

Groundwater Transfer Review Summary Form

Transfer/PA # T- 11864

GW Reviewer Gerald H. Grondin

Date Re-Review Completed: 8 July 2020

Date Original Review Completed: 26 August 2014

Summary of Same Source Review:

☐ The proposed change in point of appropriation is not within the same aquifer as per OAR 690-380-2110(2).

Summary of Injury Review:

☐ The proposed transfer will result in another, existing water right not receiving previously available water to which it is legally entitled or result in significant interference with a surface water source as per 690-380-0100(3).

Summary of GW-SW Transfer Similarity Review:

☐ The proposed SW-GW transfer doesn't meet the definition of "similarly" as per OAR 690-380-2130.

☒ **None of the Above**

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations.



Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900
www.wrd.state.or.us

Ground Water Review Form:

- ☒ **Water Right Transfer**
☐ **Permit Amendment**
☐ **GR Modification**
☐ **Other**

Application: **T-11864**

Applicant Name: **Troy Fine**

Proposed Changes: ☒ **POA** ☐ **APOA** ☐ **SW→GW** ☐ **RA**
☐ **USE** ☒ **POU** ☐ **OTHER**

Reviewer(s): **Gerald H. Grondin**

Date of Re-Review: **8 July 2020**

Date of Original Review: **26 August 2014**

Date Reviewed by GW Mgr. and Returned to WRSD: **JTI 7/9/2020**

The information provided in the application is insufficient to evaluate whether the proposed transfer may be approved because:

- ☐ The water well reports provided with the application do not correspond to the water rights affected by the transfer.
- ☐ The application does not include water well reports or a description of the well construction details sufficient to establish the ground water body developed or proposed to be developed.
- ☐ Other _____

1. Basic description of the changes proposed in this transfer: _____

This transfer application relates to water right certificate 51465. That certificate authorizes irrigation of 72.7 POU acres, a single POA well, a maximum pumping rate of 0.91 cfs (408 gpm), and a maximum annual duty of 3 feet per acre (218.10 ac-ft) all within T26S/R15E-sec 04.

The original POA (LAKE 371) under certificate 51465 has collapsed. The original transfer application proposed to change the POA from the authorized POA (LAKE 371) to a proposed POA (LAKE 52309). The proposed POA is located 11.0 feet south of the authorized POA.

The revised transfer proposes to move the entire groundwater right (including POA well and the POU acres) about 5 miles east to T26S/R16E-sec 08. The proposed new POA has not been drilled yet.

2. Will the proposed POA develop the same aquifer (source) as the existing authorized POA?

☒ Yes ☐ No Comments: _____

Yes, the same aquifer is likely given the same groundwater system will likely be tapped despite the proposed POA well (not drilled yet) is proposed to be significantly deeper than the authorized POA well LAKE 371 (1455 ft. blsd vs. 262 ft. blsd). Long term groundwater level data indicates groundwater levels at wells surrounding the currently authorized POA location and at a well (LAKE 504) within the same section as the proposed POA well have similar elevations, seasonally fluctuate similarly, and show the same long-term trends (see attached hydrograph).

Additionally, groundwater in the Fort Rock Valley-Christmas Valley area (Fort Rock Classified Area) is a single groundwater system. Groundwater is found in both a shallower predominantly basin-fill sediment unit and a deeper predominantly volcanic rocks and sediments unit below. The predominantly basin fill sediment unit and the predominantly volcanic rocks and sediment unit both readily yield groundwater and the two units are hydraulically connected. The authorized POA (LAKE 371) appears to obtain groundwater from volcanic sediments. The proposed POA is anticipated to obtain groundwater from basalt.

Miller (1984 and 1986) describes the groundwater source as the main groundwater reservoir. That reservoir includes groundwater in different geologic units. The reservoir has three characteristics. First, the "natural" groundwater level changes less than 1.5 feet annually, indicating the system is highly modulated. Second, the 1980s potentiometric surface was approximately 4292 feet elevation amsl basin-wide with Silver Lake an exception. Third, the reservoir consists of numerous water producing zones in several formations, all having an essentially common potentiometric level, and all being very transmissive in general.

3. a) Is there more than one source developed under the right (e.g., basalt and alluvium)?

☐ Yes ☒ No _____

No, single hydraulically connected groundwater system. See discussion in part 2 above.

b) If yes, estimate the portion of the right supplied by each of the sources and describe any limitations that will need to be placed on the proposed change (rate, duty, etc.): _____

Single groundwater system. No estimate made and no limitation recommended.

4. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another ground water right**?

☒ Yes ☐ No Comments: _____

The proposed POA well change will move groundwater pumping under this certificate closer to other water right wells. The calculated maximum additional seasonal groundwater level drawdown at the water right well (LAKE 504) closest to the proposed POA well (not drilled yet) is less than 1.5 feet. The change in seasonal groundwater level drawdown will be less at wells further away. All these water right wells should be able to accommodate the seasonal drawdown change.

The long-term impact on the groundwater system should be the same. That impact is to continue contributing its ongoing share to the annual Fort Rock Classified Area groundwater level decline (see the attached hydrograph...it shows an annual decline rate of about 0.25 feet per year).

- b) If yes, would this proposed change, at its maximum allowed rate of use, likely result in another groundwater right not receiving the water to which it is legally entitled?

☐ Yes ☒ No If yes, explain: _____

See discussion in part 4a above.

5. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another surface water source**?

☒ Yes ☐ No Comments: _____

The closest surface water to the authorized "From" well and the proposed "To" POA well are Paulina Marsh and Silver Lake. The proposed POA change will move the pumping about 2.3 miles further away from Paulina Marsh and about 0.6 mile closer to Silver Lake. The calculated change in seasonal groundwater level drawdown at these surface water bodies will be less than 0.2 feet decrease at Paulina Marsh (see attached) and less than 0.03 feet increase at Silver Lake (see attached). The change in seasonal groundwater level drawdown at surface water bodies further away will be less. These calculated results indicate the change in interference with surface water should be minimal.

The long-term impact on the groundwater system and subsequently surface water should be the same. That impact is to continue contributing its ongoing share to the annual Fort Rock Classified Area groundwater level decline (see the attached hydrograph...it shows an annual decline rate of about 0.25 feet per year) and its subsequent long-term impact on surface water.

- b) If yes, at its maximum allowed rate of use, what is the expected change in degree of interference with any **surface water sources** resulting from the proposed change?

Stream: Paulina Marsh ☒ Minimal ☐ Significant

Stream: Silver Lake ☒ Minimal ☐ Significant

Provide context for minimal/significant impact: _____

See comment in part 5a above.

6. For SW-GW transfers, will the proposed change in point of diversion affect the surface water source similarly to the authorized point of diversion specified in the water use subject to transfer?

☐ Yes ☒ No Comments: _____

Not Applicable. No SW-GW transfer.

7. What conditions or other changes in the application are necessary to address any potential issues identified above: _____

Note: the proposed transfer is within the Fort Rock groundwater limited area.

The following are technical groundwater review recommendations. It is recognized that one or more technically recommended conditions may or may not be allowed under the transfer process rules and statutes. This technical groundwater review relies on other appropriate and authorized Department staff to make that determination.

“Large” flow meter condition for any proposed “To” POA well. Require the flow meter for any POA well to be properly installed and maintained. Each meter shall be either within 50 feet of the well head with a clearly visible monument adjacent to the meter or a surveyed location shall be provided and a clearly visible monument adjacent to the meter shall be installed for each meter more than 50 feet from the well head.

Condition 7P (well tag condition) for all the “To” and “From” POA wells.

Condition 7T (modified) for all “To” POA wells: “Prior to use, all POA wells shall be configured to allow a strictly clean water (no oil) static water level measurements with an electric-tape. That can include measurement access via an unobstructed vertical discharge pipe that allows the groundwater level to fluctuate freely within the discharge pipe (no valves, etc.). Otherwise, a dedicated measuring tube must be installed prior to use. The tube must be unobstructed, have a diameter of ¾ inch (0.75 inch) or greater, and pursuant to figure 200-5 in OAR 690-200.”

8. Any additional comments: _____

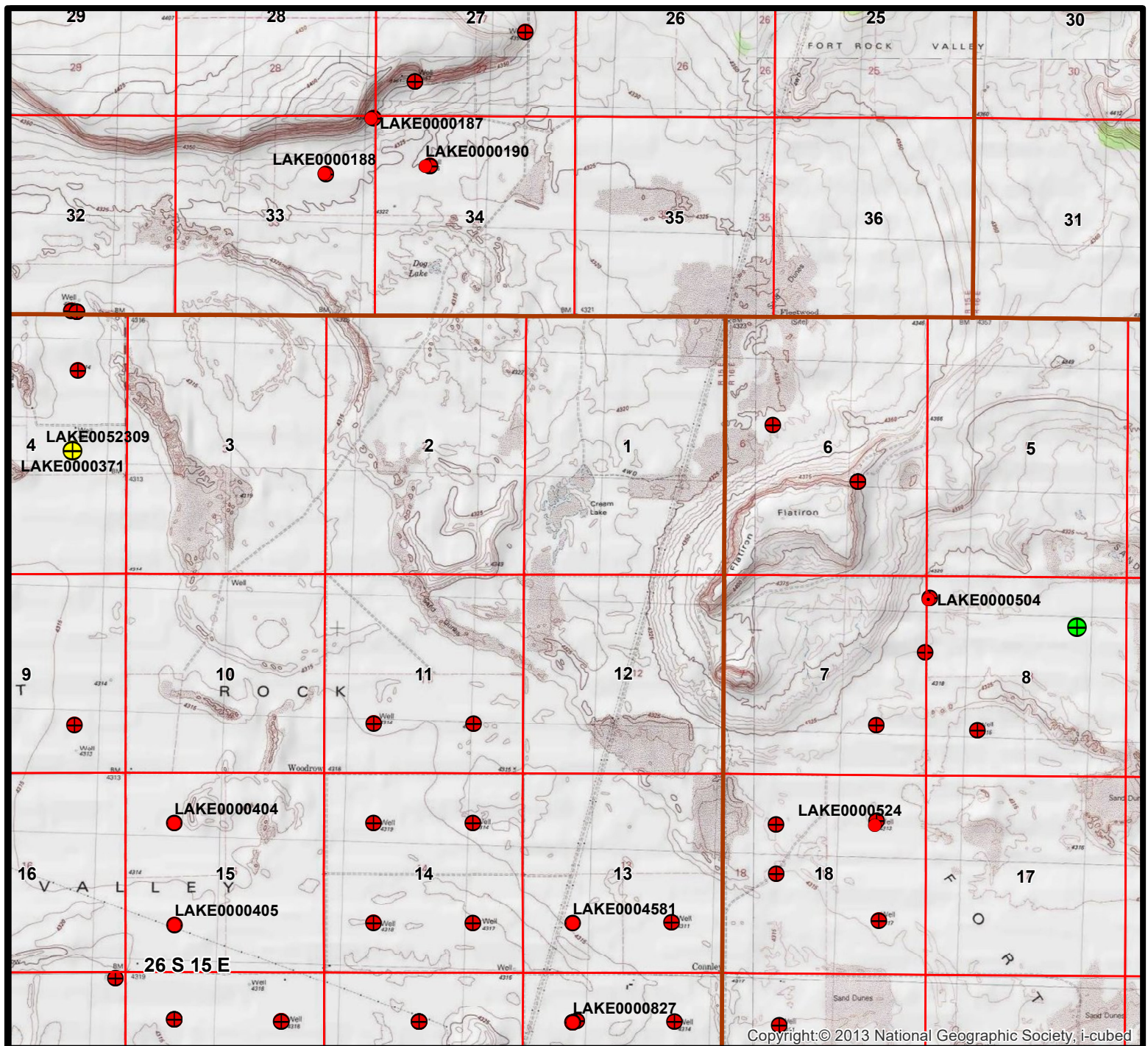
No additional comments.

References:

Miller, D.W., 1986, Appraisal of ground-water conditions in the Fort Rock Basin, Lake County, Oregon: Oregon Water Resources Department, Ground Water Report No. 31, 196 p and plates.

Groundwater Permit Amendment Application T-13162

Golden Rule Farms Inc.

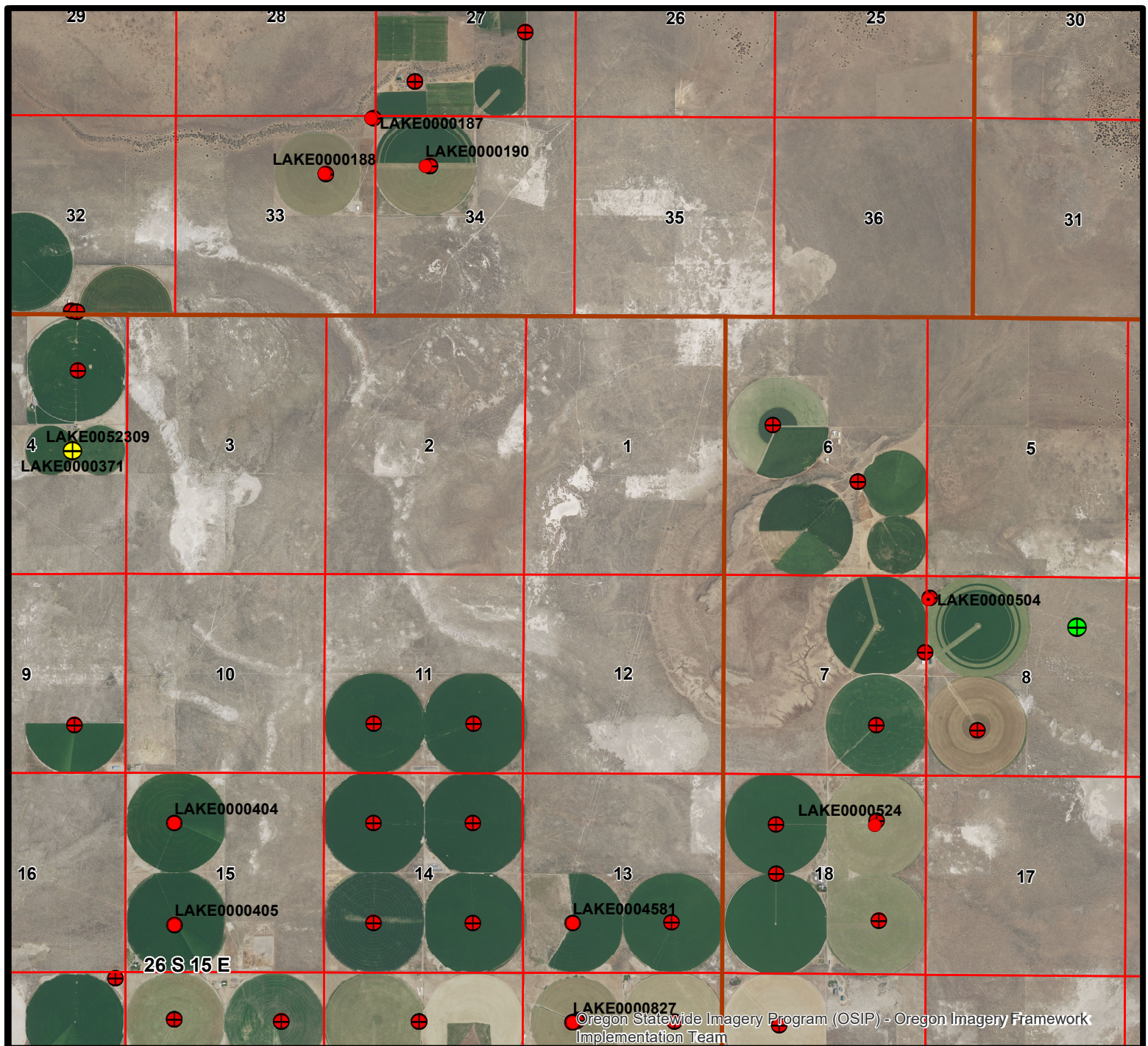


Yellow = Authorized Wells
Green = Proposed Wells
Red = Groundwater PODs & Obs Well
Blue = Surface Water PODs



Groundwater Permit Amendment Application T-13162

Golden Rule Farms Inc.



0 0.5 1 2 3 4
Miles

Yellow = Authorized Wells

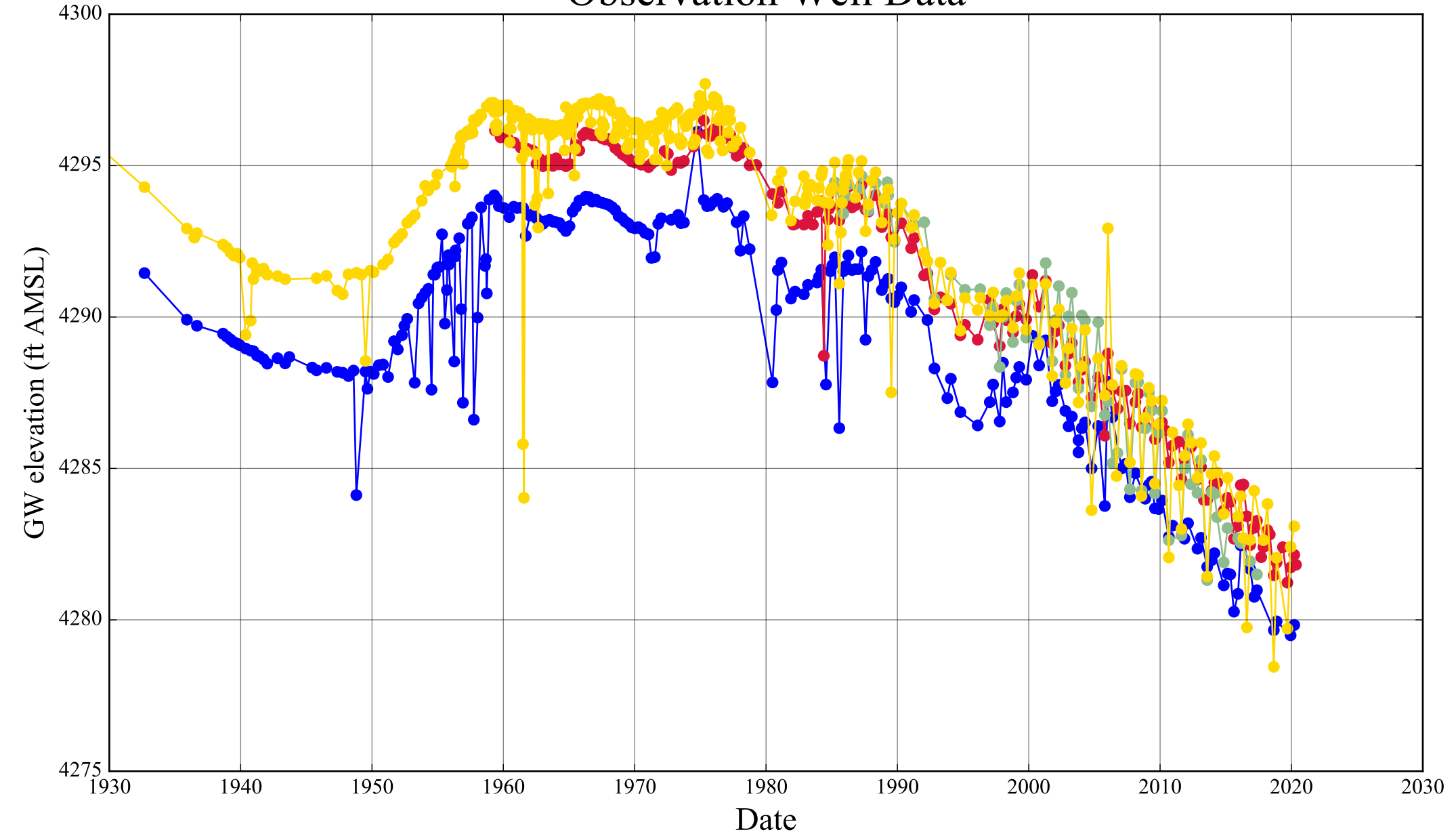
Green = Proposed Wells

Red = Groundwater PODs & Obs Well

Blue = Surface Water PODs



Observation Well Data



Drawdown Calculations Using Theis Equation

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

 s = drawdown (L) r = radial distance (L)
 T = transmissivity (L²/T) t = time (T)
 S = storage coefficient (dimensionless) u = dimensionless
 π = 3.141592654 $W(u)$ = 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)	Drawdown Change s (feet)	Well	Comments
								Note : W(u) calculation valid when u < 7.1					
								7.0000	1.1545E-04				W(u) calculation test
"From" POA wells to Water Right Well LAKE 504 closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	30.00	23,020.00	3.14	0.2944	0.9197	0.3831		LAKE 371	Continuous Pumping at Full Rate
			407.88	0.91						0.38			
"To" POA wells to Water Right Well LAKE 504 closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	30.00	4,025.00	3.14	0.0090	4.1423	1.7254		Not Drilled Yet	Continuous Pumping at Full Rate
			407.88	0.91						1.73	1.3424		
"From" POA wells to Water Right Well LAKE 504 closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	30.00	23,020.00	3.14	0.2944	0.9197	0.1892		LAKE 371	Continuous Pro-Rated Pumping
			201.44	0.45						0.19			
"To" POA wells to Water Right Well LAKE 504 closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	30.00	4,025.00	3.14	0.0090	4.1423	0.8521		Not Drilled Yet	Continuous Pro-Rated Pumping
			201.44	0.45						0.85	0.6629		

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) r = radial distance (L)
 T = transmissivity (L²/T) t = time (T)
 S = storage coefficient (dimensionless) u = dimensionless
 π = 3.141592654 $W(u)$ = 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)	Drawdown Change s (feet)	Well	Comments
								Note : W(u) calculation valid when u < 7.1					
								7.0000	1.1545E-04				W(u) calculation test
"From" POA wells to Water Right Well LAKE 504 closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	245.00	23,020.00	3.14	0.0360	2.7814	1.1586		LAKE 371	Continuous Pumping at Full Rate
			407.88	0.91						1.16			
"To" POA wells to Water Right Well LAKE 504 closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	245.00	4,025.00	3.14	0.0011	6.2344	2.5969		Not Drilled Yet	Continuous Pumping at Full Rate
			407.88	0.91						2.60	1.4384		
"From" POA wells to Water Right Well LAKE 504 closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	245.00	23,020.00	3.14	0.0360	2.7814	0.5722		LAKE 371	Continuous Pro-Rated Pumping
			201.44	0.45						0.57			
"To" POA wells to Water Right Well LAKE 504 closest to Proposed "To" Well (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	245.00	4,025.00	3.14	0.0011	6.2344	1.2825		Not Drilled Yet	Continuous Pro-Rated Pumping
			201.44	0.45						1.28	0.7104		

Drawdown Calculations Using Theis Equation

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

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 T = transmissivity (L²/T)
 S = storage coefficient (dimensionless)
 π = 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)	Drawdown Change s (feet)	Well	Comments
								Note : W(u) calculation valid when u < 7.1					
								7.0000	1.1545E-04				W(u) calculation test
"From" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	30.00	46,375.00	3.14	1.1948	0.1597	0.0665		LAKE 371	Continuous Pumping at Full Rate
			407.88	0.91						0.07			
"To" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	30.00	58,675.00	3.14	1.9126	0.0552	0.0230		LAKE 52309	Continuous Pumping at Full Rate
			407.88	0.91						0.02	-0.0435		
"From" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	30.00	46,375.00	3.14	1.1948	0.1597	0.0329		LAKE 371	Continuous Pro-Rated Pumping
			201.44	0.45						0.03			
"To" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	30.00	58,675.00	3.14	1.9126	0.0552	0.0114		LAKE 52309	Continuous Pro-Rated Pumping
			201.44	0.45						0.01	-0.0215		

Drawdown Calculations Using Theis Equation

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

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 S = storage coefficient (dimensionless)
 π = 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)	Drawdown Change s (feet)	Well	Comments
								Note : W(u) calculation valid when u < 7.1					
								7.0000	1.1545E-04				W(u) calculation test
"From" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	245.00	46,375.00	3.14	0.1463	1.4860	0.6190		LAKE 371	Continuous Pumping at Full Rate
			407.88	0.91						0.62			
"To" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	245.00	58,675.00	3.14	0.2342	1.0955	0.4563		LAKE 52309	Continuous Pumping at Full Rate
			407.88	0.91						0.46	-0.1626		
"From" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	245.00	46,375.00	3.14	0.1463	1.4860	0.3057		LAKE 371	Continuous Pro-Rated Pumping
			201.44	0.45						0.31			
"To" POA wells to Paulina Marsh (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	245.00	58,675.00	3.14	0.2342	1.0955	0.2254		LAKE 52309	Continuous Pro-Rated Pumping
			201.44	0.45						0.23	-0.0803		

Drawdown Calculations Using Theis Equation

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

s = drawdown (L)
 T = transmissivity (L²/T)
 S = storage coefficient (dimensionless)
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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)	Drawdown Change s (feet)	Well	Comments
								Note : W(u) calculation valid when u < 7.1					
								7.0000	1.1545E-04				W(u) calculation test
"From" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	30.00	79,250.00	3.14	3.4892	0.0071	0.0029		LAKE 371	Continuous Pumping at Full Rate
			407.88	0.91						0.00			
"To" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	30.00	75,880.00	3.14	3.1988	0.0101	0.0042		LAKE 52309	Continuous Pumping at Full Rate
			407.88	0.91						0.00	0.0013		
"From" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	30.00	79,250.00	3.14	3.4892	0.0071	0.0015		LAKE 371	Continuous Pro-Rated Pumping
			201.44	0.45						0.00			
"To" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	30.00	75,880.00	3.14	3.1988	0.0101	0.0021		LAKE 52309	Continuous Pro-Rated Pumping
			201.44	0.45						0.00	0.0006		

Drawdown Calculations Using Theis Equation

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

 s = drawdown (L) r = radial distance (L)
 T = transmissivity (L²/T) t = time (T)
 S = storage coefficient (dimensionless) u = dimensionless
 π = 3.141592654 $W(u)$ = 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)	Drawdown Change s (feet)	Well	Comments
								Note : W(u) calculation valid when u < 7.1					
								7.0000	1.1545E-04				W(u) calculation test
"From" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	245.00	79,250.00	3.14	0.4272	0.6588	0.2744		LAKE 371	Continuous Pumping at Full Rate
			407.88	0.91						0.27			
"To" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	407.88	0.91	245.00	75,880.00	3.14	0.3917	0.7165	0.2985		LAKE 52309	Continuous Pumping at Full Rate
			407.88	0.91						0.30	0.0240		
"From" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	245.00	79,250.00	3.14	0.4272	0.6588	0.1355		LAKE 371	Continuous Pro-Rated Pumping
			201.44	0.45						0.14			
"To" POA wells to Silver Lake (Transmissivity from Morgan (1988) and McFarland and Ryals (1991)): Used S = 0.001													
112,207.80	15,000.00	0.00100	201.44	0.45	245.00	75,880.00	3.14	0.3917	0.7165	0.1474		LAKE 52309	Continuous Pro-Rated Pumping
			201.44	0.45						0.15	0.0119		

