

MEMO

March 8, 2016

TO: Application G- 18237

FROM: GW: Ken Woody
(Reviewer's Name)

☒ YES☐ NO

☒ YES

☐ NO

☐ 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.**

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.

[illegible]

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 03/08/2016

FROM: Groundwater Section Jen Woody
Reviewer's Name

SUBJECT: Application G- 18237 Supersedes review of n/a 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: Conor Carey/Carey, Niklas,cDarnell, LLC
County: Josephine

A1. Applicant(s) seek(s) 0.125 cfs from 1 well(s) in the Rogue Basin,
Illinois River subbasin

A2. Proposed use nursery 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 13055		Alluvium	0.125	T40S/R8W-14 SE ¼ NE ¼	1650' S, 850' W fr NE 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	1462	139	28	6/24/1987	160	0-30	0-150	N/A	130-150	40		AIR

Use data from application for proposed wells.

A4. **Comments:** _____

A5. ☐ **Provisions of the** _____ **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) 7J, Medium Water Use Reporting condition;
 - 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 Illinois Valley is characterized by sand, gravel and clay sediments up to approximately 600 feet thick. Groundwater is increasingly confined and saline with depth. Water level data from other alluvial wells in the Illinois Valley alluvium show stability at the current level of use (see observation well data). Water levels fluctuate seasonally approximately five feet.

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	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: The alluvium is increasingly confined with depth. Aquifer tests conducted in the Illinois Valley upper alluvial aquifer (less than 150 feet deep) by OWRD in 2001 produced storativity values ranging from 0.0004 to 0.0046, which are typical of confined 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	East Fork Illinois River	1434	1435	3300	☒	☐	☐	☐	☒
1	2	Althouse Slough	1434	1435	3230	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Groundwater is coincident with surface water within a mile of the applicant's well, indicating hydraulic connection. Over 100 feet of clay overlie the water-bearing sand and gravel, which will act as a resistor that prevents efficient hydraulic connection.

Water Availability Basin the well(s) are located within: Watershed ID #: 69810 ALTHOUSE CR > E FK ILLINOIS R - AT MOUTH; Watershed ID #: 70980 E FK ILLINOIS R > ILLINOIS 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	2	☐	☐			☐	6.22	☒	<<25%	☐
1	1	☐	☐	IS70980	51.40	☐	41.50	☐	<<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: PSI is triggered by the proposed pumping rate being > 1% of 80% natural flow in the E Fork Illinois River WAB.

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		%	%	%	%	%	%	%	%	%	%	%	%

Basis for impact evaluation:

This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.[illegible]

Version: 04/20/2015

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

Water Availability Analysis Detailed Reports

ALTHOUSE CR > E FK ILLINOIS R - AT MOUTH ROGUE BASIN

Water Availability as of 3/8/2016

Watershed ID #: 69810 ([Map](#))

Exceedance Level: 80%

Date: 3/8/2016

Time: 11:52 AM

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	43.50	0.19	43.30	0.00	85.00	-41.70
FEB	73.60	0.23	73.40	0.00	85.00	-11.60
MAR	95.90	0.23	95.70	0.00	85.00	10.70
APR	87.70	0.31	87.40	0.00	85.00	2.39
MAY	46.20	0.34	45.90	0.00	85.00	-39.10
JUN	21.90	0.42	21.50	0.00	50.00	-28.50
JUL	11.70	0.52	11.20	0.00	34.00	-22.80
AUG	7.51	0.45	7.06	0.00	34.00	-26.90
SEP	6.22	0.34	5.88	0.00	50.00	-44.10
OCT	6.83	0.20	6.63	0.00	50.00	-43.40
NOV	11.00	0.14	10.90	0.00	85.00	-74.10
DEC	31.90	0.14	31.80	0.00	85.00	-53.20
ANN	47,500.00	213.00	47,200.00	0.00	49,000.00	10,900.00

Water Availability Analysis Detailed Reports

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

Water Availability as of 3/8/2016

Watershed ID #: 70980 ([Map](#))

Exceedance Level: 80%

Date: 3/8/2016

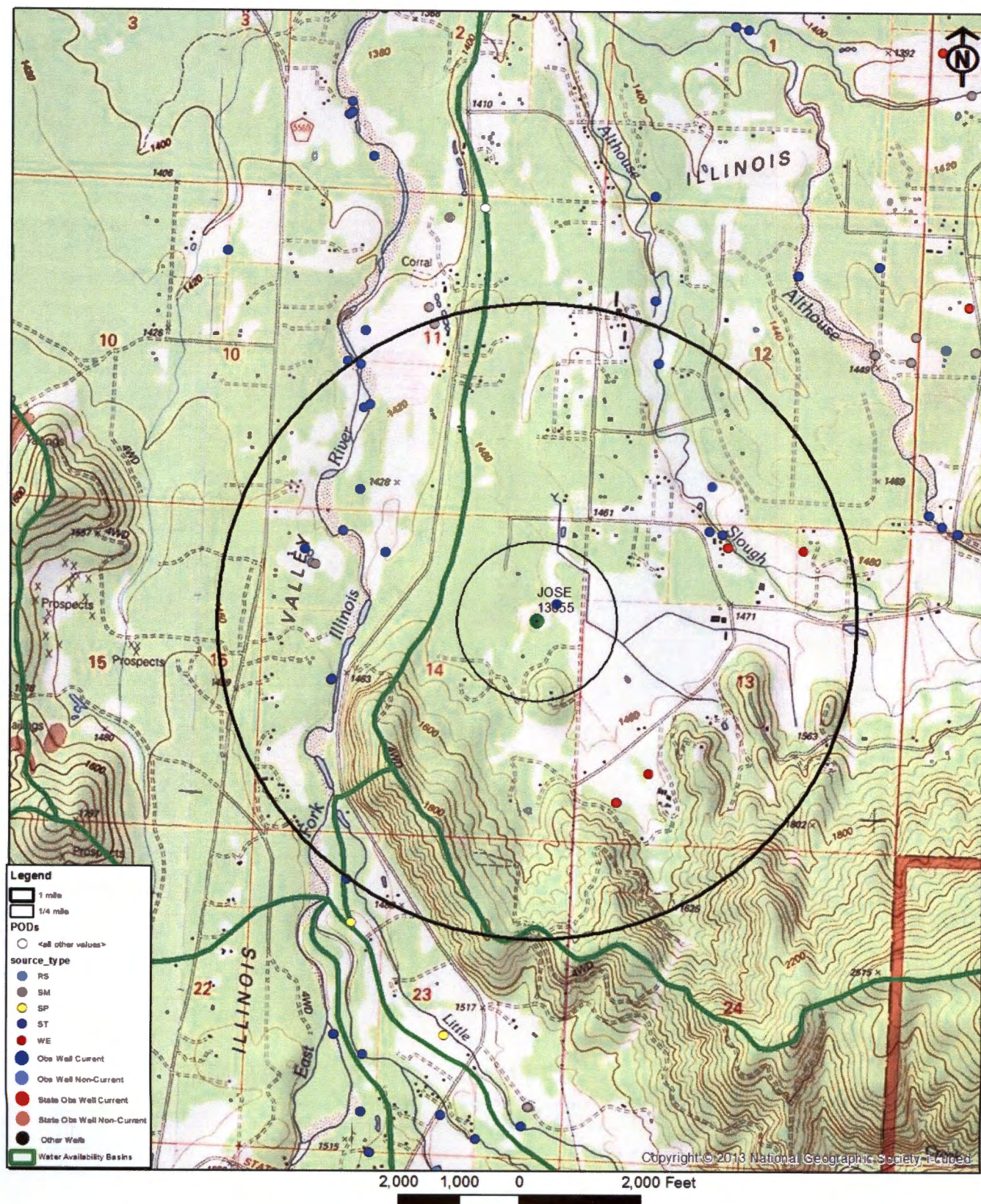
Time: 11:55 AM

Water Availability Calculation

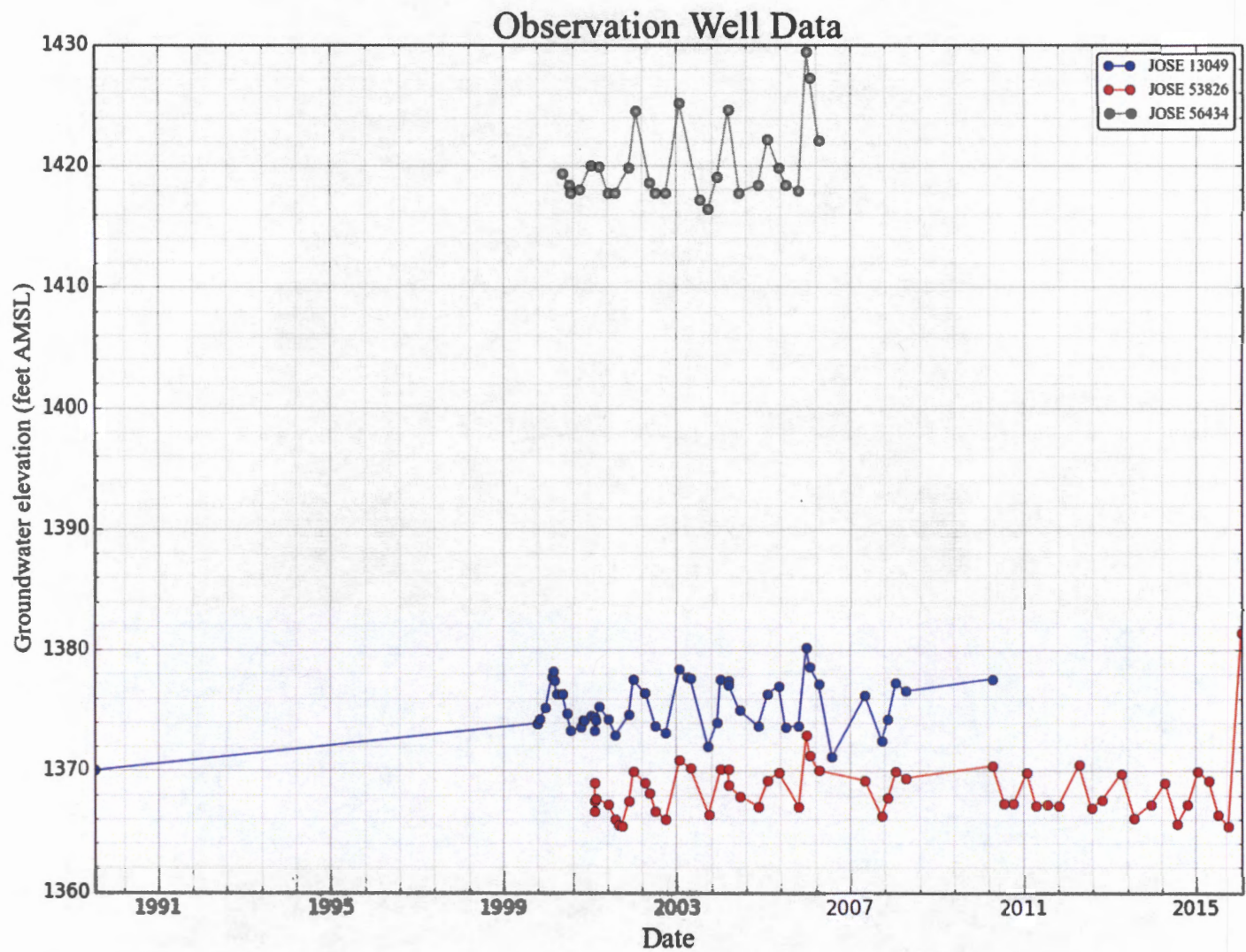
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	342.00	4.20	338.00	0.00	135.00	203.00
FEB	535.00	4.36	531.00	0.00	135.00	396.00
MAR	556.00	4.40	552.00	0.00	135.00	417.00
APR	498.00	8.94	489.00	0.00	135.00	354.00
MAY	317.00	11.70	305.00	0.00	135.00	170.00
JUN	139.00	14.80	124.00	0.00	80.00	44.20
JUL	66.30	18.60	47.70	0.00	60.00	-12.30
AUG	46.10	15.90	30.20	0.00	54.00	-23.80
SEP	41.50	11.60	29.90	0.00	70.00	-40.10
OCT	47.70	6.00	41.70	0.00	100.00	-58.30
NOV	102.00	3.51	98.50	0.00	135.00	-36.50
DEC	290.00	4.01	286.00	0.00	135.00	151.00
ANN	330,000.00	6,540.00	323,000.00	0.00	78,900.00	249,000.00

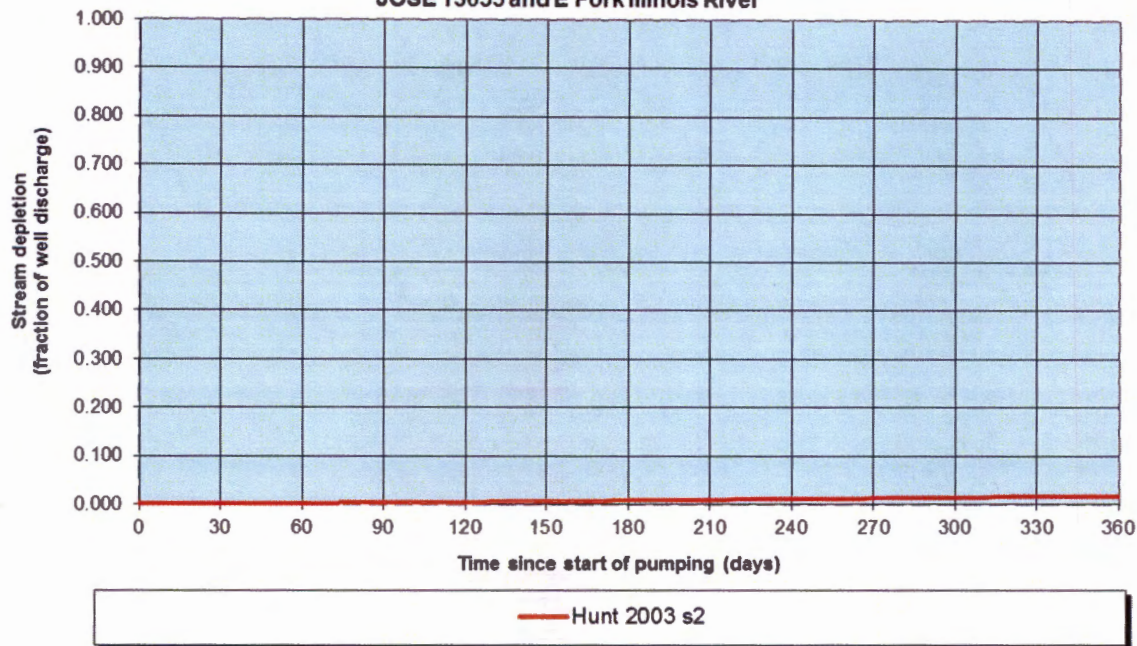
Well Location Map

G-18237 Carey
T40S/R8W- Section 14

Water-Level Trends in Nearby Wells



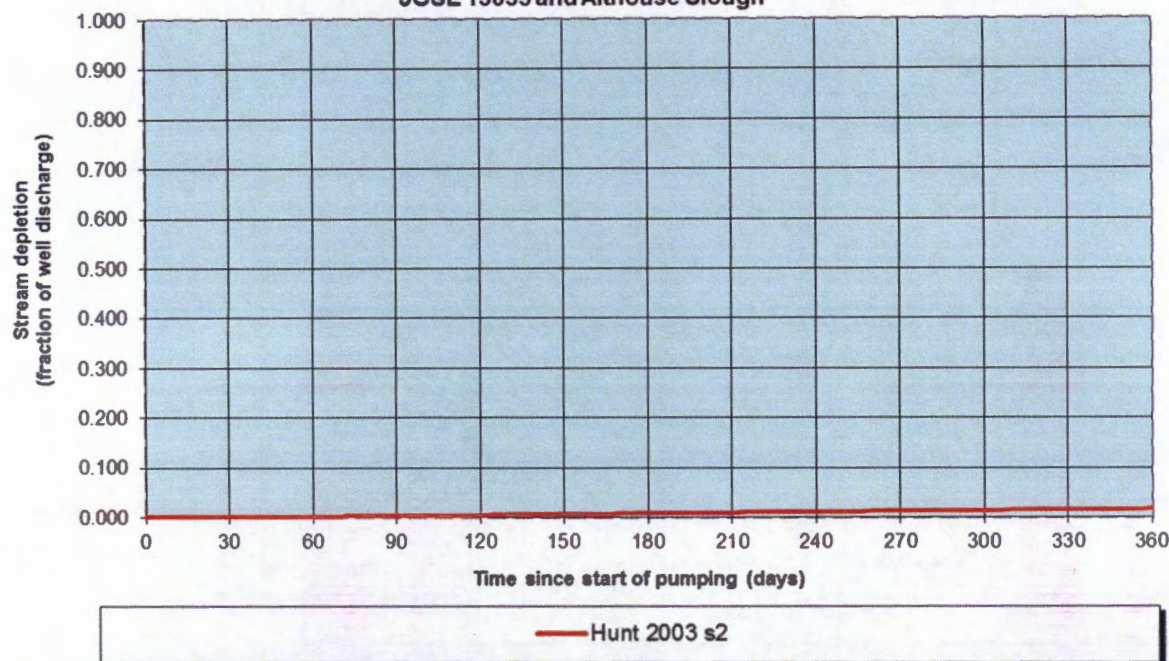
Transient Stream Depletion (Hunt, 2003)
JOSE 13055 and E Fork Illinois River



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	87.9%	91.4%	93.0%	93.9%	94.6%	95.1%	95.4%	95.7%	96.0%	96.2%	96.3%	96.5%
H SD 1999	16.8%	23.5%	28.1%	31.7%	34.6%	37.0%	39.1%	41.0%	42.6%	44.1%	45.5%	46.8%
H SD 2003	0.08%	0.19%	0.31%	0.46%	0.61%	0.76%	0.92%	1.07%	1.22%	1.37%	1.52%	1.67%
Qw, cfs	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
H SD 99, cfs	0.021	0.029	0.035	0.040	0.043	0.046	0.049	0.051	0.053	0.055	0.057	0.058
H SD 03, 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

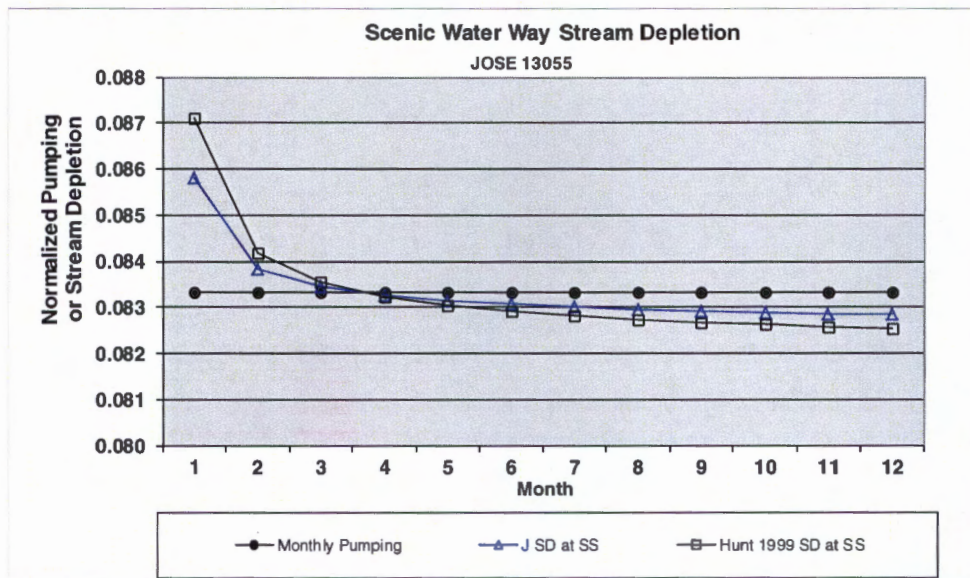
Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	56.10	56.10	56.10	gpm
Time pump on (pumping duration)	tpon	365	365	365	days
Perpendicular from well to stream	a	3300	3300	3300	ft
Well depth	d	160	160	160	ft
Aquifer hydraulic conductivity	K	48	55	50	ft/day
Aquifer saturated thickness	b	100	100	100	ft
Aquifer transmissivity	T	4800	5500	5000	ft ² /day
Aquifer storativity or specific yield	S	0.0028	0.0007	0.0005	
Aquitard vertical hydraulic conductivity	Kva	1	1	1	ft/day
Aquitard saturated thickness	ba	100	100	100	ft
Aquitard thickness below stream	babs	130	130	130	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft

Transient Stream Depletion (Hunt, 2003)
JOSE 13055 and Althouse Slough



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	88.2%	91.6%	93.2%	94.1%	94.7%	95.2%	95.5%	95.8%	96.0%	96.2%	96.4%	96.6%
H SD 1999	16.9%	23.6%	28.2%	31.7%	34.6%	37.1%	39.2%	41.0%	42.7%	44.2%	45.6%	46.8%
H SD 2003	0.09%	0.20%	0.33%	0.48%	0.63%	0.79%	0.95%	1.10%	1.26%	1.41%	1.57%	1.71%
Qw, cfs	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125	0.125
H SD 99, cfs	0.021	0.030	0.035	0.040	0.043	0.046	0.049	0.051	0.053	0.055	0.057	0.059
H SD 03, 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

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	56.10	56.10	56.10	gpm
Time pump on (pumping duration)	tpon	365	365	365	days
Perpendicular from well to stream	a	3230	3230	3230	ft
Well depth	d	160	160	160	ft
Aquifer hydraulic conductivity	K	48	55	50	ft/day
Aquifer saturated thickness	b	100	100	100	ft
Aquifer transmissivity	T	4800	5500	5000	ft*ft/day
Aquifer storativity or specific yield	S	0.0028	0.0007	0.0005	
Aquitard vertical hydraulic conductivity	Kva	1	1	1	ft/day
Aquitard saturated thickness	ba	100	100	100	ft
Aquitard thickness below stream	babs	130	130	130	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft



Region	28 Steady state stream depletion as a fraction of pumping normalized to crop water use consumption.												
Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Resid
Qw	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.00
J SD SS	0.086	0.084	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.000
H99 SD SS	0.087	0.084	0.084	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.000

<== Jenkins Stream Depletion at Steady State
<== Hunt 1999 Stream Depletion at Steady State

Parameters:	Values	Units
Maximum number of years pumped	ymax	25 years
Days pumped each month	tpoff	30.4375 days/month
Perpendicular from well to stream	a	3230 ft
Well depth	d	160 ft
Aquifer hydraulic conductivity	K	55 ft/day
Aquifer saturated thickness	b	100 ft
Aquifer transmissivity	T_ft	5,500 ft ² /day = K*b
Aquifer transmissivity	T_gal	41,140 gpd/ft = K*b
Aquifer storativity or specific yield	S	0.0007
Streambed conductivity (Hunt 1999)	Ks	1 ft/day
Streambed thickness, Hunt 1999	bs	3 ft
Stream width (Hunt 1999)	ws	20 ft
Streambed conductance (lambda)	sbc	6.6667 ft/day = Ks*ws/bs
Stream depletion factor	sdf	1.3278 days = (a ² *S)/(T)
Streambed factor	sbf	3.9152 = sbc*a/T