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-19194
Date:	February 3, 2022

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

Applicant's Well #1 (LAKE 52007): Based on a review of the Well Report, Applicant's Well #1 seems to protect the groundwater resource.

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

LAKE 52007

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

52007

WELL I.D. # L 90680
START CARD # 193423

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number
Name Leo Filippi
Address P.O. Box 994
City Preston State WA Zip 98050

(2) TYPE OF WORK ☒ New Well
☐ Deepening ☐ Alteration (repair/recondition) ☐ Abandonment ☐ Conversion

(3) DRILL METHOD
☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☐ Other

(4) PROPOSED USE
☒ Domestic ☐ Community ☐ Industrial ☐ Irrigation
☐ Thermal ☐ Injection ☐ Livestock ☐ Other

(5) BORE HOLE CONSTRUCTION Special Construction: ☐ Yes ☐ No
Depth of Completed Well 175 ft.
Explosives used: ☐ Yes ☒ No Type Amount

BORE HOLE Diameter	From	To	SEAL Material	From	To	Sacks or Pounds
10"	0	18'	bentonite	0	18'	13
6"	18'	175'				

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other poured dry
Backfill placed from ft. to ft. Material
Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	6"	+2	175'	0.250	☒	☐	☒	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
					☐	☐	☐	☐
Liner:					☐	☐	☐	☐
					☐	☐	☐	☐

Drive Shoe used ☐ Inside ☒ Outside ☐ None
Final location of shoe(s) 175'

(7) PERFORATIONS/SCREENS Method torch downhole perforator
☒ Perforations Type Material
☐ Screens

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
50'	75'		1 row			☒	☐
75'	140'		2 rows			☒	☐
torch 140'	175'		3 rows			☒	☐
						☐	☐

(8) WELL TESTS: Minimum testing time is 1 hour
☐ Pump ☐ Bailer ☒ Air ☐ Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
360		173	1 hr.

Temperature of water 53° F Depth Artesian Flow Found
Was a water analysis done? ☐ Yes By whom
Did any strata contain water not suitable for intended use? ☐ Too little
☐ Salty ☐ Muddy ☐ Odor ☐ Colored ☐ Other
Depth of strata:

RECEIVED
FEB 01 2008
WATER RESOURCES DEPT
SALEM, OREGON

RECEIVED
APR 17 2008
WATER RESOURCES DEPT
SALEM, OREGON

(9) LOCATION OF WELL (legal description)
County Lake
Tax Lot Partition Plat 2095-B-71 Lot parcel 2
Township 39 N or S Range 19 E or W WM
Section 15 SE 1/4 1/4
Lat ° ' " or (degrees or decimal)
Long ° ' " or (degrees or decimal)
Street Address of Well (or nearest address)

(10) STATIC WATER LEVEL
24.5' ft. below land surface. Date
ft. below land surface. Date
Artesian pressure lb. per square inch Date

(11) WATER BEARING ZONES
Depth at which water was first found 138'

From	To	Estimated Flow Rate	SWL
138'	150'	360 gpm	24.5'

(12) WELL LOG Ground Elevation

Material	From	To	SWL
Top soil	0'	10'	
brown sandy clay	10'	30'	
gray " "	30'	125'	
green " "	125'	150'	24.5'
gray " "	150'	173'	
green clay	173'	175'	

Date Started 10/19/07 Completed 10/22/07

(unbonded) Water Well Constructor Certification
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number Date

Signed

(bonded) Water Well Constructor Certification
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 1716 Date 11/20/07
Signed Linda Landau

ORIGINAL – WATER RESOURCES DEPARTMENT FIRST COPY – CONSTRUCTOR SECOND COPY – CUSTOMER 06/16/2004

Groundwater Application Review Summary Form

Application # G- _19194_

GW Reviewer _Darrick E. Boschmann_ Date Review Completed: _11/29/2021_

Summary of GW Availability and Injury Review:

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

Summary of Potential for Substantial Interference Review:

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

Summary of Well Construction Assessment:

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

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

WATER RESOURCES DEPARTMENT

MEMO **_11/29/2021_**

TO: **Application** G-**_19194_**

FROM: **GW:** **_Darrick E. Boschmann_**
(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 _[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 11/29/2021

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

SUBJECT: Application G- **19194** Supersedes review of NA
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525.* Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. **This review is based upon available information and agency policies in place at the time of evaluation**.

A. GENERAL INFORMATION: Applicant's Name: **Adam Albertson** County: **Lake**

A1. Applicant(s) seek(s) 0.124 cfs from 1 well(s) in the Goose & Summer Lakes Basin, Goose Lake subbasin

A2. Proposed use 10 acres primary irrigation Seasonality: March 1 to October 31

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

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	LAKE 52007	1	Basin Fill	0.124	39.00S-19.00E-15-NW SE	1756 FT NORTH AND 2183 FT WEST FROM SE CORNER, SECTION 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	4854	138	24.5	10/22/2007	175	0-18	0-175	None	50-175	360	NA	Air

Use data from application for proposed wells.

A4. **Comments:** The proposed well is located within the Lower Cottonwood Creek subwatershed approximately 5 miles west of Lakeview. The area immediately underlying the proposed well was mapped by Walker (1963) as QTs (sedimentary deposits including lacustrine, fluviatile, and aeolian sedimentary rocks, interstratified tuff, ashy diatomite, and unconsolidated clay, sand, silt, and gravel). Morgan (1988) mapped this area as Qlo (older alluvium - fluvial terrace and lacustrine deposits).

The proposed well HARN 52007 produces groundwater from sandy clay, which is consistent with deposits of Walker's QTs unit, and the basin fill Qlo unit of Morgan, 1988.

A5. ☒ **Provisions of the** Goose & 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.

OAR 690-513-0030(2)d says "Groundwater from any well within 1,000 feet of Thomas Creek, or a tributary, and taking water from an unconfined aquifer is classified for domestic and stockwater uses only. This paragraph only applies to wells within the following areas:…(D) Sections 1-3 and 10-15; Township 39S; Range 19E;"

The proposed well is within the area noted. It is within 39S/19E section 15.

Groundwater in basin fill deposits in the Goose Lake area is identified as unconfined.

The proposed well is located greater than 1,000 feet from Thomas Creek or any tributary.

A6. ☐ **Well(s) #** _____ , _____ , _____ , _____ , _____ , 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) **7N; 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:**

Groundwater for the proposed use cannot be determined to be over-appropriated due to a lack of sufficient data regarding average annual rates of recharge.

The nearest current state observation well LAKE 2320 is located over 2.5 miles to the southeast of the proposed well. This well is 110 feet, completed in basin fill, and has a water level record from 1962 to 2021. Overall the record depicts no indication of a long term year-to-year decline trend over the period of record. Other state observation wells in the Goose Lake subbasin (LAKE 1979, LAKE 2424) similarly show no indication of long term year-to-year decline trend over the period of record.

The nearest authorized POD to the proposed well is POD 1 under certificate 60743 (a sump) which is located ~800 feet to the southeast. The potential increase in seasonal interference was calculated using the Theis equation (see attachment). The transmissivity used in the calculation (1340 ft^2/day) is the mean transmissivity of model layer 1 (basin fill) of Morgan, 1988. The storage coefficient used (0.1) is the value used by Morgan (1988) for model layer 1 (basin fill). At the maximum pumping rate (0.124 cfs) the results indicate an increase in seasonal drawdown of ~1.6 ft.

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.

Morgan (1988) describes unconfined conditions in the shallow basin fill, with confined groundwater increasing with depth. The confined-like conditions at depth appear to be due to the considerable anisotropy resulting from the layered heterogeneity of the deposits – with vertical anisotropy ratios from 2:1 to 170:1. There is no indication of shallower groundwater being separated from deeper groundwater by a continuous regional confining layer.

Regional hydraulic gradients are from the upland recharge areas toward the axis of the basin and principal discharge area underlying and adjacent to Goose Lake where groundwater moves upward and is discharged via evapotranspiration, seepage to Goose Lake, streams and wells. This regional pattern describes groundwater movement in both the shallow and deeper parts of the groundwater flow system, with upward vertical gradients at the discharge area underlying and surrounding Goose Lake. Local subsystems also discharge to lakes, reservoirs, meadows and streams.

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**	**perennial stream 82750975***	**4829.5**	**4822**	**2100**	☒	☐	☐	☐	☒
1	**2**	**Cottonwood Creek**	**4829.5**	**4831**	**4025**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation:

The USGS National Hydrography Dataset (NHD) dataset was used to identify surface water features. Morgan (1988) reports that flow in perennial streams is sustained during summer and fall by groundwater discharge. Two perennial streams are located within one mile of the proposed well. SW 1 is located a distance of 2100 feet from the proposed well and slightly down gradient. SW 2 is located a distance of 4025 feet from the proposed well and the elevation of SW is likely within error of the GW elevation at the well.

Note there is an unnamed intermittent stream (82750841*) located within ¼ mile of the proposed well, but the reach where this stream becomes perennial is located ~1.8 miles to the east. The intermittent reach is not evaluated for PSI.

*Unnamed NHD features denoted by the Permanent_Identifier field in the NHDFlowline feature class.

Water Availability Basin the well(s) are located within: THOMAS CR > GOOSE L – AT MOUTH

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked ☒ box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	**1**	☐	☐	**NA**	**NA**	☐	**8.24**	☒	**0.02**	☒
1	**2**	☐	☐	**NA**	**NA**	☐	**2.83**	☒	**0.00**	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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:

C3a. Hunt (1999) was used to calculate the interference between well 1 with SW1 and SW2. The values used for the calculation are conservative and appropriate until better values become available. The calculations used a transmissivity of 1340 ft^2/day, the mean transmissivity of model layer 1 (basin fill) of Morgan, 1988. The storage coefficient used (0.1) is the value used by Morgan (1988) for model layer 1 (basin fill). The hydraulic conductivity assigned to the streambed is 0.023 feet/day. See reports attached.

WABS evaluated: THOMAS CR > GOOSE L - AT MOUTH; COTTONWOOD CR > THOMAS CR - AT MOUTH

***Qw is greater than 1% of 80% natural flow for both SW 1 and SW2.**

C3b. No distributed rate requested.

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:

No analysis here. PSI is already triggered under other criteria.

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:**

C1. 690-09-040 (1)
It is determined that all wells will produce water from an unconfined aquifer.

C2. 690-09-040 (2) (3)
It is determined that all wells are hydraulically connected with perennial stream 82750975 and Cottonwood Creek.

C3a./C3b. 690-09-040 (4)
PSI is assumed for Well 1 to SW #1 and Well 1 to SW #2.

C4a. 690-09-040 (5)
No analysis here. PSI is already triggered under other criteria.

If a permit is issued, the following conditions are recommended:

7N: Annual Measurement and Decline Condition

Flow meter condition: Use the "medium" water use reporting permit condition.

References Used:

Hunt, B., 1999, Unsteady stream depletion from ground water pumping: Ground Water, v. 37, no. 1, p. 98-102.

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.

OWRD Well Log Database

OWRD Groundwater Information System Database

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

Walker, G.W., 1963. Reconnaissance geologic map of the eastern half of the Klamath Falls (AMS) quadrangle, Lake and Klamath Counties, Oregon. USGS Miscellaneous Field Studies Map 260, scale 1:250,000.

D. WELL CONSTRUCTION, OAR 690-200

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

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

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

D3. **THE WELL construction deficiency or other comment is described as follows:**

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

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

THOMAS CR > GOOSE L - AT MOUTH
Watershed ID #: 31300102 Basin: GOOSE & SUMMER LAKE Exceedance Level: 80
Time: 11:44 AM Date: 11/29/2021

Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	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	39,700	28,900	0	0	28,900

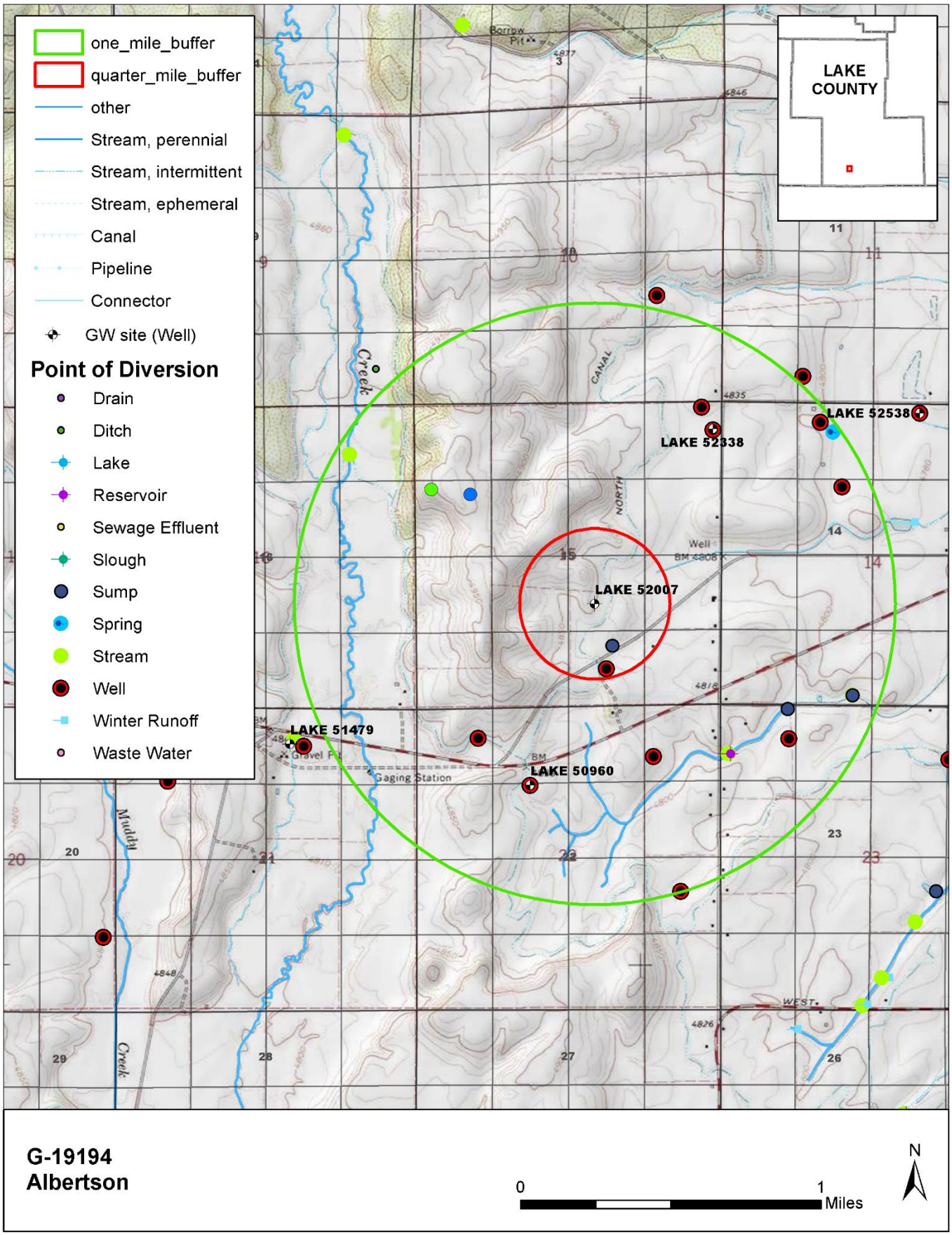
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

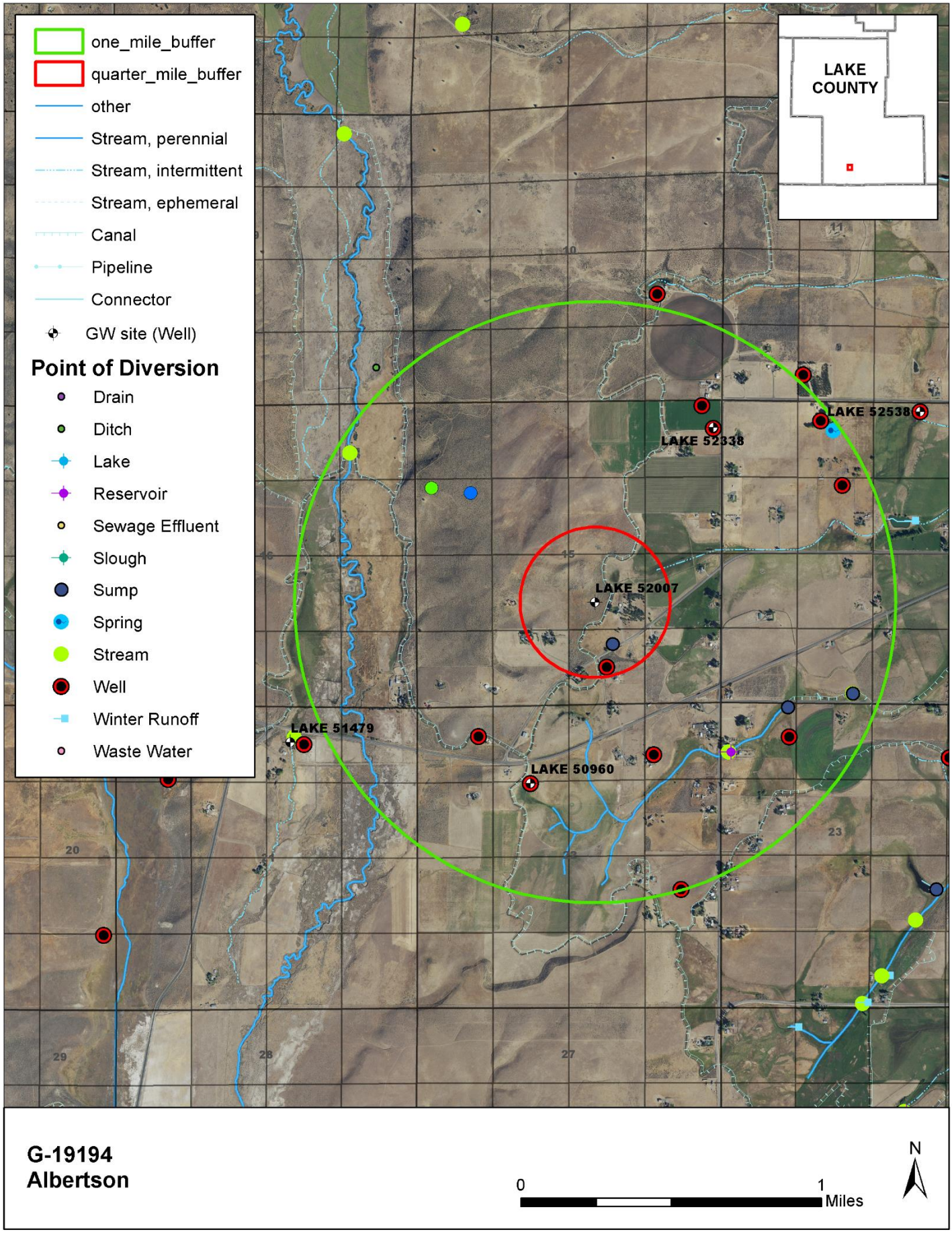
COTTONWOOD CR > THOMAS CR - AT MOUTH
Watershed ID #: 31300103 Basin: GOOSE & SUMMER LAKE Exceedance Level: 80
Time: 11:44 AM Date: 11/29/2021

Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

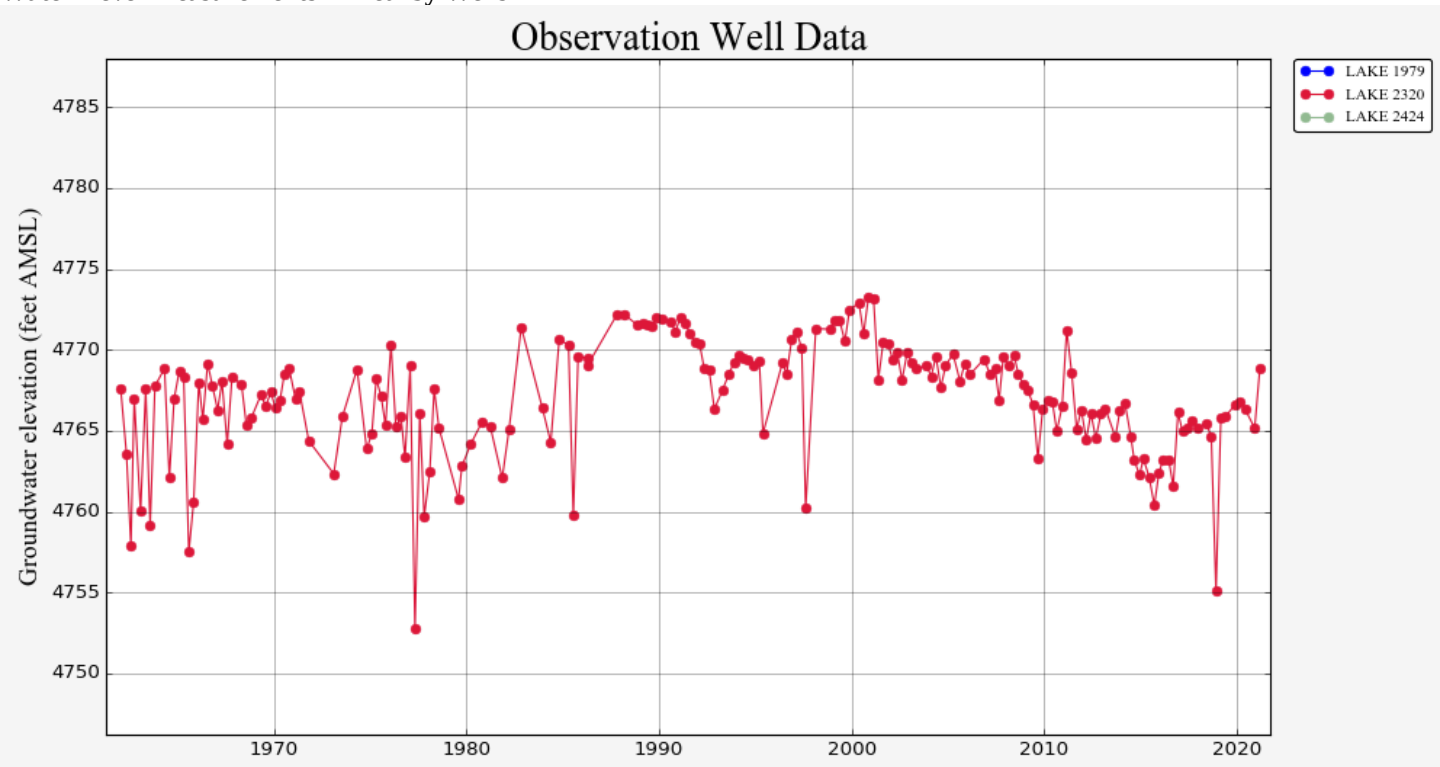
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
JAN	6.63	14.00	-7.41	0.00	0.00	-7.41
FEB	9.62	22.50	-12.80	0.00	0.00	-12.80
MAR	17.10	31.20	-14.10	0.00	0.00	-14.10
APR	38.80	63.00	-24.20	0.00	0.00	-24.20
MAY	40.30	102.00	-61.80	0.00	0.00	-61.80
JUN	15.10	75.00	-59.90	0.00	0.00	-59.90
JUL	4.78	21.60	-16.90	0.00	0.00	-16.90
AUG	2.99	11.30	-8.32	0.00	0.00	-8.32
SEP	2.83	10.20	-7.35	0.00	0.00	-7.35
OCT	3.22	6.59	-3.37	0.00	0.00	-3.37
NOV	4.31	4.12	0.19	0.00	0.00	0.19
DEC	5.60	11.60	-5.96	0.00	0.00	-5.96
ANN	17,500	22,500	1,170	0	0	1,170

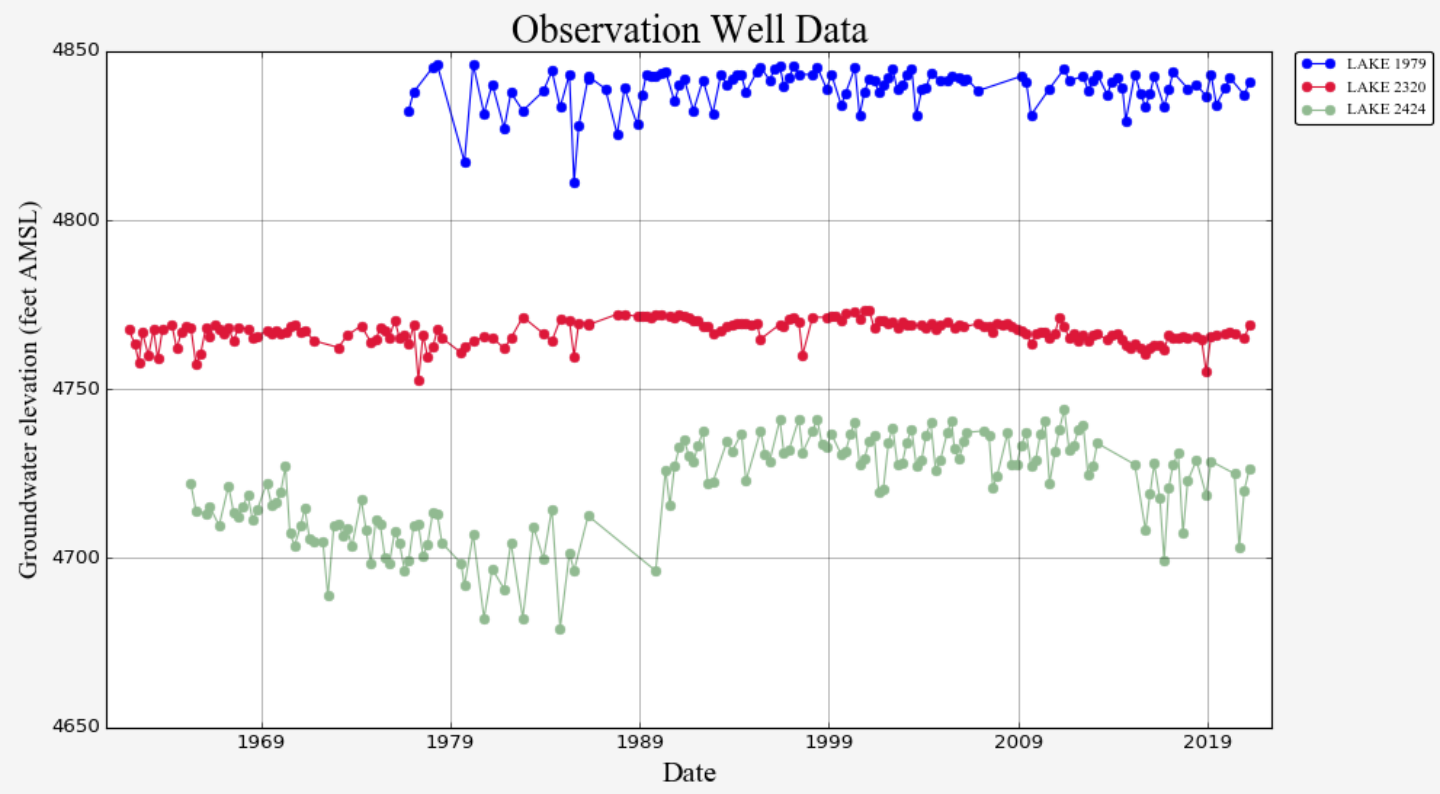
Well Location Maps




one_mile_buffer
quarter_mile_buffer
other
Stream, perennial
Stream, intermittent
Stream, ephemeral
Canal
Pipeline
Connector
GW site (Well)
Point of Diversion
Drain
Ditch
Lake
Reservoir
Sewage Effluent
Slough
Sump
Spring
Stream
Well
Winter Runoff
Waste Water
LAKE COUNTY
LAKE 52538
LAKE 52338
LAKE 52007
LAKE 51479
LAKE 50960
G-19194
Albertson
0
1
Miles
N

Water-Level Measurements in Nearby Wells





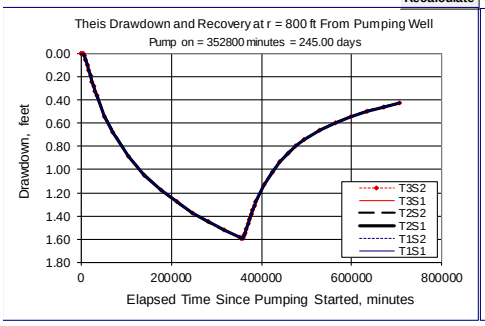
Theis Time-Drawdown Worksheet v.3.00

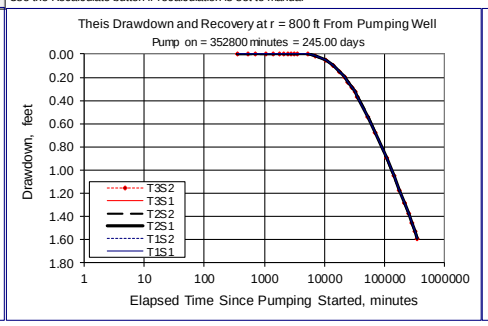
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

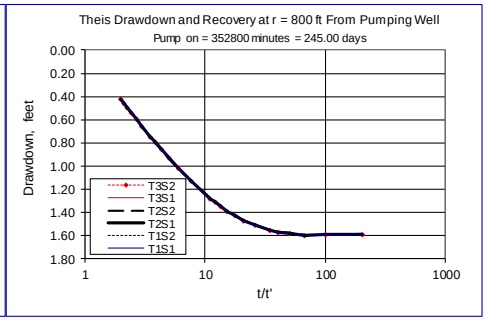
Written by Karl C. Wozniak September 1992. Last modified December 30, 2014

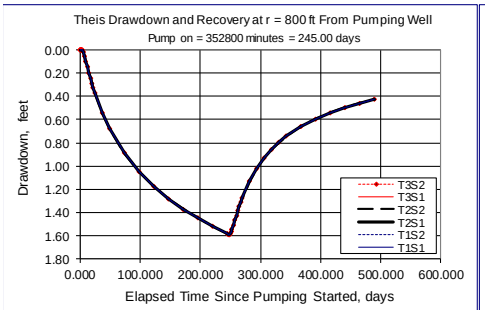
Input Data:	Var Name	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**	
Total pumping time	t		**245**		d	
Radial distance from pumped well:	r		**800.00**		ft	**Q conversions**
Pumping rate	Q		**0.1**		cfs	55.65 gpm
Hydraulic conductivity	K	**13**	**13**	**13**	ft/day	0.12 cfs
Aquifer thickness	b		**100**		ft	7.44 cfm
Storativity	S_1		**0.10000**			10,713.60 cfd
	S_2		**0.10000**			0.25 af/d
Transmissivity Conversions	T_f2pd	1,340	1,340	1,340	ft2/day	
	T_ft2pm	0.9306	0.9306	0.9306	ft2/min	
	T_gpdpft	10,023	10,023	10,023	gpd/ft	

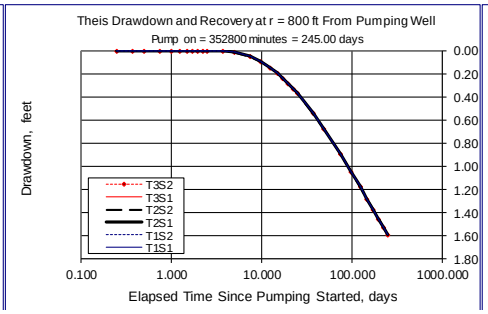
Recalculate Use the Recalculate button if recalculation is set to manual

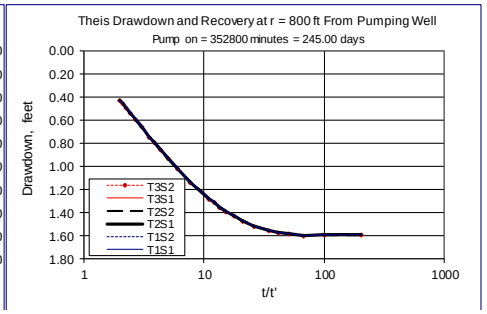


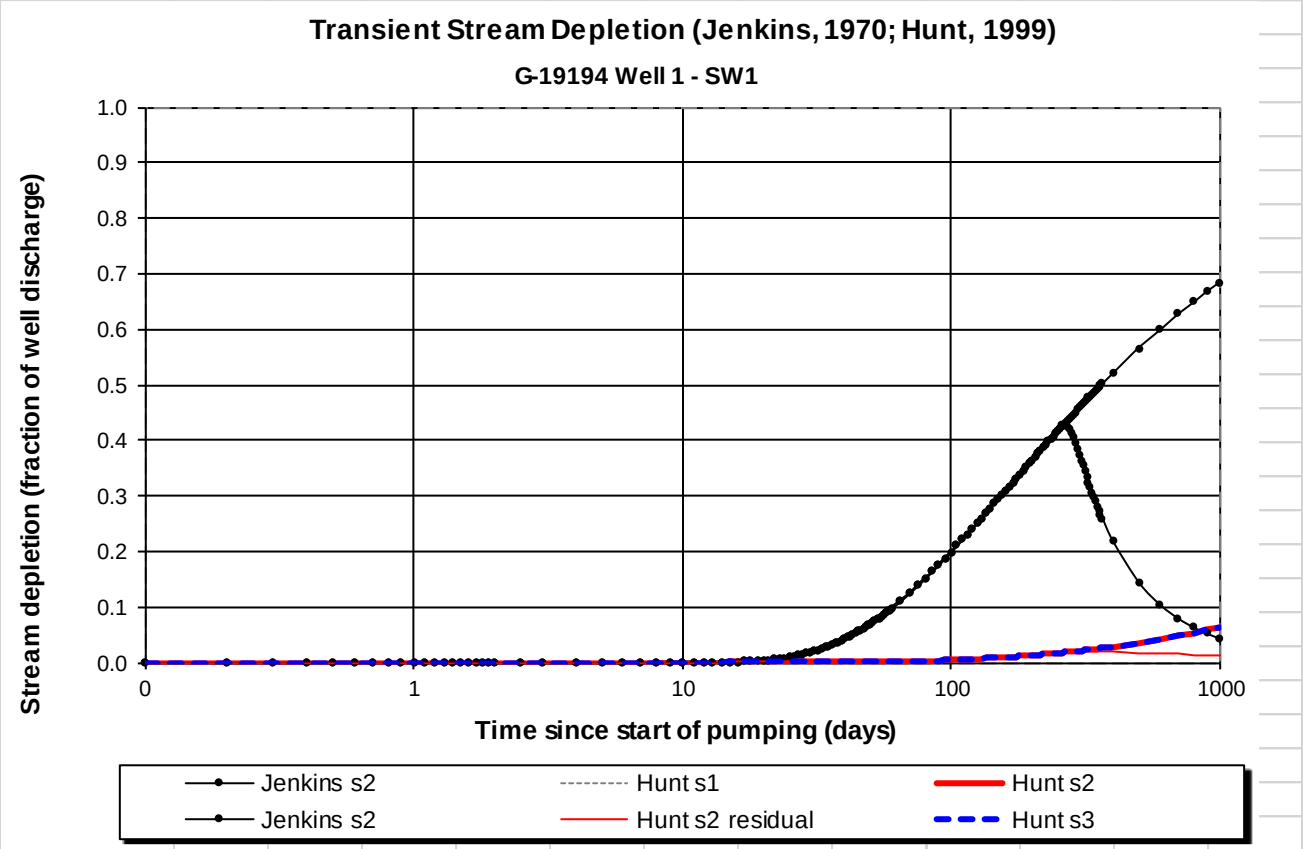








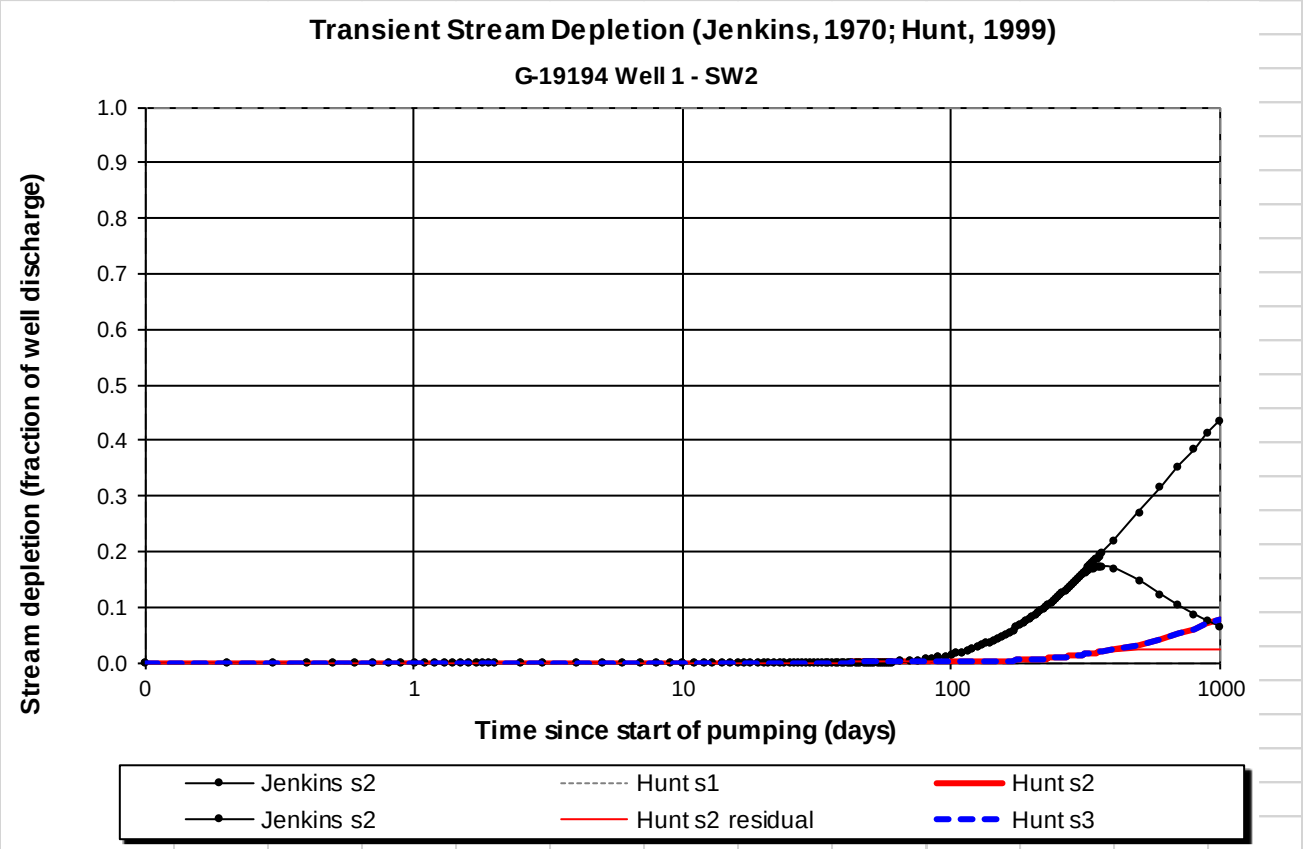




Output for Hunt Stream Depletion, Scenerio 2 (s2): **Time pump on = 245 days**

Days	**30**	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124
Jenk SD s2 %	**1.92**	9.77	17.63	24.16	29.49	33.90	37.60	40.77	42.47	37.52	31.60	26.74
Jen SD s2 cfs	0.002	0.012	0.022	0.030	0.037	0.042	0.047	0.051	0.053	0.047	0.039	0.033
Hunt SD s2 %	**0.02**	0.15	0.36	0.60	0.85	1.11	1.36	1.60	1.84	1.96	1.99	1.97
Hunt SD s2 cfs	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002	0.002

Parameters:		**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**
Net steady pumping rate	Qw	0.124	0.124	0.124	cfs
Distance to stream	a	2100	2100	2100	ft
Aquifer hydraulic conductivity	K	10	10	10	ft/day
Aquifer thickness	b	134	134	134	ft
Aquifer transmissivity	T	1340	1340	1340	ft*ft/day
Aquifer storage coefficient	S	0.1	0.1	0.1	
Stream width	ws	10	10	10	ft
Streambed hydraulic conductivity	Ks	0.023	0.023	0.023	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	0.076666667	0.076666667	0.076666667	ft/day
Stream depletion factor (Jenkins)	sdf	329.1044776	329.1044776	329.1044776	days
Streambed factor (Hunt)	sbf	0.120149254	0.120149254	0.120149254	



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	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124	0.124
Jenk SD s2 %	**0.00**	0.15	0.96	2.48	4.47	6.69	8.98	11.25	13.46	15.48	16.83	17.32
Jen SD s2 cfs	0.000	0.000	0.001	0.003	0.006	0.008	0.011	0.014	0.017	0.019	0.021	0.021
Hunt SD s2 %	**0.00**	0.00	0.03	0.11	0.23	0.39	0.59	0.81	1.06	1.32	1.56	1.78
Hunt SD s2 cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.002	0.002

Parameters:		**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**
Net steady pumping rate	Qw	0.124	0.124	0.124	cfs
Distance to stream	a	4025	4025	4025	ft
Aquifer hydraulic conductivity	K	10	10	10	ft/day
Aquifer thickness	b	134	134	134	ft
Aquifer transmissivity	T	1340	1340	1340	ft*ft/day
Aquifer storage coefficient	S	0.1	0.1	0.1	
Stream width	ws	25	25	25	ft
Streambed hydraulic conductivity	Ks	0.023	0.023	0.023	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	0.191666667	0.191666667	0.191666667	ft/day
Stream depletion factor (Jenkins)	sdf	1209.001866	1209.001866	1209.001866	days
Streambed factor (Hunt)	sbf	0.575715174	0.575715174	0.575715174	