

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date September 6, 2016
 FROM: Groundwater Section Aurora C Bouchier
Reviewer's Name
 SUBJECT: Application G- 18308 Supersedes review of na
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: Arkley County: Polk

- A1. Applicant(s) seek(s) 0.375 cfs from 1 well(s) in the Willamette Basin,
Middle Willamette subbasin
- A2. Proposed use Nursery (15 acres) Seasonality: year round
- 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	Farm Well	Alluvial	0.375 (168 gpm)	9S/4W-14 NE-NW	471' N, 454' E fr SE COR, NWNW S14
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	177				Est 40-80					168		

Use data from application for proposed wells.

A4. **Comments:** Well construction information for proposed well given on application. Elevation is derived from proposed well location.

A5. **Provisions of the** Willamette 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: The OWRD database shows 22 out of 29 wells in the section with static water levels above the zone at which water was first encountered, indicating confined conditions (see Well Statistics below). The proposed location is on a SLIGHT high within the meander belt zone and, like most other wells in the Section, will likely have a water level above the zone at which it is encountered. Therefore the pertinent rules (OAR 690-502-0240) do not apply.

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; or
- d. will, if properly conditioned, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. The permit should contain condition #(s) 7N;
 - 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 proposed well will develop groundwater from predominately course-grained Holocene flood deposits that have a saturated thickness of approximately 20 feet (Conlon et al., 2005). Water levels in the aquifer are closely tied to stream stage in the Willamette River (Conlon et al., 2005). The proposed well is located within the floodplain/within old meander loops of the Willamette River where the Willamette Silt has been removed. Since the water levels in this system are closely tied to the Willamette River stage, the long term stability of the aquifer is not likely to be a problem, but the saturated thickness of the aquifer could crop substantially in late summer in conjunction with lower stream stage. The seasonal fluctuation of the aquifer is unknown at this time. Despite the limited distance, interference with nearby groundwater users at the request pumping rate should not be a problem – on 10/14/1992 a pumping test was conducted at nearby POLK 3878 at a rate of 700 gpm which resulted in 3 feet of drawdown and 100% recovery within less than 10-minutes of the pump being turned off.

The nearest wells with long term water level reporting, similarly located within the unconsolidated Holocene floodplain, are MARI 13280 (located 3.75 miles to the north) and BENT 1558 (located 8.9 miles to the south). The hydrograph for MARI 13280 and BENT 1558 shows no long term decline.

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	Alluvial	<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"/>

Basis for aquifer confinement evaluation: 22 out of 29 well logs in the OWRD database show static water levels rising above the zone at which water was first encountered, indicating confined conditions.

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	Unnamed, intermittent tributaries to Duck Slough	~155	162-170	610	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Willamette River	~155	153-154	4,450	<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"/>

Basis for aquifer hydraulic connection evaluation: Published water table maps (Conlon et al., 2005, and Woodward et al., 1998) and the well logs for nearby wells indicate that the water table is at an elevation of approximately 155 feet, which is below the elevation of the intermittent tributaries to Duck Slough within a mile of the proposed well location.

The groundwater elevation is above or coincident with the elevation of the Willamette River at the adjacent reach, suggesting that groundwater is contributing to the surface water. Locally, the alluvial aquifer is largely composed of coars-grained Willamette River floodplain sediments which abut the coarse-grained streambed of the river. This indicates an efficient hydraulic connection between the river and the alluvial aquifer (Gonthier, 1983).

Water Availability Basin the well(s) are located within: 183: WILLAMETTE R > COLUMBIA R – AB MILL CR AT GAGE 14191000

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	2	<input type="checkbox"/>	<input type="checkbox"/>	MF 183	1,300.00	<input type="checkbox"/>	3,620.00	<input type="checkbox"/>	5.5%	<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: Stream interference was estimated using the Hunt model (1999, see attached plot). A transmissivity value of 20,000 ft²/day was used based on a single well pump tests for other wells which are similarly located in the meander belt/floodplain of the Willamette River. Because the aquifer is somewhat confined in the area between the well and the stream, pumping impacts will propagate to the stream quickly.

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												
	(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: _____

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:** _____
In the vicinity of the proposed well site, the Willamette River is fully incised through the Willamette Silt such that its bed is in contact with the underlying alluvial aquifer. Therefore, wells that produce from the aquifer have a direct connection to the river.

References Used: _____
Application file: G-18308, and nearby G-17975

Conlon, T. D., Wozniak, K. C., Woodcock, D., Herrera, N.B., Fischer, B.J. Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-Water Hydrology of the Willamette Basin, Oregon: U. S. Geological Survey Scientific Investigations Report 2005-5168.

Gannett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-A.

Gonthier, J.B., 1983, Groundwater Resources of the Dallas-Monmouth Area, Polk, Benton, and Marion Counties, Oregon; Oregon Water Resources Department, Groundwater Report No. 28, 50 p.

Herra, N. B., Burns, E. R., and Conlon, T. D, 2014, Simulation of groundwater flow and the interaction of groundwater and surface water in the Willamette Basin and Central Willamette subbasin, Oregon: U.S. Geological Survey Scientific Investigations Report 2014-5136, 152 p., <http://dx.doi.org/10.3133/sir20155136>.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

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

Woodward, Dennis G., Gannett, Marshall W., and Vaccaro, John J., 1998 Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-B.

Nearby well logs and water level data, especially POLK 71, POLK 655, POLK 3884, POLK 53369; and water level data for BENT 1558 and MARI 13280.

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.**

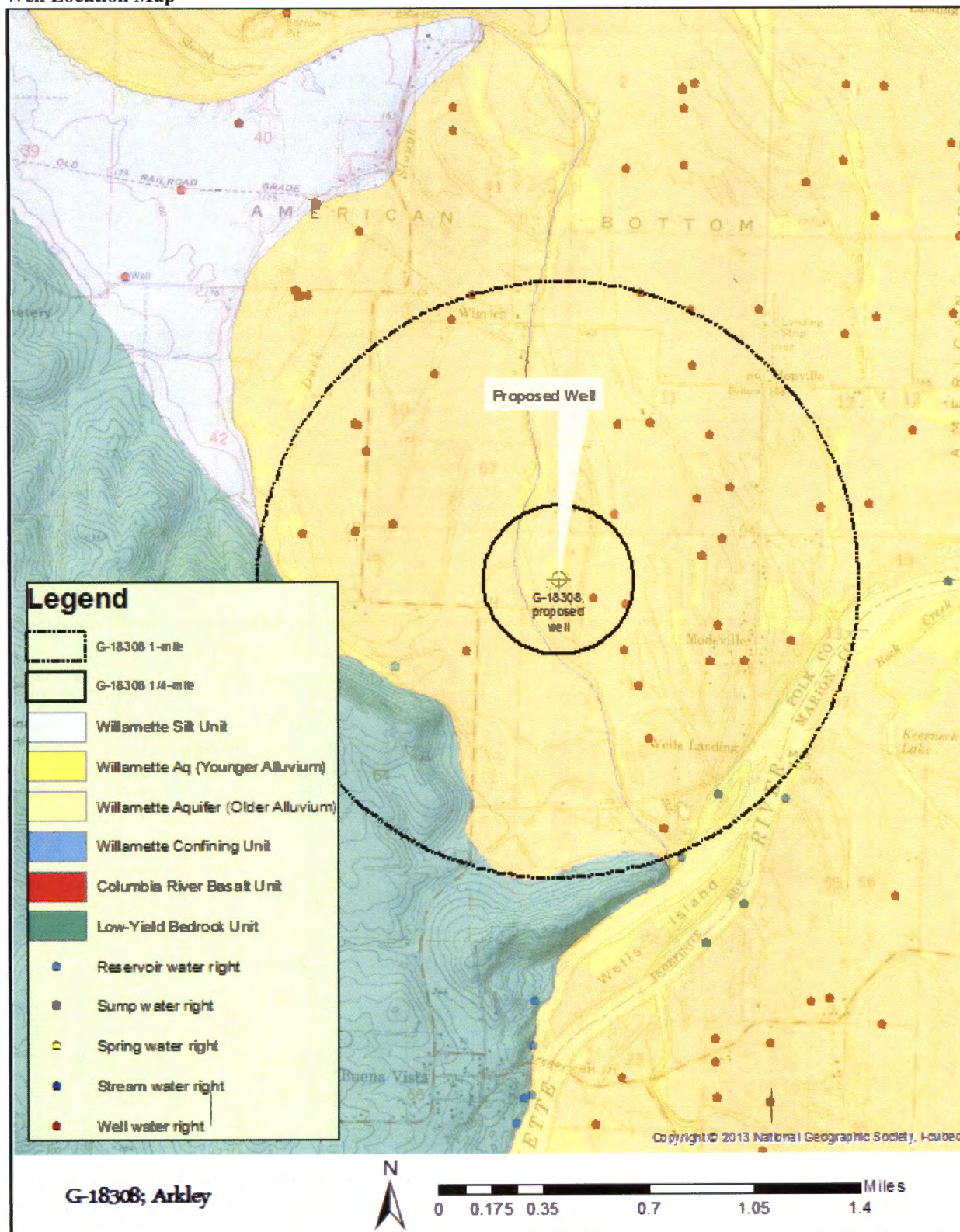
Water Availability Tables

WATER AVAILABILITY TABLE															
Watershed ID #: 183		WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191000										Exceedance Level: 80			
Time: 11:44 AM		Basin: WILLAMETTE										Date: 09/02/2016			
# watershed	Nest ID Number	Stream Name	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	STOR
1	181	WILLAMETTE R > COLUMBIA R - AT MOUTH	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2	182	WILLAMETTE R > COLUMBIA R - AB MOLALLA R	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
3	183	WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

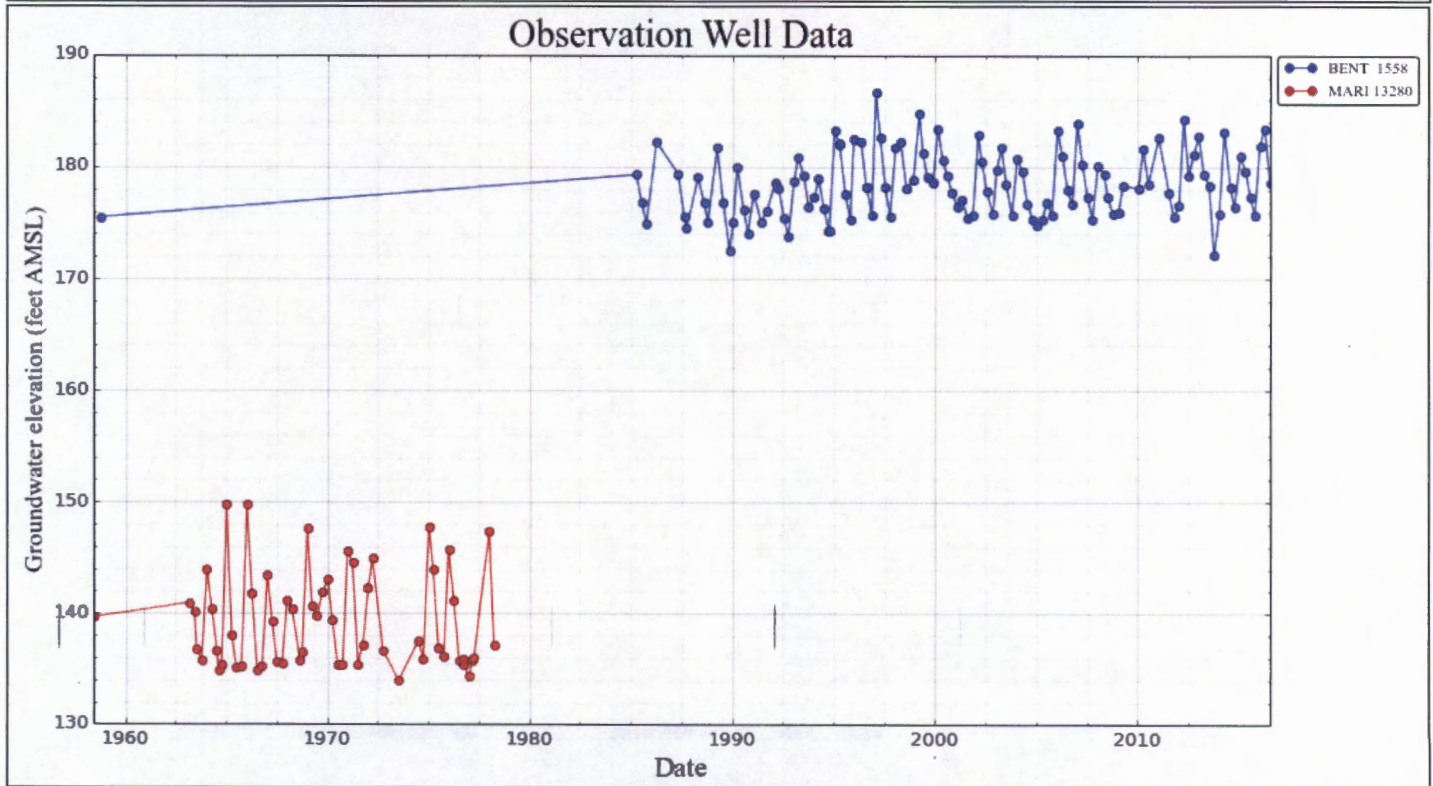
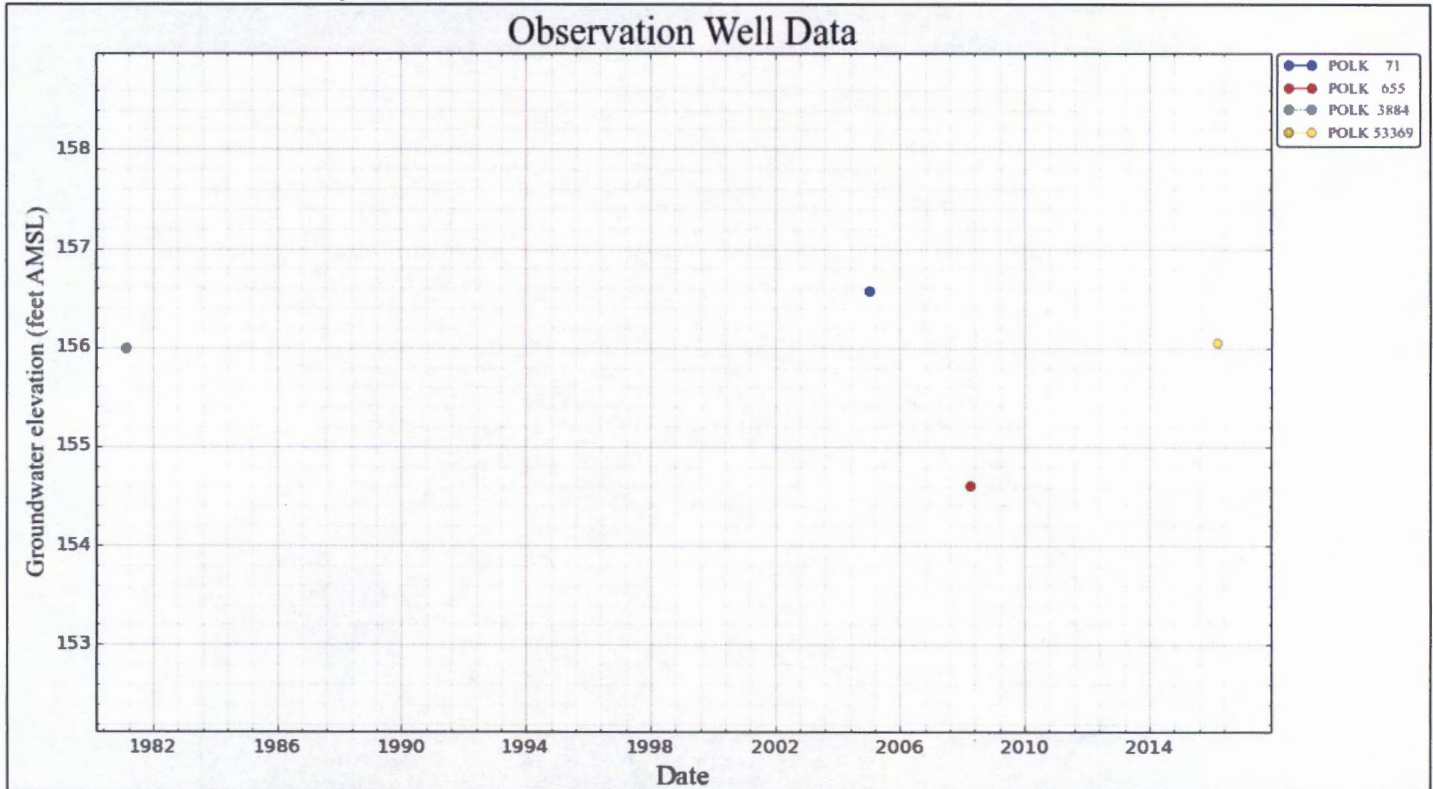
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 183		WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191000				Exceedance Level: 80
Time: 11:44 AM		Basin: WILLAMETTE				Date: 09/02/2016
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	18,400.00	2,240.00	16,200.00	0.00	1,300.00	14,900.00
FEB	20,100.00	7,420.00	12,700.00	0.00	1,300.00	11,400.00
MAR	19,600.00	7,210.00	12,400.00	0.00	1,300.00	11,100.00
APR	18,000.00	6,870.00	11,100.00	0.00	1,300.00	9,830.00
MAY	15,500.00	4,160.00	11,300.00	0.00	1,300.00	10,000.00
JUN	8,310.00	1,690.00	6,620.00	0.00	1,300.00	5,320.00
JUL	4,710.00	1,440.00	3,270.00	0.00	1,300.00	1,970.00
AUG	3,620.00	1,330.00	2,290.00	0.00	1,300.00	993.00
SEP	3,680.00	1,150.00	2,530.00	0.00	1,300.00	1,230.00
OCT	4,650.00	743.00	3,910.00	0.00	1,300.00	2,610.00
NOV	9,400.00	851.00	8,550.00	0.00	1,300.00	7,250.00
DEC	16,700.00	909.00	15,800.00	0.00	1,300.00	14,500.00
ANN	13,500,000	2,150,000	11,300,000	0	942,000	10,400,000

DETAILED REPORT OF INSTREAM REQUIREMENTS													
Watershed ID #: 183		WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191000										Basin: WILLAMETTE	
Time: 11:44 AM												Date: 09/02/2016	
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
MF183A	APPLICATION	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0
MAXIMUM		1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0	1300.0

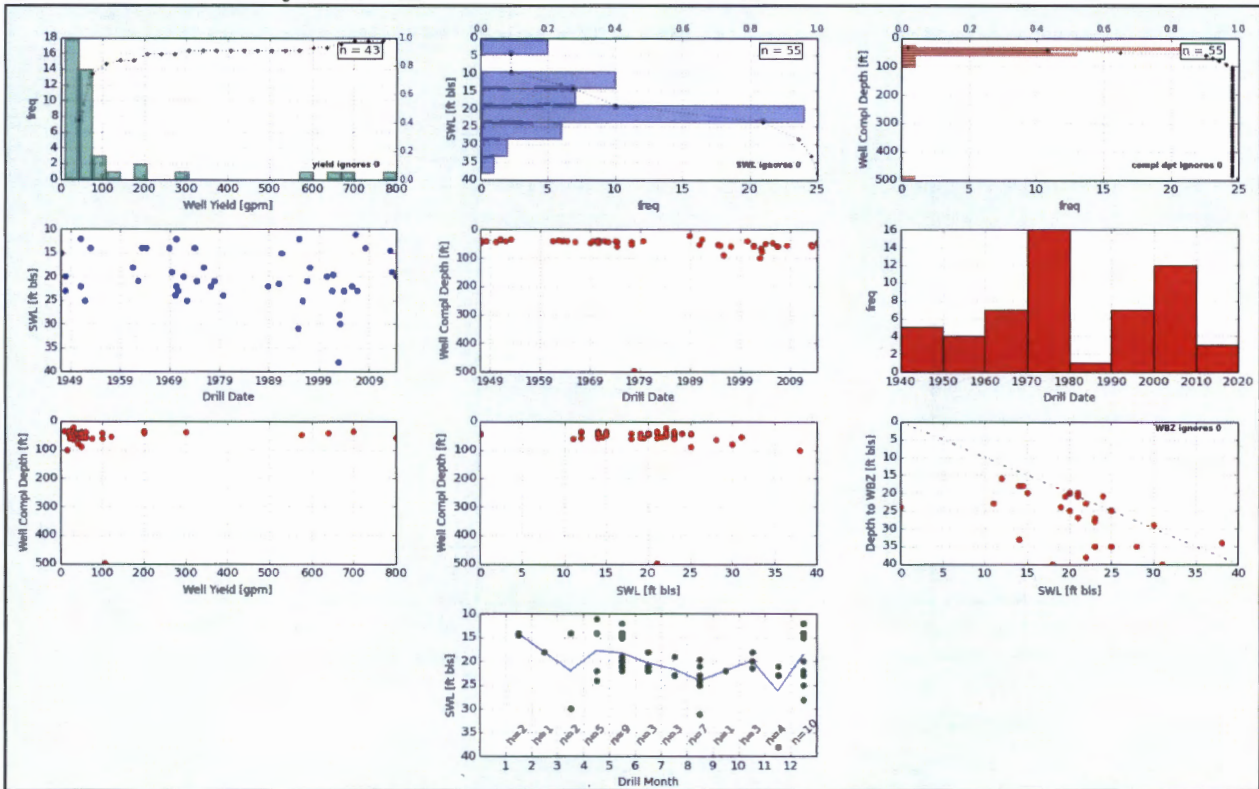
Well Location Map



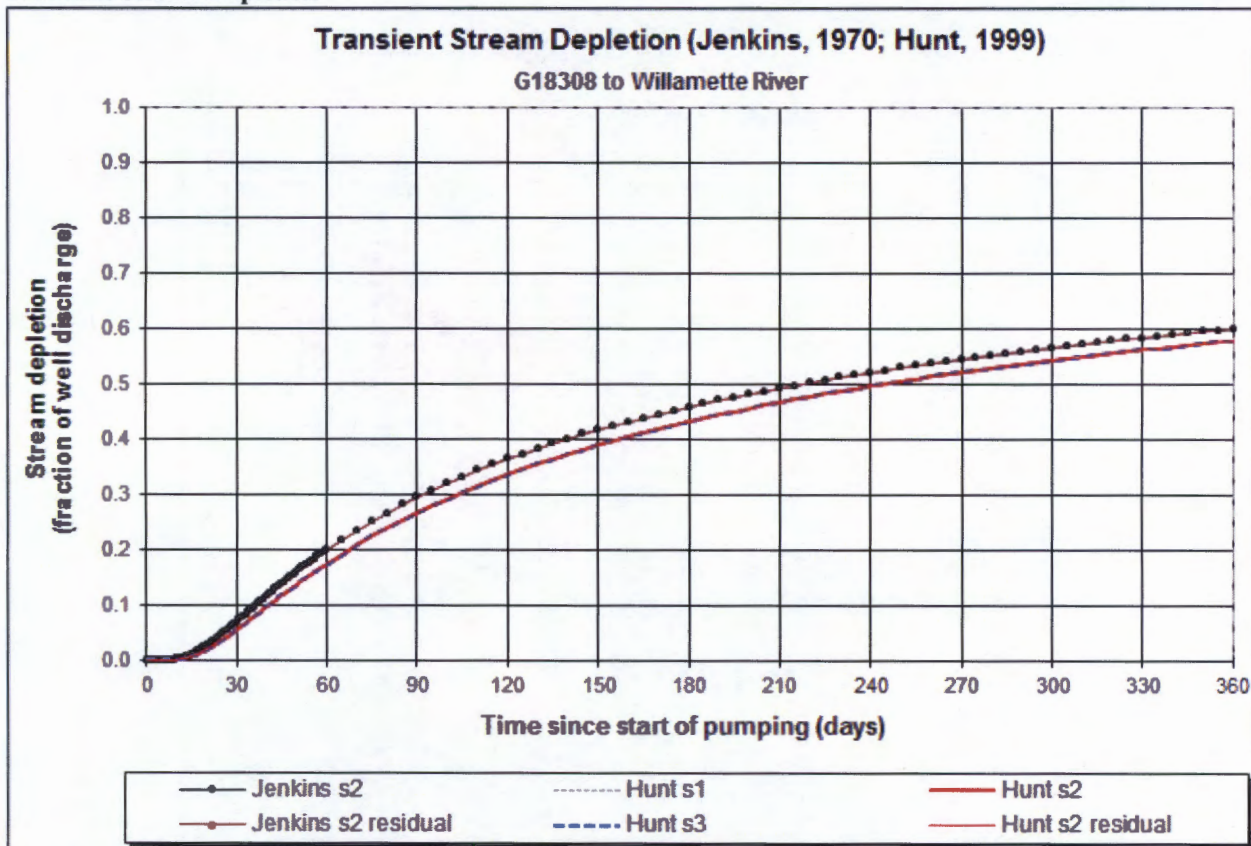
Water-Level Trends in Nearby Wells



Well Statistics for Nearby Wells



Transient Stream Depletion



Output for Hunt Stream Depletion, Scenario 2 (s2): Time pump on = 365 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375	0.375
Jenk SD s2 %	6.93	19.89	29.42	36.37	41.65	45.83	49.23	52.07	54.48	56.56	58.39	60.00
Jen SD s2 cfs	0.026	0.075	0.110	0.136	0.156	0.172	0.185	0.195	0.204	0.212	0.219	0.225
Hunt SD s2 %	5.55	17.46	26.72	33.64	38.97	43.23	46.71	49.63	52.12	54.28	56.17	57.85
Hunt SD s2 cfs	0.021	0.065	0.100	0.126	0.146	0.162	0.175	0.186	0.195	0.204	0.211	0.217

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.375	0.375	0.375	cfs
Distance to stream	a	4450	4450	4450	ft
Aquifer hydraulic conductivity	K	1000	1000	1000	ft/day
Aquifer thickness	b	20	20	20	ft
Aquifer transmissivity	T	20000	20000	20000	ft ² /day
Aquifer storage coefficient	S	0.2	0.2	0.2	
Stream width	ws	750	750	750	ft
Streambed hydraulic conductivity	Ks	1	1	1	ft/day
Streambed thickness	bs	5	5	5	ft
Streambed conductance	sbc	150	150	150	ft/day
Stream depletion factor (Jenkins)	sdf	198.025	198.025	198.025	days
Streambed factor (Hunt)	sbf	33.375	33.375	33.375	