WATER RESOURCES DEPARTMENT

MEMO August 10 ,2015

TO: **Application G-** 18037

FROM: **GW:** Aurora Bouchier
(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 _____ 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

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date **August 10, 2015**

FROM: Groundwater Section **Aurora C. Bouchier**
Reviewer's Name

SUBJECT: Application G- **18037** 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: **Gonzo Properties LLC** County: **Clackamas**

A1. Applicant(s) seek(s) **0.275 (123 gpm)** cfs from **1** well(s) in the **Willamett** Basin, **Molalla-Pudding** subbasin

A2. Proposed use **Irrigation of 22 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	0.275	T5S/R1E-14 NE-SW	2510' N, 1640' E fr SW cor S 14
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	270	na			500	0-50	+2-500		350-500			

Use data from application for proposed wells.

A4. **Comments:** The application specifies the aquifer source as the "sediments above the basalt aquifer." The proposed well location is within the Gladtidings Ground Water Limited Area (see A6).

This review evaluates the full requested rate of 0.275 cfs.

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 applicant's proposed well is greater than ¼ mile from a perennial surface water source, so the pertinent basin rules (OAR690-502-0240) do not apply.

A6. ☒ **Well(s) #** **1** , _____ , _____ , _____ , _____ , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **Gladtidings (OAR 690-502-0180)**
Comments: This Statue restricts groundwater use from the basalt aquifer to exempt uses (with some exceptions). Therefore, it is important that the well produces from the alluvial aquifer as described in the application.

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) **7C**;
   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:**

Over 500 feet of alluvial sediments occur beneath land surface in the vicinity of the proposed POA. The water table occurs 70-80 feet below land surface. Productive sand and gravel beds occur throughout the sequence separated layers of lower permeability silts and clay which progressively confine deeper water-bearing zones (Gannet and Caldwell, 1998, and Woodward et al., 1998).

Nearby observation wells indicate relatively stable long-term trends for alluvial wells in the immediate vicinity of the proposed POA (see attached hydrograph), but 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	**Alluvial**	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: The well logs for nearby wells indicate static water levels above the water-bearing zones. Published maps of the groundwater table corroborate this (Woodward et al., 1998).

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? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	1	**Kaiser Creek**	**~190**	**140-184**	**~1,375**	☒	☐	☐	☐	☒
1	2	**Rock Creek**	**~190**	**140-150**	**~4,610**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Published water-table maps indicate that groundwater in the alluvial aquifer flows toward, and discharges to, Kaiser and Rock creeks (Woodward et al., 1998).

Water Availability Basin the well(s) are located within: 151 (PUDDING R >MOLALLA R –AB MILL 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	☐	☐	**MF 151**	**35**	☐	**67.30**	☐	**<<25%**	☐
1	2	☐	☐	**MF 151**	**35**	☐	**67.30**	☐	**<<25%**	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: Stream depletion was estimated using the Hunt 2003 model.

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:

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:

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.

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

Woodward, Dennis BG., 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 CLAC 2460, CLAC 53757, CLAC 56644, CLAC 59386, and CLAC 66134.

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

PUDDING R > MOLALLA R - AB MILL CR
Watershed ID #: 151 Basin: WILLAMETTE Exceedance Level: 80
Time: 11:17 AM Date: 08/10/2015

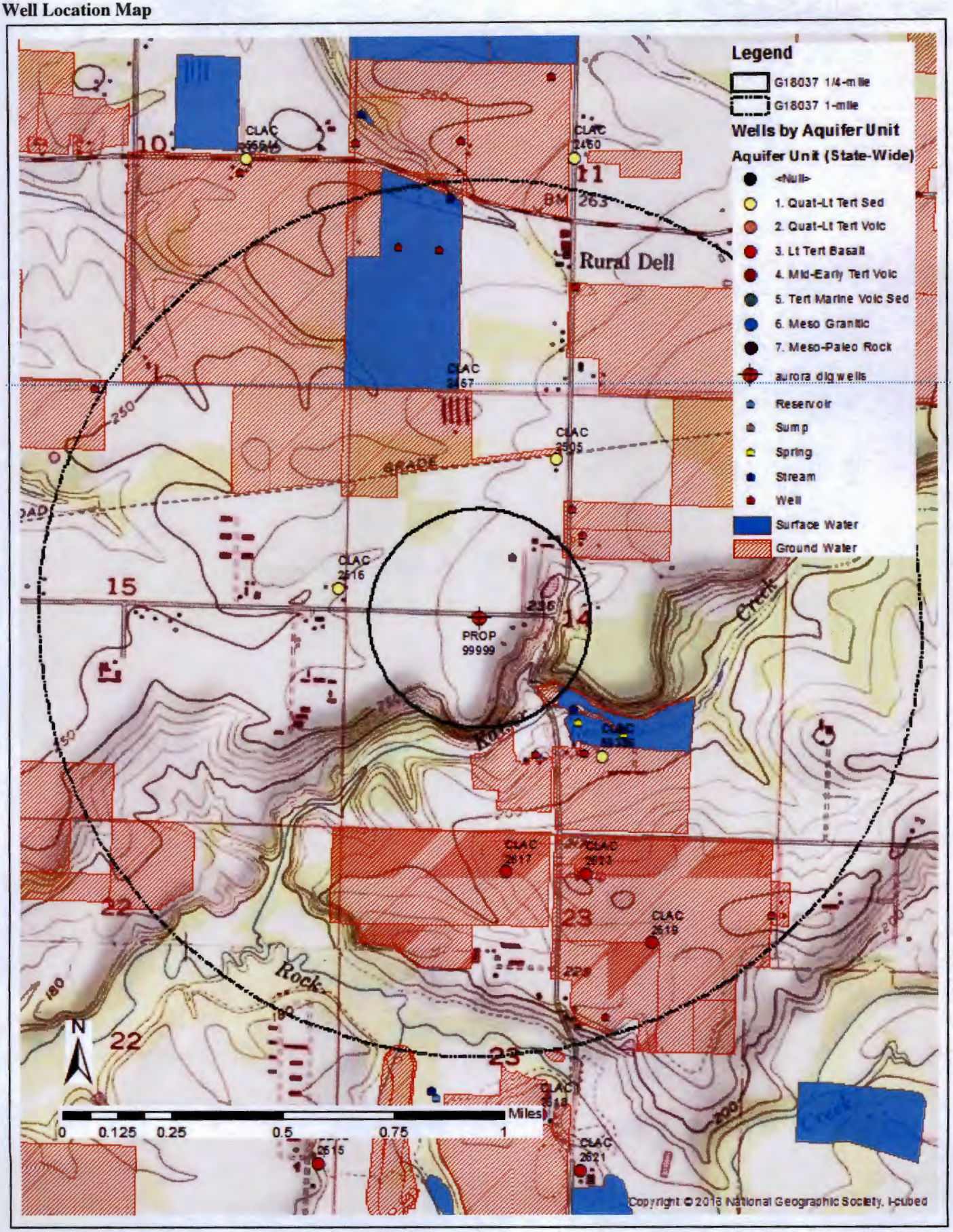
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
	Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.					
JAN	1,040.00	125.00	915.00	0.00	36.00	879.00
FEB	1,180.00	115.00	1,060.00	0.00	36.00	1,030.00
MAR	1,010.00	79.90	930.00	0.00	36.00	894.00
APR	787.00	55.70	731.00	0.00	36.00	695.00
MAY	425.00	52.70	372.00	0.00	36.00	336.00
JUN	224.00	72.90	151.00	0.00	36.00	115.00
JUL	109.00	113.00	-4.01	0.00	36.00	-40.00
AUG	71.00	93.30	-22.30	0.00	36.00	-58.30
SEP	67.30	54.50	13.80	0.00	36.00	-23.20
OCT	91.60	14.00	77.60	0.00	36.00	41.60
NOV	363.00	49.10	314.00	0.00	36.00	278.00
DEC	957.00	119.00	838.00	0.00	36.00	802.00
ANN	706,000	57,000	649,000	0	26,100	625,000

DETAILED REPORT OF INSTREAM REQUIREMENTS

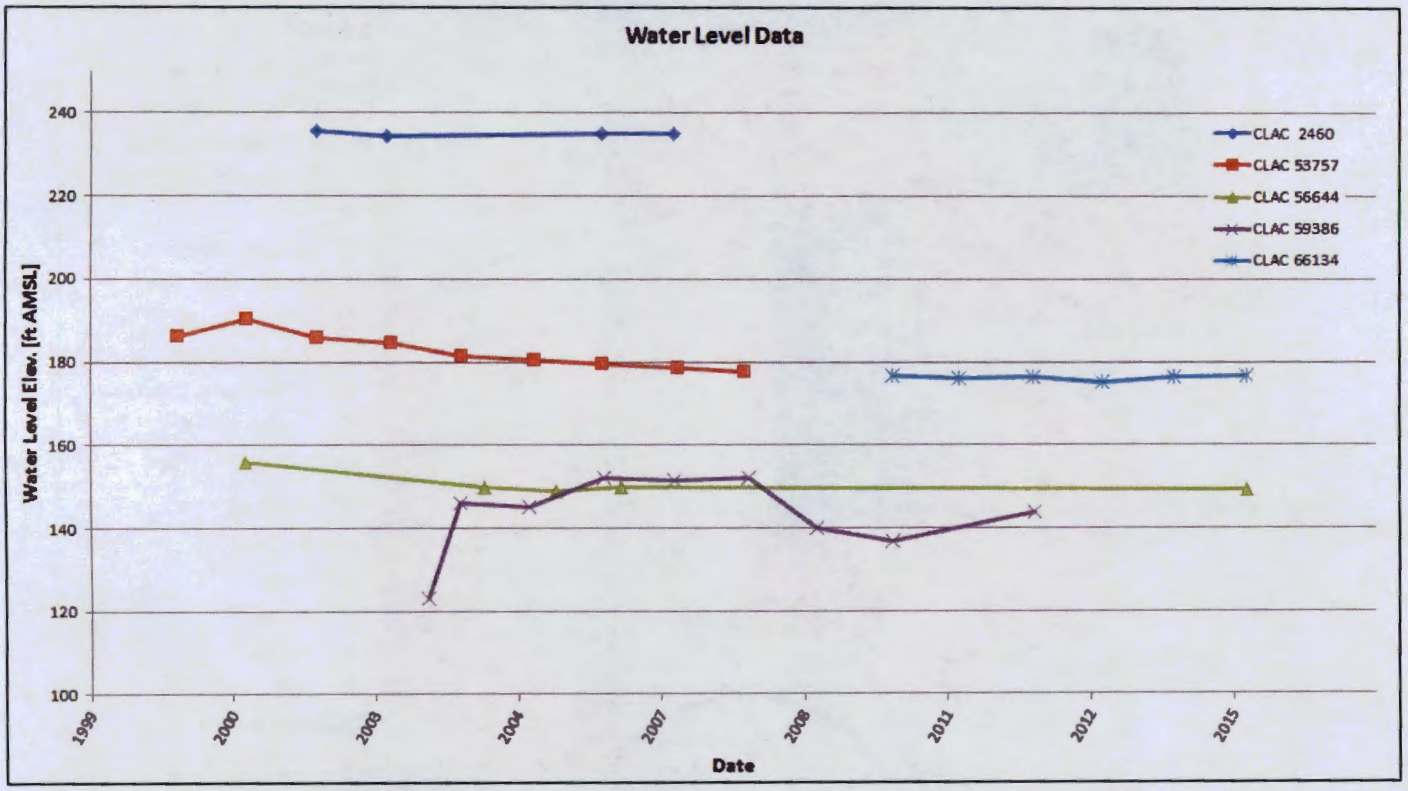
PUDDING R > MOLALLA R - AB MILL CR
Watershed ID #: 151 Basin: WILLAMETTE
Time: 11:17 AM Date: 08/10/2015

Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
		Monthly values are in cfs.											
MF151A	CERTIFICATE	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.00	35.0
IS73532B	CERTIFICATE	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.00	36.0
IS73533A	CERTIFICATE	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.00	16.0
IS73534A	CERTIFICATE	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.00	11.0
MAXIMUM		36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0

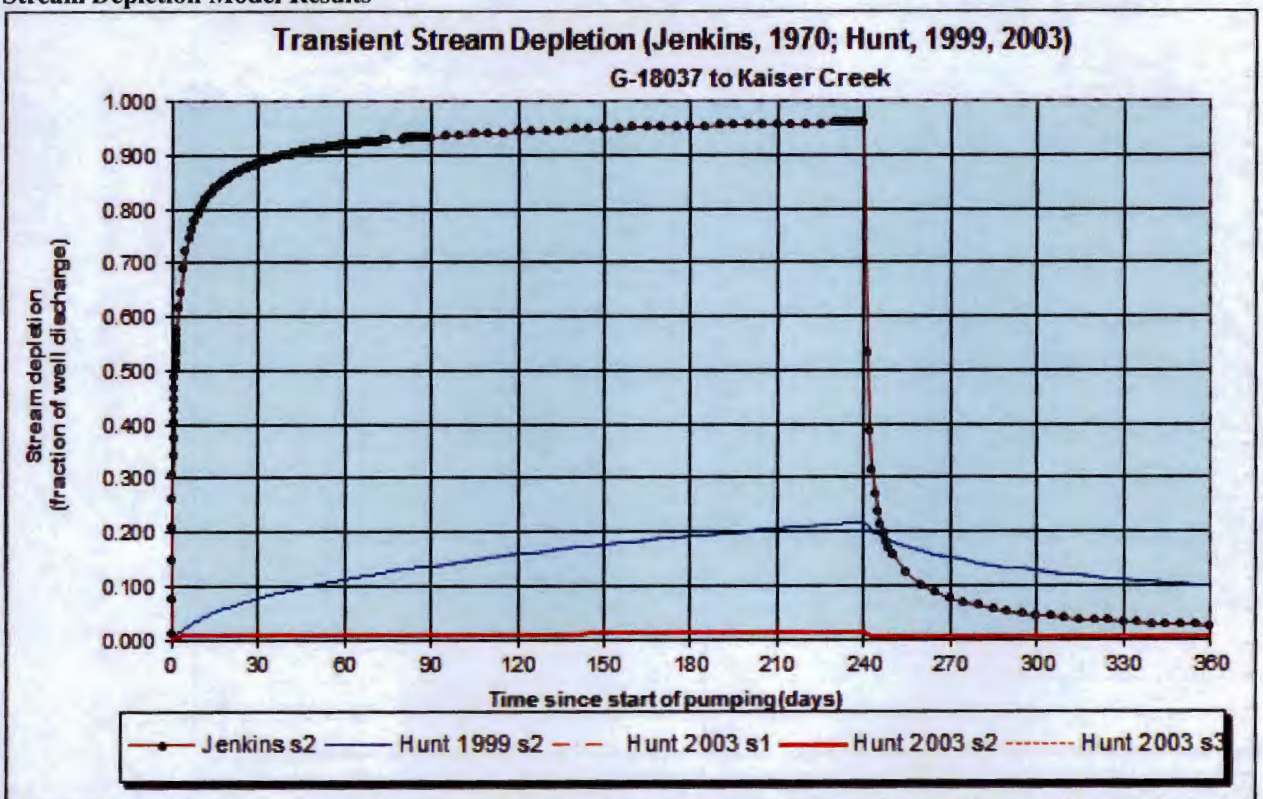
Well Location Map



Water-Level Trends in Nearby Wells

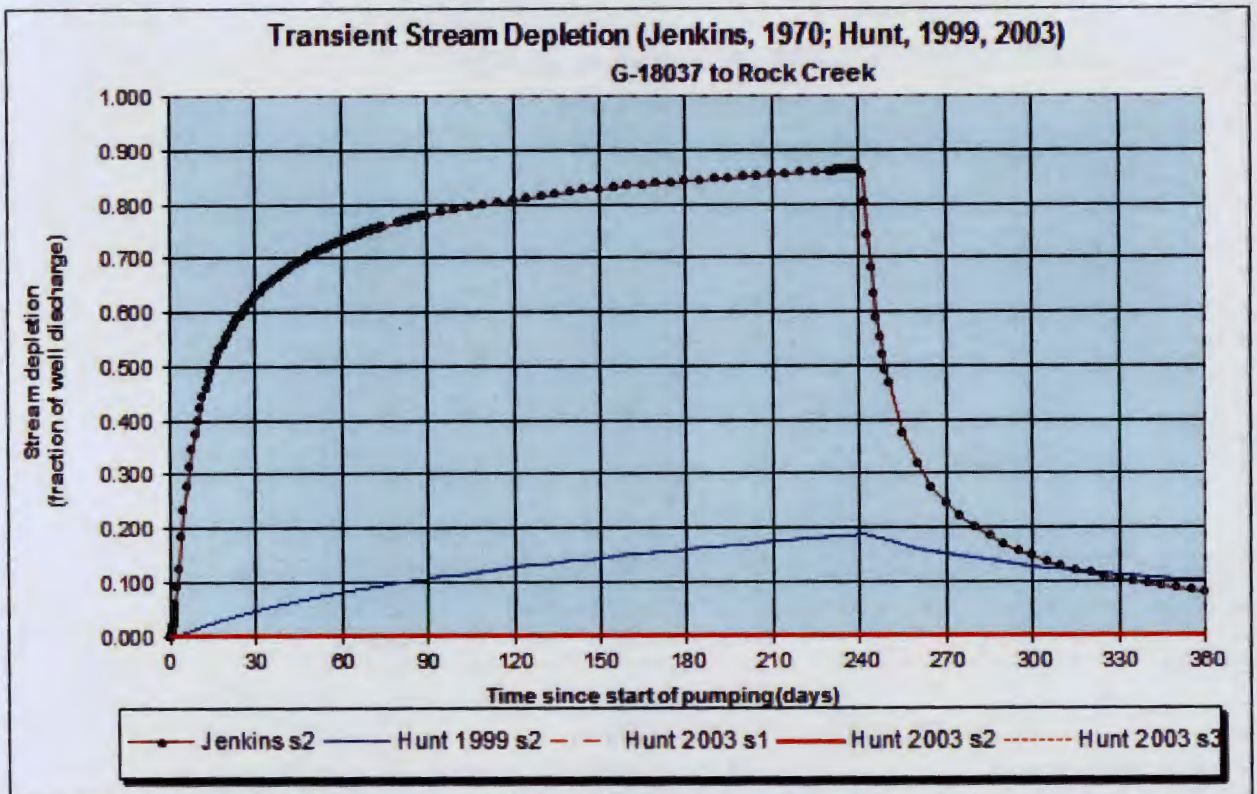


Stream Depletion Model Results



Output for Stream Depletion, Scenerio 2 (s2):	Time pump on (pumping duration) = 240 days											
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	88.5%	91.8%	93.3%	94.2%	94.8%	95.3%	95.6%	95.9%	7.7%	4.5%	3.2%	2.4%
H SD 1999	7.8%	11.3%	13.8%	15.9%	17.6%	19.2%	20.6%	21.8%	15.2%	12.7%	11.1%	10.0%
H SD 2003	0.85%	0.92%	1.00%	1.07%	1.14%	1.20%	1.27%	1.34%	0.55%	0.54%	0.54%	0.53%
Qw, cfs	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
H SD 99, cfs	0.021	0.031	0.038	0.044	0.049	0.053	0.057	0.060	0.042	0.035	0.031	0.028
H SD 03, cfs	0.002	0.003	0.003	0.003	0.003	0.003	0.003	0.004	0.002	0.001	0.001	0.001

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.28	0.28	0.28	cfs
Time pump on (pumping duration)	tpon	240	240	240	days
Perpendicular from well to stream	a	1375	1375	1375	ft
Well depth	d	500	500	500	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer saturated thickness	b	30	30	30	ft
Aquifer transmissivity	T	1500	1500	1500	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.01	0.01	ft/day
Aquitard saturated thickness	ba	15	15	15	ft
Aquitard thickness below stream	babs	5	5	5	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft
Streambed conductance (lambda)	sbc	0.040000	0.040000	0.040000	ft/day
Stream depletion factor	sdf	1.260417	1.260417	1.260417	days
Streambed factor	sbf	0.036667	0.036667	0.036667	
input #1 for Hunt's Q_4 function	t'	0.793388	0.793388	0.793388	
input #2 for Hunt's Q_4 function	K'	0.840278	0.840278	0.840278	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	0.036667	0.036667	0.036667	



Output for Stream Depletion, Scenerio 2 (s2):	Time pump on (pumping duration) = 240 days											
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	62.7%	73.1%	77.9%	80.8%	82.8%	84.3%	85.4%	86.4%	24.4%	14.7%	10.4%	8.0%
H SD 1999	4.8%	8.1%	10.7%	12.7%	14.5%	16.1%	17.5%	18.7%	15.1%	12.9%	11.3%	10.2%
H SD 2003	0.11%	0.13%	0.15%	0.17%	0.19%	0.21%	0.23%	0.25%	0.17%	0.17%	0.17%	0.18%
Qw, cfs	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275	0.275
H SD 99, cfs	0.013	0.022	0.029	0.035	0.040	0.044	0.048	0.052	0.042	0.035	0.031	0.028
H SD 03, cfs	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.28	0.28	0.28	cfs
Time pump on (pumping duration)	tpon	240	240	240	days
Perpendicular from well to stream	a	4610	4610	4610	ft
Well depth	d	500	500	500	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer saturated thickness	b	30	30	30	ft
Aquifer transmissivity	T	1500	1500	1500	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.01	0.01	ft/day
Aquitard saturated thickness	ba	15	15	15	ft
Aquitard thickness below stream	babs	5	5	5	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft
Streambed conductance (lambda)	sbc	0.040000	0.040000	0.040000	ft/day
Stream depletion factor	sdf	14.168067	14.168067	14.168067	days
Streambed factor	sbf	0.122933	0.122933	0.122933	
input #1 for Hunt's Q_4 function	t'	0.070581	0.070581	0.070581	
input #2 for Hunt's Q_4 function	K'	9.445378	9.445378	9.445378	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	0.122933	0.122933	0.122933	