

Approved:



MEMO

To: Kristopher Byrd, Well Construction and Compliance Section Manager
From: Travis Kelly, Well Construction Compliance Coordinator
Subject: Review of Water Right Application G-19156
Date: January 6, 2022

The attached application was forwarded to the Well Construction and Compliance Section by the Groundwater Section. Joe Kemper reviewed the application. Please see Joe's Groundwater Review.

Applicant's Well #1 (Proposed Well): Applicant's Well #1 is a proposed well, therefore it cannot be reviewed for construction. Construction of this proposed well shall be completed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240. During construction of this well, specific attention should be paid to ensure sealing requirements are met and that the well does not commingle aquifers.

The construction of applicant's proposed Well #1 may not satisfy hydraulic connection issues.

Applicant's Well #2 (Proposed Well): Applicant's Well #2 is a proposed well, therefore it cannot be reviewed for construction. Construction of this proposed well shall be completed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240. During construction of this well, specific attention should be paid to ensure sealing requirements are met and that the well does not commingle aquifers.

The construction of applicant's proposed Well #2 may not satisfy hydraulic connection issues.

Groundwater Application Review Summary Form

Application # G- 19156

GW Reviewer Joe Kemper Date Review Completed: 11/22/2021

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

November 22, 2021

TO: Application G- 19156

FROM: GW: Joe Kemper
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES The source of appropriation is hydraulically connected to a State Scenic
☒ NO Waterway or its tributaries

☐ YES
☒ NO Use the Scenic Waterway Condition (Condition 7J)

☐ 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 NA 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 11/22/2021
 FROM: Groundwater Section Joe Kemper
 Reviewer's Name
 SUBJECT: Application G- 19156 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: Kathleen and David Reed County: Coos

A1. Applicant(s) seek(s) 1.0 cfs from 2 well(s) in the South Coast Basin,
Coos Bay subbasin

A2. Proposed use Irrigation (80 acres) Seasonality: March 1 to 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	sediments	1.0	27S/14W-21	917'N, 528'W fr center S 21
2	Proposed	2	sediments	1.0		945'N, 1707' W fr center S 21
3						
4						

* 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	168	NA	10-20	NA	TBD	TBD	TBD	TBD	TBD	NA	NA	NA
2	182	NA	10-20	NA	TBD	TBD	TBD	TBD	TBD	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The applicant's wells are proposed and their construction is to be modeled after COOS 57430. It is assumed that they will be constructed to be open only the Pioneer Terrace and not the underlying Elkton Formation.

A5. ☒ **Provisions of the** South Coast (OAR 690-517) 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: South Coast basin rules contain no 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) _____;
 - 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 wells access an unconfined aquifer hosted in sands, gravels, silts, and clays of the Pioneer Terrace (Qmtp), which overlies the low permeability mudstone Sacchi Beach unit of the Elkton Formation (Tes) (Wiley et al, 2015). There are several OWRD observation wells approximately one mile to the west that access the aquifer hosted in terrace sediments. In general, these wells show seasonal fluctuations of approximately 10 feet with relatively stable water levels on a decadal time scale (see attached hydrograph). The stair-stepped marine terraces and local stream incision likely create steeper hydraulic gradients in specific locations. The available data indicates that the groundwater resource is not currently over appropriated.

The proposed use will likely cause well-to-well interference with adjacent senior groundwater users, the closest of which are likely are exempt-use wells on tax lot 701 and 1301. A Theis distance drawdown model estimates that the proposed use will likely cause more than 35 feet of seasonal drawdown at these wells, which would trigger the proposed 25-foot decline permit conditions. Thus, the proposed use will likely injure prior water users.

Median reported yield for wells in TRS 27S/14W-21 is 15 GPM and the maximum yield is 30. The requested rate is 1.0 cfs or 448.8 gpm between two wells, which is far higher than expected yields for the area. Thus, the requested use cannot be sustained by the target aquifer and is considered not within the capacity of the resource.

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	Sediments of Whiskey Run Terrace	☐	☒
2	Sediments of Whiskey Run Terrace	☐	☒

Basis for aquifer confinement evaluation: Water is stored and transmitted in the primary pore space of unconsolidated sediments deposited as an elevated marine terrace. SWLs in well logs are typically reported at the depth at which water is first encountered.

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	Twomile Creek	148-158	72	1210	☐	☐	☒	☒	☐
2	1	Twomile Creek	162-172	71	1650	☒	☐	☐	☐	☒
1	2	Unnamed trib to Twomile Ck	148-158	95	475	☐	☐	☒	☒	☐
2	2	Unnamed trib to Twomile Ck	162-172	95	1520	☒	☐	☐	☐	☒
1	3	Whisky Run	148-158	85	4675	☒	☐	☐	☐	☒
2	3	Whisky Run	162-172	85	3650	☒	☐	☐	☐	☒
1	4	Unnamed trib to Sevenmile Ck	148-158	75	4215	☒	☐	☐	☐	☒
2	4	Unnamed trib to Sevenmile Ck	162-172	75	5150	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Water level elevations in the target aquifer are higher than the streams that have incised into the sediments. This indicates that water is flowing towards and discharging to surface water. Surface water divides between Whisky Run, Twomile Creek, and Severn Creek do not likely act as groundwater divides. Rather, the target aquifer discharges water to all these streams, and groundwater pumpage from the aquifer overall will likely result in stream depletion to multiple streams.

Additionally, Well 1 accesses an unconfined aquifer within ¼ mile from Twomile Creek and its unnamed tributary, resulting in an assumption of hydraulic connection and the potential for substantial interference (PSI) as per OAR 690-009.

Water Availability Basin the well(s) are located within: TWOMILE CR > PACIFIC OCEAN - AT MOUTH; impacts are also considered to WHISKY RUN > PACIFIC OCEAN - 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 (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	☒	☐	IS72804	.30	☒	0.28	☒	>25	☒
2	1	☐	☐	IS72804	.30	☒	0.28	☒	>25	☒
1	2	☒	☐	NA	NA	☐	0.28	☒	>25	☒
2	2	☐	☐	NA	NA	☐	0.28	☒	>25	☒
1	3	☐	☐	IS72964	0.13	☒	0.10	☒	NA	☒
2	3	☐	☐	IS72964	0.13	☒	0.10	☒	NA	☒
1	4	☐	☐	NA	NA	☐	0.58	☒	NA	☒
2	4	☐	☐	NA	NA	☐	0.58	☒	NA	☒

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 #		Q _w > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Q _w > 1% ISWR?	80% Natural Flow (cfs)	Q _w > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: Interference with Twomile Creek and its unnamed tributary is estimated using the Jenkins (1968) model with bulk aquifer parameters representative of the underlying geology. Results for Well 2 and the unnamed tributary to Twomile Creek are shown below, and shorter well-to-stream distances are assumed to have greater stream depletion. Stream depletion model results for Whisky Run and the unnamed tributary to Sevenmile Ck are not considered for the table above because impacts from Well 1 and Well 2 would be focused on Twomile Creek so analytical model results for Whisky Run and the unnamed tributary to Sevenmile Creek would be overestimated.

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													
(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: Streams beyond 1 mile were not evaluated for PSI.

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:
- ☐ The permit should contain condition #(s) _____;
 - ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** The applicants' wells access an aquifer that is determined to be hydraulically connected to Twomile Creek, unnamed tributary to Twomile Creek, Whisky Run, and unnamed tributary to Sevenmile Creek). The proposed use is found to have the potential for substantial interference (PSI) for Well 1 and Well 2 as per OAR 690-009 by the following metrics:

- The proposed rate (1.0 cfs) is greater than 1% of Twomile WAB 80% exceedance flow (1% of .28 cfs or 0.0028 cfs).
- The proposed rate (1.0 cfs) is greater than 1% of Whisky Run WAB 80% exceedance flow (1% of .1 cfs or 0.001 cfs).
- The proposed rate (1.0 cfs) is greater than 1% of Sevenmile WAB 80% exceedance flow (1% of .58 cfs or 0.0058 cfs).
- The proposed rate is greater than 1% of the adopted instream water right (1% of 0.3 cfs or 0.003 cfs) for Twomile Creek.
- The proposed rate is greater than 1% of the adopted instream water right (1% of 0.13 cfs or 0.0013 cfs) for Whisky Run.
- Estimated stream depletion to Twomile Creek and its unnamed tributary is greater than 25% after 30 days of pumping.

Well 1 is found to have PSI because is located within ¼ mile of a hydraulically connected surface water source (Twomile Creek the unnamed tributary to Twomile Creek). **Reducing the requested rate will not change the finding of PSI for either wells.**

References Used:

Barlow, P.M., and Leake, S.A., 2012, Streamflow depletion by wells—Understanding and managing the effects of groundwater pumping on streamflow: U.S. Geological Survey Circular 1376, 84 p.

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

OWRD Groundwater Information System Database – Accessed 4/8/2021.

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., McClaughry, J.D., Niewendorp, C.N., Ma, L., Herinckx, H.H., and Mickelson, K.A., 2015, Geologic map of the southern Oregon coast between Bandon, Coquille, and Sunset Bay, Coos County, Oregon: Oregon Department of Geology and Mineral Industries, Open-File Report O-15-04, 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:** _____
- D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Tables

Water Availability Analysis

Detailed Reports

TWO MILE CR > PACIFIC OCEAN - AT MOUTH
SOUTH COAST BASIN

Water Availability as of 11/1/2021

Watershed ID #: 72804 ([Map](#))

Date: 11/1/2021

Exceedance Level: 80% ▾

Time: 9:42 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	7.45	0.11	7.34	0.00	14.00	-6.66
FEB	10.10	0.14	9.97	0.00	14.00	-4.03
MAR	7.43	0.09	7.34	0.00	12.40	-5.06
APR	4.77	0.09	4.68	0.00	7.92	-3.24
MAY	2.30	0.09	2.21	0.00	3.63	-1.42
JUN	1.27	0.09	1.18	0.00	1.92	-0.74
JUL	0.73	0.00	0.73	0.00	0.89	-0.16
AUG	0.40	0.00	0.40	0.00	0.43	-0.03
SEP	0.30	0.00	0.30	0.00	0.30	0.00
OCT	0.28	0.00	0.28	0.00	0.34	-0.06
NOV	1.09	0.09	1.00	0.00	2.76	-1.76
DEC	5.08	0.09	4.99	0.00	12.60	-7.61
ANN	4,650.00	46.80	4,600.00	0.00	4,280.00	345.00

Water Availability Analysis Detailed Reports

SEVENMILE CR > RANDOLPH SL - AT MOUTH
SOUTH COAST BASIN

Water Availability as of 11/22/2021

Watershed ID #: 70574 ([Map](#))

Exceedance Level: 80% ▾

Date: 11/22/2021

Time: 1:10 PM

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	17.00	1.43	15.60	0.00	12.00	3.57
FEB	22.70	1.47	21.20	0.00	12.00	9.23
MAR	16.90	1.27	15.60	0.00	12.00	3.63
APR	11.10	0.71	10.40	0.00	12.00	-1.61
MAY	5.53	0.82	4.71	0.00	8.55	-3.84
JUN	2.90	1.20	1.70	0.00	4.12	-2.42
JUL	1.55	1.53	0.03	0.00	1.72	-1.70
AUG	0.83	1.24	-0.41	0.00	0.79	-1.20
SEP	0.63	0.81	-0.18	0.00	0.53	-0.71
OCT	0.58	0.55	0.04	0.00	0.59	-0.56
NOV	2.30	0.65	1.65	0.00	5.58	-3.93
DEC	11.70	0.85	10.90	0.00	12.00	-1.15
ANN	10,400.00	756.00	9,660.00	0.00	4,930.00	4,960.00

Water Availability Analysis Detailed Reports

WHISKY RUN > PACIFIC OCEAN - AT MOUTH
SOUTH COAST BASIN

Water Availability as of 11/22/2021

Watershed ID #: 72964 ([Map](#))

Exceedance Level: 80% ▾

Date: 11/22/2021

Time: 1:10 PM

Water Availability Calculation

Consumptive Uses and Storages

Instream Flow Requirements

Reservations

Water Rights

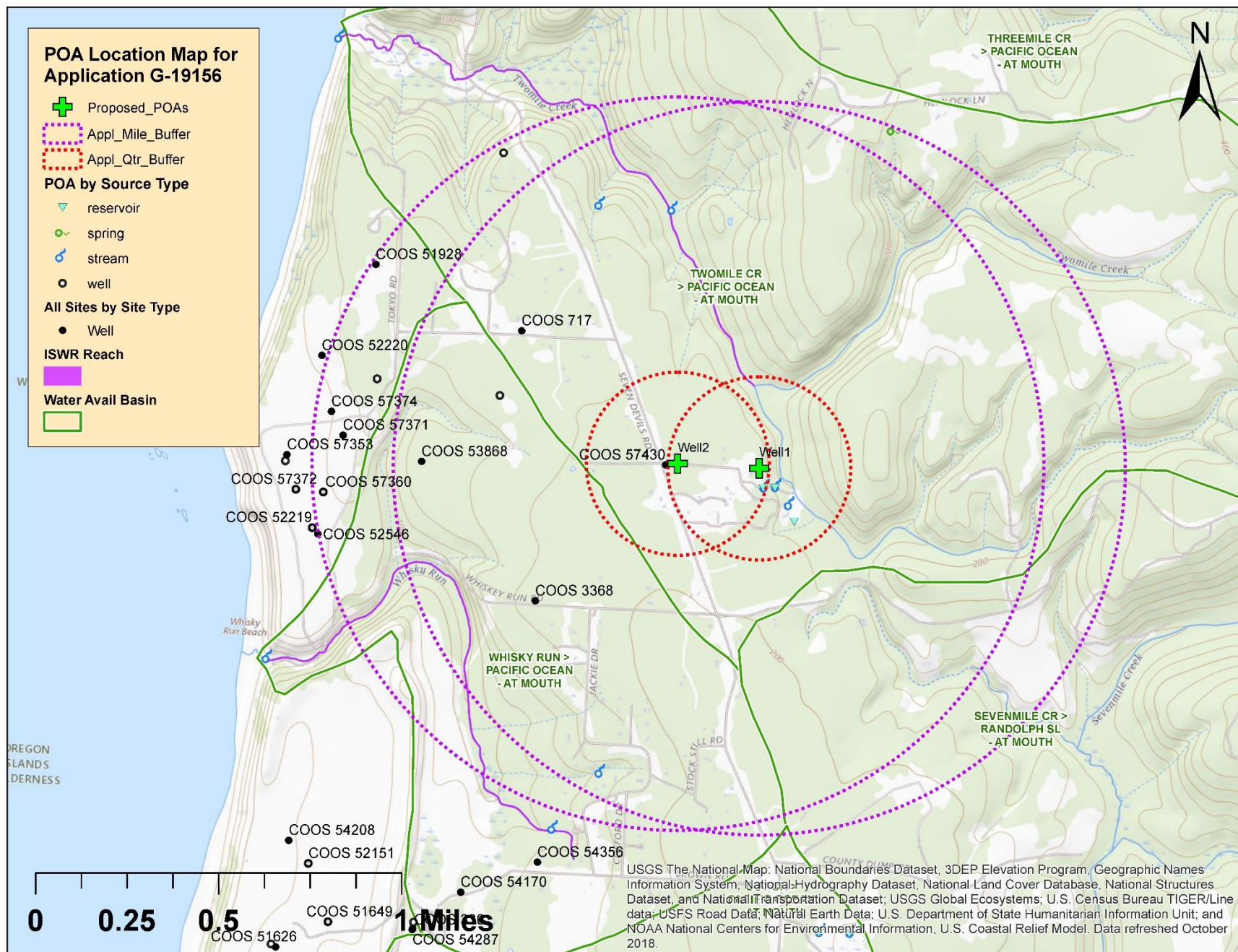
Watershed Characteristics

Water Availability Calculation

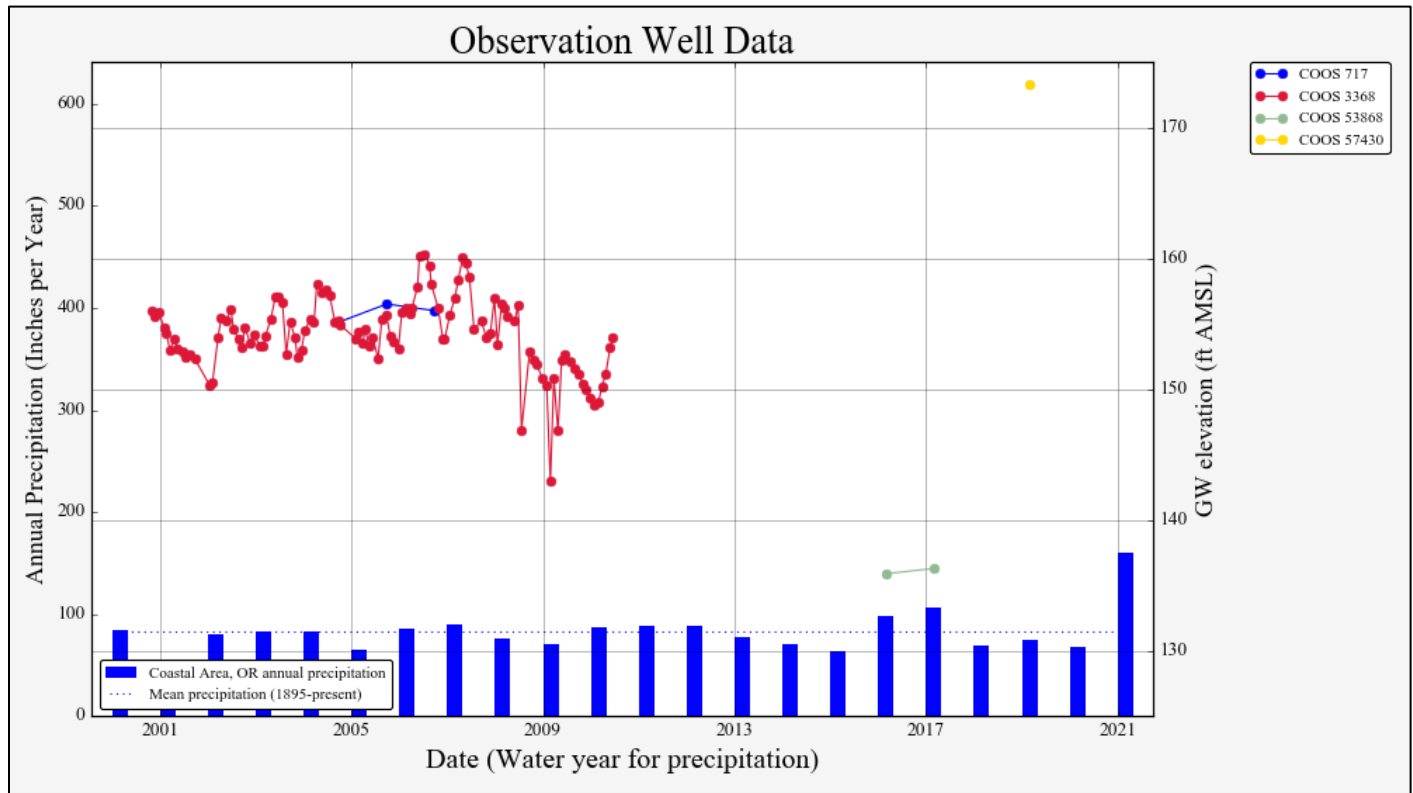
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	2.71	0.00	2.71	0.00	5.80	-3.09
FEB	3.71	0.00	3.71	0.00	6.42	-2.71
MAR	2.72	0.00	2.72	0.00	4.63	-1.91
APR	1.69	0.04	1.65	0.00	2.87	-1.22
MAY	0.79	0.27	0.52	0.00	1.28	-0.76
JUN	0.46	0.81	-0.35	0.00	0.75	-1.10
JUL	0.27	1.27	-1.00	0.00	0.36	-1.36
AUG	0.15	1.03	-0.88	0.00	0.18	-1.06
SEP	0.11	0.43	-0.32	0.00	0.13	-0.45
OCT	0.10	0.04	0.06	0.00	0.14	-0.08
NOV	0.41	0.00	0.41	0.00	1.08	-0.67
DEC	1.82	0.00	1.82	0.00	4.62	-2.80
ANN	1,720.00	237.00	1,600.00	0.00	1,690.00	10.60

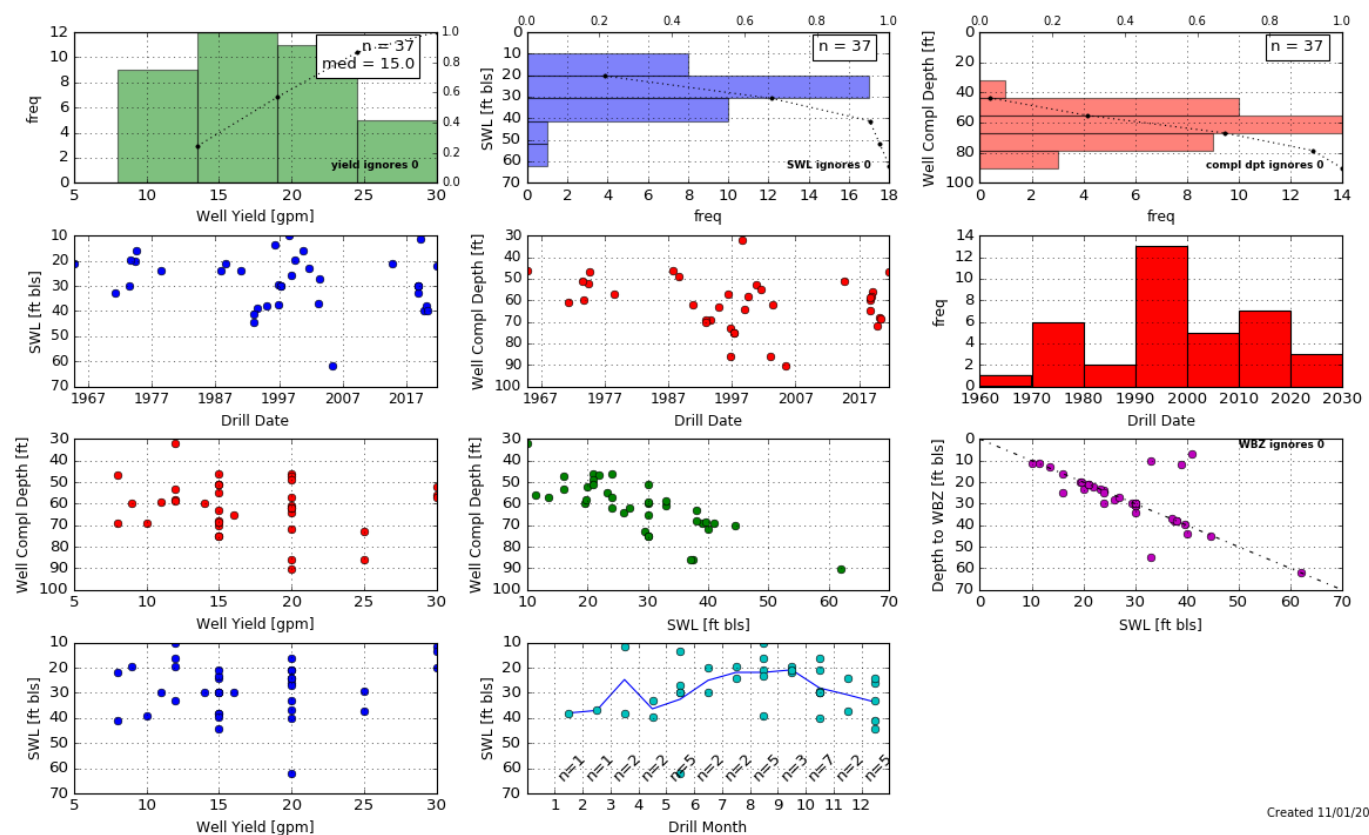
Well Location Map



Water-Level Measurements in Nearby Wells



Summary Statistics for Well Reports Filed in TRS 27S/14W S-21



Theis Distance Drawdown Modeling

Theis Time-Drawdown Worksheet v.5.00

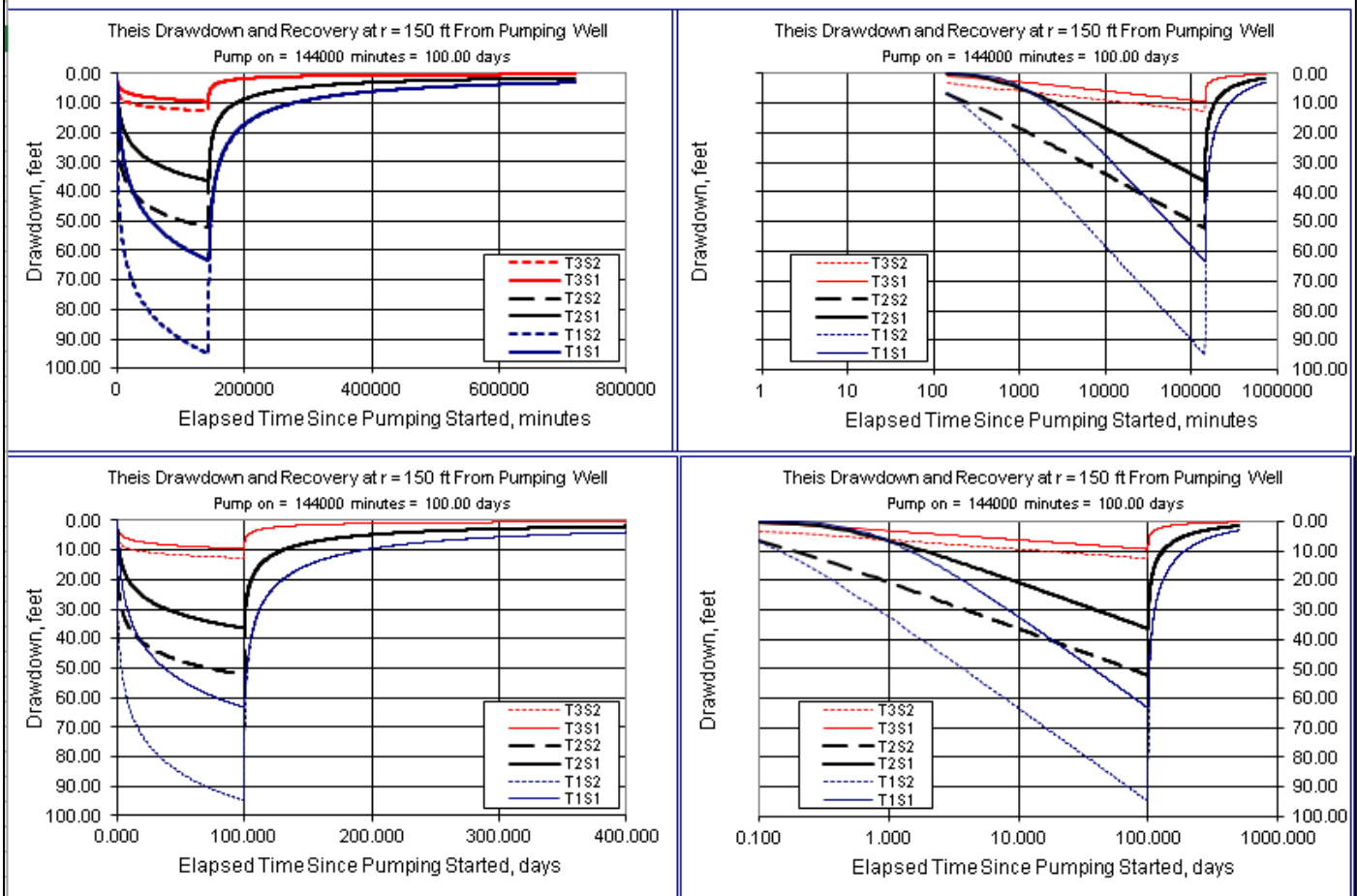
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r , from a pumping well for 3 different T values and radial distance, r , from a pumping well for 3 different T values and 2 different S values.

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		100		d	
Radial distance from pumped well:	r		150		ft	
Pumping rate	Q		1		cfs	448.80 gpm
Hydraulic conductivity	K	5	10	50	ft/day	1.00 cfs
Aquifer thickness	b		100		ft	60.00 cfm
Storativity	S_1		0.05			86,400.00 cfd
	S_2		0.005			1.98 af/d
Transmissivity Conversions	T_ft2pd	500	1000	5000	ft2/day	
	T_ft2pm	0.347222	0.694444	3.472222	ft2/min	
	T_gpdft	3740	7480	37400	gpd/ft	

Recalculate

Use the Recalculate button if recalculation is set to manual



Stream Depletion Modeling (Jenkins, 1968)

Application type:	G
Application number:	19156
Well number:	1
Stream Number:	1
Pumping rate (cfs):	1
Pumping duration (days):	244
Pumping start month number (3=March)	3.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	1650	1650	1650	ft
Aquifer transmissivity	T	500	1000	5000	ft ² /day
Aquifer storativity	S	0.01	0.001	0.0001	-
Not used		0.01	0.05	0.1	
Not used		1	1	1	
Not used		4.0	3.0	2.0	
Not used		1	1	1	
Not used		10	10	10	

Stream depletion for Scenario 2:

Days	10	330	360	30	60	90	120	150	180	210	240	270	300
Depletion (%)	71	5	4	83	88	90	92	92	93	94	94	12	7
Depletion (cfs)	0.71	0.05	0.04	0.83	0.88	0.90	0.92	0.92	0.93	0.94	0.94	0.12	0.07

