

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date March 16, 2016
 FROM: Groundwater Section Aurora C Bouchier
 SUBJECT: Application G- 18196 Reviewer's Name 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: Daniel & Thomas Love County: Clackamas

- A1. Applicant(s) seek(s) 0.23 cfs from 1 well(s) in the Willamette Basin,
Molalla-Pudding subbasin (Yoder quad)
- A2. Proposed use Irrigation (18.29 acres) Seasonality: March 1 – October 31
- 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	Alluvium	0.23	4S/1E-9 SE-NE	1730' S, 440' W fr NE c S 9
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	~120		~115		Est 100	Est 0-18	Est 0-100		Est 0-100			

Use data from application for proposed wells.

- A4. **Comments:** _____

- 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: Well is greater than 1/4-mile from a surface water body, so the pertinent rule (OAR 690-502-0240) does 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 alluvial 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's well is located in an area that contains floodplain sediments from the Molalla River from land surface to a depth of approximately 20-30 feet. A sequence of mostly fine-grained alluvial sediments containing thin sand and gravel beds underlies the floodplain sediments to a depth of approximately 600 feet (Woodward et al., 1998).

Groundwater observation data for nearby wells within the floodplains between or along the Molalla and Pudding rivers, where the aquifer is locally unconfined, is limited to CLAC 8794. Observations at this well are limited in duration but show no groundwater decline over the period of record (see first hydrograph below). Groundwater observation data for wells completed on the terrace above the floodplain between the Molalla and Pudding rivers but less than approximately 1/2 mile from the edge of the terrace - which are likely confined by low permeability Willamette Silt, show no long-term decline (see first hydrograph below). Groundwater observation data for wells completed on the terrace above the floodplain between the Molalla and Pudding rivers but greater than approximately 1/2 mile from the edge of the terrace, show some degree of decline (see second hydrograph below). Increased groundwater development in the area indicates a need for additional water-level monitoring.

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	Alluvium	<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 well is located within the unconfined Holocene flood deposits of the Willamette River (Conlon et al., 2005, P. 9).

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	Molalla River	~115	105	1600	<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"/>

Basis for aquifer hydraulic connection evaluation: The proposed well would likely produce from Holocene floodplain deposits adjacent to the Molalla River. An efficient hydraulic connection exists between the river and the Holocene floodplain deposits (Conlon et al., 2005, P. 50).

Water Availability Basin the well(s) are located within: 135: MOLALLA R> WILLAMETTE R- AB GRIBBLE CR, and 69796: MOLALLA R> WILLAMETTE R- AT MOUTH (this WAB is downstream and has larger flows, therefore this evaluation is compared with WAB 135).

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"/>	MF 135	60.00	<input type="checkbox"/>	65.10	<input type="checkbox"/>	<25%	<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: In the vicinity of the proposed well, water-bearing gravel or sand and gravel layers are encountered under a thin layer of topsoil. Since this area is lacking a confining layer, stream depletion was estimated using the Hunt 1999 model using a 3 foot clogging layer at the base of the stream. Analysis of a pump test at a nearby well (CLAC 62322, located approximately 2.2 miles to the northwest, also within the floodplain) resulted in transmissivity value of approximately 5,000 ft²/day. Therefore a hydraulic conductivity of 100 ft/day was used for this analysis.

Locally, the Molalla River has a cobble substrate (personal communication with Water Master Amy Kim, 12/3/2015), therefore a streambed hydraulic conductivity value of 1ft/day was used (on the low end of the range for a clean sand) (Driscoll, 1986).

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: _____

References Used: _____
Application Files: G18196, and nearby G16476 and G18146.

Driscoll, Fletcher G. Ph.D., 1986, Groundwater and Wells, second edition.

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.

Well logs and water level data in the OWRD database.

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

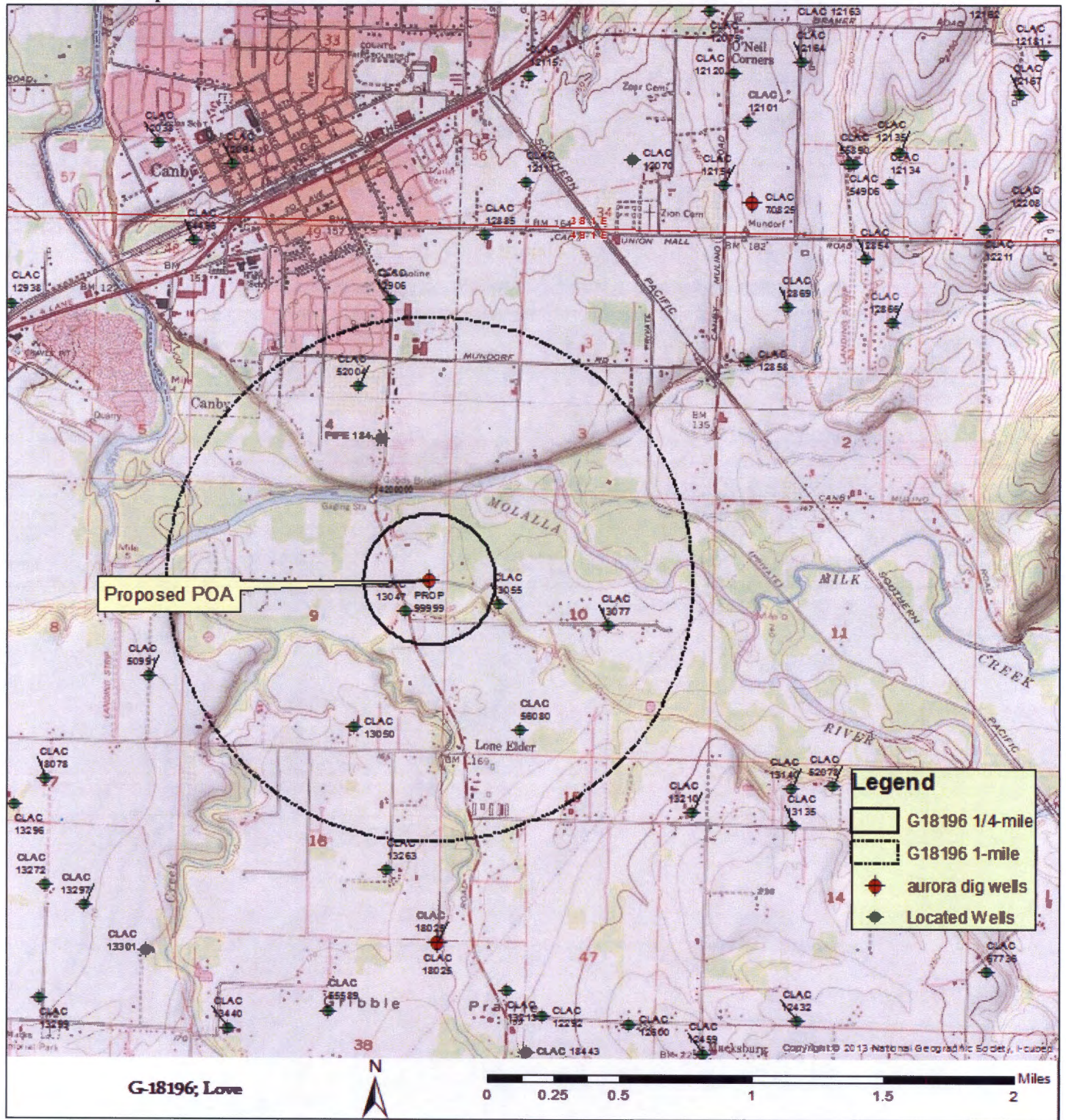
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
watershed ID #: 135		MOLALLA R > WILLAMETTE R - AB GRIBBLE CR			Exceedance Level: 80	
Time: 3:15 PM		Basin: WILLAMETTE			Date: 03/14/2016	
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	694.00	3.61	690.00	0.00	60.00	630.00
FEB	701.00	3.49	698.00	0.00	60.00	638.00
MAR	714.00	3.19	711.00	0.00	60.00	651.00
APR	685.00	3.70	681.00	0.00	60.00	621.00
MAY	495.00	10.10	485.00	0.00	60.00	425.00
JUN	221.00	14.40	207.00	0.00	60.00	147.00
JUL	97.60	24.70	72.90	0.00	60.00	12.90
AUG	67.00	20.20	46.80	0.00	60.00	-13.20
SEP	65.10	8.80	56.30	0.00	60.00	-3.70
OCT	103.00	3.31	99.70	0.00	60.00	39.70
NOV	306.00	3.15	303.00	0.00	60.00	243.00
DEC	669.00	3.73	665.00	0.00	60.00	605.00
ANN	560,000	6,220	554,000	0	43,500	511,000

DETAILED REPORT OF INSTREAM REQUIREMENTS													
watershed ID #: 135		MOLALLA R > WILLAMETTE R - AB GRIBBLE CR										Basin: WILLAMETTE	
Time: 3:17 PM												Date: 03/14/2016	
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
MF135A	CERTIFICATE	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
MAXIMUM		60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0

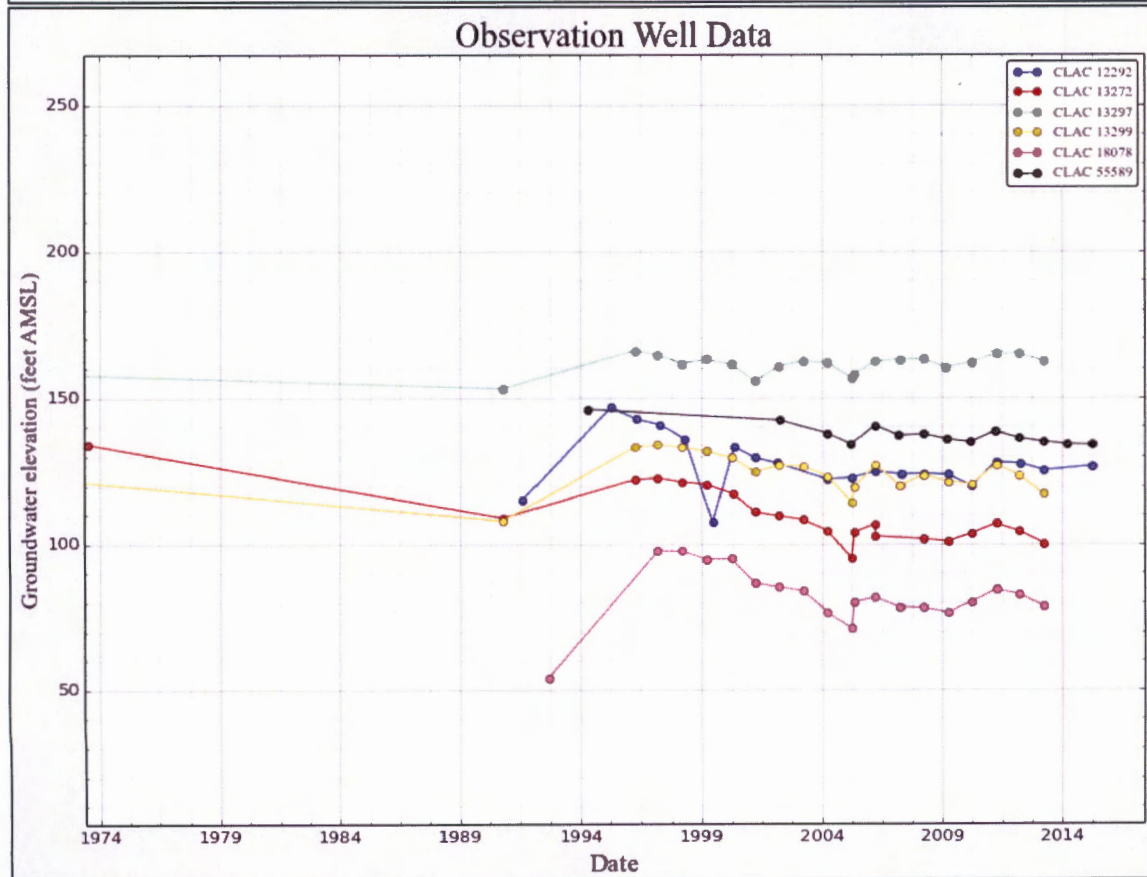
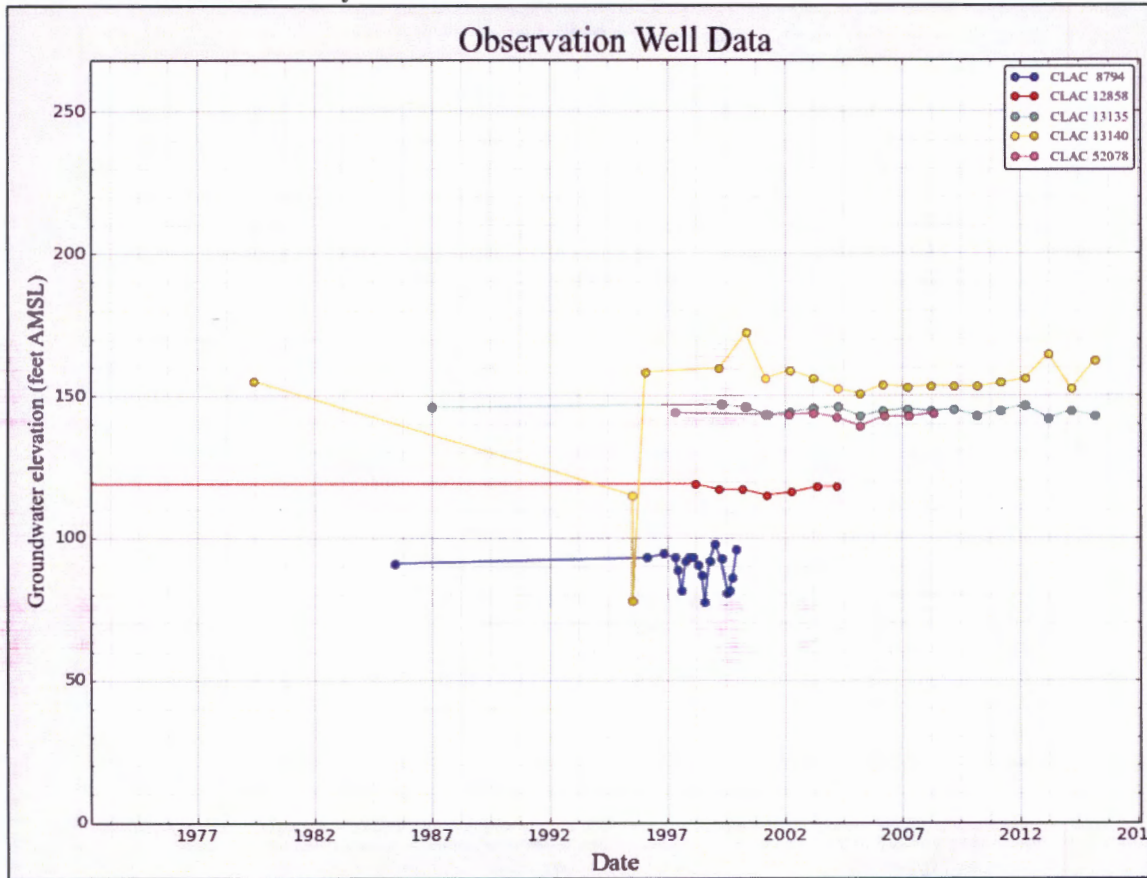
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 69796		MOLALLA R > WILLAMETTE R - AT MOUTH			Exceedance Level: 80	
Time: 3:15 PM		Basin: WILLAMETTE			Date: 03/14/2016	
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	1,870.00	154.00	1,720.00	0.00	500.00	1,220.00
FEB	2,010.00	144.00	1,870.00	0.00	500.00	1,370.00
MAR	1,830.00	115.00	1,710.00	0.00	500.00	1,210.00
APR	1,530.00	89.00	1,440.00	0.00	500.00	941.00
MAY	927.00	99.00	828.00	0.00	500.00	328.00
JUN	431.00	119.00	312.00	0.00	500.00	-188.00
JUL	204.00	183.00	21.10	0.00	200.00	-179.00
AUG	139.00	154.00	-15.20	0.00	100.00	-115.00
SEP	134.00	83.30	50.70	0.00	150.00	-99.30
OCT	188.00	41.70	146.00	0.00	450.00	-304.00
NOV	637.00	79.60	557.00	0.00	500.00	57.40
DEC	1,700.00	149.00	1,550.00	0.00	500.00	1,050.00
ANN	1,320,000	85,300	1,240,000	0	295,000	966,000

DETAILED REPORT OF INSTREAM REQUIREMENTS													
Watershed ID #: 69796		MOLALLA R > WILLAMETTE R - AT MOUTH										Basin: WILLAMETTE	
Time: 3:17 PM												Date: 03/14/2016	
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
IS69796A	CERTIFICATE	500.0	500.0	500.0	500.0	500.0	500.0	200.0	100.0	150.0	450.0	500.00	500.0
	MAXIMUM	500.0	500.0	500.0	500.0	500.0	500.0	200.0	100.0	150.0	450.0	500.0	500.0

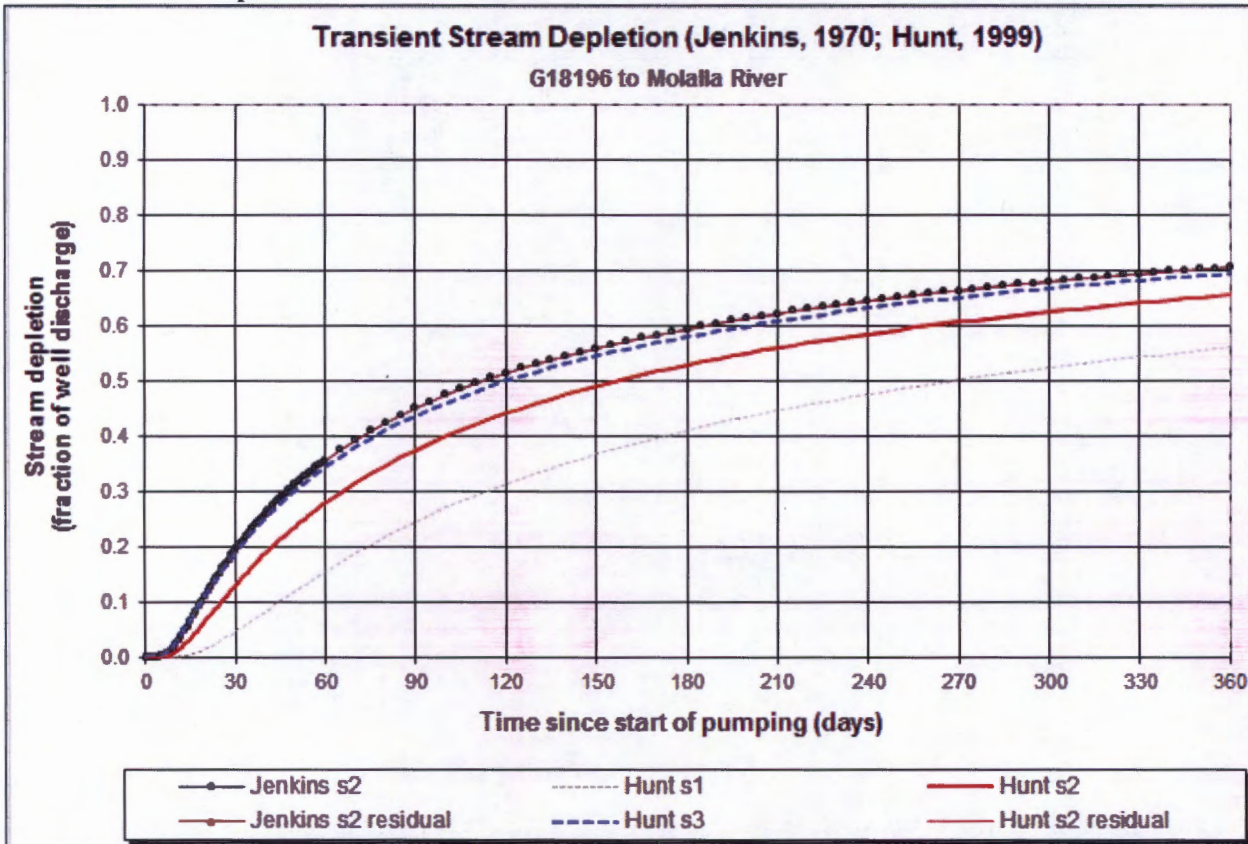
Well Location Map



Water-Level Trends in Nearby Wells



Transient Stream Depletion



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

Time pump on = 365 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230	0.230
Jenk SD s2 %	19.14	35.56	45.07	51.36	55.91	59.38	62.15	64.42	66.32	67.95	69.37	70.61
Jen SD s2 cfs	0.044	0.082	0.104	0.118	0.129	0.137	0.143	0.148	0.153	0.156	0.160	0.162
Hunt SD s2 %	13.03	27.95	37.52	44.14	49.05	52.87	55.94	58.49	60.64	62.48	64.09	65.51
Hunt SD s2 cfs	0.030	0.064	0.086	0.102	0.113	0.122	0.129	0.135	0.139	0.144	0.147	0.151

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.23	0.23	0.23	cfs
Distance to stream	a	1600	1600	1600	ft
Aquifer hydraulic conductivity	K	50	100	150	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	2500	5000	7500	ft*ft/day
Aquifer storage coefficient	S	0.2	0.2	0.2	
Stream width	ws	100	100	100	ft
Streambed hydraulic conductivity	Ks	1	1	1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	33.33333333	33.33333333	33.33333333	ft/day
Stream depletion factor (Jenkins)	sdf	204.8	102.4	68.26666667	days
Streambed factor (Hunt)	sbf	21.33333333	10.66666667	7.111111111	