Groundwater Application Review Summary Form

Application # G- _19149_

GW Reviewer _Darrick E. Boschmann_ Date Review Completed: _02/01/2023_

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 **_02/01/2023_**

TO: **Application** G-**_19149_**

FROM: **GW:** **_M. Thoma_**
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☒ **YES**
☐ **NO**

The source of appropriation is hydraulically connected to a State Scenic 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 Deschutes 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 **02/01/2023**

FROM: Groundwater Section **Darrick E. Boschmann**
Reviewer's Name

SUBJECT: Application G- **19149** Supersedes review of 11/30/2021
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: **Shotgun Cr. Ranch** County: **Crook**

A1. Applicant(s) seek(s) 0.21 cfs from 3 well(s) in the Deschutes Basin, Crooked River subbasin

A2. Proposed use Irr. (3.3 ac); Suppl. Irr. (13.5 ac) Seasonality: April 15 – Oct 15 (184 d)

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	CROO0055050	EF-1	Bedrock	0.21	17.00S-20.00E-7 NENE	430 FEET SOUTH AND 260 FEET WEST FROM NE CORNER, SECTION 7
2	CROO0055048	EF-2	Bedrock	0.21	17.00S-20.00E-8 NWNW	70 FEET SOUTH AND 40 FEET EAST FROM NW CORNER, SECTION 8
3	CROO0055049	EF-3	Bedrock	0.21	17.00S-20.00E-5 SWSW	250 FEET NORTH AND 560 EAST FROM SW CORNER, SECTION 5
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	3650	330	25	4/2/21	635	0-56	+3-57	13-631	571-631	45		A
2	3620	150	18	3/26/21	610	0-58	+1.5-58.5	10-600	420-600	15		A
3	3650	62	62	3/30/21	703	0-58	+1.5-58.5	22-702	422-682	15		A

Use data from application for proposed wells.

A4. **Comments:**

This re-review addresses the finding in section B1a in accordance with the 1/18/2023 clarification memo on the current policy for determining over-appropriation for new groundwater applications. No other modifications from the original 11/30/2021 review were made.

A5. ☐ **Provisions of the** Deschutes (OAR 690-505) 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 POAs are outside of the Deschutes Groundwater Study Area

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) **7C (7-yr SWL); Medium Water-Use Reporting**;

ii. ☐ The permit should be conditioned as indicated in item 2 below.

iii. ☐ The permit should contain special condition(s) as indicated in item 3 below;

B2. a. ☐ **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;

b. ☐ **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;

c. ☐ **Condition** to allow groundwater production only from the _____ groundwater reservoir between approximately _____ ft. and _____ ft. below land surface;

d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

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

B3. **Groundwater availability remarks:** _____

Available groundwater level data from wells completed in the Clarno formation within several miles of the proposed wells do not suggest any clear decline trend over the period of record.

The available water level record does not meet the Division 8 definition of excessively declining or declined excessively (for the *storage* portion of the source of water to wells).

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	**Volc. Sediments of Clarno Group**	☒	☐
2	**Volc. Sediments of Clarno Group**	☒	☐
3	**Volc. Sediments of Clarno Group**	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: The wells are producing from the Clarno formation which consists primarily of layered volcanically-derived sediments, mainly listed as "claystone" on the driller's logs; these layers likely provide increasing confinement with depth.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	**1**	**Crooked River**	**3625**	**~3400**	**4150**	☒	☐	☐	☐	☒
2	**1**	**Crooked River**	**3600**	**~3400**	**3870**	☒	☐	☐	☐	☒
3	**1**	**Crooked River**	**3590**	**~3400**	**3650**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: GW elevations are above SW elevations implying that groundwater is flowing towards and discharging to surface water.

Water Availability Basin the well(s) are located within: CROOKED R > DESCHUTES R – AB SAND CR (ID# 70353)

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**	☐	☐	**IS70353**	**47.8**	☐	**38.7**	☐	**< 25%**	☐
2	**1**	☐	☐	**IS70353**	**47.8**	☐	**38.7**	☐	**< 25%**	☐
3	**1**	☐	☐	**IS70353**	**47.8**	☐	**38.7**	☐	**< 25%**	☐
		☐	☐			☐		☐		☐

Comments: Stream-depletion was estimated using the Hunt-2003 stream-depletion model with parameter values within a range of values expected for the geology of the area and purposefully weighted toward values that would be more-likely to produce higher estimates of stream depletion in order to obtain a "worst-case" analysis.

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells**. Otherwise same evaluation and limitations apply as in C3a above.

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

Comments: _____

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation: _____

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:

i. ☐ The permit should contain condition #(s)_____;

ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** The applicant's proposed POAs would be producing from an aquifer that has been found to be hydraulically-connected to surface water – specifically the Crooked River. The proposed rate is less than 1% of both the adopted natural streamflow and the instream right, and the estimated stream-depletion is less than 25% at 30 days, so the proposed use is not assumed to have the potential for substantial interference with surface water per OAR 690-009. However, the proposed POAs are hydraulically-connected to the Crooked River, which is upstream of the Deschutes State Scenic Waterway and will have a long-term impact on flows necessary for the scenic waterway. Given the distance between the POAs and the Crooked River, and the river-distance between the Crooked River near the POAs and the Deschutes State Scenic Waterway, along with the reservoirs in between, the impact from the proposed use on the scenic waterway will likely be evenly distributed throughout the entire year.

References Used:

Gannett, M. W. and K. E. Lite. 2004. Simulation of Regional Ground-Water Flow in the Upper Deschutes Basin, Oregon. USGS Water Resources Investigations Report 2003-4195

Gannett, M. W. and K. E. Lite. 2013. Analysis of 1997-2009 Groundwater Level Changes in the Upper Deschutes Basin, Central Oregon. USGS Scientific Investigations Report 2013-5092

Gannett, M. W., Lite, K. E., Risley, J. C., Pischel, E. M., and J. L. LaMarche. 2017. Simulation of Groundwater and Surface-Water Flow in the Upper Deschutes Basin, Oregon. USGS Scientific Investigations Report 2017-5097

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

Lite, K. E. and M. W. Gannett. 2002. Geologic Framework of the Regional Ground-Water Flow System in the Upper Deschutes Basin, Oregon. USGS Water-Resources Investigations Report 02-4015

McClaughry, J. D., Ferns, M. L., and C. L. Gordon. 2021. Geology of the North Half of the Lower Crooked River Basin, Crook, Deschutes, Jefferson, and Wheeler Counties, Oregon. DOGAMI Bulletin 108.

OWRD Well Log Database, Accessed 11/30/2021 [https://apps.wrd.state.or.us/apps/gw/well_log/Default.aspx]

OWRD Groundwater Information System Database, Accessed 11/30/2021 [https://apps.wrd.state.or.us/apps/gw/gw_info/gw_info_report/gw_search.aspx]

Swanson, D. A. 1969. Reconnaissance Geologic Map of the East Half of the Bend Quadrangle, Crook, Wheeler, Jefferson, Wasco, and Deschutes Counties, Oregon. USGS Miscellaneous Geologic Investigations Map I-568

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

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

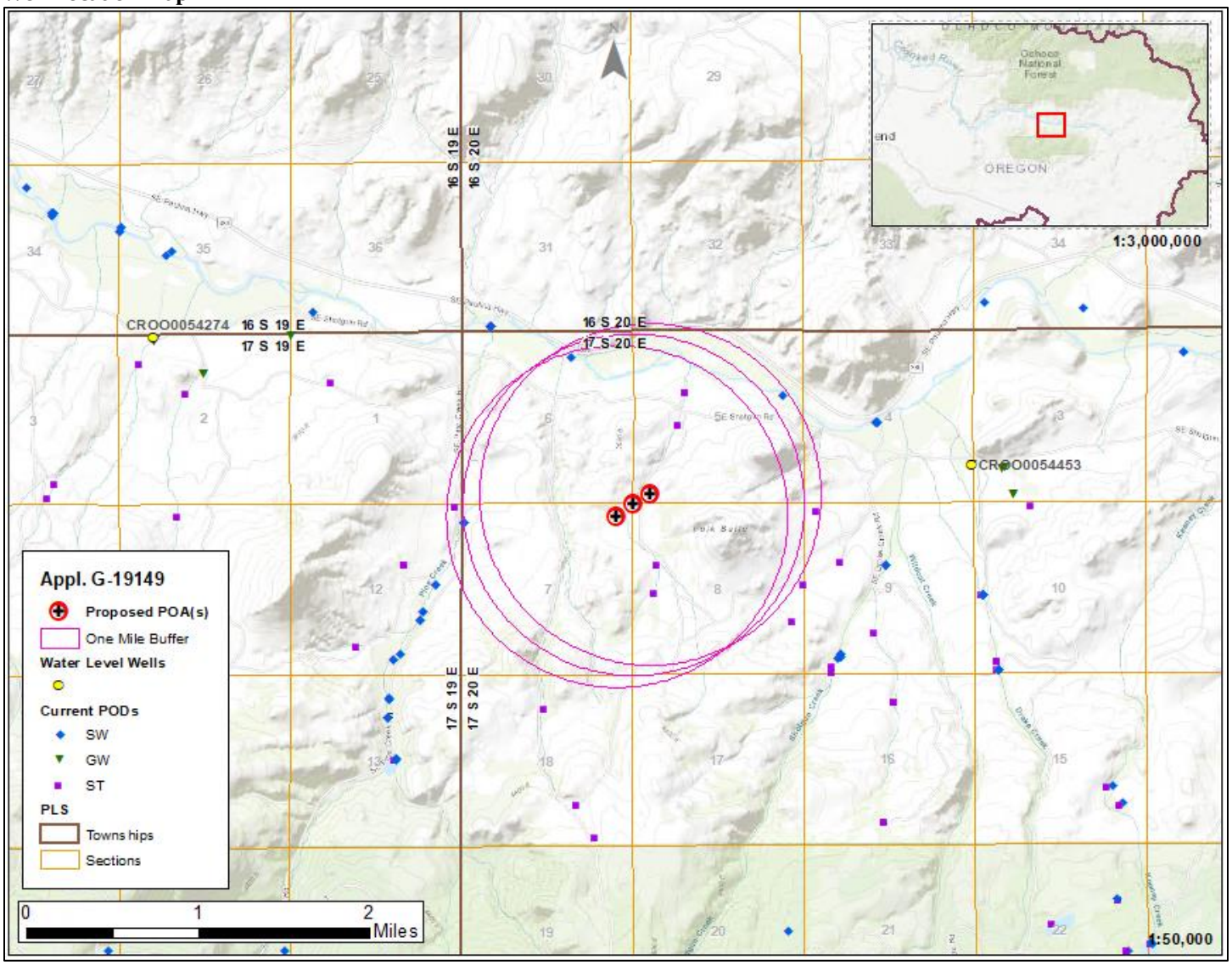
CROOKED R > DESCHUTES R - AB SAND CR

Watershed ID #: 70353 Basin: DESCHUTES Exceedance Level: 80

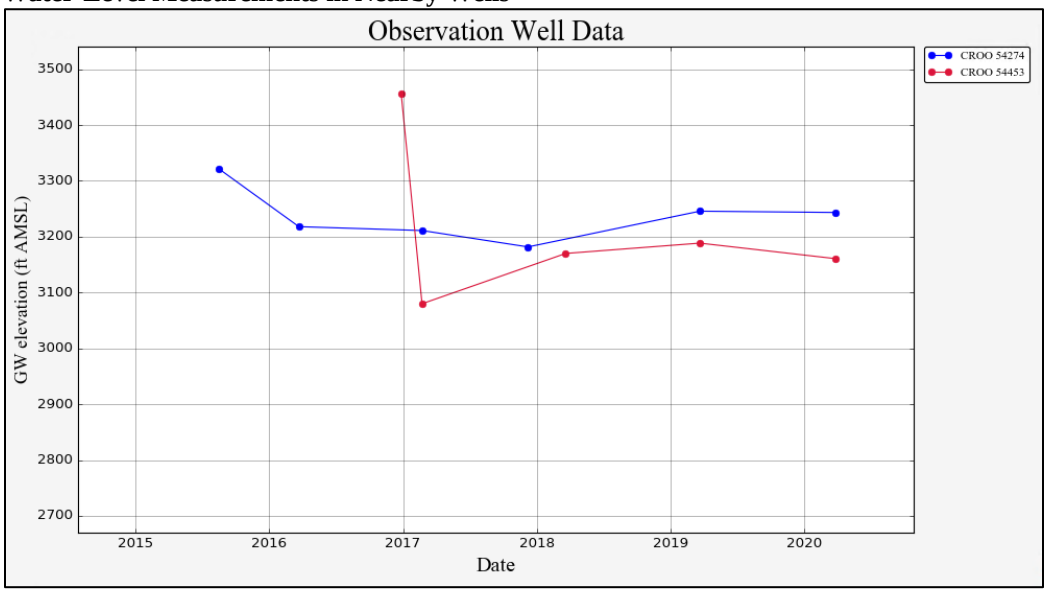
Time: 12:31 PM Date: 11/30/2021

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
		Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.				
JAN	78.90	7.74	71.20	0.00	50.00	21.20
FEB	175.00	15.50	160.00	0.00	75.00	84.50
MAR	337.00	145.00	192.00	0.00	113.00	78.80
APR	598.00	332.00	266.00	0.00	113.00	153.00
MAY	404.00	370.00	34.20	0.00	113.00	-78.80
JUN	261.00	295.00	-34.50	0.00	75.00	-109.00
JUL	80.10	85.00	-4.86	0.00	50.00	-54.90
AUG	38.70	43.20	-4.47	0.00	47.80	-52.30
SEP	45.20	44.80	0.37	0.00	50.00	-49.60
OCT	47.30	22.90	24.40	0.00	50.00	-25.60
NOV	60.60	3.44	57.20	0.00	50.00	7.16
DEC	76.50	5.50	71.00	0.00	50.00	21.00
ANN	223,000	82,900	140,000	0	50,500	100,000

Well Location Map



Water-Level Measurements in Nearby Wells



Stream-Depletion Model Results

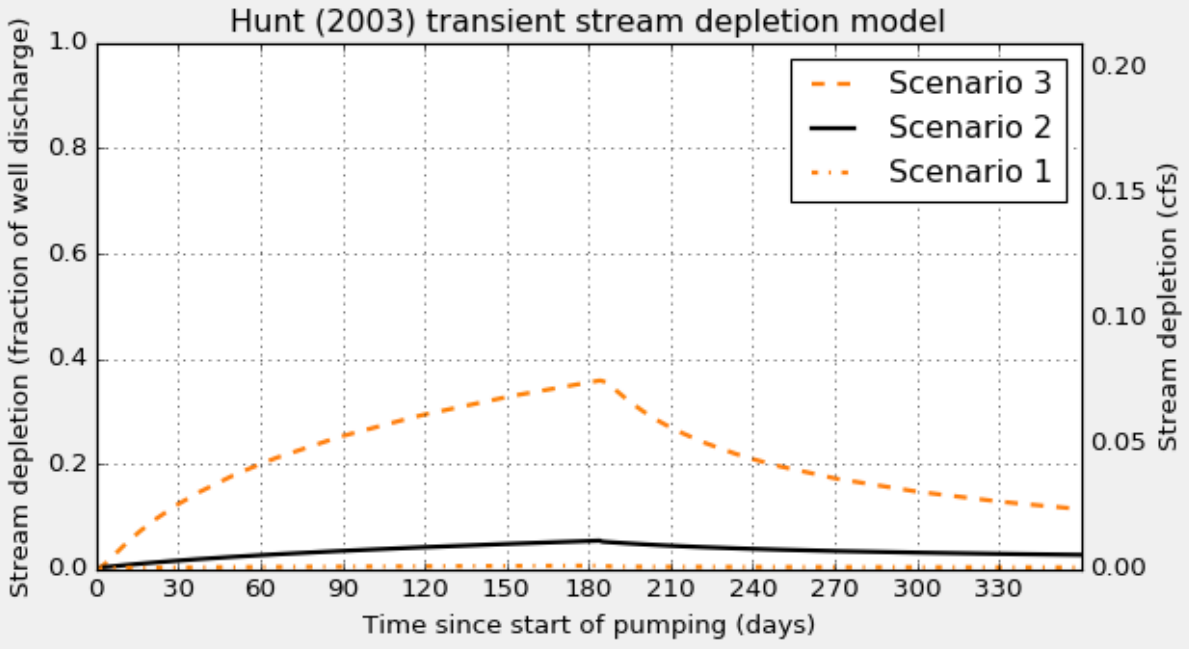
PyHunt stream depletion analysis tool

Application type:	G
Application number:	19149
Well number:	1
Stream Number:	1
Pumping rate (cfs):	0.21
Pumping duration (days):	184
Pumping start month number (3=March)	4

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	3650	3650	3650	ft
Aquifer transmissivity	T	1000	500	100	ft2/day
Aquifer storativity	S	0.0001	0.00005	0.00001	-
Aquitard vertical hydraulic conductivity	Kva	0.0001	0.0005	0.001	ft/day
Aquitard saturated thickness	ba	5	5	5	ft
Aquitard thickness below stream	babs	2	2	2	ft
Aquitard specific yield	Sya	0.001	0.0005	0.0001	-
Stream width	ws	20	20	20	ft

Stream depletion for Scenario 2:

Days	10	300	330	360	30	60	90	120	150	180	210	240	270
Depletion (%)	1	3	3	3	2	3	3	4	5	5	4	4	3
Depletion (cfs)	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01



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-19149
Date:	February 4, 2022

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

Applicant's Well #EF-1 (CROO 55050): Based on a review of the Well Report, Applicant's Well #EF-1 seems to protect the groundwater resource.

The construction of Applicant's Well #EF-1 may not satisfy hydraulic connection issues.

Applicant's Well #EF-2 (CROO 55048): Based on a review of the Well Report, Applicant's Well #EF-2 seems to protect the groundwater resource.

The construction of Applicant's Well #EF-2 may not satisfy hydraulic connection issues.

Applicant's Well #EF-3 (CROO 55049): Based on a review of the Well Report, Applicant's Well #EF-3 seems to protect the groundwater resource.

The construction of Applicant's Well #EF-3 may not satisfy hydraulic connection issues.