WATER RESOURCES DEPARTMENT

MEMO Mar 22 ,2016

TO: **Application G-** 18246

FROM: **GW:** M. Thoma
(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 Illinois 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
0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date **March 21, 2016**

FROM: Groundwater Section **Michael J Thoma**
Reviewer's Name

SUBJECT: Application G- **18246** 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: **Gina LoPreste** County: **Josephine**

A1. Applicant(s) seek(s) **0.033** cfs from **1** well(s) in the **Rogue** Basin, **Illinois River** subbasin

A2. Proposed use **Nursery (1.93 ac)** 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	JOSE 59710	1	Alluvium	0.03	40S/08W-04 SWSE	2154'S, 1501'W of E qtr cor S4
2						
3						

* 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	1420	100	20	1/15/2016	120	0-18	+2-98			18		

Use data from application for proposed wells.

A4. **Comments:** The applicant's proposed POA is an existing well. All information in table A3 is from the application and well log

A5. ☒ **Provisions of the** Rogue (OAR 690-515) 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: Rogue Basin Rules do not specifically identify groundwater use but rules may be pertinent if a finding of PSI is made.

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) **Medium 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's proposed POA would be producing from alluvial valley-fill deposits within the upper Illinois River Valley. These deposits are over 100 ft thick in the center of the valley but thin toward the margins. The applicant's well log (JOSE 59710) lists clay and gravel to the full depth of 120 ft. OWRD has SWL data from a nearby well (JOSE 56240) which shows stable SWL trends over the past several years which is typical of other SWL observations in the Illinois Valley.

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 of Illinois Valley**	☒	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: The applicant's well log and other well logs in the area report SWL several feet above 'first water' and many list "clay" or "clay and gravel" in the driller's geologic log.

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**	**W. Fk Illinois River**	**1400**	**1320-1360**	**4470**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: GW elevation higher than SW elevation suggests that groundwater is flowing toward and discharging to surface water

Water Availability Basin the well(s) are located within: W Fk Illinois R > Illinois R – At Mouth (ID# 70997)

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**	☐	☐	**IS70997**	**20.7**	☐	**16.8**	☐	**<< 25%**	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

Comments: Interference @ 30 d was estimated using the Hunt (2003) stream-depletion model – results are shown below.

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:

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													
(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:** The applicant's proposed POA would be producing from a confined to semi-confined alluvial aquifer in the Illinois River Valley. This aquifer / aquifer system has been determined to be hydraulically connected to surface water with the nearest surface water source being the W. Fork Illinois River (Logan Cut is a man-made mining ditch and not a natural surface water source). Estimated levels of interference where found not to rise to the threshold of PSI per OAR 690-009.

References Used:

Contreras, T. A. 2005. *Using Magnetotellurics to Characterize Aquifers in the Illinois Valley, Southwest Oregon*. MS Thesis, University of Oregon.

Hunt, B. 2003. *Unsteady Stream Depletion when Pumping from a Semiconfined Aquifer*. Journal of Hydrologic Engineering. Vol 8(1), pp 12-19

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

W FK ILLINOIS R > ILLINOIS R - AT MOUTH
ROGUE BASIN

Water Availability as of 3/22/2016

Watershed ID #: 70997 (Map) Exceedance Level: 80%

Date: 3/22/2016 Time: 7:27 AM

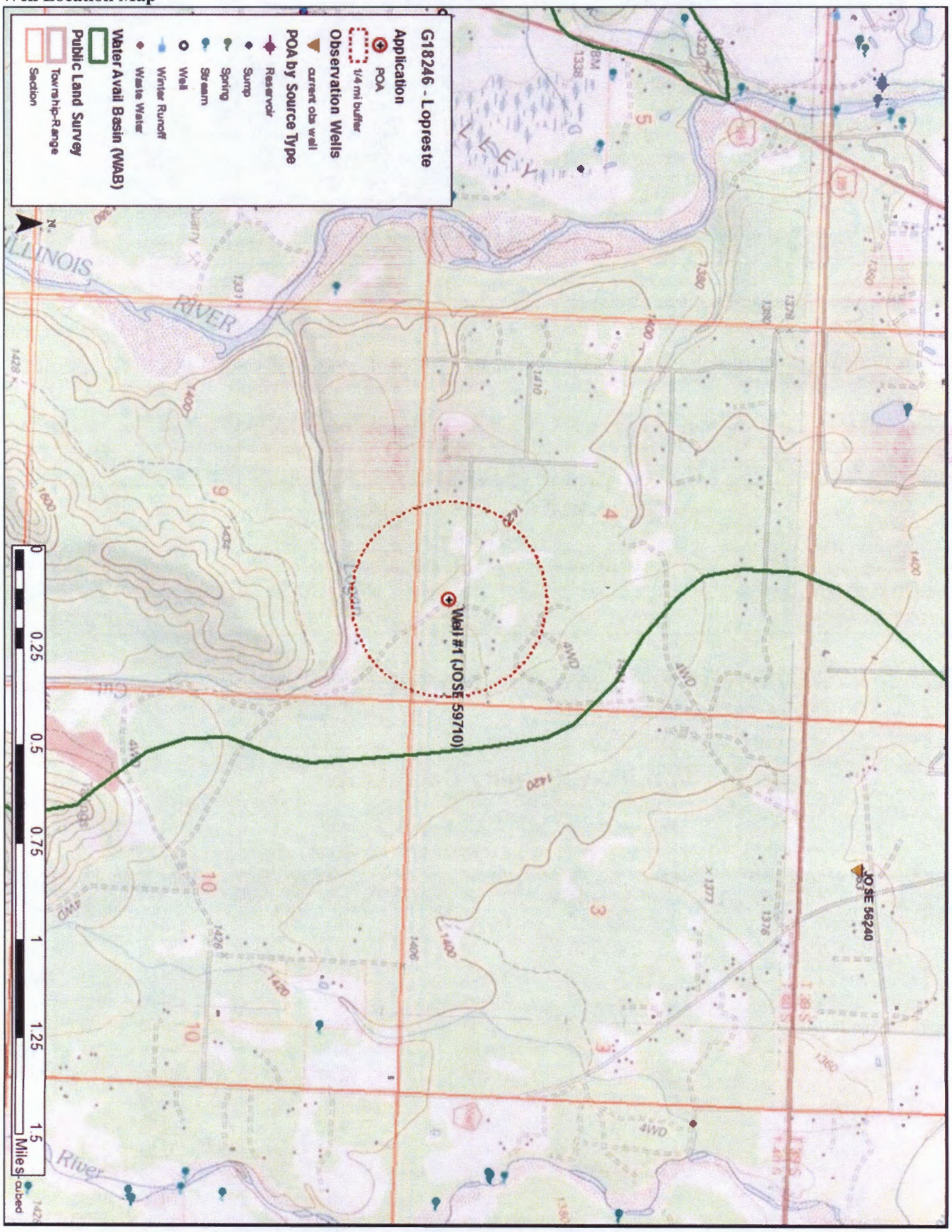
Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations | Water Rights | Watershed Characteristics

Water Availability Calculation

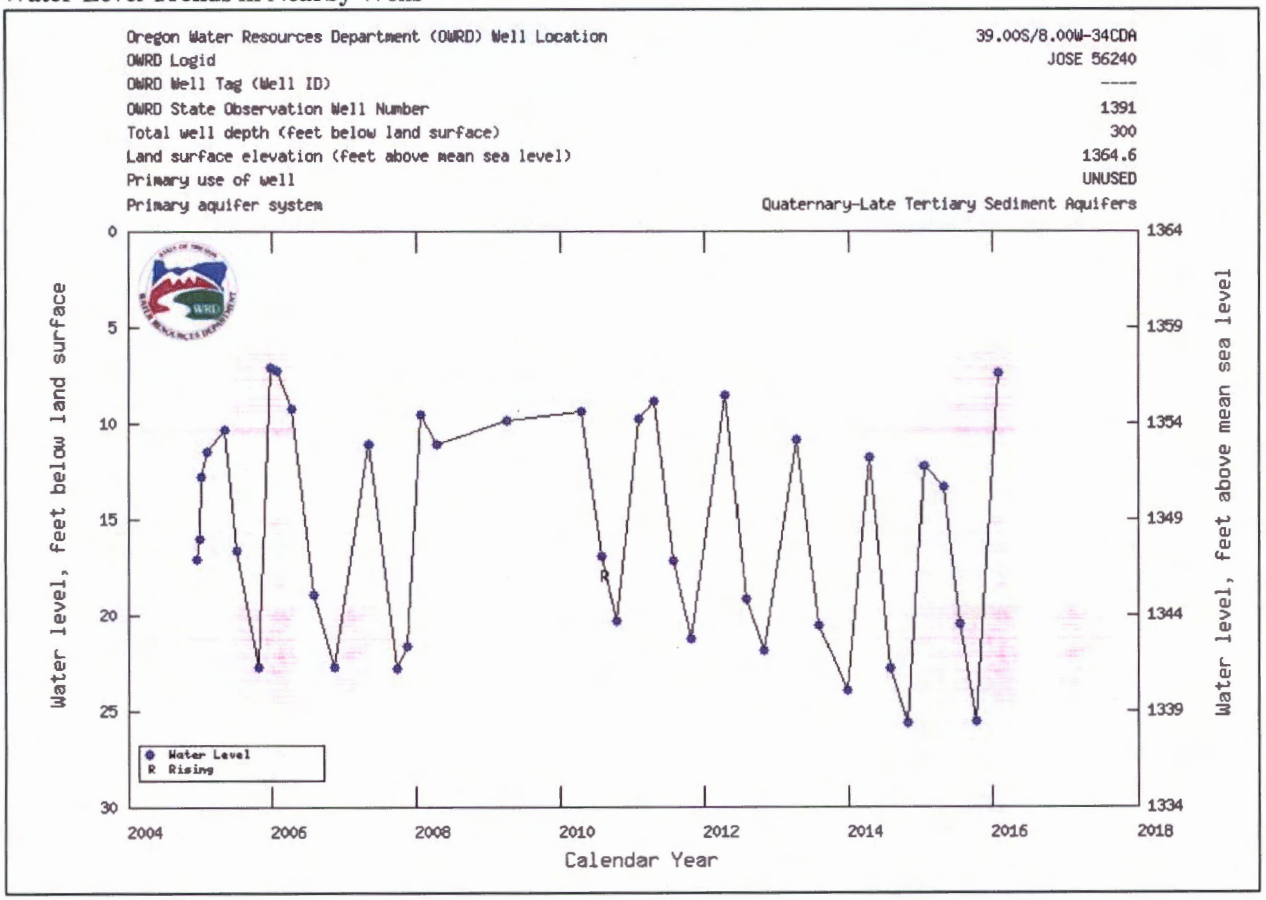
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	235.00	0.79	234.00	0.00	170.00	64.20
FEB	352.00	0.81	351.00	0.00	170.00	181.00
MAR	357.00	0.81	356.00	0.00	170.00	186.00
APR	221.00	1.60	219.00	0.00	170.00	49.40
MAY	118.00	2.16	116.00	0.00	149.00	-33.20
JUN	57.30	2.79	54.50	0.00	89.40	-34.90
JUL	28.10	3.53	24.60	0.00	37.00	-12.40
AUG	17.70	3.02	14.70	0.00	26.10	-11.40
SEP	16.80	2.19	14.60	0.00	80.00	-65.40
OCT	20.10	1.13	19.00	0.00	125.00	-106.00
NOV	67.80	0.67	67.10	0.00	170.00	-103.00
DEC	227.00	0.76	226.00	0.00	170.00	56.20
ANN	218,000.00	1,230.00	216,000.00	0.00	91,900.00	134,000.00

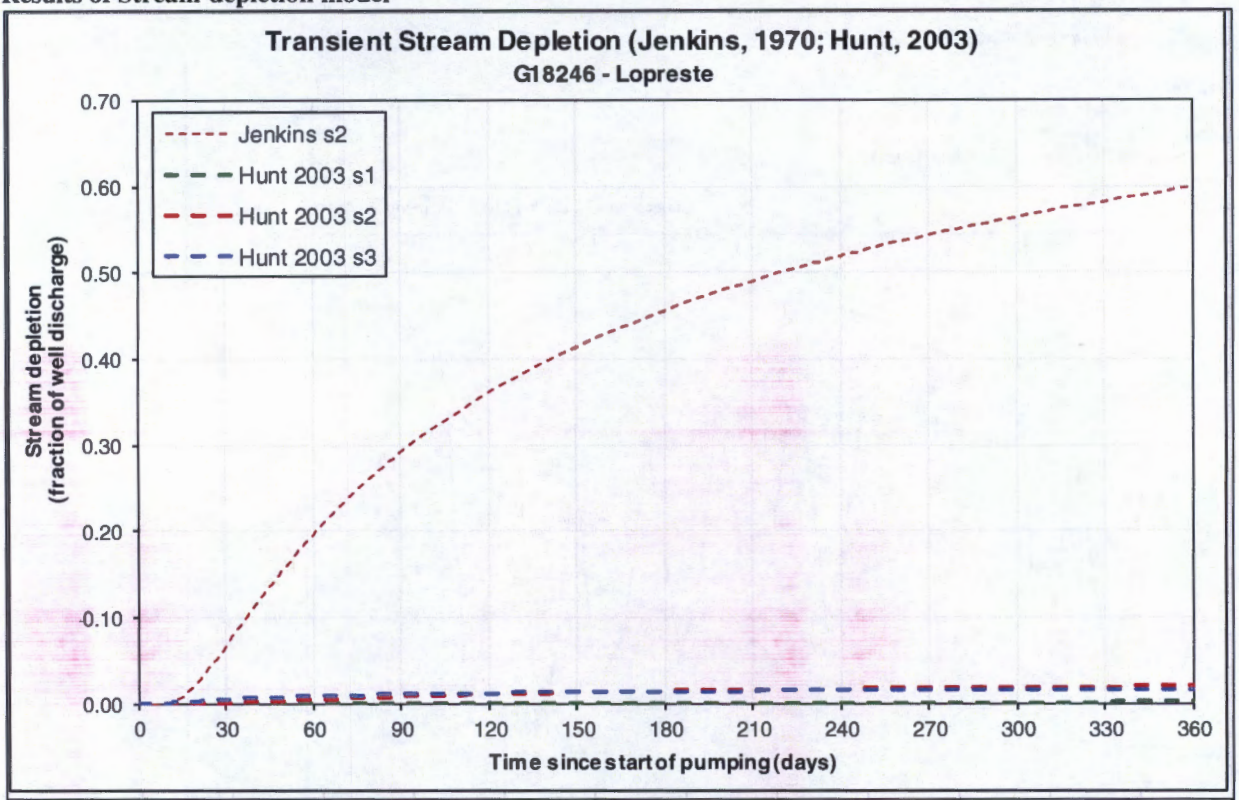
Well Location Map



Water-Level Trends in Nearby Wells



Results of Stream-depletion model



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 365 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	6.8%	19.7%	29.2%	36.2%	41.4%	45.6%	49.0%	51.9%	54.3%	56.4%	58.2%	59.8%
H SD 1999	0.2%	0.8%	1.5%	2.3%	3.0%	3.7%	4.4%	5.0%	5.6%	6.2%	6.7%	7.2%
H SD 2003	**0.13%**	0.52%	0.88%	1.16%	1.37%	1.53%	1.66%	1.76%	1.85%	1.92%	1.99%	2.05%
Qw, cfs	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030	0.030
H SD 99, cfs	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002
H SD 03, cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.03	0.03	0.03	cfs
Time pump on (pumping duration)	tpon	365	365	365	days
Perpendicular from well to stream	a	4470	4470	4470	ft
Well depth	d	100	100	100	ft
Aquifer hydraulic conductivity	K	1	10	100	ft/day
Aquifer saturated thickness	b	100	100	100	ft
Aquifer transmissivity	T	100	1000	10000	ft*ft/day
Aquifer storativity or specific yield	S	0.01	0.01	0.01	
Aquitard vertical hydraulic conductivity	Kva	0.001	0.001	0.001	ft/day
Aquitard saturated thickness	ba	10	10	10	ft
Aquitard thickness below stream	babs	2	2	2	ft
Aquitard porosity	n	0.12	0.12	0.12	
Stream width	ws	100	100	100	ft
Streambed conductance (lambda)	sbc	5.00E-02	5.00E-02	5.00E-02	ft/day
Stream depletion factor	sdf	2.00E+03	2.00E+02	2.00E+01	days
Streambed factor	sbf	2.24E+00	2.24E-01	2.24E-02	
input #1 for Hunt's Q_4 function	t'	5.00E-04	5.00E-03	5.00E-02	
input #2 for Hunt's Q_4 function	K'	2.00E+01	2.00E+00	2.00E-01	
input #3 for Hunt's Q_4 function	epsilon'	8.33E-02	8.33E-02	8.33E-02	
input #4 for Hunt's Q_4 function	lamda'	2.24E+00	2.24E-01	2.24E-02	