

Groundwater Application Review Summary Form

Application # G- 18743

GW Reviewer D. BOSCHMANN Date Review Completed: 01/04/2019

Summary of GW Availability and Injury Review:

[] Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

[] The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

WATER RESOURCES DEPARTMENT

MEMO

01/04, 2019

TO: Application G- 18743

FROM: GW: D. BOSCHMANN
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

YES
The source of appropriation is within or above a Scenic Waterway
 NO

YES
Use the Scenic Waterway condition (Condition 7J)
 NO

Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway.**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in JOHN DAY Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.083	0.084	0.085	0.085	0.085	0.084	0.083	0.083	0.082	0.081	0.082	

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 01/04/2019
 FROM: Groundwater Section Darrick E. Boschmann
 Reviewer's Name
 SUBJECT: Application G- 18743 Supersedes review of N.A.
 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: Jason Kehrberg County: Grant

- A1. Applicant(s) seek(s) 1.21 cfs from 1 well(s) in the John Day Basin,
Upper John Day subbasin
 A2. Proposed use Irrigation (31.0 acres primary; 66.1 acres supplemental); livestock; domestic Seasonality: varies by use
 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	Proposed	Kehrberg Well	CRBG	1.21	13.00S-31.00E-19-NW SW	2170 FEET NORTH AND 840 FEET EAST FROM SW CORNER, SECTION 19
2						
3						
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	3016	?	?	-	?	?	?	?	?	?	?	-

Use data from application for proposed wells.

A4. **Comments:** _____

The proposed well is in Grant County, along the John Day River, about four miles west of John Day. The area immediately underlying the well is mapped as Qtg (terrace gravels) by Brown and Thayer, 1966. At this location these Quaternary deposits overlie isolated eroded remnants of the Clarno Formation, which in turn overlie Triassic and Paleozoic rocks.

The application proposes to develop groundwater from CRBG aquifers, which are not present in the section at this location (Brown and Thayer, 1966). Nearby domestic well GRAN 50893 reports "rock brn solid" and "vesicular basalt" from 50-105 feet, which likely represents volcanic rocks of the Clarno Formation – described by Brown and Thayer (1966) as andesitic to basaltic flows, mud-flow breccias and conglomerates; silicified and hydrothermally altered in places.

A5. **Provisions of the** John Day 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: Currently no administrative area.

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; 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, 7F, 7N, 7P, 7T, flow meter, 7J,;
 - 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:** _____

The application proposes to develop groundwater from CRBG aquifers, which are not present in the section at this location (Brown and Thayer, 1966). Nearby domestic well GRAN 50893 reports “rock brn solid” and “vesicular basalt” from 50-105 feet, which likely represents volcanic rocks of the Clarno Formation.

Few nearby wells with a static water level record are completed within the Clarno Formation. State Observation Well 145 (GRAN 351) is located ~2.5 miles west-southwest of the proposed well, which based on mapping by Brown and Thayer (1966) likely produces groundwater from volcanic rocks of the Clarno Formation. The hydrograph for GRAN 351 is somewhat complicated by pumping and rising levels in the record, however a very slight decline trend totaling ~2 feet is apparent over the period of record 1965-2017.

Gannett (1984) reports low groundwater potential from the Clarno Formation, with adequate well yields for even domestic and stock use extremely difficult to obtain in many cases. Locally, higher yields are reported. The pump test on the well log for GRAN 351 reports 200 gpm with 16 feet of drawdown over 4 hours. The air test on the well log for GRAN 50893 reports 100 gpm. If highly fractured lavas are encountered higher yields may be possible, however it is unknown if the requested rate will be obtained.

There is very little groundwater development in the immediate vicinity of the proposed well.

If a permit is issued, the following conditions are recommended:

7B: Interference Condition

7F: Proposed Well location Condition

7N: Annual Measurement and Decline Condition

7P: Well Tag Condition

7T: Dedicated Measuring Tube Condition for all POA wells

Flow meter condition: Use the water rights "large" permit condition requiring a totalizing flow meter and reporting

7J: Scenic waterway condition

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	Clarno Formation	<input type="checkbox"/>	<input checked="" 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"/>

Basis for aquifer confinement evaluation:

The Clarno Formation is a thick section of largely andesitic volcanic plugs, lava flows, and lahars that represent subduction related volcanism (Bestland, 1999), more analogous to Cascadian volcanism than to the widespread flood basalt volcanism required to form the confined conditions of the CRBG aquifers.

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	John Day River	*2961	2945	1350	<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"/>
						<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"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation:

The proposed well will produce groundwater from an unconfined aquifer. The estimated GW elevation is 16 feet above the river elevation at this location.

*The SWL used to calculate the GW elevation is taken from the well log for GRAN 50893.

Water Availability Basin the well(s) are located within: JOHN DAY R > COLUMBIA R - AB BEECH CR

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?
1	1	<input type="checkbox"/>	<input type="checkbox"/>	MF212B	30	<input checked="" type="checkbox"/>	61.2	<input checked="" type="checkbox"/>	*	<input checked="" 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"/>		<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: _____

*C3a. *Interference at 30 days is not calculated here due to triggering of PSI under other criteria.

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
		%	%	%	%	%	%	%	%	%	%	%	%
	Well Q as CFS												
	Interference CFS												
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													
	%	%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
	%	%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
	%	%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
	%	%	%	%	%	%	%	%	%	%	%	%	%
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100	%	%	%	%	%	%	%	%	%	%	%	%	%

(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: _____

 No analysis here. The proposed well is within a mile of the evaluated surface water source.

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:** _____

C1. 690-09-040 (1)
 It is determined that the well will produce water from an unconfined aquifer.

C2. 690-09-040 (2) (3)
 It is determined that the well is hydraulically connected with the John Day River.

C3a./C3b. 690-09-040 (4)
 PSI is assumed for Well 1 to SW 1.

C4a. 690-09-040 (5)
 No analysis here. The proposed well is within a mile of the evaluated surface water source.

References Used: _____

 Bestland, E.A., Hammond, P.E., Blackwell, D.L.S., Kays, M.A., Retallack, G.J. and Stimac, J., 1999. Geologic framework of the Clarno Unit, John Day Fossil Beds National Monument, central Oregon. Oregon Geology, 61(1), pp.3-19.

 Brown, C.E., and Thayer, T.P., 1966, Geologic map of the Canyon City quadrangle, northeastern Oregon: U.S. Geological Survey, Miscellaneous Geologic Investigations Map I-447, scale 1:250,000

Reidel, S.P., Johnson, V.G., and Spane, F.A., 2002, Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA: a guide to site characterization, Pacific Northwest National Laboratory, Richland, Washington.

Gannet, M., 1984, Ground Water Assessment of the John Day Basin. Oregon Water Resources Department, Salem, Oregon.

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

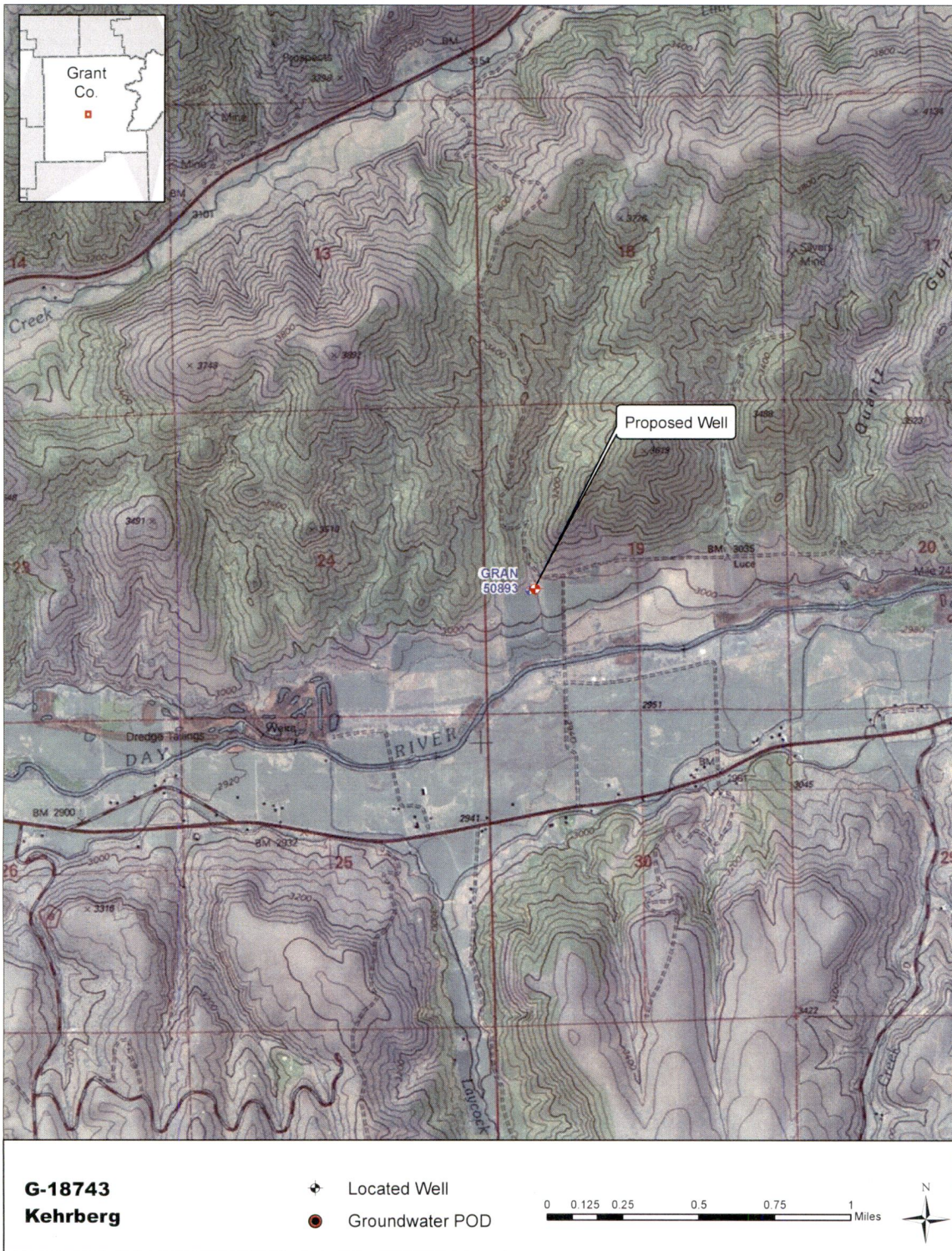
Water Availability Analysis Detailed Reports								
JOHN DAY R - COLUMBIA R. - AB BEECH CR								
JOHN DAY BASIN								
Water Availability as of 1/3/2019								
Watershed ID # 30620117 (Map)						Exceedance Level 80%		
Date 1/3/2019						Time 1:44 PM		
Water Availability Calculation		Consumptive Uses and Storages		Instream Flow Requirements		Reservations		Watershed Characteristics
Water Availability Calculation								
Monthly Streamflow in Cubic Feet per Second								
Annual Volume at 50% Exceedance in Acre-Feet								
Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirements	Net Water Available		
JAN	126.00	4.08	122.00	0.00	85.00	41.00		
FEB	165.00	4.33	161.00	0.00	119.00	42.00		
MAR	234.00	4.61	229.00	0.00	119.00	111.00		
APR	364.00	25.70	338.00	0.00	118.00	217.00		
MAY	343.00	53.15	289.00	0.00	118.00	166.00		
JUN	191.00	78.80	112.00	0.00	85.00	26.00		
JUL	113.00	112.06	0.94	0.00	56.00	-49.50		
AUG	70.60	88.16	-17.56	0.00	30.00	-47.50		
SEP	33.00	59.78	-26.78	0.00	30.00	-26.50		
OCT	98.00	24.20	73.80	0.00	58.00	12.60		
NOV	113.00	3.83	109.00	0.00	80.00	29.00		
DEC	125.00	4.02	121.00	0.00	80.00	41.00		
ANN	181,000.00	28,780.06	152,000.00	0.00	57,360.00	97,100.00		

Download Data (Text Formatted Text Tab Delimited Excel)

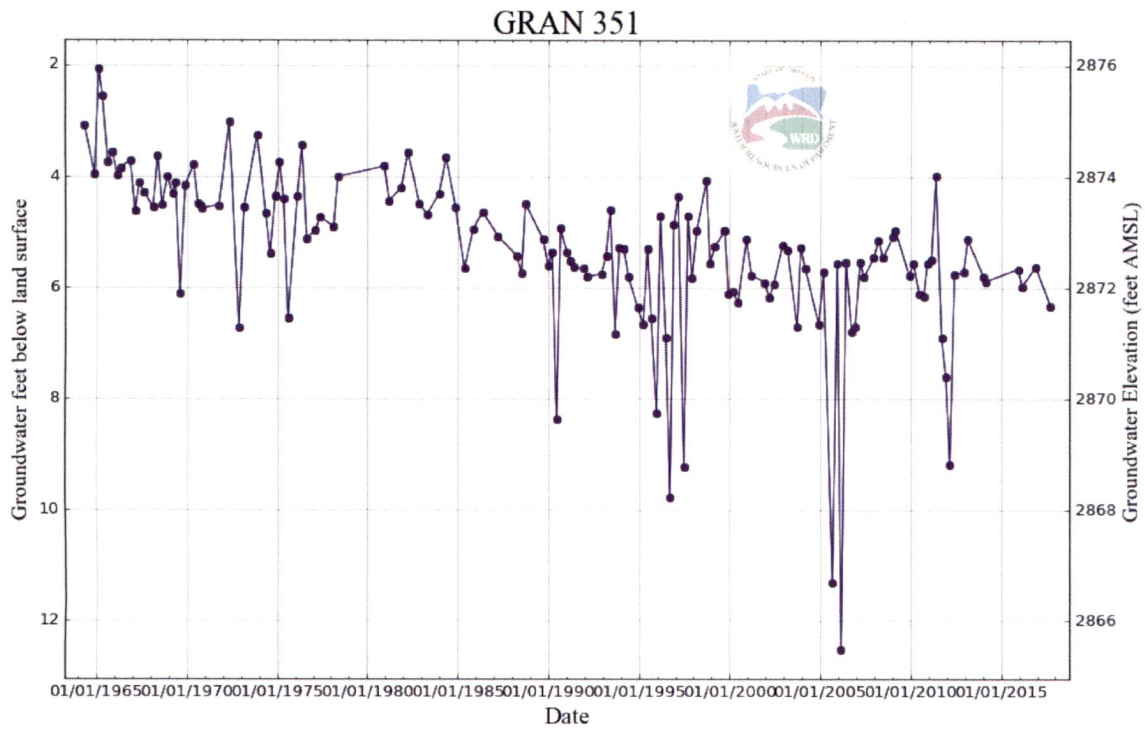
Water Availability Analysis Detailed Reports													
JOHN DAY R - COLUMBIA R. - AB BEECH CR													
JOHN DAY BASIN													
Water Availability as of 1/3/2019													
Watershed ID # 30620117 (Map)								Exceedance Level 80%					
Date 1/3/2019								Time 2:31 PM					
Water Availability Calculation		Consumptive Uses and Storages		Instream Flow Requirements		Reservations		Watershed Characteristics					
Detailed Report of Instream Flow Requirements													
Instream Flow Requirements in Cubic Feet per Second													
Application#	Stream	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
642128	CERTIFICATE	80.00	118.00	118.00	118.00	118.00	80.00	58.00	30.00	30.00	58.00	80.00	80.00
Maximum		80.00	118.00	118.00	118.00	118.00	80.00	58.00	30.00	30.00	58.00	80.00	80.00

Download Data (Text Formatted Text Tab Delimited Excel)

Well Location Map

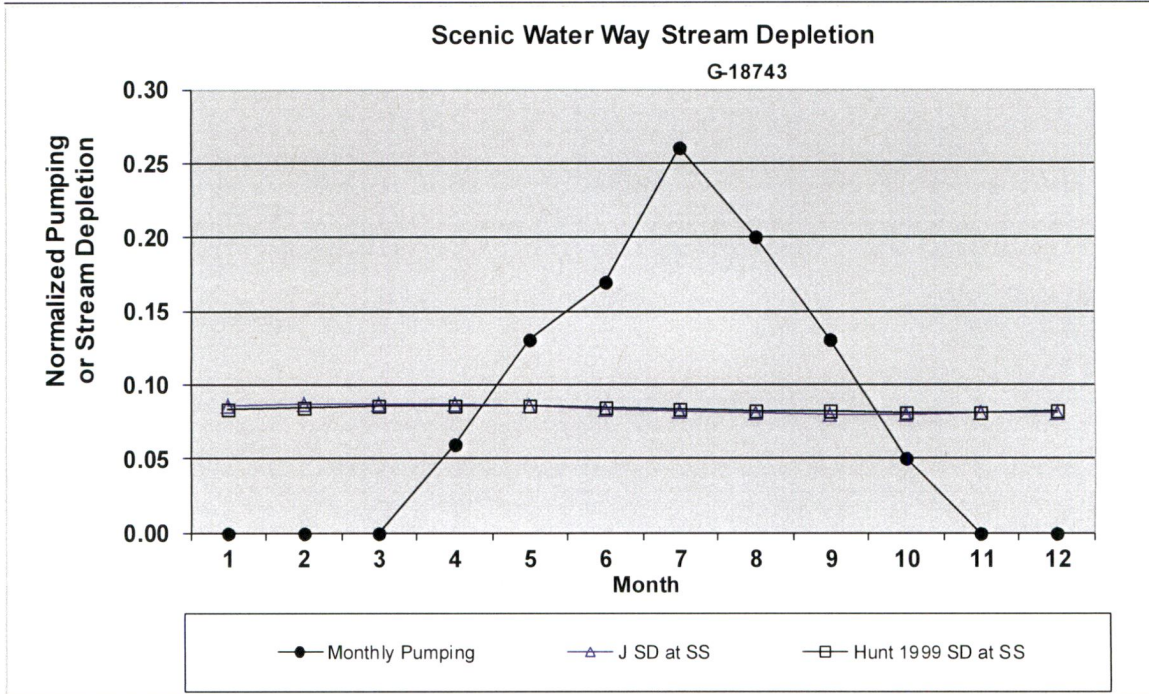


Water-Level Trends in Nearby Wells



Scenic Water Way Stream Depletion

Hunt (1999) was used to calculate the Scenic Water Way stream depletion. The values used for the calculation are conservative and appropriate until better values become available. The calculations used a transmissivity of 20ft²/day, which is the median transmissivity reported for the Clarno Formation in Gannett, 1984. Additionally, the calculation used a storage coefficient of 0.02, as reported in Gannett, 1984 for the Clarno Formation. The hydraulic conductivity assigned to the bed of the stream is 0.023 ft/day, with a streambed thickness of 3 feet.



Region	21	Steady state stream depletion as a fraction of pumping normalized to crop water use consumption.												
Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Resid	
Qw	0.00	0.00	0.00	0.06	0.13	0.17	0.26	0.20	0.13	0.05	0.00	0.00	0.00	
J SD SS	0.085	0.087	0.087	0.086	0.085	0.084	0.082	0.081	0.080	0.080	0.081	0.081	0.000	
H99 SD SS	0.083	0.084	0.085	0.085	0.085	0.084	0.083	0.083	0.082	0.081	0.081	0.082	0.000	

Parameters:		Values	Units	
Maximum number of years pumped	yrmax	25	years	
Days pumped each month	tpoff	30.4375	days/month	
Perpendicular from well to stream	a	1350	ft	
Well depth	d	105	ft	
Aquifer hydraulic conductivity	K	0.5	ft/day	
Aquifer saturated thickness	b	40	ft	
Aquifer transmissivity	T_ft	20	ft ² /day	= K*b
Aquifer transmissivity	T_gal	150	gpd/ft	= K*b
Aquifer storativity or specific yield	S	0.02		
Streambed conductivity (Hunt 1999)	Ks	0.023	ft/day	
Streambed thickness, Hunt 1999	bs	3	ft	
Stream width (Hunt 1999)	ws	25	ft	
Streambed conductance (lambda)	sbc	0.1917	ft/day	= Ks*ws/bs
Stream depletion factor	sdf	1822.5000	days	= (a ² *S)/(T)
Streambed factor	sbf	12.9375		= sbc*a/T