

Groundwater Application Review Summary Form

Application # G- 19032

GW Reviewer Gerald H. Grondin Date Review Completed: 08/12/2021

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.

☒ **None of the above. Calculations indicate likely interference with nearby wells and surface water. See sections B and C.**

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

08/12/2021

TO: Application G- 19032

FROM: GW: Gerald H. Grondin
(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 [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 August 2021
 FROM: Groundwater Section Gerald H. Grondin
 Reviewer's Name
 SUBJECT: Application G- 19032 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: Dennis & Pamela Amsbaugh County: Lake

A1. Applicant(s) seek(s) (2,666 gpm) 5.94 cfs from 1 well(s) in the Goose and Summer Lakes Basin,
Goose Lake subbasin

A2. Proposed use Primary Irrigation (45.5 acres, 136.5 ac-ft/yr) and Supplemental Irrigation (430.0 acres, 1,290.0 ac-ft/yr)
 Seasonality: 1 March to 31 October (245 days)

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 Well	3	Basin Fill Seds	5.94	40S/20E-sec 15 dcc	155' N, 2712' E fr SW cor S 15
2						
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	4715	25 to 130	4	Mar 2016 - Mar 2019	Prop 500+	Prop 20	Prop 0 - 500+	?	Prop 145 - 425	Prop 2667	?	?

Use data from application for proposed wells.

A4. Comments: _____

Groundwater permit application G-19032 proposes to use a maximum rate of 5.94 cfs (2,666 gpm) and a maximum volume of 1,426.5 ac-ft/yr to irrigate 45.5 primary acres and 136.5 supplemental acres from a proposed well (not drilled yet).

The first water in A3 is based upon nearby wells, which reported first water from 25 to 130 feet blsd. The static water level in A3 is based on March measurements from 2016 to 2019 at nearby well LAKE 2851 (see attached maps). The well construction in A3 is as proposed in the application.

The anticipated source of groundwater is basin-fill sediments based on the application and water well reports for nearby wells. Peterson and Brown (1980) mapped the site as undifferentiated alluvium and sediments (Qal/Qs) that includes lacustrine and fluvial gravel, sand, and silt. Water well reports for wells in sections 2, 3, 10, 11, 14, and 15 indicate sand, silt, clay, and gravel deposits in the area and irrigation, well yields exceeding 1,000 gpm. This site is west of an area Peterson and Brown (1980) mapped as alluvial fan deposits (Of) that includes unconsolidated to partially cemented stratified sand, gravel, and boulders.

- A5. ☐ **Provisions of the Goose and Summer Lakes 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: _____

OAR 690-513-0030 (Goose Lake Subbasin) does not apply. The proposed well and use appear to be within the allowable ground water classifications for the subbasin OAR 690-513-0030 (2).

- A6. ☐ **Well(s) #** N.A., _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: _____

Comments: _____

Currently, no administrative area.

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) _____
Recommend:
7B (interference condition)
7N (annual measurement condition)
7T (measuring tube condition)
"Large" flow meter condition _____;
 - ii. ☐ The permit should be conditioned as indicated in item 2 below.
 - iii. ☐ The permit should contain special condition(s) as indicated in item 3 below;

- B2. a. ☐ **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;
- b. ☐ **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;
- c. ☐ **Condition** to allow groundwater production only from the _____ groundwater reservoir between approximately _____ ft. and _____ ft. below land surface;
- d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

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

B3. Groundwater availability remarks: _____

Groundwater level drawdown at the nearest POA/POD well was estimated using the Theis drawdown equation. The calculations used a transmissivity of 3125 ft²/day derived from specific capacity data from wells LAKE 2840, LAKE 280 and LAKE 52266. Additionally, the calculation used an assumed intermediate storage coefficient (0.001). A pumping rate of 5.94 cfs (2666 gpm) maximum rate requested and 2.94 cfs (1318 gpm) pro-rated rate was used.

The estimated drawdown for 30 days was about 76.3 feet for the maximum rate requested and 37.7 feet for the pro-rate rate. The estimated drawdown for 245 days was about 103.7 feet for the maximum rate requested and 51.2 feet for the pro-rate rate. **Nearby wells may need to lower pumps or deepen wells.**

Recommend conditions 7B (interference condition), 7N (annual measurement condition), 7T (measuring tube condition), and "Large" flow meter condition.

Reports for the Goose and Summer Lakes Basin indicate ground water occurs in alluvium, basin fill sediments, and different basalt units. Peterson and Brown (1980) mapped the site as undifferentiated alluvium and sediments (Qal/Qs) that includes lacustrine and fluvial gravel, sand, and silt. Water well reports for wells in sections 2, 3, 10, 11, 14, and 15 indicate sand, silt, clay, and gravel deposits in the area and irrigation, well yields exceeding 1,000 gpm. This site is west of an area Peterson and Brown (1980) mapped as alluvial fan deposits (Qf) that includes unconsolidated to partially cemented stratified sand, gravel, and boulders.

The attached hydrograph shows available groundwater level data related to wells located north and east of Goose Lake. The data shows variability over the decades but no discernable long term trend yet.

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	Basin Fill Sediments	☐	☒
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: _____

The system is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement.

The aquifer at the proposed well is identified as basin fill sediments. Peterson and Brown (1980) mapped the site as undifferentiated alluvium and sediments (Qal/Qs) that includes lacustrine and fluvial gravel, sand, and silt. Water well reports for wells in sections 2, 3, 10, 11, 14, and 15 indicate sand, silt, clay, and gravel deposits in the area and irrigation, well yields exceeding 1,000 gpm. This site is west of an area Peterson and Brown (1980) mapped as alluvial fan deposits (Qf) that includes unconsolidated to partially cemented stratified sand, gravel, and boulders.

Morgan (1988) notes for the Goose Lake subbasin that ground water flow is generally from upland recharge areas to lowland discharge areas. However, local subsystems discharge to lakes, reservoirs, meadows, and streams. Large quantities of ground water move through complexly interbedded, discontinuous, unconsolidated sand, gravel, silt, and clay deposits. Morgan characterizes the upper portion of ground water as unconfined with confined-like conditions increasing with depth. This appears related to anisotropic hydraulic conductivities with horizontal hydraulic conductivity much greater than vertical hydraulic conductivity. For one site noted, the estimated ratios ranged from 2:1 to 179:1. There is no indication of shallower ground water being separated from deeper ground water by a confining layer.

- 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	Goose Lake	4,711	4,705	5,700	☒	☐	☐	☐	☒
1	2	Crane Creek	4,711	4,720	6,100	☒	☐	☐	☐	☒
1	3	Cogswell Creek	4,711	4,705	9,555	☒	☐	☐	☐	☒
1	4	Thomas Creek	4,711	4,712	12,410	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: _____

The system is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement. Similar surface water and groundwater levels. Goose Lake and Cogswell Creek closest reach are downgradient from proposed well. Crane Creek and Thomas Creek closest reach are upgradient of proposed well.

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

Proposed well location is within the Crane Creek watershed which has no water availability calculation. The proposed well location is between the Cogswell Creek watershed and the Thomas Creek watershed which do have water availability calculations.

- 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?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

- 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: _____

No calculation given the proposed well location is more than one mile from Goose Lake, Crane Creek, Cogswell Creek, and Thomas Creek.

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
1	1	%	%	%	%	%	%	%	%	%	%	%	%
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:

The proposed well is more than 1.0 mile from Goose Lake

No water availability values are calculated for Goose Lake.

Groundwater level drawdown at the nearest shore of Goose Lake was estimated using the Theis drawdown equation. The calculations used a transmissivity of 3125 ft²/day derived from specific capacity data from wells LAKE 2840, LAKE 280 and LAKE 52266. Additionally, the calculation used an assumed intermediate storage coefficient (0.001). A pumping rate of 5.94 cfs (2666 gpm) maximum rate requested and 2.94 cfs (1318 gpm) pro-rated rate was used.

The estimated drawdown for 30 days was about 25.5 feet for the maximum rate requested and 12.6 feet for the pro-rate rate. The estimated drawdown for 245 days was about 52.0 feet for the maximum rate requested and 25.7 feet for the pro-rate rate.

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
1	2	%	%	%	%	%	%	%	%	%	%	%	%
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:

The proposed well is more than 1.0 mile from Crane Creek

No water availability values calculated for Crane Creek were found.

Groundwater level drawdown at the nearest reach of Crane Creek was estimated using the Theis drawdown equation. The calculations used a transmissivity of 3125 ft²/day derived from specific capacity data from wells LAKE 2840, LAKE 280 and LAKE 52266. Additionally, the calculation used an assumed intermediate storage coefficient (0.001). A pumping rate of 5.94 cfs (2666 gpm) maximum rate requested and 2.94 cfs (1318 gpm) pro-rated rate was used.

The estimated drawdown for 30 days was about 23.9 feet for the maximum rate requested and 11.8 feet for the pro-rate rate. The estimated drawdown for 245 days was about 50.3 feet for the maximum rate requested and 24.8 feet for the pro-rate rate.

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
1	3	1.1 %	1.0 %	0.3 %	0.5 %	0.7 %	0.9 %	1.0 %	1.2 %	1.3 %	1.4 %	1.3 %	1.2 %
Well Q as CFS		0.00	0.00	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	0.00	0.00
Interference CFS		0.064	0.059	0.015	0.029	0.041	0.051	0.060	0.069	0.076	0.084	0.078	0.070
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.		0.064	0.059	0.015	0.029	0.041	0.051	0.060	0.069	0.076	0.084	0.078	0.070
(B) = 80 % Nat. Q		1.71	2.85	4.48	11.80	18.40	6.27	1.66	1.07	0.99	1.20	1.58	1.93
(C) = 1 % Nat. Q		0.017	0.029	0.045	0.118	0.184	0.063	0.017	0.011	0.010	0.012	0.016	0.019
(D) = (A) > (C)		Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
(E) = (A / B) x 100		3.74%	2.07%	0.33%	0.25%	0.22%	0.81%	3.61%	6.45%	7.68%	7.00%	4.94%	3.63%

(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:

The proposed well is more than 1.0 mile from Cogswell Creek

Water availability values calculated for Cogswell Creek were found.

Groundwater level drawdown at the nearest reach of Cogswell Creek was estimated using the Theis drawdown equation. The calculations used a transmissivity of 3125 ft²/day derived from specific capacity data from wells LAKE 2840, LAKE 280 and LAKE 52266. Additionally, the calculation used an assumed intermediate storage coefficient (0.001). A pumping rate of 5.94 cfs (2666 gpm) maximum rate requested and 2.94 cfs (1318 gpm) pro-rated rate was used.

The estimated drawdown for 30 days was about 13.9 feet for the maximum rate requested and 6.9 feet for the pro-rate rate. The estimated drawdown for 245 days was about 38.8 feet for the maximum rate requested and 19.2 feet for the pro-rate rate.

Hunt (1999) was used to calculate groundwater interference with Cogswell Creek using the values noted above for the Theis calculations as well as a stream width of 5 feet, streambed thickness of 25 feet, and a streambed hydraulic conductivity of 0.02 feet/day. By the end of the irrigation season, interference with the creek was calculated as 1.4 percent of the pumping rate. The calculated interference exceeded one percent the natural creek flow 9 of 12 months with a maximum interference of 7.68 percent during the lowest creek flow month.

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
1	4	4.90%	4.50%	1.20%	2.40%	3.30%	4.20%	4.90%	5.50%	6.10%	6.70%	6.20%	5.40%
Well Q as CFS		0.00	0.00	5.94	5.94	5.94	5.94	5.94	5.94	5.94	5.94	0.00	0.00
Interference CFS		0.291	0.268	0.073	0.142	0.199	0.247	0.289	0.327	0.363	0.395	0.366	0.322
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.		0.291	0.268	0.073	0.142	0.199	0.247	0.289	0.327	0.363	0.395	0.366	0.322
(B) = 80 % Nat. Q		16.70	38.70	76.60	151.00	111.00	47.70	13.10	8.24	8.98	10.40	14.50	19.10
(C) = 1 % Nat. Q		0.167	0.387	0.766	1.510	1.110	0.477	0.131	0.082	0.090	0.104	0.145	0.191
(D) = (A) > (C)		Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
(E) = (A / B) x 100		1.74%	0.69%	0.10%	0.09%	0.18%	0.52%	2.21%	3.97%	4.04%	3.80%	2.52%	1.69%

(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:

The proposed well is more than 1.0 mile from Thomas Creek

Water availability values calculated for Thomas Creek were found.

Groundwater level drawdown at the nearest reach of Thomas Creek was estimated using the Theis drawdown equation. The calculations used a transmissivity of 3125 ft²/day derived from specific capacity data from wells LAKE 2840, LAKE 280 and LAKE 52266. Additionally, the calculation used an assumed intermediate storage coefficient (0.001). A pumping rate of 5.94 cfs (2666 gpm) maximum rate requested and 2.94 cfs (1318 gpm) pro-rated rate was used.

The estimated drawdown for 30 days was about 8.9 feet for the maximum rate requested and 4.4 feet for the pro-rate rate. The estimated drawdown for 245 days was about 32.2 feet for the maximum rate requested and 15.9 feet for the pro-rate rate.

Hunt (1999) was used to calculate groundwater interference with Thomas Creek using the values noted above for the Theis calculations as well as a stream width of 25 feet, streambed thickness of 25 feet, and a streambed hydraulic conductivity of 0.02 feet/day. By the end of the irrigation season, interference with the creek was calculated as 6.7 percent of the pumping rate. The calculated interference exceeded one percent the natural creek flow 7 of 12 months with a maximum interference of 4.04 percent during the second lowest creek flow month.

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: _____

If a permit is issued, include conditions 7B, 7N, 7T, and "large" flow meter condition.

Nearby wells may need to lower pumps or deepen wells. The estimated drawdown at the nearest POA/POD well for 30 days pumping was about 76.3 feet for the maximum rate requested and 37.7 feet for the pro-rate rate. The estimated drawdown for 245 days pumping was about 103.7 feet for the maximum rate requested and 51.2 feet for the pro-rate rate.

The proposed well is more than one mile away from surface water.

The estimated drawdown at Goose Lake for 30 days pumping was about 25.5 feet for the maximum rate requested and 12.6 feet for the pro-rate rate. The estimated drawdown for 245 days pumping was about 52.0 feet for the maximum rate requested and 25.7 feet for the pro-rate rate.

The estimated drawdown at Crane Creek for 30 days pumping was about 23.9 feet for the maximum rate requested and 11.8 feet for the pro-rate rate. The estimated drawdown for 245 days pumping was about 50.3 feet for the maximum rate requested and 24.8 feet for the pro-rate rate.

The estimated drawdown at Cogswell Creek for 30 days pumping was about 13.9 feet for the maximum rate requested and 6.9 feet for the pro-rate rate. The estimated drawdown for 245 days pumping was about 38.8 feet for the maximum rate requested and 19.2 feet for the pro-rate rate. **By the end of the irrigation season, interference with the creek was calculated as 1.4 percent of the pumping rate. The calculated interference exceeded one percent the natural creek flow 9 of 12 months with a maximum interference of 7.68 percent during the lowest creek flow month.**

The estimated drawdown at Thomas Creek for 30 days pumping was about 8.9 feet for the maximum rate requested and 4.4 feet for the pro-rate rate. The estimated drawdown for 245 days pumping was about 32.2 feet for the maximum rate requested and 15.9 feet for the pro-rate rate. **By the end of the irrigation season, interference with the creek was calculated as 6.7 percent of the pumping rate. The calculated interference exceeded one percent the natural creek flow 7 of 12 months with a maximum interference of 4.04 percent during the second lowest creek flow month.**

The groundwater system is identified as generally unconfined with discontinuous low permeability layers causing local (discontinuous, limited) confinement.

The groundwater source at the proposed well is identified as basin fill sediments. Peterson and Brown (1980) mapped the site as undifferentiated alluvium and sediments (Qal/Qs) that includes lacustrine and fluvial gravel, sand, and silt. Water well reports for wells in sections 2, 3, 10, 11, 14, and 15 indicate sand, silt, clay, and gravel deposits in the area and irrigation, well yields exceeding 1,000 gpm. This site is west of an area Peterson and Brown (1980) mapped as alluvial fan deposits (Qf) that includes unconsolidated to partially cemented stratified sand, gravel, and boulders.

Morgan (1988) notes for the Goose Lake subbasin that ground water flow is generally from upland recharge areas to lowland discharge areas. However, local subsystems discharge to lakes, reservoirs, meadows, and streams. Large quantities of ground water move through complexly interbedded, discontinuous, unconsolidated sand, gravel, silt, and clay deposits. Morgan characterizes the upper portion of ground water as unconfined with confined-like conditions increasing with depth. This appears related to anisotropic hydraulic conductivities with horizontal hydraulic conductivity much greater than vertical hydraulic conductivity. For one site noted, the estimated ratios ranged from 2:1 to 179:1. There is no indication of shallower ground water being separated from deeper ground water by a confining layer.

References Used:

Gonthier, J.B. 1985, A description of aquifer units in eastern Oregon: USGS Water Resources Investigations Report 84-4095, 39 p., 4 plates.

Morgan, D.S., 1988, Geohydrology and numerical model analysis of ground-water flow in the Goose Lake Basin, Oregon and California: USGS Water Resources Investigations Report 87-4058, 92 p.

Oregon Water Resources Department, 1989, Goose and Summer Lakes Basin report: OWRD Basin Report, 112 p.

Peterson, N.V. and McIntyre, J.R., 1970, The reconnaissance geology and mineral resources of eastern Klamath County and western Lake County, Oregon: DOGAMI Bulletin 66, 70 p.

Peterson, N.V., and Brown, D.E., 1980, Preliminary geology and geothermal resource potential of the Lakeview area, Oregon: DOGAMI Open-File Report O-80-09, 57 p., 1:62,500 maps.

Phillips, K.N. and VanDenburgh, A.S., 1971, Hydrology and geochemistry of Abert, Summer, and Goose Lakes, and other closed-basin lakes in south-central Oregon: USGS Professional Paper 502-B, 86p.

Walker, G.W., 1963, Reconnaissance geologic map of the eastern half of the Klamath Falls (AMS) quadrangle, Lake and Klamath Counties, Oregon: USGS Mineral Investigations Field Studies Map MF-260.

Walker, G.W. and Reppening, C.A., 1965, Reconnaissance geologic map of the Adel quadrangle, Lake, Harney, and Malheur Counties, Oregon: USGS Miscellaneous Geologic Investigations Map I-446.

Waring, G.A., 1908, Geology and water resources of a portion of south-central Oregon: USGS Water Supply Paper 220, 85 p.

Goose and Summer Lakes Basin Program rules (OAR 690-513).

Groundwater level data for wells LAKE 2202, LAKE 2320, LAKE 2851, LAKE 2923, LAKE 52338, and LAKE 52538.

Water well reports, particularly for wells LAKE 2840, LAKE 2860, and LAKE 52266.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: N.A. Logid: Not constructed yet

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.**

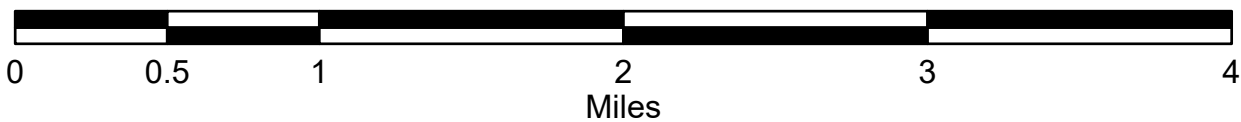
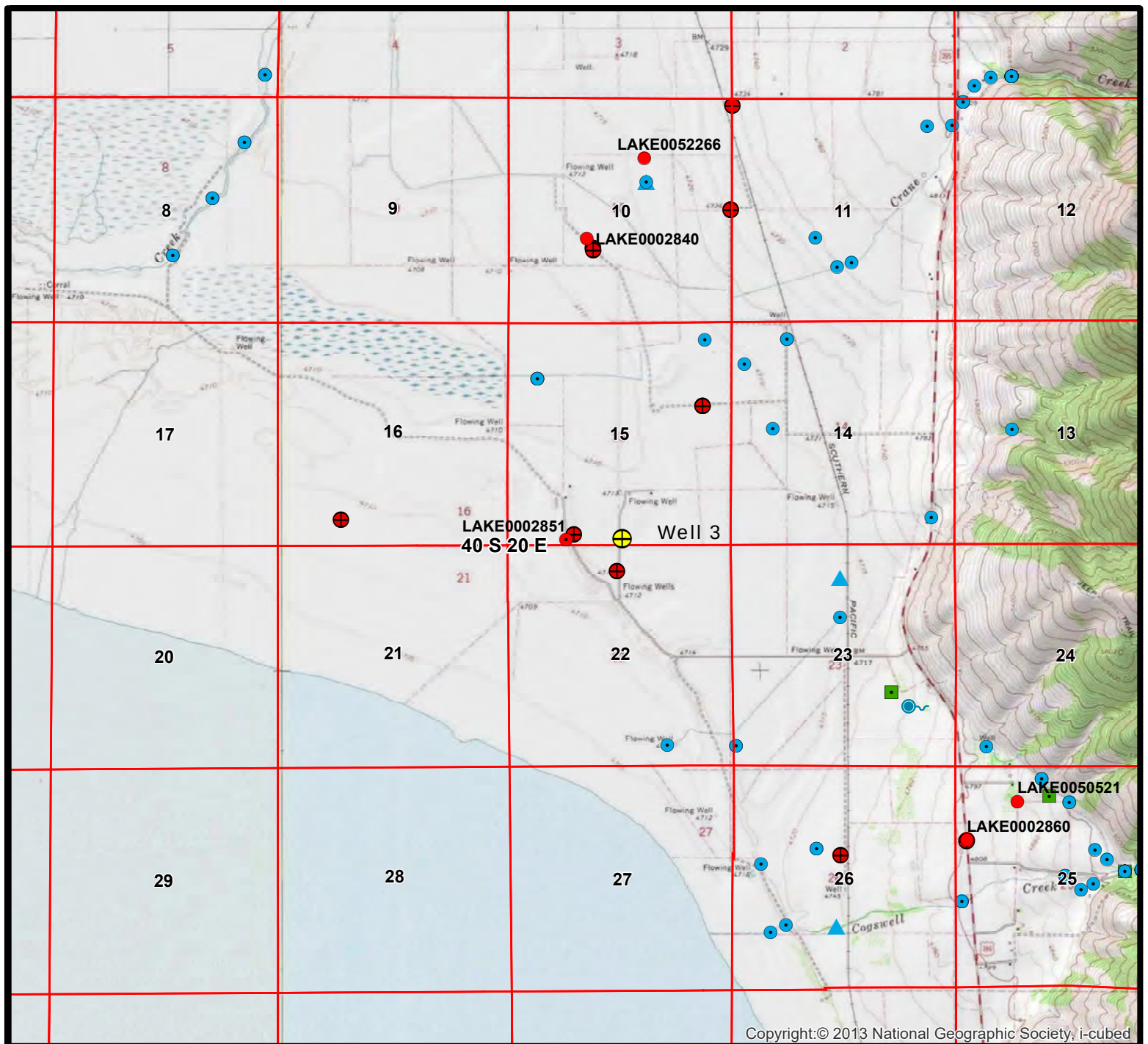
Water Availability Tables

Well Location Map

Water-Level Measurements in Nearby Wells

Groundwater Permit Application G-19032

Dennis & Pamela Amsbaugh (Amsbaugh Ranch)

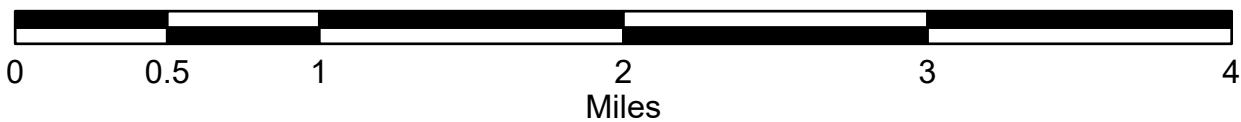
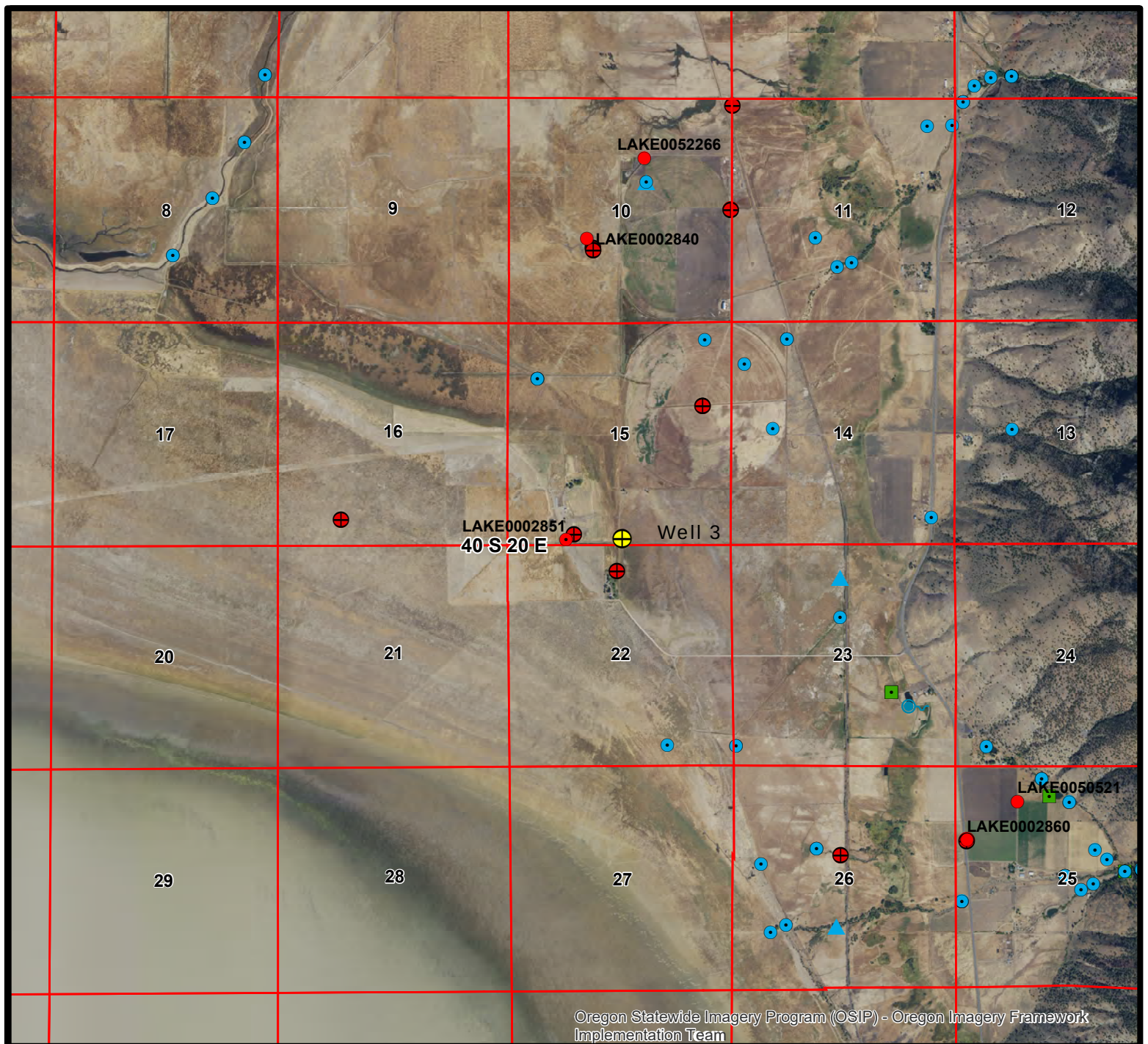


Yellow = Proposed POA/POD Well
Red = Groundwater PODs & Other Wells
Blue = Surface Water PODs



Groundwater Permit Application G-19032

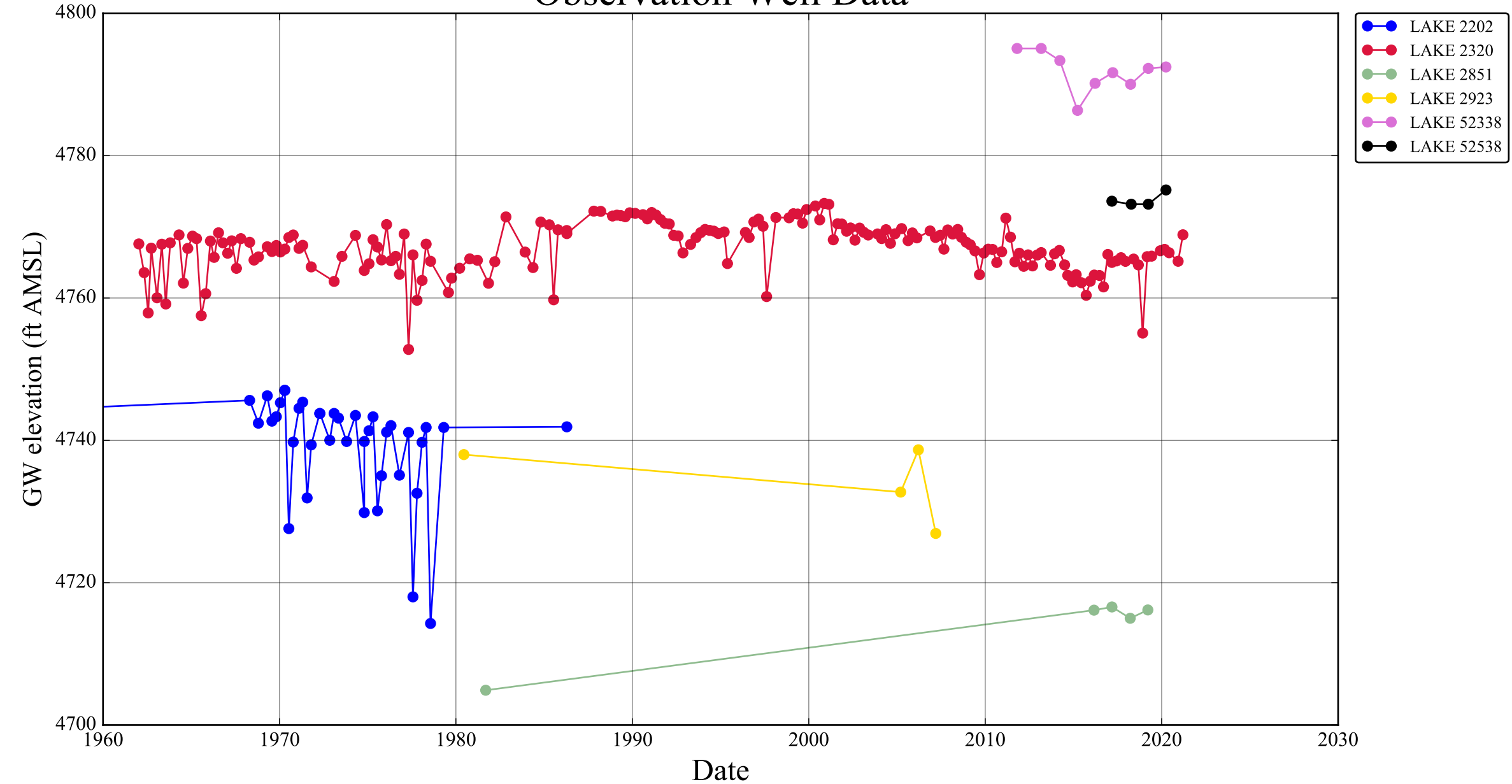
Dennis & Pamela Amsbaugh (Amsbaugh Ranch)



Yellow = Proposed POA/POD Well
Red = Groundwater PODs & Other Wells
Blue = Surface Water PODs



Observation Well Data



Drawdown Calculations Using Theis Equation

Theis Equation: $s = [Q/(4 \cdot T \cdot \pi)] [W(u)]$
 $u = (r^2 \cdot S)/(4 \cdot T \cdot t)$
 $W(u) = (-\ln u) - (0.5772157) + (u/1 \cdot 1!) - (u^2/2 \cdot 2!) + (u^3/3 \cdot 3!) - (u^4/4 \cdot 4!) + \dots$

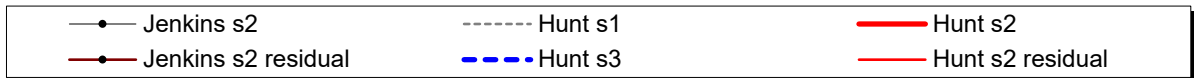
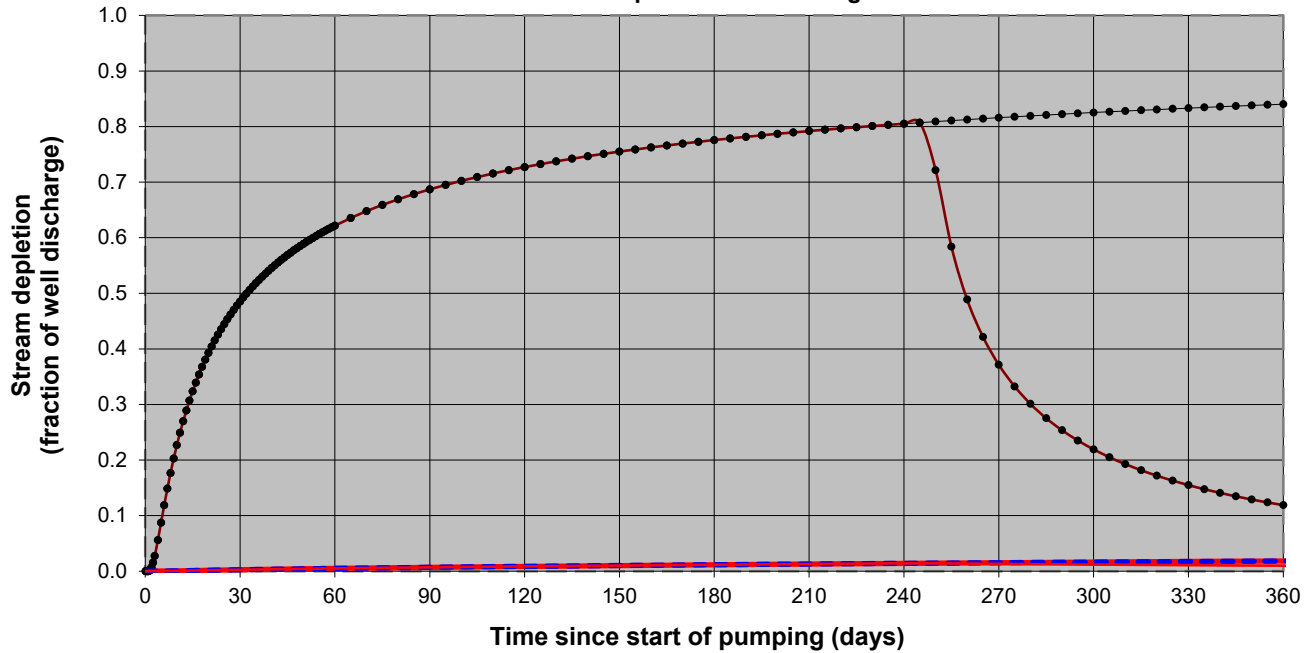
s = drawdown (L)
T = transmissivity (L²/T)
S = storage coefficient (dimensionless)
pi = 3.141592654

r = radial distance (L)
t = time (T)
u = dimensionless
W(u) = well function

Transmissivity T (gpd/ft)	Transmissivity T (ft ² /day)	Storage Coefficient S	Pumping Rate Q (gal/min)	Pumping Rate Q (ft ³ /sec)	Time t (days)	Distance r (feet)	pi	u	W(u)	Drawdown s (feet)	Comments
Note : W(u) calculation valid when u < 7.1											
Note: yellow grid areas are where values are calculated								7.0000	1.1545E-04		W(u) calculation test
Proposed Well Drawdown at Nearest POA/POD Well											
23,376.63	3,125.00	0.00100	2,666.06	5.9400	30.00	785.00	3.14	0.0016	5.8355	76.2638	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	2,666.06	5.9400	245.00	785.00	3.14	0.0002	7.9341	103.6905	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	30.00	785.00	3.14	0.0016	5.8355	37.6888	Continuous Pumping at Pro-Rated Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	245.00	785.00	3.14	0.0002	7.9341	51.2428	Continuous Pumping at Pro-Rated Rate
Proposed Well Drawdown at Goose Lake											
23,376.63	3,125.00	0.00100	2,666.06	5.9400	30.00	5,700.00	3.14	0.0866	1.9536	25.5312	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	2,666.06	5.9400	245.00	5,700.00	3.14	0.0106	3.9794	52.0068	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	30.00	5,700.00	3.14	0.0866	1.9536	12.6173	Continuous Pumping at Pro-Rated Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	245.00	5,700.00	3.14	0.0106	3.9794	25.7013	Continuous Pumping at Pro-Rated Rate
Proposed Well Drawdown at Crane Creek											
23,376.63	3,125.00	0.00100	2,666.06	5.9400	30.00	6,100.00	3.14	0.0992	1.8300	23.9155	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	2,666.06	5.9400	245.00	6,100.00	3.14	0.0122	3.8453	50.2541	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	30.00	6,100.00	3.14	0.0992	1.8300	11.8188	Continuous Pumping at Pro-Rated Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	245.00	6,100.00	3.14	0.0122	3.8453	24.8351	Continuous Pumping at Pro-Rated Rate
Proposed Well Drawdown at Cogswell Creek											
23,376.63	3,125.00	0.00100	2,666.06	5.9400	30.00	9,555.00	3.14	0.2435	1.0650	13.9183	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	2,666.06	5.9400	245.00	9,555.00	3.14	0.0298	2.9652	38.7525	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	30.00	9,555.00	3.14	0.2435	1.0650	6.8783	Continuous Pumping at Pro-Rated Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	245.00	9,555.00	3.14	0.0298	2.9652	19.1511	Continuous Pumping at Pro-Rated Rate
Proposed Well Drawdown at Thomas Creek											
23,376.63	3,125.00	0.00100	2,666.06	5.9400	30.00	12,410.00	3.14	0.4107	0.6848	8.9496	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	2,666.06	5.9400	245.00	12,410.00	3.14	0.0503	2.4624	32.1814	Continuous Pumping at Full Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	30.00	12,410.00	3.14	0.4107	0.6848	4.4228	Continuous Pumping at Pro-Rated Rate
23,376.63	3,125.00	0.00100	1,317.54	2.9355	245.00	12,410.00	3.14	0.0503	2.4624	15.9037	Continuous Pumping at Pro-Rated Rate

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)

Proposed Well 3 to Cogswell Creek



Output for Hunt Stream Depletion, Scenerio 2 (s2): **Time pump on = 245 days**

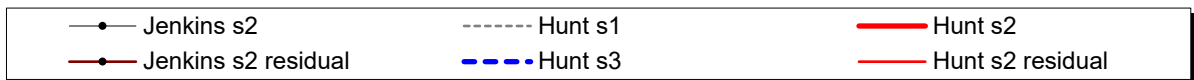
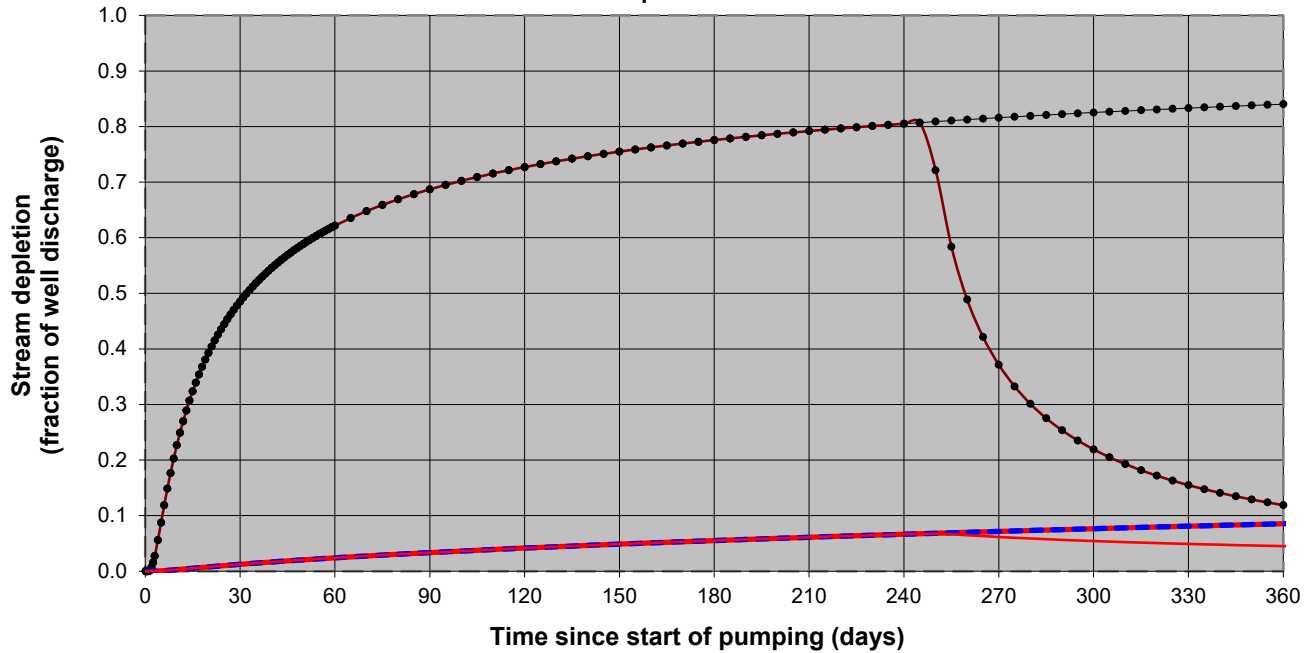
Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940
Jenk SD %	0.485	0.622	0.687	0.727	0.755	0.776	0.792	0.805	0.371	0.219	0.155	0.119
Jen SD cfs	2.883	3.693	4.081	4.319	4.485	4.608	4.704	4.782	2.206	1.301	0.920	0.706
Hunt SD %	0.003	0.005	0.007	0.009	0.010	0.012	0.013	0.014	0.013	0.012	0.011	0.010
Hunt SD cfs	0.015	0.029	0.041	0.051	0.060	0.069	0.076	0.084	0.078	0.070	0.064	0.059

Parameters:

		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	5.94	5.94	5.94	cfs
Distance to stream	a	9555	9555	9555	ft
Aquifer hydraulic conductivity	K	6.25	6.25	6.25	ft/day
Aquifer thickness	b	500	500	500	ft
Aquifer transmissivity	T	3125	3125	3125	ft*ft/day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	5	5	5	ft
Streambed hydraulic conductivity	Ks	0.02	0.02	0.02	ft/day
Streambed thickness	bs	25	25	25	ft
Streambed conductance	sbc	0.004	0.004	0.004	ft/day
Stream depletion factor (Jenkins)	sdf	29.215368	29.215368	29.215368	days
Streambed factor (Hunt)	sbf	0.0122304	0.0122304	0.0122304	

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)

Proposed Well 3 to Thomas Creek



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 245 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940	5.940
Jenk SD %	0.485	0.622	0.687	0.727	0.755	0.776	0.792	0.805	0.371	0.219	0.155	0.119
Jen SD cfs	2.883	3.693	4.081	4.319	4.485	4.608	4.704	4.782	2.206	1.301	0.920	0.706
Hunt SD %	0.012	0.024	0.033	0.042	0.049	0.055	0.061	0.067	0.062	0.054	0.049	0.045
Hunt SD cfs	0.073	0.142	0.199	0.247	0.289	0.327	0.363	0.395	0.366	0.322	0.291	0.268

Parameters:

		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	5.94	5.94	5.94	cfs
Distance to stream	a	9555	9555	9555	ft
Aquifer hydraulic conductivity	K	6.25	6.25	6.25	ft/day
Aquifer thickness	b	500	500	500	ft
Aquifer transmissivity	T	3125	3125	3125	ft*ft/day
Aquifer storage coefficient	S	0.001	0.001	0.001	
Stream width	ws	25	25	25	ft
Streambed hydraulic conductivity	Ks	0.02	0.02	0.02	ft/day
Streambed thickness	bs	25	25	25	ft
Streambed conductance	sbc	0.02	0.02	0.02	ft/day
Stream depletion factor (Jenkins)	sdf	29.215368	29.215368	29.215368	days
Streambed factor (Hunt)	sbf	0.061152	0.061152	0.061152	

Theis_Equation_specific_capacity_to_transmissivity					
Basin-Fill					
Well County	Well Num	Transmissivity	Transmissivity	Open Interval	Conductivity
		ft2/day	gpd/ft	feet	ft/day
LAKE	52266	3,035.54	22,707.42	140.00	21.68
LAKE	2840	5,448.91	40,760.68	380.00	14.34
LAKE	2860	898.92	6,724.39	150.00	5.99
		3,127.79	22,707.42	Average	14.00



Water Availability Analysis

COGSWELL CR > GOOSE L - AT MOUTH

GOOSE & SUMMER LAKE BASIN

Water Availability as of 8/11/2021

Watershed ID #: 31300122 ([Map](#))

Date: 8/11/2021

Exceedance Level:

Time: 3:07 PM

[Download Data](#)

Water Availability

Select any Watershed for Details

Nesting Order	Watershed ID #	Stream Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sto
1	31300122	COGSWELL CR> GOOSE L - AT MOUTH	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes

Limiting Watersheds

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

Month	Limiting Watershed ID #	Stream Name	Water Available?	Net Water Available
JAN	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	1.70
FEB	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	2.84
MAR	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	4.46
APR	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	8.88
MAY	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	14.40
JUN	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	1.25
JUL	31300122	COGSWELL CR > GOOSE L - AT MOUTH	No	-5.71
AUG	31300122	COGSWELL CR > GOOSE L - AT MOUTH	No	-4.73
SEP	31300122	COGSWELL CR > GOOSE L - AT MOUTH	No	-3.01
OCT	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	0.11
NOV	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	1.57
DEC	31300122	COGSWELL CR > GOOSE L - AT MOUTH	Yes	1.92

Detailed Reports for Watershed ID #31300122

COGSWELL CR > GOOSE L - AT MOUTH

GOOSE & SUMMER LAKE BASIN

Water Availability as of 8/11/2021

Watershed ID #: 31300122 ([Map](#))

Date: 8/11/2021

Exceedance Level:

Time: 3:07 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	1.71	0.01	1.70	0.00	0.00	1.70
FEB	2.85	0.01	2.84	0.00	0.00	2.84
MAR	4.48	0.02	4.46	0.00	0.00	4.46
APR	11.80	2.92	8.88	0.00	0.00	8.88
MAY	18.40	3.97	14.40	0.00	0.00	14.40
JUN	6.27	5.02	1.25	0.00	0.00	1.25
JUL	1.66	7.37	-5.71	0.00	0.00	-5.71
AUG	1.07	5.80	-4.73	0.00	0.00	-4.73
SEP	0.99	4.00	-3.01	0.00	0.00	-3.01
OCT	1.20	1.09	0.11	0.00	0.00	0.11
NOV	1.58	0.01	1.57	0.00	0.00	1.57
DEC	1.93	0.01	1.92	0.00	0.00	1.92
ANN	6,180.00	1,840.00	4,950.00	0.00	0.00	4,950.00

Detailed Report of Consumptive Uses and Storage

Consumptive Uses and Storages in Cubic Feet per Second

Month	Storage	Irrigation	Municipal	Industrial	Commercial	Domestic	Agricultural	Other	Total
JAN	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
FEB	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01

MAR	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
APR	0.05	2.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.92
MAY	0.10	3.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.97
JUN	0.04	4.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.02
JUL	0.01	7.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.37
AUG	0.01	5.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.80
SEP	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00
OCT	0.00	1.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09
NOV	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
DEC	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01

Detailed Report of Reservations for Storage and Consumptive Uses

Reserved Streamflow in Cubic Feet per Second

No reservations were found for this watershed.

Detailed Report of Instream Flow Requirements

Instream Flow Requirements in Cubic Feet per Second

No instream flow requirements were found for this watershed.



Water Availability Analysis

THOMAS CR > GOOSE L - AT MOUTH

GOOSE & SUMMER LAKE BASIN

Water Availability as of 8/11/2021

Watershed ID #: 31300102 ([Map](#))

Date: 8/11/2021

Exceedance Level:

Time: 3:22 PM

[Download Data](#)

Water Availability

Select any Watershed for Details

Nesting Order	Watershed ID #	Stream Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sto
1	31300102	THOMAS CR> GOOSE L - AT MOUTH	Yes	Yes	Yes	Yes	No	No	No	No	No	No	Yes	Yes	Yes

Limiting Watersheds

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

Month	Limiting Watershed ID #	Stream Name	Water Available?	Net Water Available
JAN	31300102	THOMAS CR > GOOSE L - AT MOUTH	Yes	0.04
FEB	31300102	THOMAS CR > GOOSE L - AT MOUTH	Yes	11.80
MAR	31300102	THOMAS CR > GOOSE L - AT MOUTH	Yes	29.30
APR	31300102	THOMAS CR > GOOSE L - AT MOUTH	Yes	43.30
MAY	31300102	THOMAS CR > GOOSE L - AT MOUTH	No	-80.20
JUN	31300102	THOMAS CR > GOOSE L - AT MOUTH	No	-102.00
JUL	31300102	THOMAS CR > GOOSE L - AT MOUTH	No	-31.50
AUG	31300102	THOMAS CR > GOOSE L - AT MOUTH	No	-16.50
SEP	31300102	THOMAS CR > GOOSE L - AT MOUTH	No	-12.80
OCT	31300102	THOMAS CR > GOOSE L - AT MOUTH	No	-3.21
NOV	31300102	THOMAS CR > GOOSE L - AT MOUTH	Yes	8.64
DEC	31300102	THOMAS CR > GOOSE L - AT MOUTH	Yes	5.28

Detailed Reports for Watershed ID #31300102

THOMAS CR > GOOSE L - AT MOUTH

GOOSE & SUMMER LAKE BASIN

Water Availability as of 8/11/2021

Watershed ID #: 31300102 ([Map](#))

Date: 8/11/2021

Exceedance Level:

Time: 3:22 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	16.70	16.70	0.04	0.00	0.00	0.04
FEB	38.70	26.90	11.80	0.00	0.00	11.80
MAR	76.60	47.30	29.30	0.00	0.00	29.30
APR	151.00	108.00	43.30	0.00	0.00	43.30
MAY	111.00	191.00	-80.20	0.00	0.00	-80.20
JUN	41.70	143.00	-102.00	0.00	0.00	-102.00
JUL	13.10	44.60	-31.50	0.00	0.00	-31.50
AUG	8.24	24.70	-16.50	0.00	0.00	-16.50
SEP	8.98	21.80	-12.80	0.00	0.00	-12.80
OCT	10.40	13.60	-3.21	0.00	0.00	-3.21
NOV	14.50	5.86	8.64	0.00	0.00	8.64
DEC	19.10	13.80	5.28	0.00	0.00	5.28
ANN	62,400.00	39,700.00	28,900.00	0.00	0.00	28,900.00

Detailed Report of Consumptive Uses and Storage

Consumptive Uses and Storages in Cubic Feet per Second

Month	Storage	Irrigation	Municipal	Industrial	Commercial	Domestic	Agricultural	Other	Total
JAN	16.30	0.00	0.21	0.03	0.00	0.02	0.10	0.00	16.70
FEB	26.50	0.00	0.21	0.03	0.00	0.02	0.10	0.03	26.90

MAR	34.30	12.60	0.21	0.03	0.00	0.02	0.10	0.03	47.30
APR	46.90	60.50	0.21	0.03	0.00	0.02	0.10	0.00	108.00
MAY	26.40	164.00	0.21	0.03	0.00	0.02	0.10	0.00	191.00
JUN	5.99	137.00	0.43	0.03	0.00	0.02	0.10	0.00	143.00
JUL	1.70	42.30	0.43	0.03	0.00	0.02	0.10	0.00	44.60
AUG	1.03	23.10	0.43	0.03	0.00	0.02	0.10	0.00	24.70
SEP	1.15	20.10	0.43	0.03	0.00	0.02	0.10	0.00	21.80
OCT	1.47	11.80	0.21	0.03	0.00	0.02	0.10	0.00	13.60
NOV	5.50	0.00	0.21	0.03	0.00	0.02	0.10	0.00	5.86
DEC	13.50	0.00	0.21	0.03	0.00	0.02	0.10	0.00	13.80

Detailed Report of Reservations for Storage and Consumptive Uses

Reserved Streamflow in Cubic Feet per Second

No reservations were found for this watershed.

Detailed Report of Instream Flow Requirements

Instream Flow Requirements in Cubic Feet per Second

No instream flow requirements were found for this watershed.