,520	7,250	7,700	7,540	7,460
28	7,610	7,760	6,770	5,680	5,170	4,780	5,160	5,710	7,650	6,970	7,710	7,550
29	7,120	7,630	6,800	5,560	4,900	4,660	4,920	5,600	7,620	7,480	7,370	7,750
30	7,640		6,580	5,280	4,860	4,520	5,010	5,500	7,640	7,460	7,860	7,670
31	7,430		6,560		4,860		5,030	5,340		7,400		7,520

Canyon County, Idaho Hydrologic Unit Code 17050115 Latitude 43°52'34", Longitude 116°58'57" NAD83 Drainage area 58,700 square miles Contributing drainage area 58,700 square miles Gage datum 2,170 feet above NGVD29	Output formats HTML table of all data Tab-separated data Reselect output format
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Figure 3: Location Map

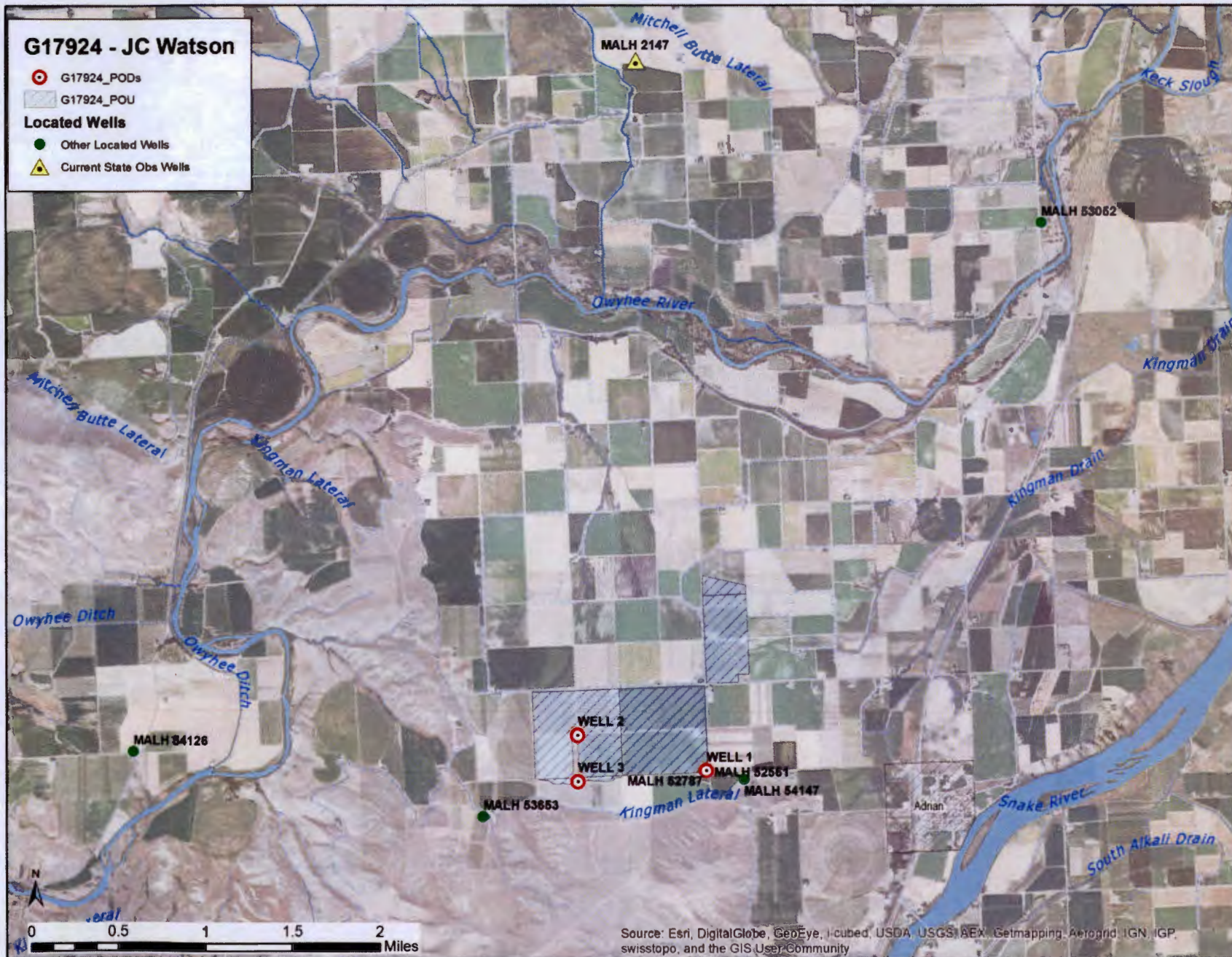


Figure 4: MALH 2147 Water Level Data

