

WATER RESOURCES DEPARTMENT

MEMO

April 18, 2016

TO: Application G- 18197

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 April 18, 2016
 FROM: Groundwater Section Aurora C Bouchier
Reviewer's Name
 SUBJECT: Application G- 18197 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: Steve Skinner County: Clackamas

A1. Applicant(s) seek(s) 0.056 cfs (25 gpm) from 1 well(s) in the Willamette Basin,
Molalla-Pudding subbasin

A2. Proposed use Nursery (0.5 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	CLAC 12922	1	Alluvium	0.056	4S/1E-5 NE-SW	2160' N, 920' W fr S ¼ corner S 5
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	101	40	31	1/25/1979	87	0-19	0-80		67-87	25	19	?

Use data from application for proposed wells.

A4. **Comments:** I am not exactly sure what the requested rate is. The application lists 5.6 (no units) but then in the table in Section 3 that the well specific rate of 5.6 is scratched out and 25 is handwritten. I believe they are requesting 25 gpm, which comes to 0.056 cfs, which is the rate this review is based upon. They are requesting year-round nursery use of 0.5 acres, so I believe they would be limited to 0.5 acres * 1/40 cfs /acre = 0.0125 cfs (6 gpm).

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 well is not within ¼ mile of the nearest surface water source, so pertinent basin 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 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 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 hydrograph below).

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	70-80	73-98	2700	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Pudding River	70-80	~70-80	6440	<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"/>

Basis for aquifer hydraulic connection evaluation: The well likely produces 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: 69796: Molalla R> Willamette R- At Mouth. Pumping from this well will likely produce some water that would otherwise flow into WAB 69998: Pudding R> Molalla R- At Mouth

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"/>	IS 69796	100.00	<input type="checkbox"/>	134.00	<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"/>
		<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 0.4 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 1 ft/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
1	2	0.00 %	0.00 %	0.04 %	0.18 %	0.45 %	0.85 %	1.38 %	2.00 %	2.70 %	3.46 %	4.25 %	5.07 %
Well Q as CFS		0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056
Interference CFS		0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.002	0.003
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													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													

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 #: 69796 Time: 1:06 PM		MOLALLA R > WILLAMETTE R - AT MOUTH Basin: WILLAMETTE			Exceedance Level: 80 Date: 04/18/2016	
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 Time: 1:06 PM		MOLALLA R > WILLAMETTE R - AT MOUTH										Basin: WILLAMETTE Date: 04/18/2016	
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
I569796A	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

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

Watershed ID #: 69998
 Time: 1:05 PM
 PUDDING R > MOLALLA R - AT MOUTH
 Basin: WILLAMETTE
 Exceedance Level: 80
 Date: 04/18/2016

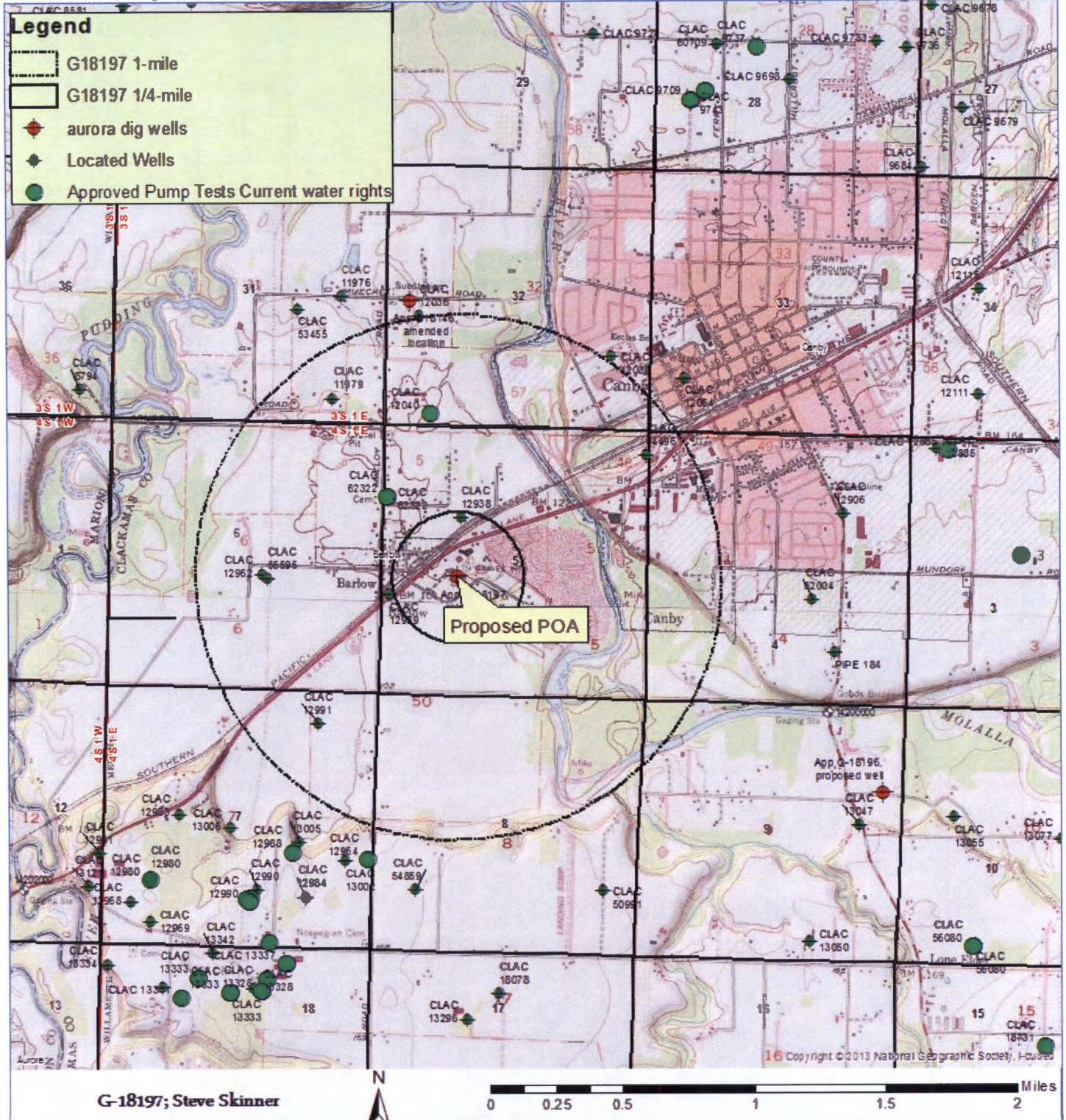
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	1,120.00	130.00	990.00	0.00	80.00	910.00
FEB	1,260.00	120.00	1,140.00	0.00	80.00	1,060.00
MAR	1,080.00	90.80	989.00	0.00	80.00	909.00
APR	834.00	64.30	770.00	0.00	80.00	690.00
MAY	448.00	60.30	388.00	0.00	80.00	308.00
JUN	231.00	82.50	148.00	0.00	60.00	88.50
JUL	111.00	127.00	-16.10	0.00	50.00	-66.10
AUG	71.60	105.00	-33.30	0.00	40.00	-73.30
SEP	67.90	61.40	6.48	0.00	40.00	-33.50
OCT	91.50	16.90	74.60	0.00	60.00	14.60
NOV	364.00	54.70	309.00	0.00	80.00	229.00
DEC	1,010.00	124.00	886.00	0.00	80.00	806.00
ANN	748,000	62,600	686,000	0	48,900	642,000

DETAILED REPORT OF INSTREAM REQUIREMENTS

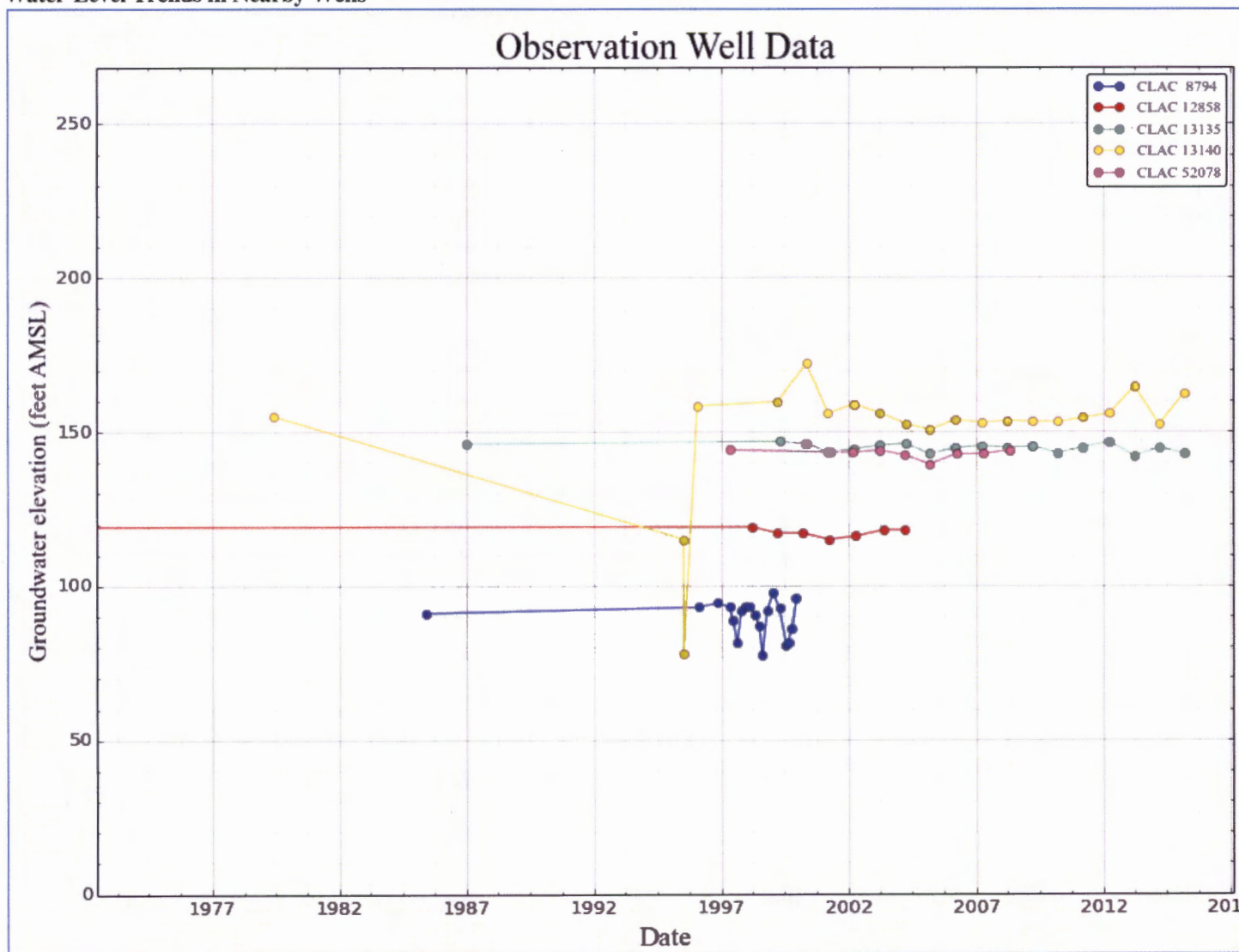
Watershed ID #: 69998
 Time: 1:06 PM
 PUDDING R > MOLALLA R - AT MOUTH
 Basin: WILLAMETTE
 Date: 04/18/2016

Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
IS69998A	CERTIFICATE	80.0	80.0	80.0	80.0	80.0	60.0	50.0	40.0	40.0	60.0	80.00	80.0
IS73532A	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
MAXIMUM		80.0	80.0	80.0	80.0	80.0	60.0	50.0	40.0	40.0	60.0	80.0	80.0

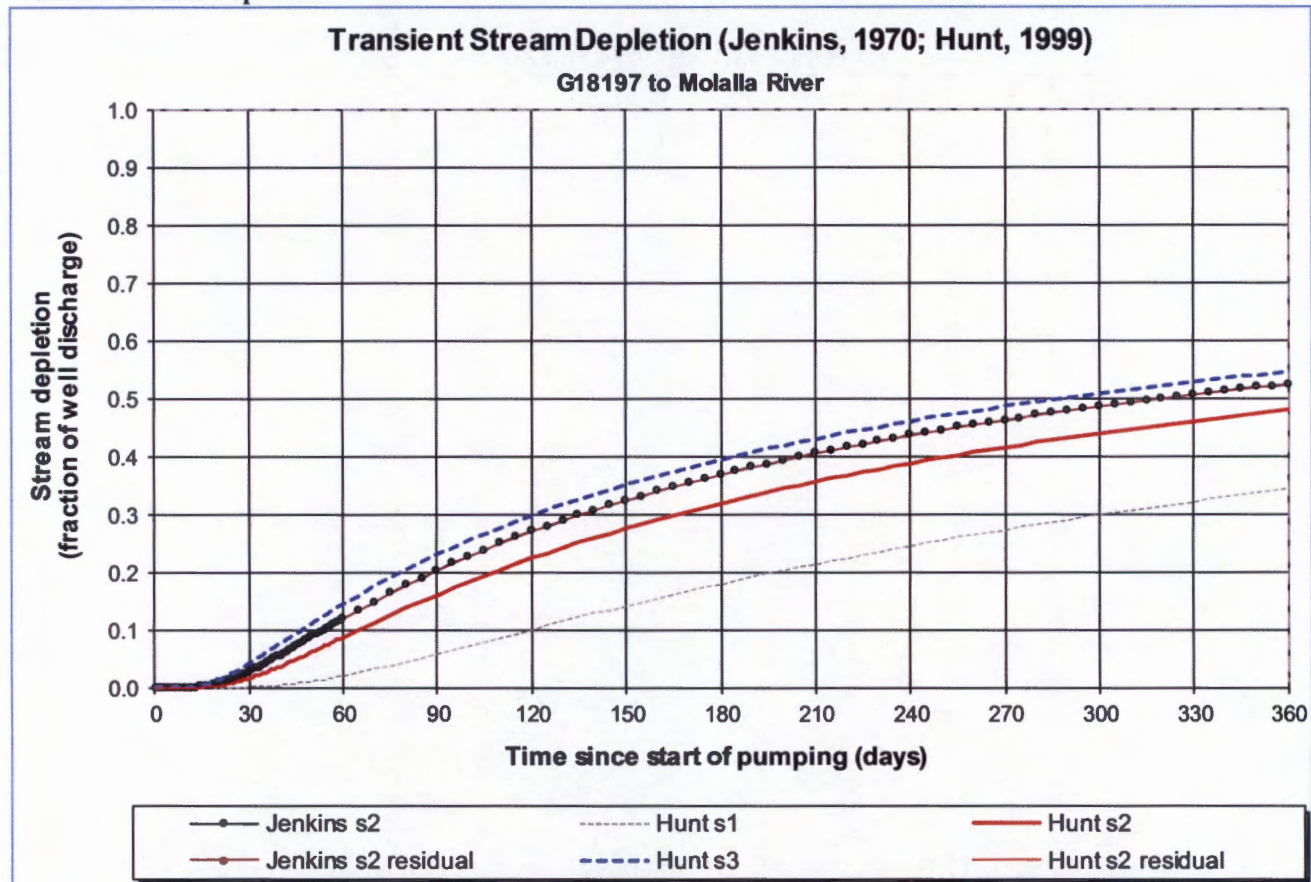
Well Location Map



Water-Level Trends in Nearby Wells



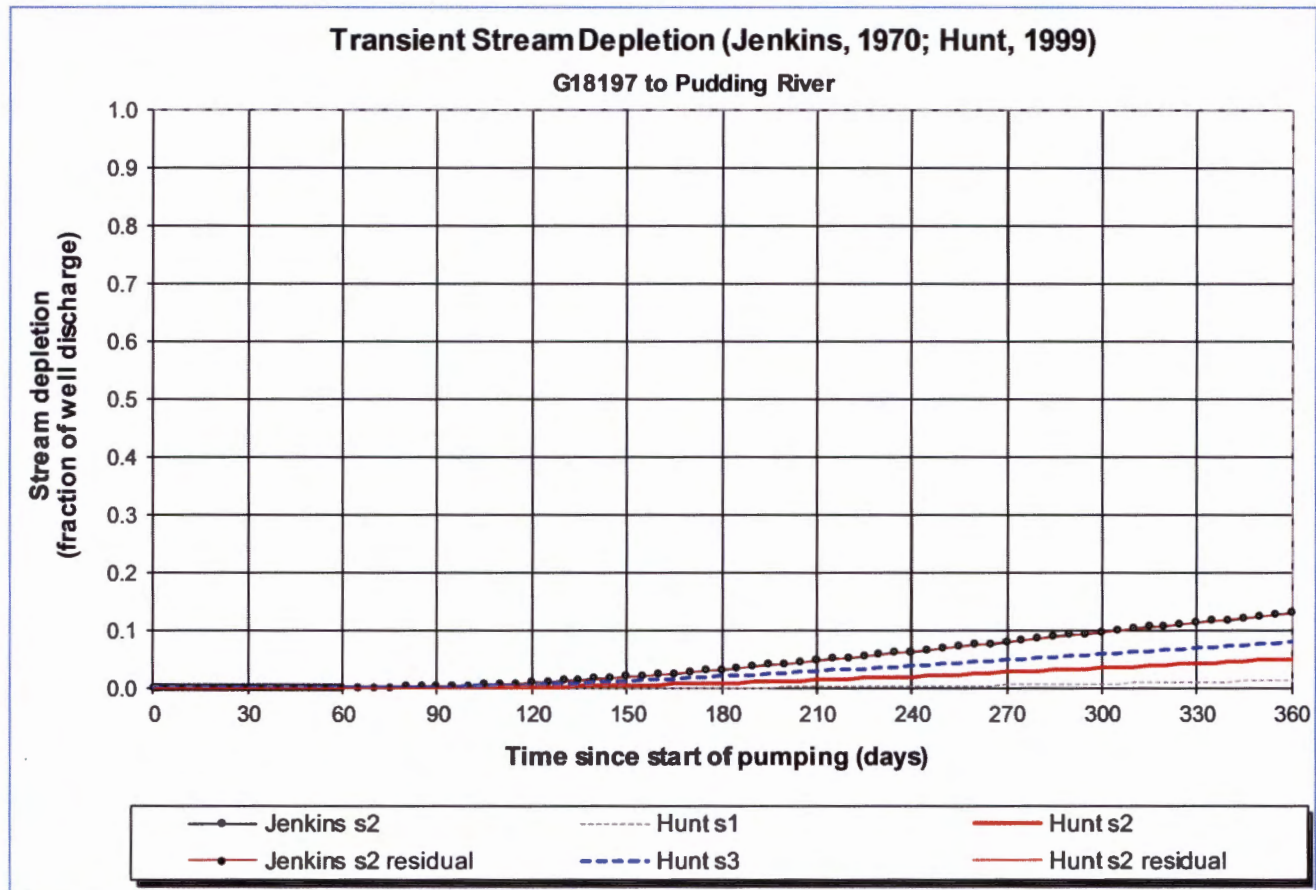
Transient Stream Depletion



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	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056
Jenk SD s2 %	2.75	11.90	20.31	27.03	32.42	36.81	40.47	43.57	46.24	48.57	50.62	52.45
Jen SD s2 cfs	0.002	0.007	0.011	0.015	0.018	0.021	0.023	0.024	0.026	0.027	0.028	0.029
Hunt SD s2 %	1.66	8.73	16.11	22.40	27.61	31.97	35.66	38.83	41.58	44.00	46.14	48.06
Hunt SD s2 cfs	0.001	0.005	0.009	0.013	0.015	0.018	0.020	0.022	0.023	0.025	0.026	0.027

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.056	0.056	0.056	cfs
Distance to stream	a	2700	2700	2700	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	583.2	291.6	194.4	days
Streambed factor (Hunt)	sbf	36	18	12	



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	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056
Jenk SD s2 %	0.00	0.02	0.24	0.86	1.87	3.18	4.69	6.30	7.96	9.64	11.29	12.90
Jen SD s2 cfs	0.000	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.004	0.005	0.006	0.007
Hunt SD s2 %	0.00	0.00	0.04	0.18	0.45	0.85	1.38	2.00	2.70	3.46	4.25	5.07
Hunt SD s2 cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.002	0.003

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.056	0.056	0.056	cfs
Distance to stream	a	6440	6440	6440	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	0.1	0.1	0.1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	3.333333333	3.333333333	3.333333333	ft/day
Stream depletion factor (Jenkins)	sdf	3317.888	1658.944	1105.962667	days
Streambed factor (Hunt)	sbf	8.586666667	4.293333333	2.862222222	