

# Groundwater Application Review Summary Form

Application # G- 19398

GW Reviewer Steve Ahlquist Date Review Completed: 4/16/2024

## Summary of GW Availability and Injury Review:

☒ Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

## Summary of Potential for Substantial Interference Review:

☒ There is the potential for substantial interference per Section C of the attached review form.

## Summary of Well Construction Assessment:

☐ The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

*This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).*

## WATER RESOURCES DEPARTMENT

### MEMO

April 16, 2024

TO: Application G- 19398

FROM: GW: Steve Ahlquist  
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

- ☒ **YES** The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries
- ☐ **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 Rogue 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 4/16/2024  
 FROM: Groundwater Section Steve Ahlquist  
 Reviewer's Name  
 SUBJECT: Application G- 19398 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: Sanh Di Ton and Hoa Kim Ton County: Jackson

A1. Applicant(s) seek(s) 0.84 cfs from 4 well(s) in the Rogue Basin,  
Middle Rogue subbasin

A2. Proposed use Nursery (65.5 ac, 164 af) Seasonality: Year-round

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

POA 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	JACK 56114	1	Bedrock	0.84	T36S/R1W-27 SE NW	3635' N, 1460' E fr SW cor S 27
2	Proposed	2	Bedrock	0.84	T36S/R1W-27 SE NW	3635' N, 2000' E from SW cor S 27
3	Proposed	3	Bedrock	0.84	T36S/R1W-27 SE NW	2765' N, 2000' E from SW cor S 27
4	Proposed	4	Bedrock	0.84	T36S/R1W-27 NE SW	2350' N, 2000' E from SW cor S 27

\* Alluvium, CRB, Bedrock

POA Well	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Drawdown (ft)	Test Type
1	160	0 - 20	+1 - 45	0 - 160	120 - 160	20	160	Air
2	200	0 - 20	+1 - 45	0 - 200	120 - 200	TBD	TBD	TBD
3	200	0 - 20	+1 - 45	0 - 200	120 - 200	TBD	TBD	TBD
4	200	0 - 20	+1 - 45	0 - 200	120 - 200	TBD	TBD	TBD

POA Well	Land Surface Elevation at Well (ft amsl)	Depth of First Water (ft bls)	SWL (ft bls)	SWL Date	Reference Level (ft bls)	Reference Level Date
1	1384	125	22	06/09/2003	TBD	TBD
2	1387	TBD	TBD	TBD	TBD	TBD
3	1386	TBD	TBD	TBD	TBD	TBD
4	1388	TBD	TBD	TBD	TBD	TBD

Use data from application for proposed wells.

A4. **Comments:** This application is for year-round irrigation/nursery use of 65.5 acres and 1 acre foot of storage in Jackson County, northwest of Medford, OR. Applicant proposes to obtain water from one existing well (JACK 56114) completed to a depth of 160 feet and three proposed wells to be completed to 200 feet deep to provide a total maximum instantaneous flow rate of 375 gpm (0.84 cfs) and total annual volume of 164 acre-feet.  
There are discrepancies between the metes-and-bounds location descriptions and the latitude and longitude coordinates (GPS locations) provided for each proposed POA in the application map. This review assumes the proposed POAs are located at the provided latitude and longitude coordinates.

A5. ☐ **Provisions of the** Rogue 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 Rogue Basin Program rules (OAR 690-515) does not contain such provisions.

- 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) 7RLN (annual measurements); 7j; large 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 proposed POAs would produce water from the fractured-rock aquifer of the Colestin formation (Western Cascades Volcanics; Wiley, 1993). Water in this aquifer system is transmitted via secondary porosity in interconnected fractures. The OWRD well report database contains records for 15 water wells near the proposed POAs (Sec. 27, T36S R1W). According to the well reports, the median and maximum yields are 22 and 40 gpm, respectively (see attached Well Statistics). The requested rate of 375 gpm (0.84 cfs) is much higher than reported well yields in the area. **It is unlikely that the four proposed POAs will achieve the requested rate so the proposed use is found to not likely be available within the capacity of the groundwater resource.**

There are several residential properties on adjacent tax lots that are likely supplied by exempt use groundwater wells. The closest residences with potential wells are located approximately 225 feet west of proposed POA 1 and approximately 240 northeast of proposed POA 2. Theis (1935) drawdown analyses were conducted to assess potential well-to-well interference at the potential nearby domestic wells due to pumping at the proposed POAs. Permits issued for nearby POAs contain the standard condition requiring curtailment of pumping when interference with a neighboring well exceeds 25 feet of drawdown; any permit pursuant to this application would be conditioned similarly. Therefore, the potential for interference to nearby wells was evaluated based on the likelihood of well-to-well interference exceeding 25 feet due to pumping at the proposed POAs. Hydraulic parameters used in the Theis analyses are within the typical range of values for the hydrogeologic

regime (Freeze and Cherry, 1979). The applicant did not indicate well-specific rates and annual volumes for the proposed POAs so each well was evaluated individually at the maximum requested rate (0.84 cfs/375 gpm) until reaching the requested annual volume of 164 acre-feet, which would take approximately 99 days. Results of the Theis analyses indicate drawdown at the adjacent residential properties would exceed 25 feet as a result of pumping at the maximum requested rate at any of the POAs. **Due to the expected well-to-well interference, the proposed use is found to not likely be available within the capacity of the groundwater resource.** If the pumping rate was reduced to 0.22 cfs (annual volume [164 sf] spread over 365 days), drawdown would still exceed 25 feet at the neighboring properties as a result of pumping at proposed POA 1 and POA 2. A pumping rate of 0.22 cfs at POA 3 and POA 4 would likely not result in well-to-well interference greater than 25 feet at neighboring properties.

### 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	Fractured Bedrock of Colestin Formation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Fractured Bedrock of Colestin Formation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Fractured Bedrock of Colestin Formation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	Fractured Bedrock of Colestin Formation	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Basis for aquifer confinement evaluation:** Water in this fractured bedrock aquifer system is primarily transmitted through interconnected fractures that generally extend near the surface and is therefore under atmospheric pressure/unconfined conditions.

#### 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	Whetstone Creek	1362	1343	4875	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Whetstone Creek	1362	1343	5420	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Whetstone Creek	1362	1343	5375	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	1	Whetstone Creek	1362	1343	5490	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Dry Creek	1362	1358	7430	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Dry Creek	1362	1358	7100	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2	Dry Creek	1362	1359	7845	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	2	Dry Creek	1362	1360	8025	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Basis for aquifer hydraulic connection evaluation:** Groundwater elevations in proposed POA 1 and nearby wells are similar and above surface water elevations indicating that groundwater is flowing towards and discharging to nearby streams. The unnamed tributary to Whetstone Creek that flows through Hoover Ponds County Park is reportedly intermittent and does not appear to receive groundwater baseflow.

#### Water Availability Basin the well(s) are located within:

SW#1: ROGUE R > PACIFIC OCEAN-AB CURRY AB CURRY G AT GAGE 14359000 (WID #270)

SW#2: ANTELOPE CR > LITTLE BUTTE CR - AT MOUTH (WID #248)

- 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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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"/>	NA	NA	<input type="checkbox"/>	1130	<input type="checkbox"/>	>25	<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"/>

- 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"/>

**Comments:** Impact to Whetstone Creek from the proposed use was estimated using the Hunt (1999) stream depletion model using hydrogeologic parameters representative of bulk aquifer properties (see attached Hunt Model Stream Depletion Analysis).

- 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
4	2	3 %	18 %	33 %	42 %	49 %	53 %	57 %	60 %	62 %	64 %	65 %	67 %
Well Q as CFS		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Interference CFS		0.00	0.04	0.07	0.09	0.11	0.12	0.13	0.13	0.14	0.14	0.15	0.15
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		0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Interference CFS		0.00	0.04	0.07	0.09	0.11	0.12	0.13	0.13	0.14	0.14	0.15	0.15
(A) = Total Interf.		0.00	0.04	0.07	0.09	0.11	0.12	0.13	0.13	0.14	0.14	0.15	0.15
(B) = 80 % Nat. Q		17.50	29.00	31.70	34.70	11.70	6.62	5.74	5.92	3.31	1.06	2.21	5.47
(C) = 1 % Nat. Q		0.175	0.29	0.317	0.347	0.117	0.0662	0.0574	0.0592	0.0331	0.0106	0.0221	0.0547
(D) = (A) > (C)		✓	✓	✓	✓	✓	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
(E) = (A / B) x 100		0.0 %	0.1 %	0.2 %	0.3 %	0.9 %	1.8 %	2.3 %	2.2 %	4.2 %	13 %	6.8 %	2.7 %

(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:** Impacts to Dry Creek were estimated using the Hunt (1999) stream depletion model with bulk aquifer parameters representative of the local geology. Dry Creek is located within the most limited WAB (Antelope Creek) in the vicinity. The table above shows the stream depletion for Dry Creek due to pumping at the farthest proposed POA (Well 4). The pumping rate of 0.22 cfs assumes that the requested annual volume (164 af) is evenly distributed over the period of use (365 days/year). Modeled interference exceeds 1% of the 80% exceedance streamflow for Dry Creek from June through December. Stream interference is expected to be greater at the other proposed wells which are closer to Dry Creek. The estimated impacts on Dry Creek result in a finding of PSI per OAR 690-009.

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:** Results of the stream depletion (Hunt 1999) modeling indicate the proposed use would result in greater than 25% stream depletion at Whetstone Creek within 30 days of pumping and therefore is found to have the potential for substantial interference (PSI). Reducing the pumping rate would not change the PSI finding for Whetstone Creek. Additionally, stream depletion of Dry Creek would exceed 1% of the 80% exceedance natural streamflow from June through December. **The proposed use is found to have PSI with Whetstone Creek and Dry Creek per OAR 690-009.**

The OWRD Water Availability Reporting System (WARS) has determined that groundwater use has measurably reduced the surface water flows necessary to maintain the free-flowing character of the Rogue Scenic Waterway as per ORS 390.835. The proposed groundwater use would further reduce surface water flow to the Rogue Scenic Waterway.

**References Used:** \_\_\_\_\_

Application File: G-19398

Freeze, R.A. and Cherry, J.A., 1979, Groundwater, Prentice Hall, Englewood Cliffs, New Jersey, 604 p.

Hunt, B. 1999. Unsteady Stream Depletion from Ground Water Pumping. Journal of Hydrologic Engineering, Vol 8(1), pp12-19

Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

Wiley, T.J., and Smith, J.G., 1993, Preliminary geologic map of the Medford East, Medford West, Eagle Point, and Sams Valley quadrangles, Jackson County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report 93-13, scale 1:24,000.

**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:** \_\_\_\_\_

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D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

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**Water Availability Tables**

ROGUE R > PACIFIC OCEAN - AB CURRY G AT GAGE 14359000  
 ROGUE BASIN

Water Availability as of 3/20/2024

Watershed ID #: 270 ([Map](#))

Exceedance Level: 80% ▼

Date: 3/20/2024

Time: 3:48 PM

**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	2,180.00	1,130.00	1,050.00	0.00	1,200.00	-149.00
FEB	2,710.00	2,050.00	663.00	0.00	1,200.00	-537.00
MAR	2,750.00	1,820.00	932.00	0.00	1,200.00	-268.00
APR	2,810.00	1,040.00	1,770.00	0.00	1,200.00	573.00
MAY	2,750.00	368.00	2,380.00	0.00	1,200.00	1,180.00
JUN	1,760.00	344.00	1,420.00	0.00	1,200.00	216.00
JUL	1,330.00	369.00	961.00	0.00	1,200.00	-239.00
AUG	1,160.00	331.00	829.00	0.00	1,200.00	-371.00
SEP	1,130.00	276.00	854.00	0.00	1,200.00	-346.00
OCT	1,160.00	228.00	932.00	0.00	1,200.00	-268.00
NOV	1,370.00	345.00	1,020.00	0.00	1,200.00	-175.00
DEC	1,810.00	563.00	1,250.00	0.00	1,200.00	47.30
ANN	1,900,000.00	529,000.00	1,370,000.00	0.00	869,000.00	532,000.00

ANTELOPE CR > LITTLE BUTTE CR - AT MOUTH  
 ROGUE BASIN

Water Availability as of 3/20/2024

Watershed ID #: 248 ([Map](#))

Exceedance Level: 80% ▼

Date: 3/20/2024

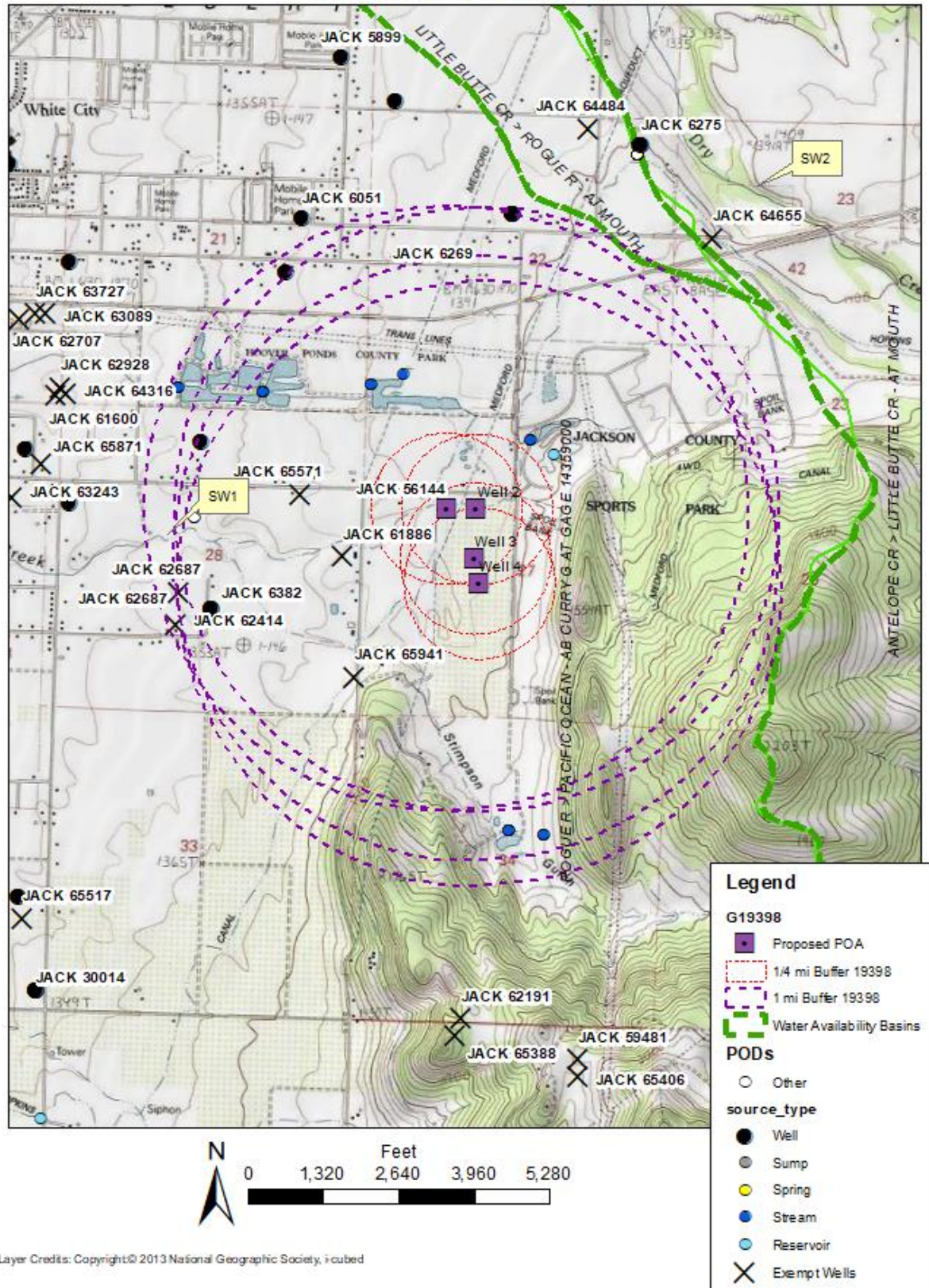
Time: 3:55 PM

**Water Availability Calculation**

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

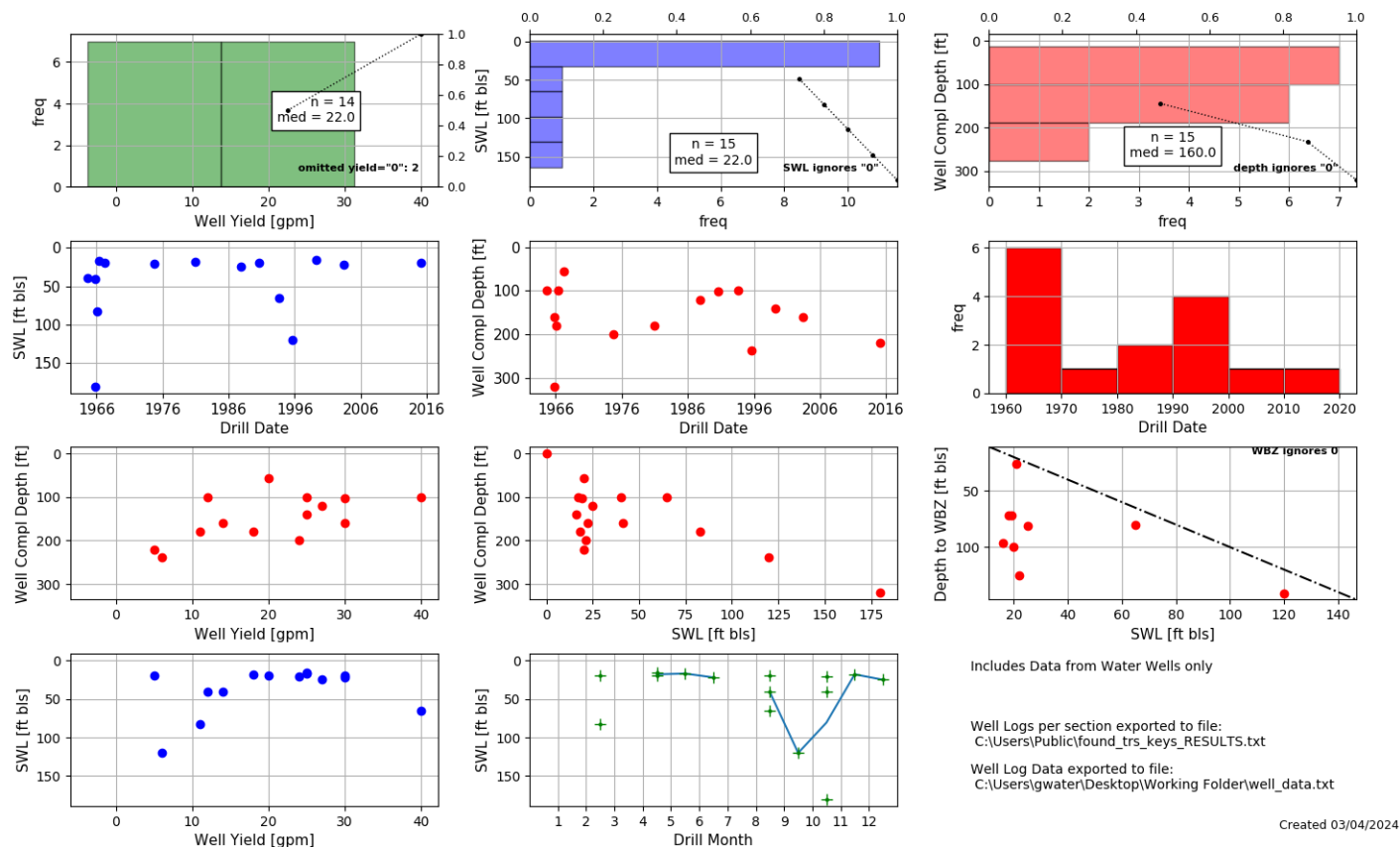
Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	17.50	4.93	12.60	0.00	50.10	-37.50
FEB	29.00	6.19	22.80	0.00	60.00	-37.20
MAR	31.70	5.92	25.80	0.00	60.00	-34.20
APR	34.70	0.66	34.00	0.00	57.80	-23.80
MAY	11.70	1.36	10.30	0.00	28.00	-17.70
JUN	6.62	2.12	4.51	0.00	8.71	-4.20
JUL	5.74	3.00	2.74	0.00	5.70	-2.96
AUG	5.92	2.44	3.48	0.00	5.00	-1.52
SEP	3.31	1.54	1.77	0.00	20.00	-18.20
OCT	1.06	0.24	0.83	0.00	20.00	-19.20
NOV	2.21	0.51	1.70	0.00	25.00	-23.30
DEC	5.47	3.08	2.39	0.00	31.30	-28.90
ANN	19,100.00	1,920.00	17,100.00	0.00	22,300.00	0.00

## Well Location Map

**Application G19398 Sanh Di Ton and Hoa Kim Ton  
T36S, R1W, Section 27**

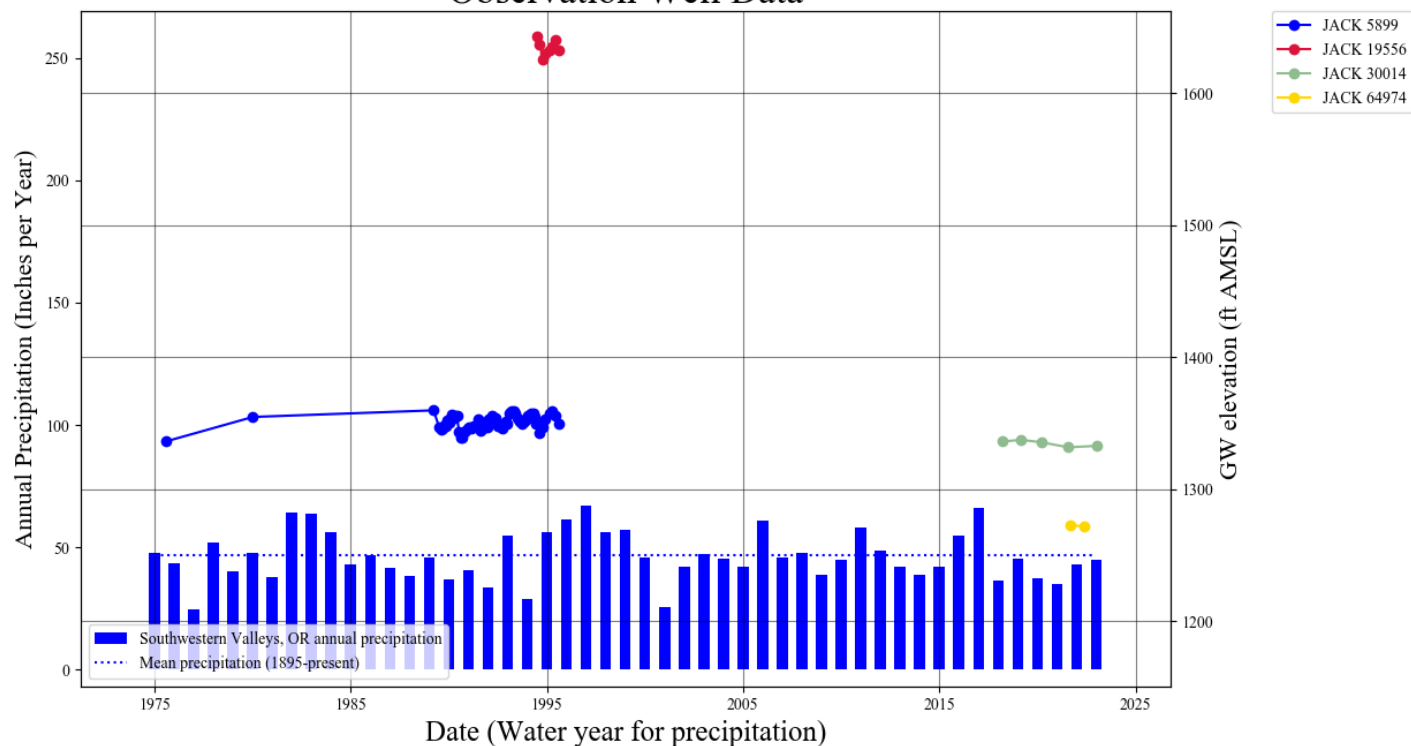
Service Layer Credits: Copyright© 2013 National Geographic Society, i-cubed

## Well Statistics



## Water-Level Measurements in Nearby Wells

## Observation Well Data





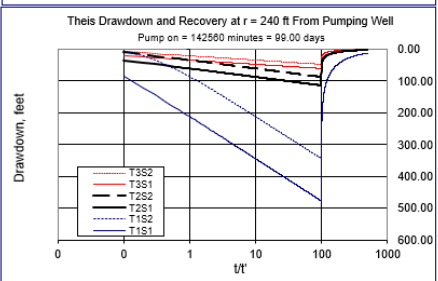
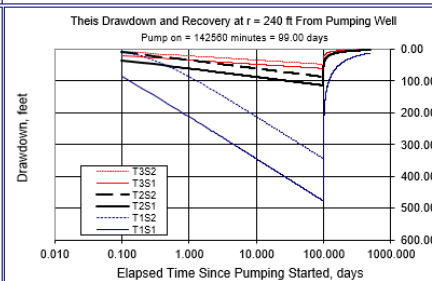
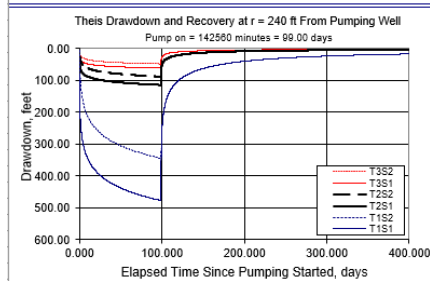
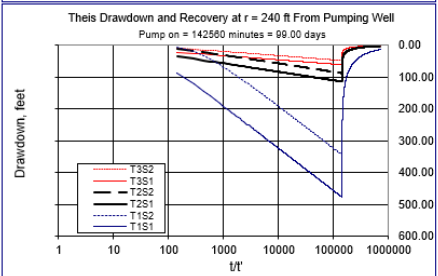
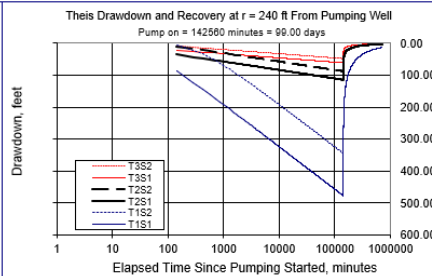
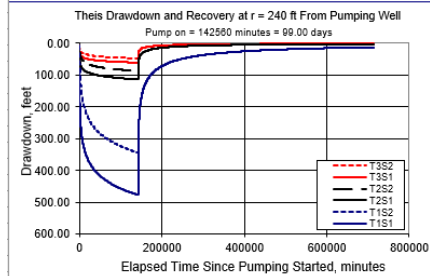
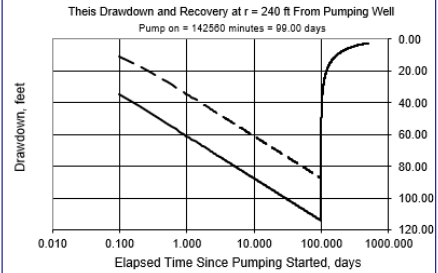
## Theis Interference Analysis

**Theis Time-Drawdown Worksheet** v.5.00  
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance,  $r$ , from a pumping well for 3 different  $T$  values and radial distance,  $r$ , from a pumping well for 3 different  $T$  values and 2 different  $S$  values.  
Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units
Total pumping time	$t$		99		d
Radial distance from pumped well:	$r$		240		ft
Pumping rate	$Q$		0.84		cfs
Hydraulic conductivity	$K$	1	5	10	ft/day
Aquifer thickness	$b$		100		ft
Storativity	$S_1$		0.0001		
	$S_2$		0.001		
Transmissivity Conversions	$T_{ft2pd}$	100	500	1000	ft <sup>2</sup> /day
	$T_{ft2pm}$	0.069444	0.347222	0.694444	ft <sup>2</sup> /min
	$T_{gdpdft}$	748	3740	7480	gpd/ft

Recalculate

Use the Recalculate button if recalculation is set to manual

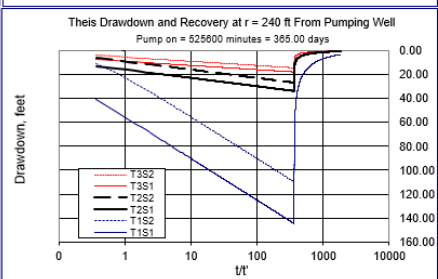
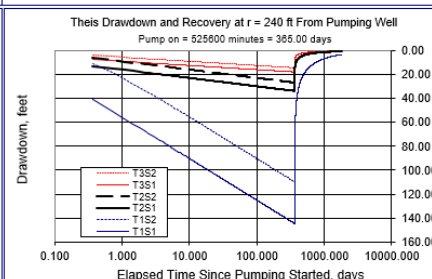
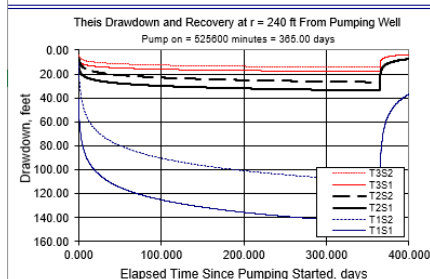
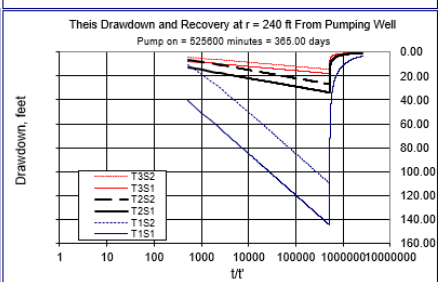
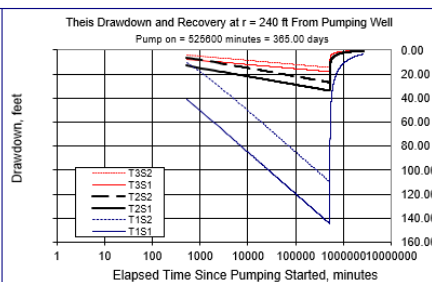
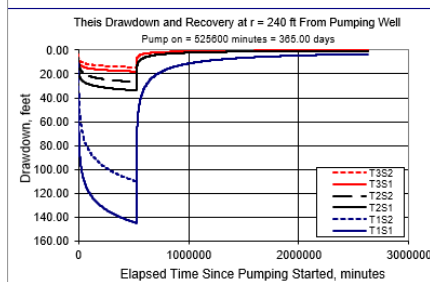
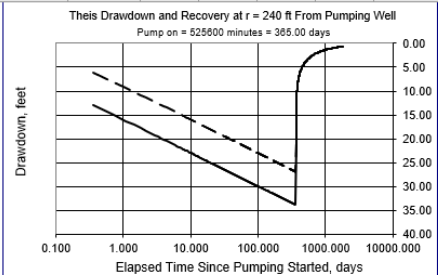


**Theis Time-Drawdown Worksheet** v.5.00  
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance,  $r$ , from a pumping well for 3 different  $T$  values and radial distance,  $r$ , from a pumping well for 3 different  $T$  values and 2 different  $S$  values.  
Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units
Total pumping time	$t$		365		d
Radial distance from pumped well:	$r$		240		ft
Pumping rate	$Q$		0.22		cfs
Hydraulic conductivity	$K$	1	5	10	ft/day
Aquifer thickness	$b$		100		ft
Storativity	$S_1$		0.0001		
	$S_2$		0.001		
Transmissivity Conversions	$T_{ft2pd}$	100	500	1000	ft <sup>2</sup> /day
	$T_{ft2pm}$	0.069444	0.347222	0.694444	ft <sup>2</sup> /min
	$T_{gdpdft}$	748	3740	7480	gpd/ft

Recalculate

Use the Recalculate button if recalculation is set to manual



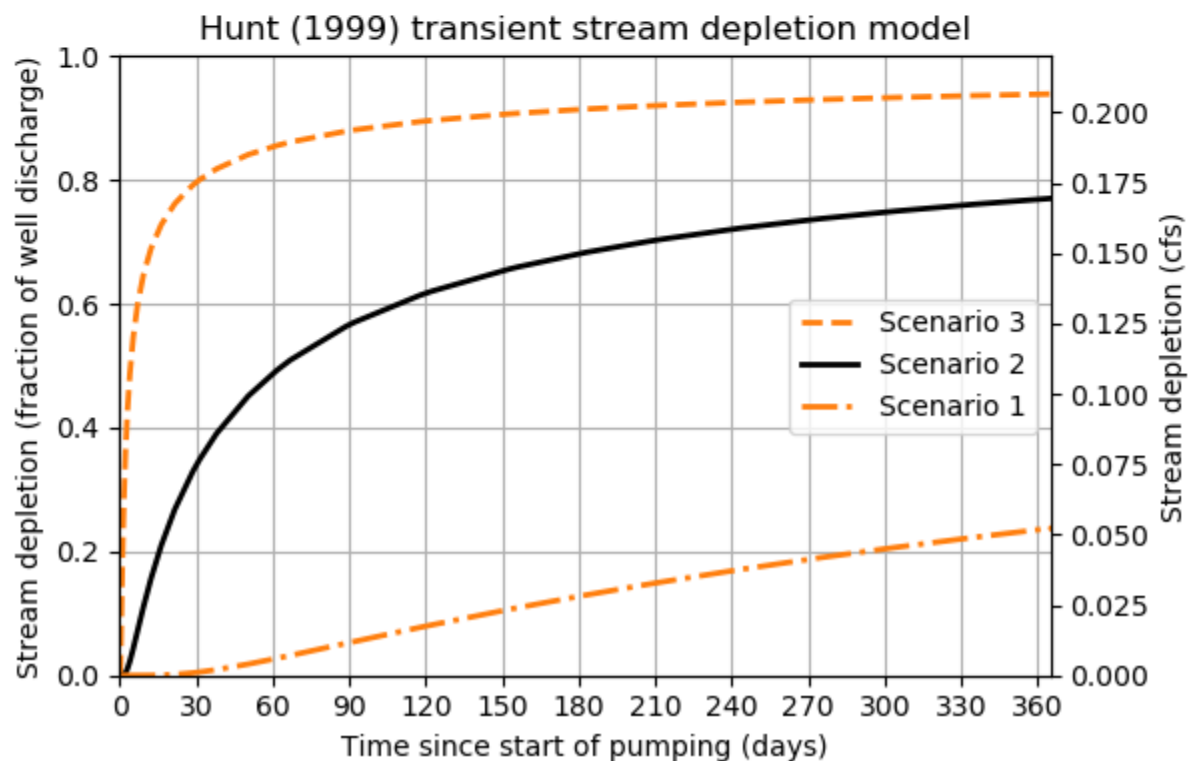
**Stream Depletion (Hunt) Model Analysis**

Application type:	G
Application number:	19398
Well number:	1
Stream Number:	1
Pumping rate (cfs):	0.22
Pumping duration (days):	365
Pumping start month number (3=March)	1

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	4900	4900	4900	ft
Aquifer transmissivity	T	100	500	1000	ft <sup>2</sup> /day
Aquifer storativity	S	.001	.0005	.0001	-
Aquitard vertical hydraulic conductivity	Kva	0.01	0.05	0.1	ft/day
Not used		0	0	0	
Aquitard thickness below stream	babs	4	3	2	ft
Not used		0	0	0	
Stream width	ws	10	20	30	ft

Stream depletion for Scenario 2:

Days	1	31	62	92	122	153	183	213	244	274	304	335	365
Depletion (%)	0	35	49	57	62	66	68	70	72	74	75	76	77
Depletion (cfs)	0.00	0.08	0.11	0.13	0.14	0.14	0.15	0.16	0.16	0.16	0.16	0.17	0.17



Application type:	G
Application number:	19398
Well number:	4
Stream Number:	2
Pumping rate (cfs):	0.22
Pumping duration (days):	365
Pumping start month number (3=March)	1

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	8000	8000	8000	ft
Aquifer transmissivity	T	100	500	1000	ft <sup>2</sup> /day
Aquifer storativity	S	.001	.0005	.0001	-
Aquitard vertical hydraulic conductivity	Kva	0.01	0.05	0.1	ft/day
Not used		0	0	0	
Aquitard thickness below stream	babs	4.0	3.0	2.0	ft
Not used		0	0	0	
Stream width	ws	10	20	30	ft

Stream depletion for Scenario 2:

Days	1	31	62	92	122	153	183	213	244	274	304	335	365
Depletion (%)	0	19	34	43	49	53	57	60	62	64	66	67	68
Depletion (cfs)	0.00	0.04	0.07	0.09	0.11	0.12	0.13	0.13	0.14	0.14	0.14	0.15	0.15

Hunt (1999) transient stream depletion model

