

Groundwater Application Review Summary Form

Application # G- 19461

GW Reviewer James Hootsmans Date Review Completed: 12/26/2024

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

December 26, 2024

TO: Application G- 19461

FROM: GW: James Hootsmans
(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 [Enter] 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 12/26/2024
 FROM: Groundwater Section James Hootsmans
 Reviewer's Name
 SUBJECT: Application G- 19461 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: Robert Gabriel County: Marion

A1. Applicant(s) seek(s) 1.10 cfs from 3 well(s) in the Willamette Basin,
 _____ subbasin

A2. Proposed use Irrigation Seasonality: March 1 through October 31

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	PROP 595	1	Alluvial	1.10	6S/2W-27 NENE	1055' S, 520' W fr NE cor S 27
2	PROP 596	2	Alluvial	1.10	6S/2W-27 NENE	1300' S, 520' W fr NE cor S 27
3	PROP 597	3	Alluvial	1.10	6S/2W-26 NWNW	810' S, 520' W fr NW cor S 26
4						

* 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	300	0-20	0-300		TBD			
2	300	0-20	0-300		TBD			
3	300	0-20	0-300		TBD			
4								

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	191				TBD	
2	191				TBD	
3	189				TBD	
4						

Use data from application for proposed wells.

A4. **Comments:** The applicant proposes to complete three Points of Appropriation (POA) approximately 2.6 miles northeast of Salem/Keizer metro area. The POAs, identified as PROP 595, PROP 596 and PROP 597 on the location map, are proposed to be developed in the alluvial groundwater system. The applicant proposed to pump 1.10 cfs (approximately 492 gallons per minute (gpm)) from the proposed POA. The total planned annual volume is 219.25 acre feet for 87.7 acres (Duty 2.5 acre-feet/acre).

A5. ☐ **Provisions of the** Willamette Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water ☐ **are**, or ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
 Comments: The proposed aquifer is confined. Per OAR 690-502-0240, the relevant basin rules do not apply.

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
 Name of administrative area: _____
 Comments: _____

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

- a. ☐ is over appropriated, ☒ is not over appropriated, or ☐ cannot be determined to be over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. ☐ will not or ☐ will likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. ☐ will not or ☐ will likely to be available within the capacity of the groundwater resource; or
- d. ☒ will, if properly conditioned, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. ☒ The permit should contain condition #(s) 7RLN, 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 Alluvial groundwater reservoir ~~between approximately~~ _____ ft. and _____ ft. below land surface;
 - d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

- B3. **Groundwater availability remarks:** The proposed POA (PROP 595, 596 and 597) are situated in the Willamette Valley, with over 500 feet of alluvial sediments from surface elevation. Therefore, the proposed depth of 300 feet will mean that the proposed POA will develop in these alluvial sediments. Sand and gravel beds with higher permeability occur throughout the sediments, separated by lower permeability silt and clay, which in turn confine deeper water-bearing zones as depth increases. Nearby well logs, where available, indicate a thick layer of silt, with clay beds deeper than 45 feet. OAR 690-210-0130 and OAR 690-210-0140 stipulate minimum well construction standards, and due to the variable geology that could be encountered during construction, the proposed POA should be cased and sealed appropriately depending on the layers encountered.
Groundwater elevations in nearby wells to the proposed POA have remained relatively stable over time, based on very limited data (with Sections 26 and 27), indicating a hydraulic connection to the nearby surface water bodies (see Observation Well Data) The proposed POA are close to Little Pudding River and within a mile of Woods Creek. Water levels in the area indicate that groundwater for the proposed use is likely not over appropriated.
The closest groundwater right to the proposed POA is Certificate 46478 OR, in neighboring tax lot 600, All the POU for the neighboring right is within a quarter mile of the proposed POA and the POA on the Certificate (MARI 4456) is approximately 270 feet away from Proposed POA 1. Water right GR 2943 (MARI 5304) is also a similar distance away from Proposed POA 1.
The applicant proposed to pump 1.10 cfs (approximately 492 gpm) from the proposed POA. This high requested rate is equivalent to 2.178 acre-feet of water used per day. The total planned annual volume is 219.25 acre feet for 87.7 acres (Duty 2.5 acre-feet/acre). Therefore, the applicant would be able to only to continuously pump at the maximum rate for

approximately 100 days before reaching the maximum allowed duty. A Theis (1935) drawdown analysis was conducted to assess the potential well-to-well interference with the neighboring groundwater right due to pumping of the proposed POA in the amounts requested. Hydraulic parameters used for the analyses were derived from regional data and studies (Pumping Test Reports; Conlon et al., 2003, 2005; Woodward et al., 1998) or are within a typical range of values for the parameter within the hydrogeologic regime (Freeze and Cherry, 1979). To be conservative, it was assumed that pumping would occur for the full irrigation season at the maximum rate, irrespective of time to reach the total annual volume. Results indicate that the proposed use is not likely to cause well-to-well interference with MARI 4456 that exceeds the threshold under the standard condition for alluvial aquifers in the Willamette Basin. (see Theis Drawdown Analysis, attached). In addition, MARI 4456 does not fully penetrate the aquifer.

Reported yields from regional wells (6S 2W Sections 26 and 27) range from less than 1 to ~ 1750 gpm, with a median of 100 gpm (see attached Well Statistics). The requested rate of 1.1 cfs (~492 gpm) therefore represents ~28 percent of the maximum yield reported for water wells in this area but almost 5 times the median reported yield. Therefore, it is likely the applicant will be able to achieve the requested pumping rate with the proposed POA. Nevertheless, with the lack of long term water level data in the area, water use reporting and water level measurements should be taken annually to better understand the resource.

Based on this analysis of the available data and under the assumptions previously identified, groundwater for the proposed use is likely within the capacity of the resource; if a permit is issued for this application, the conditions in B1(d)(i) and B2(c) are recommended to protect senior users and the groundwater 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	Alluvium	☒	☐
2	Alluvium	☒	☐
3	Alluvium	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: Water bearing zones are overlain by several hundred feet of fine-grained alluvial sediments, creating a confined to semi-confined groundwater system at depth. Similarly constructed wells nearby have static water levels above the water bearing zone within the well.

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	Little Pudding River	130-150	130 - 140	1650	☒	☐	☐	☐	☒
2	1	Little Pudding River	130-150	130-140	1850	☒	☐	☐	☐	☒
3	1	Little Pudding River	130-150	130-140	1650	☒	☐	☐	☐	☒
1	2	Woods Creek	130-150	150-175	3275	☒	☐	☐	☐	☒
2	2	Woods Creek	130-150	150-175	3230	☒	☐	☐	☐	☒
3	2	Woods Creek	130-150	150-175	2800	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Water levels in nearby wells from similar depths as the proposed POA are equal or close to elevations of adjacent streams elevations. The presence of fine-grained sediments indicates a likely inefficient hydraulic connection. However, the high requested rate may lead to Potential for Substantial Interference (PSI), see below.

Water Availability Basin the well(s) are located within: PUDDING R > MOLALLA R - AB MILL CR

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	☐	☐	NA	NA	☐	67.3	☒	<<25%	☒
2	1	☐	☐	NA	NA	☐	67.3	☒	<<25%	☒
3	1	☐	☐	NA	NA	☐	67.3	☒	<<25%	☒
1	2	☐	☐	NA	NA	☐	67.3	☒	<<25%	☒
2	2	☐	☐	NA	NA	☐	67.3	☒	<<25%	☒
3	2	☐	☐	NA	NA	☐	67.3	☒	<<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 #		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: Potential depletion (interference with) SW 1 (Little Pudding River) by proposed pumping at proposed POA 1 was estimated using Hunt 2003 analytical model. Hydraulic parameters used for the model were derived from regional data or studies of the hydrogeologic regime (OWRD Well Log Query Report; Conlon et al., 2003, 2005; Iverson 2002) or are within a typical range of values for the parameter within the hydrogeologic regime (Freeze and Cherry, 1979; Heath 1983). See attached "Stream Depletion Analysis – SW 1" for the specific parameters used in the analysis. The Hunt 2003 analytical model results indicate that depletion of (interference with) SW 1 due to pumping of the proposed POA is anticipated to be much less than 25 percent of the well discharge at 30 days of continuous pumping.

Because only the distance is expected to vary between the POA and surface water sources, only the POA-SW pair with the shortest distance (in this case, POA 2 and SW 1) was analyzed quantitatively for interference (stream depletion). All other POA-SW pairs would presumably result in less interference due to their greater separation relative to POA 2 and SW 1. Therefore, the interference of both proposed POA with all surface water sources within 1 mile are anticipated to result in much less than 25 percent of the well discharge at 30 days of continuous pumping.

The requested flow rate of 1.10 cfs is far above 1% of 80% natural flow for the pertinent Water Availability Basin (PUDDING R > MOLALLA R - AB MILL CR). Therefore, PSI is assumed. The rate would have to be reduced to lower than 0.673 cfs to be lower than the 1% threshold.

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													
(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:

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Iverson, J., 2002, Investigation of the hydraulic, physical, and chemical buffering capacity of Missoula flood deposits for water quality and supply in the Willamette Valley of Oregon: Unpublished M.S. thesis, Oregon State University, 147 p.

Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: American Geophysical Union transactions, v. 16, p. 519-524.

United States Geological Survey, 2013, National Elevation Dataset (NED) [DEM geospatial data]. 1/9th arc-second, updated 2013.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82 p.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** _____ **Logid:** _____

D2. **THE WELL does not appear to meet current well construction standards based upon:**

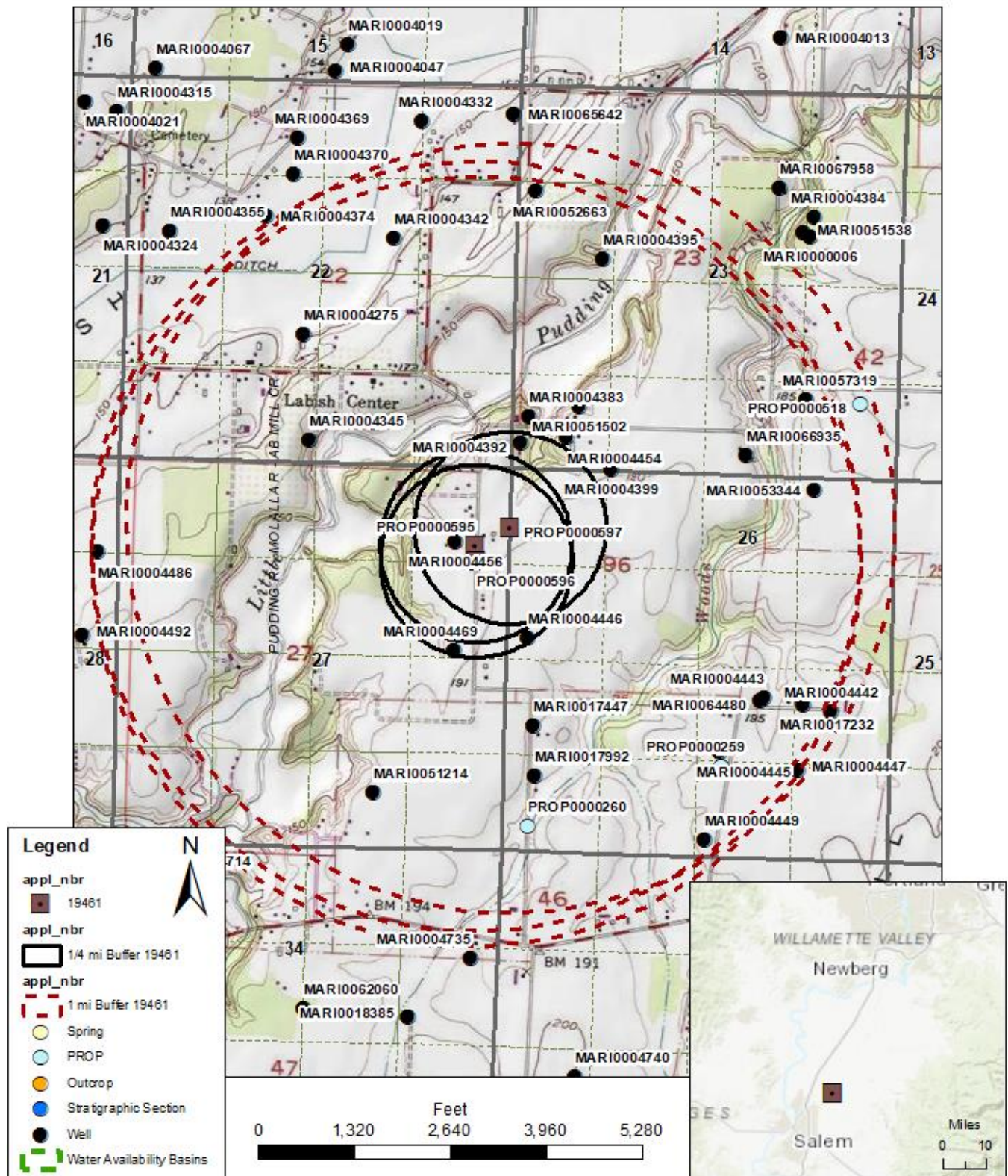
- a. ☐ review of the well log;
- b. ☐ field inspection by _____;
- c. ☐ report of CWRE _____;
- d. ☐ other: (specify) _____

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.**

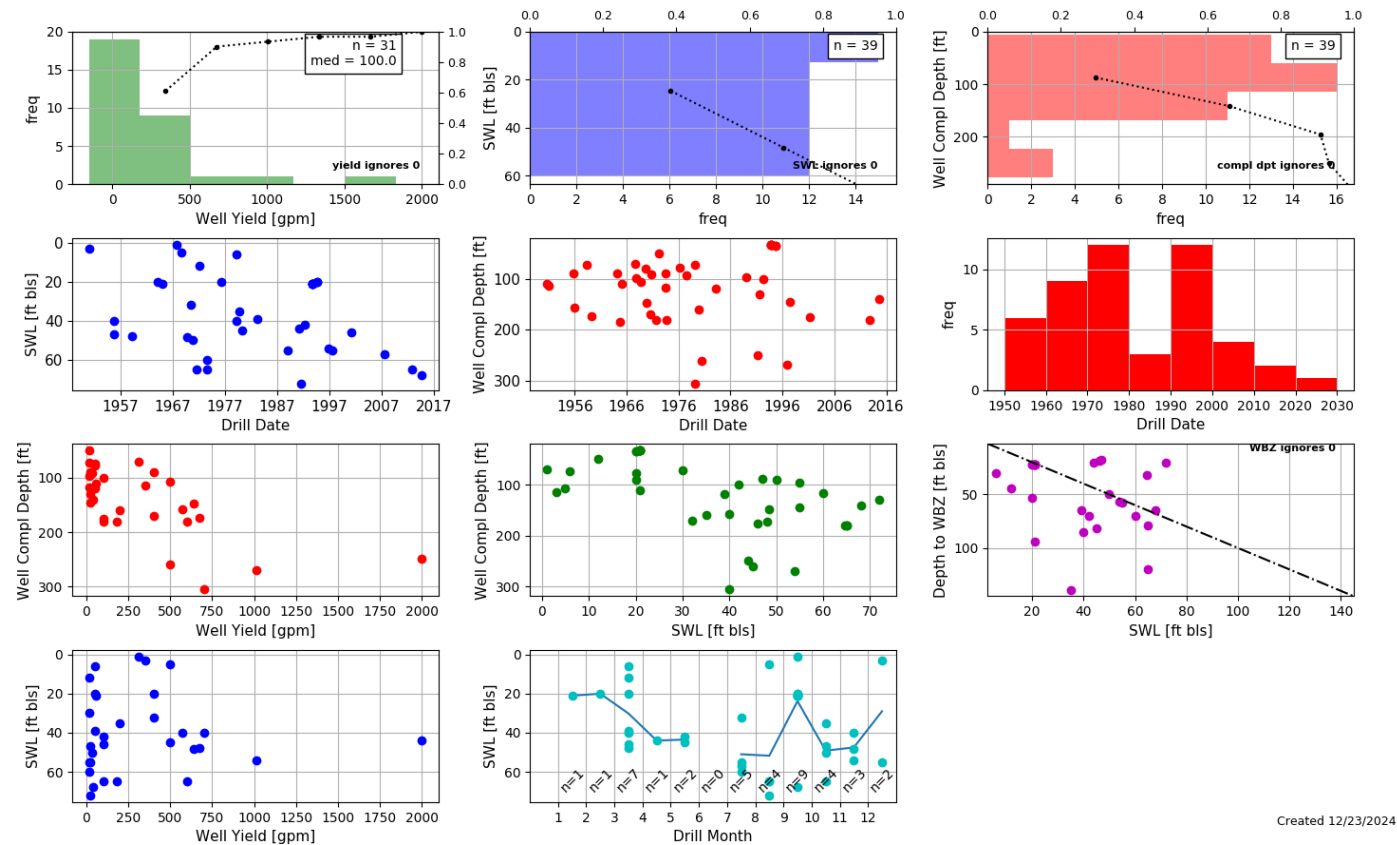
Well Location Map

G-19461 Gabriel



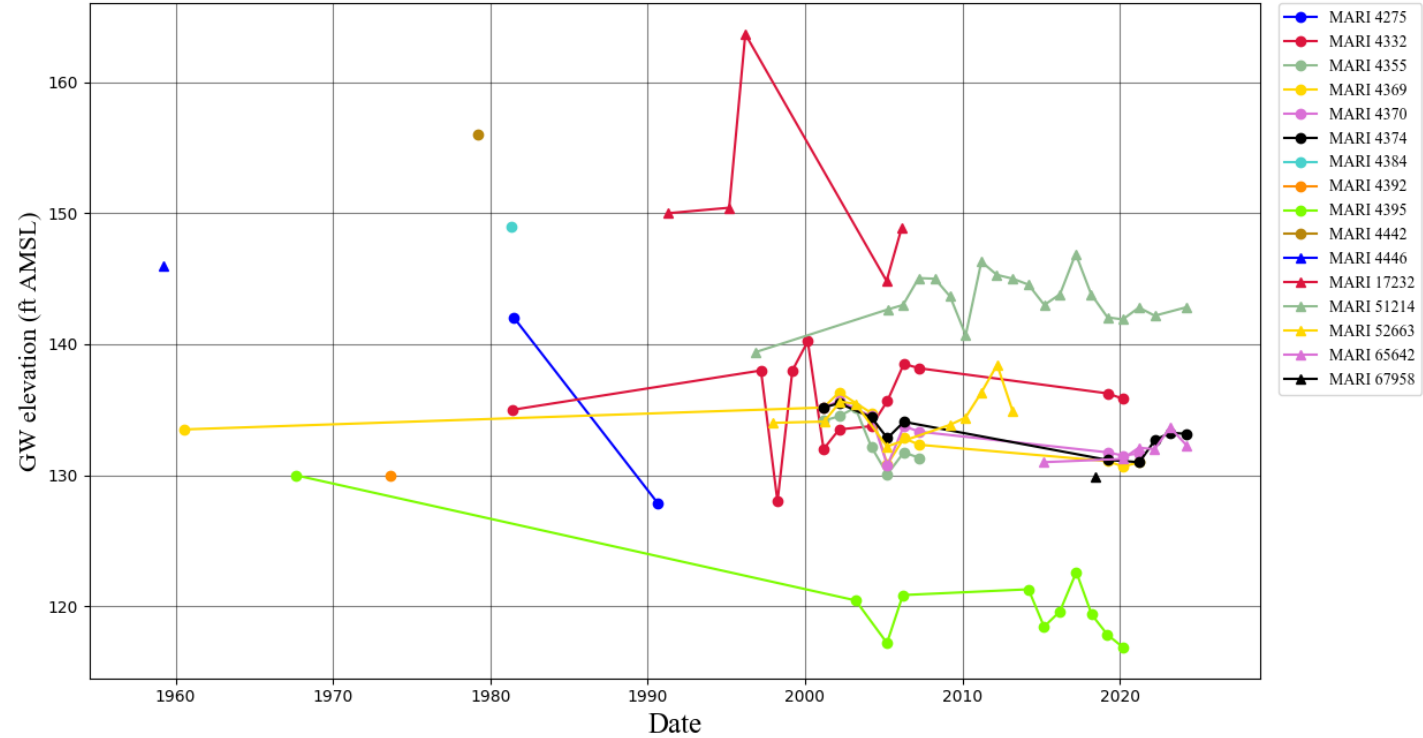
Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
 Copyright© 2013 National Geographic Society, i-cubed

Well Statistics for TRS 6S 2W Sections 26 and 27

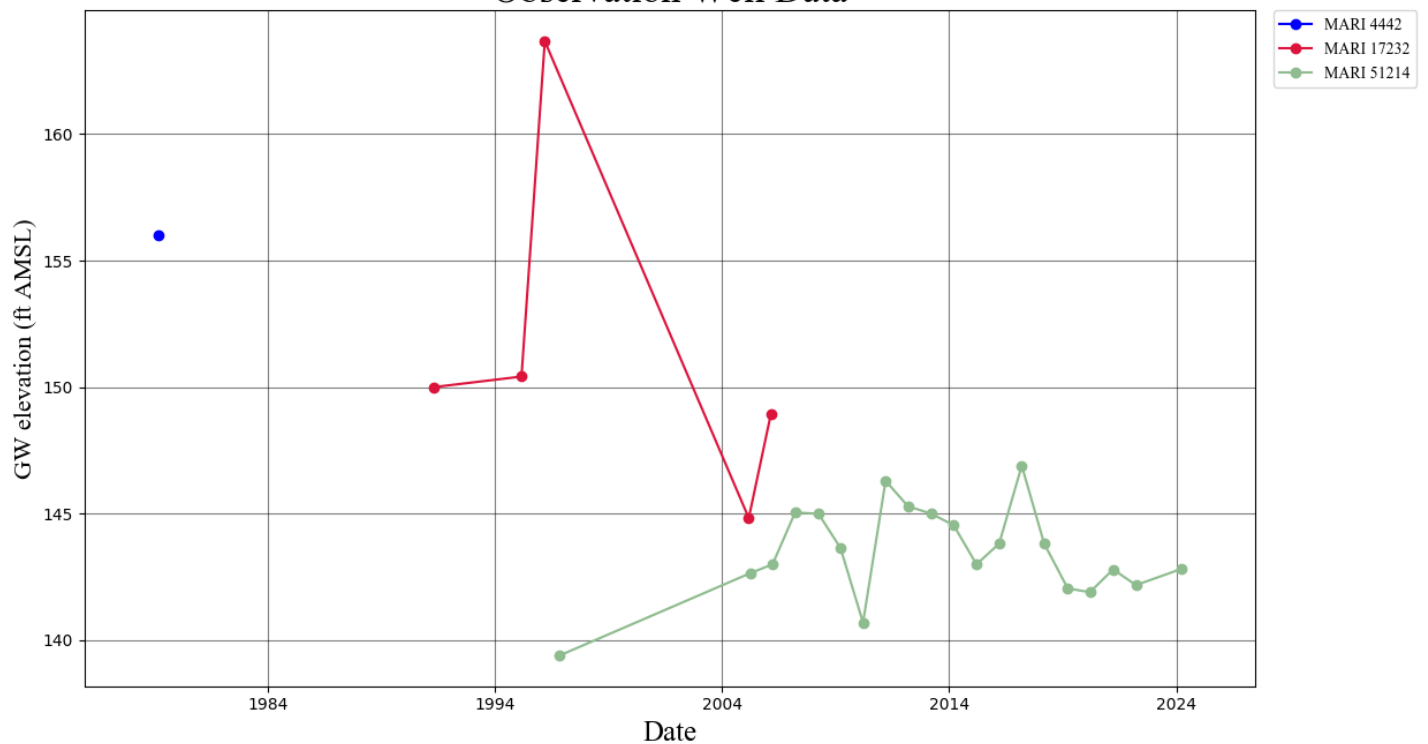


Water-Level Measurements for TRS 6S 2W Sections 22, 23, 26 and 27

Observation Well Data



Observation Well Data

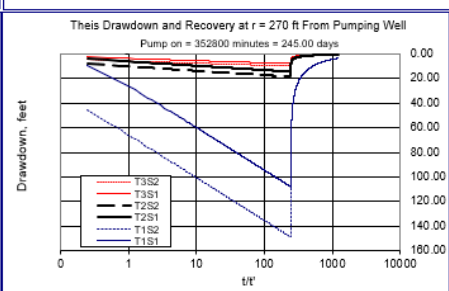
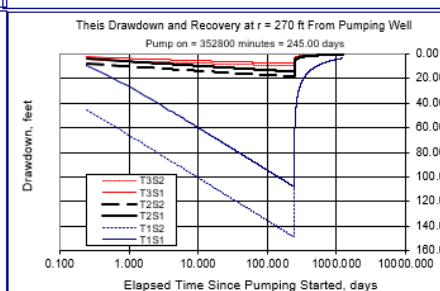
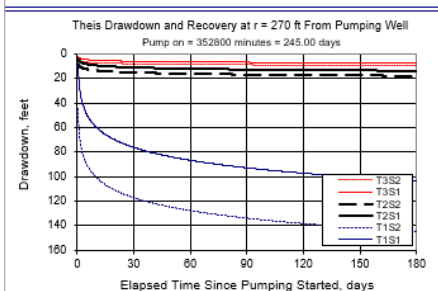
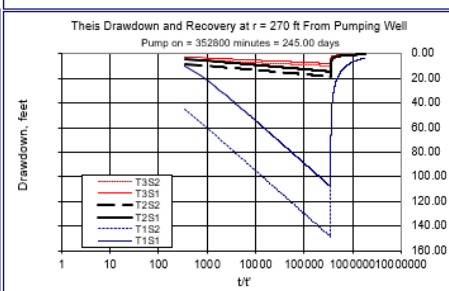
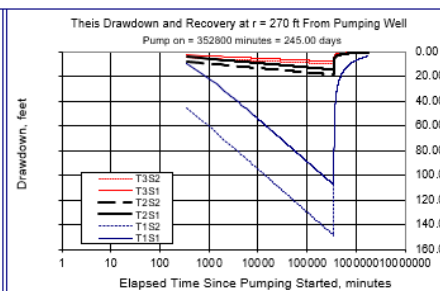
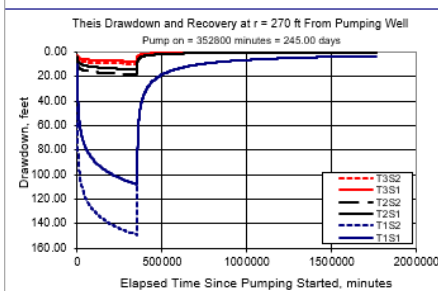
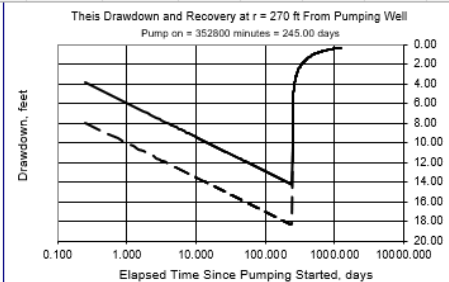


Theis Interference Analysis

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		245		d	
Radial distance from pumped well:	r		270		ft	Q conversions
Pumping rate	Q		1.1		cfs	493.68 gpm
Hydraulic conductivity	K	5	50	100	ft/day	1.10 cfs
Aquifer thickness	b		100		ft	66.00 cfm
Storage	S ₁		0.003			95,040.00 cfd
	S ₂		0.0002			2.18 af/d
Transmissivity Conversions	T ₁ 2pm	500	5000	10000	ft2/day	
	T ₁ 2pm	0.3472222	3.4722222	6.9444444	ft2/min	
	T ₁ qpd/ft	3740	37400	74800	qpd/ft	Recalculate

Use the Recalculate button if recalculation is set to manual



Water Availability Tables

Water Availability Analysis

Detailed Reports

PUDDING R > MOLALLA R - AB MILL CR

WILLAMETTE BASIN

Watershed ID #: 151 (Map)

Water Availability as of 12/11/2024

Exceedance Level: 80%
Time: 4:11 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	1,040.00	125.00	915.00	0.00	80.00	835.00
FEB	1,180.00	114.00	1,074.00	0.00	80.00	998.00
MAR	1,010.00	76.50	934.00	0.00	80.00	854.00
APR	787.00	52.40	735.00	0.00	80.00	655.00
MAY	425.00	51.00	374.00	0.00	80.00	294.00
JUN	224.00	73.20	151.00	0.00	50.00	101.00
JUL	109.00	115.00	-6.28	0.00	40.00	-46.30
AUG	71.00	94.50	-23.50	0.00	36.00	-59.50
SEP	67.30	53.60	13.70	0.00	36.00	-22.30
OCT	91.60	11.50	80.10	0.00	50.00	30.10
NOV	363.00	48.50	314.00	0.00	80.00	234.00
DEC	957.00	118.00	839.00	0.00	80.00	759.00
ANN	706,000.00	56,300.00	650,000.00	0.00	46,500.00	606,000.00

Stream Depletion (Hunt) Model Analysis

Application type: G
Application number: 19461
Well number: 1
Stream Number: 1
Pumping rate (cfs): 1.1
Pumping duration (days): 245.0
Pumping start month number (3=March): 3.0
Plotting duration (days): 365

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	1650.0	1650.0	1650.0	ft
Aquifer transmissivity	T	500	5000	10000	ft ² /day
Aquifer storativity	S	0.003	0.1	0.2	-
Aquitard vertical hydraulic conductivity	Kva	0.001	0.005	0.01	ft/day
Aquitard saturated thickness	ba	80.0	80.0	80.0	ft
Aquitard thickness below stream	babs	50.0	50.0	50.0	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	25.0	25.0	25.0	ft

Stream depletion for Scenario 2:

Days	10	330	360	30	60	90	120	150	180	210	240	270
Depletion (%)	0	0	0	0	0	0	0	0	0	0	0	0
Depletion (cfs)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hunt (2003) transient stream depletion model

Impact magnitude of input parameter ranges

Sensitivity to 50% increase in parameter values

Values > threshold may yield negative results: Dimensionless streambed conductance

Model:
 ☐ Jenkins (1968): aquifer only
 ☐ Hunt (1999): streambed
 ☒ Hunt (2003): overlying aquitard

 Show popup warnings: ☒ Yes ☐ No
 Percent change for sensitivity test (%): 50

Read disclaimer and instructions

Copy parameters from Scenario 2 to 1 and 3

Edit parameters in Excel

Run model with current parameters

Quit

Open folder with parameter refs

Reload parameters from file for this app, well, and stream

Open results spreadsheet

Version: 10/24/2023