



**PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS**

TO: Water Rights Section Date 05/11/2016  
 FROM: Groundwater Section Phillip I. Marcy  
 SUBJECT: Application G- 18201 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: Ben McCune County: Clackamas

A1. Applicant(s) seek(s) 0.41 cfs from 2 well(s) in the Willamette Basin,  
Beaver Creek subbasin

A2. Proposed use Nursery (32.7 acres) Seasonality: Year-round (365 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	Proposed	1	Basalt	0.41	3S/2E-18 NE-SW	200'S, 1360'E fr W1/4 cor S 18
2	Proposed	2	Basalt	0.41	3S/2E-18 NW-SW	20'S, 570'E fr W1/4 cor S 18
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	185	NA	NA	NA	580	0-18	0-60	NA	Unknown	NA	NA	NA
2	241	NA	NA	NA	580	0-18	0-60	NA	Unknown	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** Applicant plans to produce groundwater from basalt in both proposed wells. No well specific rate given, so each POA will be evaluated at the full requested rate.

A5.  **Provisions of the** Willamette (690-502) 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; 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; "Large Water Use Reporting";
  - 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 applicant has proposed two wells that will produce from water-bearing zones in the Columbia River Basalt Group (CRBG). The CRBG consists of a series of lava flows that range up to 300 feet thick in the vicinity of the proposed well. Although unconfined ground water occurs near the surface of the basalts, most water occurs in confined aquifers that occupy thin rubble zones (interflow zones) that occur at the contacts between lava flows. The thick interiors of the basalt flows generally have very low porosity and permeability and act as confining beds. This physical geometry generally produces a stack of thin aquifers (interflow zones) separated by thick confining beds (flow interiors). In the area of the proposed wells, the basalt aquifers are truncated by local stream drainages which have eroded to various levels through the basalt column (see attached map). Because the aquifers are confined (storativity is estimated to be 0.0001), pumping impacts will propagate outward at rapid rates and are likely to reach aquifer boundaries (streams, faults, and truncated basalt flow margins) within fractions of an hour. Using aquifer parameters appropriate for the basalts, it can be shown that the cone of depression from a pumped well will produce measurable impacts at a distance of 1 mile within several hours. Therefore, hydraulic interference with nearby wells will occur rapidly once pumping begins. The presence of local aquifer boundaries will increase the degree of interference with nearby wells that are completed in the same water-bearing zones.

Water levels within nearby CRBG wells (see attached hydrographs) have been historically stable until the past two years. Recent observed declines are likely the result of increased pumping of groundwater during the past year, brought on by drought conditions in the Willamette basin in 2015. If groundwater declines continue, however, priority will be given to senior right holders in the area, leading to possible curtailment or discontinuation of pumping if decline triggers within condition 7N are reached.

**Special Conditions:**

1. Best management practices shall be used to maximize the efficiency of water use.
2. The well shall be continuously cased and continuously sealed to a depth of at least 430 feet, and at least 10 feet into the competent bedrock unit overlying the production zone.
3. The well shall be open to a single aquifer in the Columbia River Basalt Group and shall meet applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval shall be no greater than 50 feet. However, a larger open interval may be approved by the Department if the applicant can demonstrate to the satisfaction of the Department that each well is only open to a single aquifer. Following well completion, the well shall be thoroughly developed to remove cuttings and drilling fluids. Substantial evidence of a single aquifer completion may be collected by video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods approved by the Department. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval.
4. A dedicated water-level measuring tube shall be installed in the production well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the well shall be provided to Departmental staff in order to make water-level measurements.

**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	Columbia River Basalt	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Columbia River Basalt	<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:** Aquifers within the CRBG are typically thin horizons of broken rock, porous rock, and sediments, bounded both above and below by dense, low permeability lava flow interiors. This geometry leads to high degrees of confinement within each discrete water-bearing zone within the CRBG, illustrated by vastly different head elevations within adjacent wells that produce from different 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	Unnamed trib. to Beaver Ck.	~100	133	400	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Unnamed trib. to Beaver Ck	~100	133	1200	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Beaver Creek	~100	125	700	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Beaver Creek	~100	125	1100	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	3	Willamette River	~100	57	12150	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	3	Willamette River	~100	57	11300	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Basis for aquifer hydraulic connection evaluation:** Water-bearing zones within the CRBG penetrated by the proposed POA wells are at an elevation that is not incised by local streams. The Willamette River is the most deeply incised stream in the area, but does not likely incise to within 100' of the production zone depth. No springs are observed within 1 mile of either POA location.

**Water Availability Basin the well(s) are located within:** Willamette R > Columbia R – At Mouth (181)

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"/>
		<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: This section does not apply.

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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:** This section does not apply.  
\_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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:** Streams located within one mile of proposed POA locations do not incise to a depth where they are expected to intersect with the production zones of the POA wells. Therefore, no finding of hydraulic connection was found, assuming special conditions set forth in section B3 concerning well construction are followed.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**References Used:**

Gannett and Caldwell, 1998, Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington, USGS Professional Paper 1424-A

Woodward, Gannett and Vaccaro, 1998, Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington, USGS Professional Paper 1424-B

Walton, William, 1962, Selected Analytical Methods for Well and Aquifer Evaluation, Bulletin 49, Illinois State Water Resources.

Freeze and Cherry, 1979, Groundwater, Prentice-Hall, Inc.

Conlon and Others, 2005, Ground-Water Hydrology of the Willamette Basin, Oregon, Scientific Report 2005-5168, USGS.

**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**

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

Watershed ID #: 181  
 Time: 4:03 PM

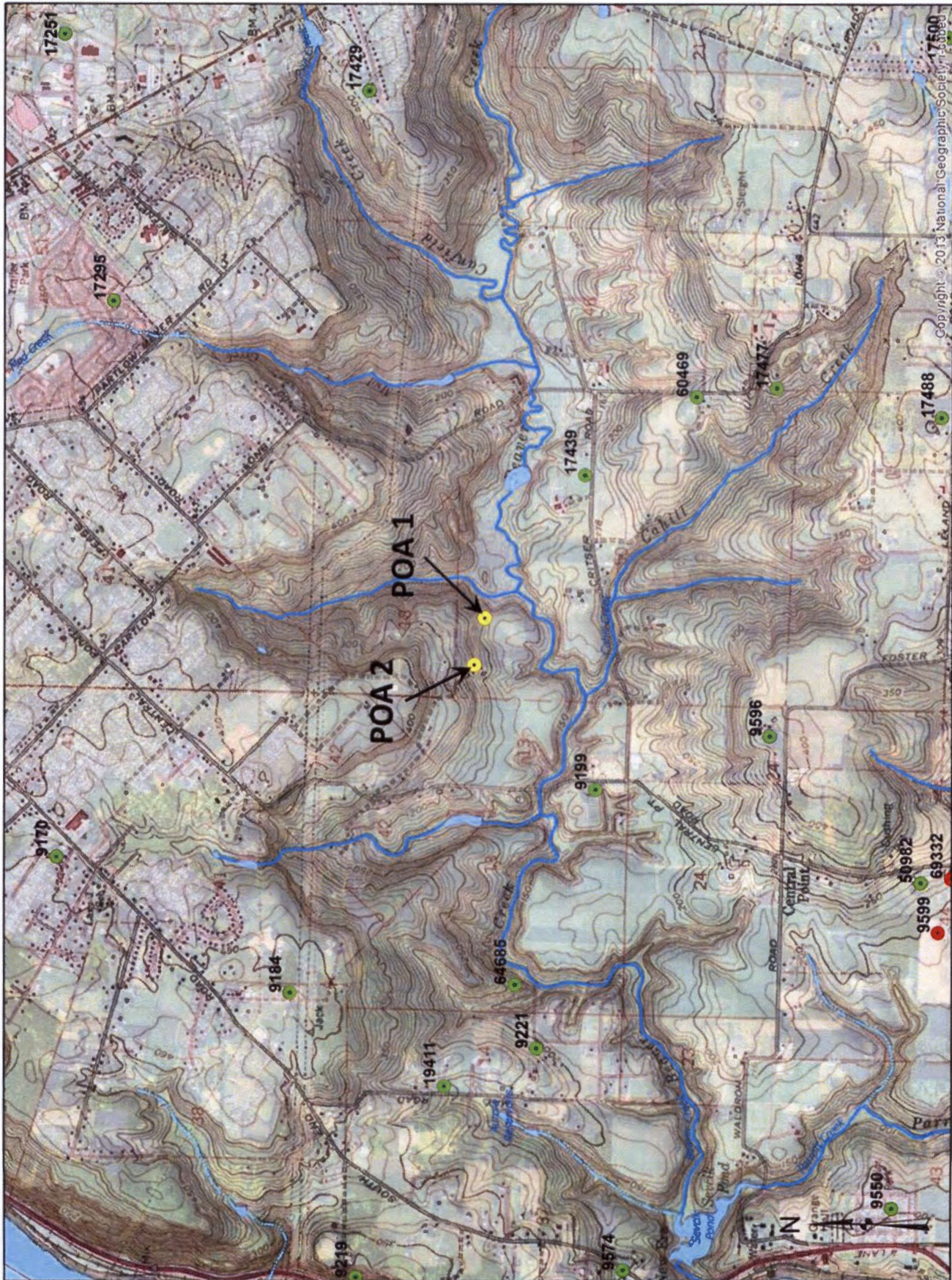
WILLAMETTE R > COLUMBIA R - AT MOUTH  
 Basin: WILLAMETTE

Exceedance Level: 80  
 Date: 05/11/2016

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	27,500.00	2,750.00	24,700.00	0.00	1,500.00	23,200.00
FEB	30,000.00	8,020.00	22,000.00	0.00	1,500.00	20,500.00
MAR	28,500.00	7,580.00	20,900.00	0.00	1,500.00	19,400.00
APR	25,400.00	7,190.00	18,200.00	0.00	1,500.00	16,700.00
MAY	20,700.00	4,440.00	16,300.00	0.00	1,500.00	14,800.00
JUN	11,000.00	2,410.00	8,590.00	0.00	1,500.00	7,090.00
JUL	6,280.00	2,350.00	3,930.00	0.00	1,500.00	2,430.00
AUG	4,890.00	2,110.00	2,780.00	0.00	1,500.00	1,280.00
SEP	4,930.00	1,740.00	3,190.00	0.00	1,500.00	1,690.00
OCT	5,990.00	721.00	5,270.00	0.00	1,500.00	3,770.00
NOV	12,700.00	1,010.00	11,700.00	0.00	1,500.00	10,200.00
DEC	24,800.00	1,400.00	23,400.00	0.00	1,500.00	21,900.00
ANN	19,700,000	2,500,000	17,200,000	0	1,090,000	16,100,000

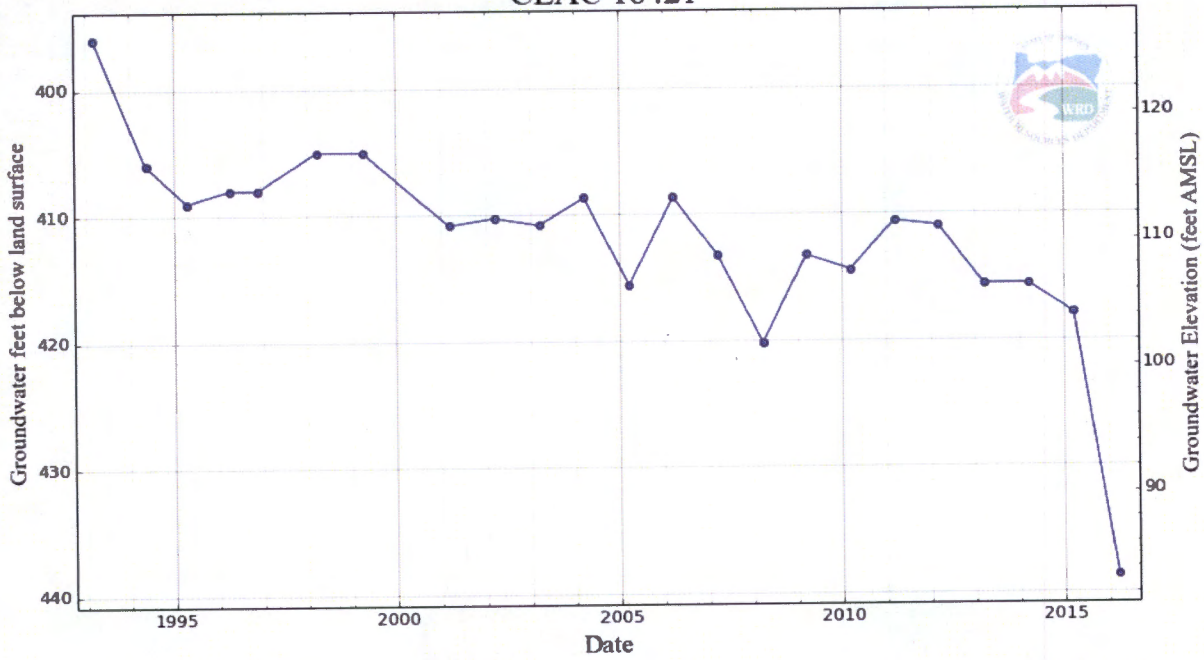


Well Location Map



Water-Level Trends in Nearby Wells

CLAC 18421



CLAC 51243

