

Groundwater Transfer Review Summary Form

Transfer/PA # T- 13898

GW Reviewer Joe Kemper Date Review Completed: 10/26/2022

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.

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-13898

Applicant Name: Philip and Penelope Knight

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

Reviewer(s): Joe Kemper

Date of Review: 10/26/2022

Date Reviewed by GW Mgr. and Returned to WRSD: JTI 11/7/22

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: The applicant proposes to 1) move 20 acres of irrigation use (0.25 cfs) from CROO 1867 and CROO 1869 under certificate 93255 to JEFF 51644 and 2) move 113.8 acres of irrigation (1.42 cfs) from CROO 1999 and CROO 54411 under certificate 94893 to JEFF 51644. The transfer also proposes to change the place of use and the character of use from irrigation to nursery to allow for layering with COID water deliveries.
2. Will the proposed POA develop the same aquifer (source) as the existing authorized POA?
☐ Yes ☒ No Comments: "From" wells CROO 1867 and CROO 1869 develop groundwater from an aquifer hosted in alluvial fan deposits mantling Powell Buttes. "From" wells CROO 54411 and CROO 1999 access an aquifer hosted within the low-yielding silicic bedrock of Powell Buttes (considered part of the John Day Formation). These aquifers are recharged from precipitation falling directly onto Powell Buttes (Gannett, 1987). Groundwater level elevations in CROO 1867 and CROO 1869 are approximately 3100 feet AMSL. Groundwater levels in CROO 1999 and CROO 54411 are ~3700 feet amsl and 3300 feet amsl respectively. This is several hundred feet higher than the regional groundwater system hosted in the Deschutes Formation, which sits at approximately 2700 feet AMSL adjacent to Powell Buttes (see CROO 24). In summary, the "from" wells produce from an aquifer system hosted in geological material that is distinct from the Deschutes Formation, receives local recharge from Powell Buttes, and has high groundwater levels than the regional groundwater system hosted in the Deschutes Formation.

The “to” well JEFF 51644 is located approximately 15 miles NW of the “from” wells. It primarily accesses the regional groundwater system hosted in the Deschutes Formation. (It may also access some water hosted in secondary fractures and joints of the lower yielding John Day Formation at a depth of ~900 feet bls.) This regional aquifer system is recharged primarily from snow and rain in the Cascades mountains and Newberry crater. The “to” accesses a distinctly different aquifer (long regional flowpaths from the Cascades to the the lower extent of the Deschutes Formation) than the “from wells (local flowpaths recharged from Powell Butte into associated volcanics and associated sediments).

3. a) Is there more than one source developed under the right (e.g., basalt and alluvium)?
☒ Yes ☐ No Note: The applicant’s “To Well” JEFF 51644 accesses WBZs in alluvial facies of the Deschutes Formation from 170-490 feet BLS and from a fractured zone of the John Day Formation at 880-900 feet BLS. The well log does not report a change in SWL when the driller encounters a WBZ within the John Day Fm, but these two geologic formations may be recharged from different sources.
- 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.): The deepening log (JEFF 51672) estimates that the WBZ within the John Day Fm provides ~50 gpm and that the well’s total yield is 150 gpm. However, the original well log (JEFF 51644) reported a yield of 150 gpm, so 50 GPM may be an overestimate of the water provided by the deep fractured zone within the John Day Formation. The John Day Formation may provide 5-30% of the total yield of the well. The Deschutes Formation likely provides well over 50% of the water to the applicant’s “to” well.
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: There are several exempt-use domestic wells adjacent to the “to” well that would not have been affected by pumping at the “from” wells. Specifically, JEFF 51644 is 2100 feet from JEFF 51433 and 2000 feet west of JEFF 51413. The proposed change will result in well-to-well interference with these domestic wells that did not occur previously. The Deschutes Formation has an approximate saturated thickness of 350 feet at this location.
- 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: Impacts to the adjacent wells are estimated using a Theis distance drawdown model assuming full appropriation of the requested 133.8 acres over a 244-day period with aquifer properties derived from published sources (Gannett et al., 2001; Gannett and Lite, 2004). Drawdowns at adjacent wells are not expected to exceed 10-30 feet. Considering the thickness of the target aquifer, the impacts are not expected to meet the definition of substantial or undue interference.

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 proposed changes will move production from wells accessing a locally recharged aquifer that has some hydraulic separation from the regional groundwater system. These wells are also approximately 15 miles from the point of regional groundwater discharge to the Crooked and Deschutes Rivers. The "To" well accesses the regional groundwater system and is located approximately 1 mile from the Crooked River where it begins to receive considerable groundwater recharge.

- 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: Crooked River ☐ Minimal ☒ Significant

Stream: _____ ☐ Minimal ☐ Significant

Provide context for minimal/significant impact: Pumpage from "to" well JEFF 51644 well will quickly result in a high proportion of stream depletion. For comparison, the Osborne Canyon modeling scenario from Gannett and Lite (2004) simulated a pumping well between the Deschutes and Crooked Rivers at a distance of ~1.5 miles from each, which resulted in more than 50% stream depletion in the first year of pumping. Pumpage at the "from" wells would likely have resulted in some stream depletion over many years to the Crooked and Deschutes rivers as the locally recharged Powell Butte alluvial fan aquifer is not completely hydraulically separated from regional system. Considering 1) the well-documented, prompt hydraulic connection between groundwater and surface water in lower portion of the Deschutes Groundwater Study Area and 2) the proximity of JEFF 51644 to the Crooked River where groundwater discharges, the proposed change in location and aquifer will likely have a significant impact to the Crooked River.

6. For SW-GW transfers, will the proposed change in point of diversion affect the surface water source similarly (as per OAR 690-380-2130) to the authorized point of diversion specified in the water use subject to transfer?
☐ Yes ☐ No Comments: NA
7. What conditions or other changes in the application are necessary to address any potential issues identified above: NA
8. Any additional comments: NA

References

Ferns, M., and McClaughry, J. (2006). Preliminary Geologic Map Of The Powell Buttes 7.5' Quadrangle, Crook County, Oregon. Department of Geology and Mineral Industries. OFR O-06-24

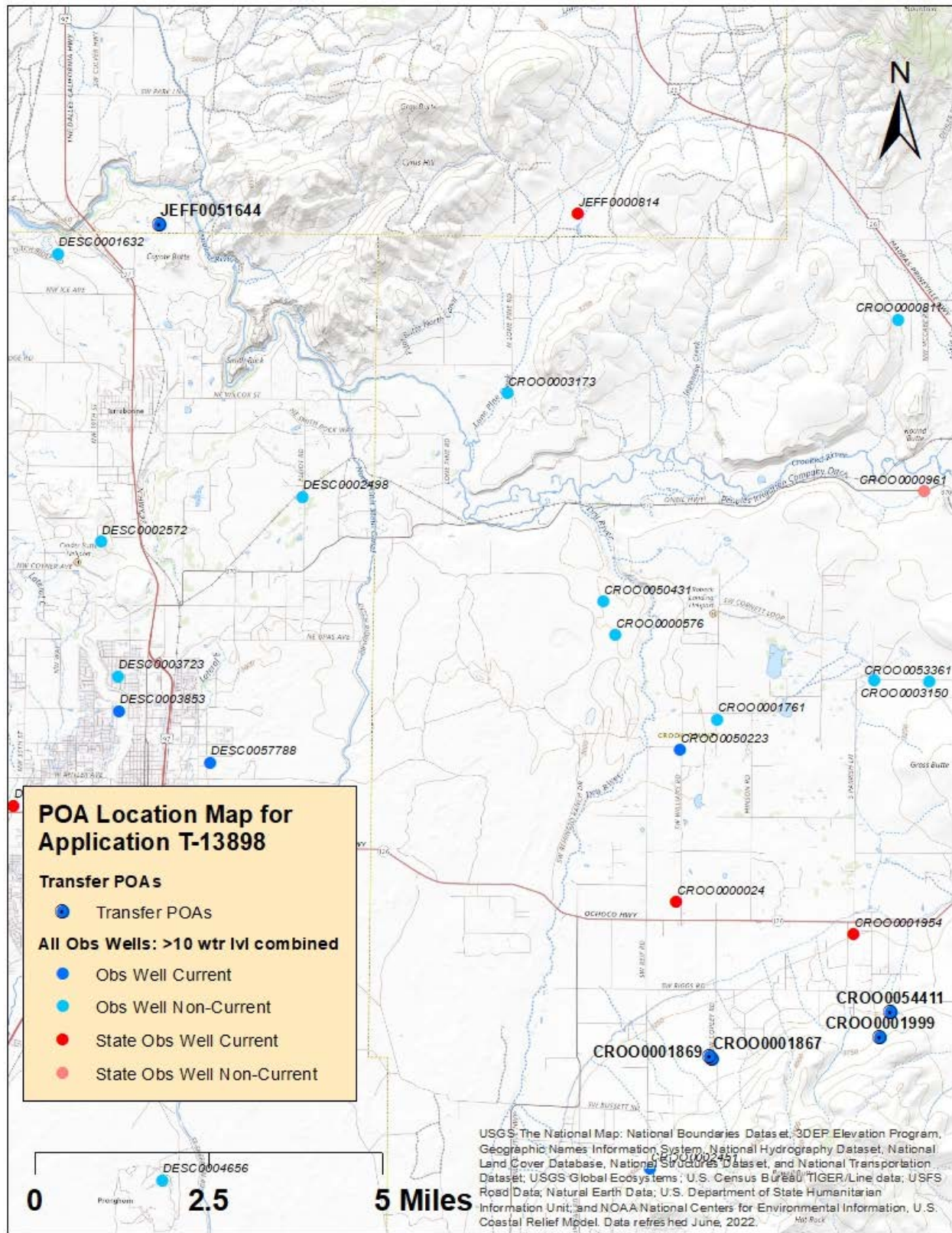
Gannett, M. (1987). Groundwater Availability in the Powell Buttes Area, Central Oregon. Oregon Water Resources Department. GW Report No. 32 Deschutes Basin: Powell Buttes Area.

Gannett, M.W., Lite, Jr., K.E., Morgan, D.S., and Collins, C.A., 2001, Ground-water hydrology of the upper Deschutes Basin, Oregon: U.S. Geological Survey Water-Resources Investigations Report 00-4162, 74 p.

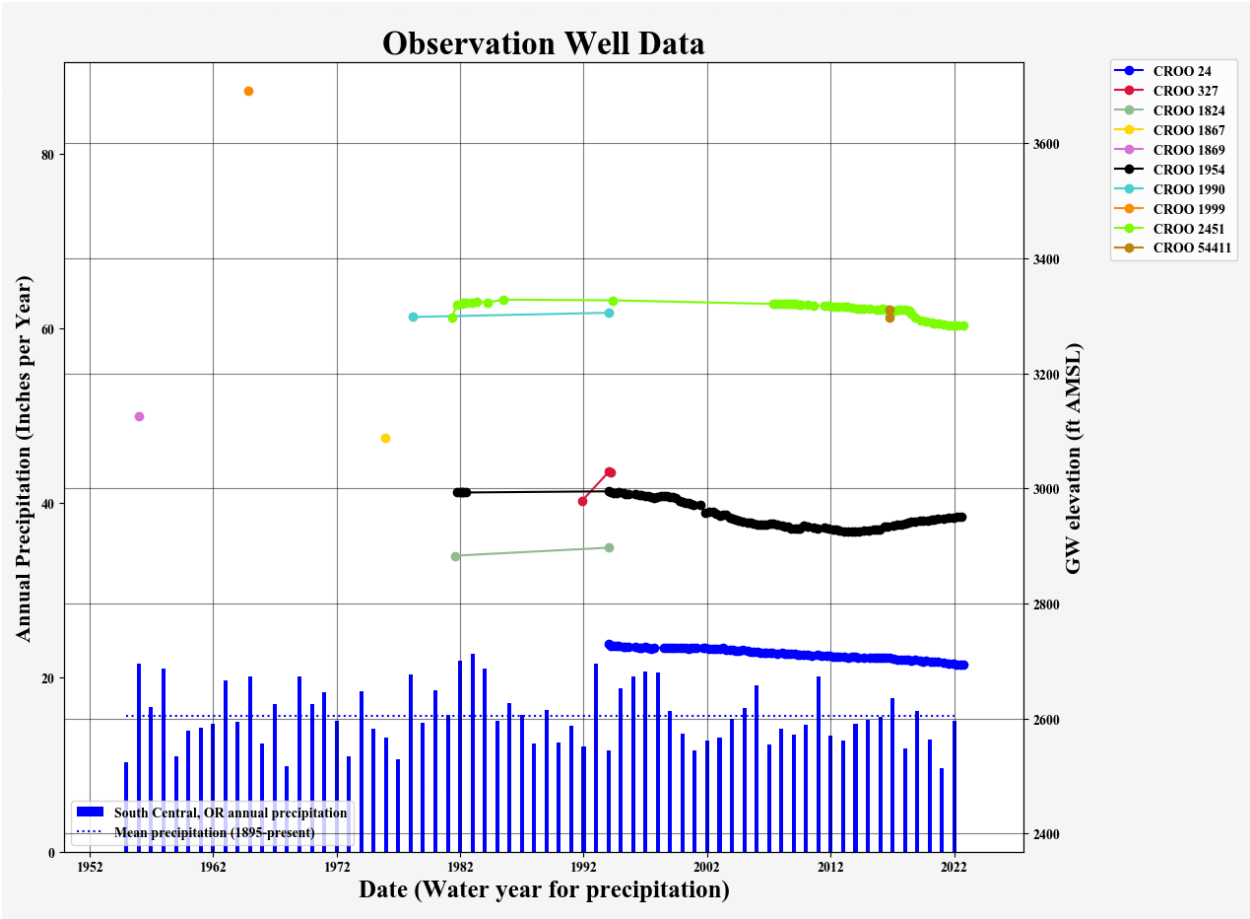
Gannett, M.W., and Lite, Jr., K.E., 2004. Simulation of Regional Ground-Water Flow in the Upper Deschutes Basin, Oregon: U.S. Geological Survey Water-Resources Investigations Report 03-4195, 84 p.

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

Transfer Map



Water Levels in Wells Near Powell Buttes



Theis (1935) Distance Drawdown Modeling

Theis Time-Drawdown Worksheet v.5.00

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 17, 2019

Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		244		d	
Radial distance from pumped well:	r		2000		ft	Q conversions
Pumping rate	Q		0.83		cfs	372.50 gpm
Hydraulic conductivity	K	5	10	50	ft/day	0.83 cfs
Aquifer thickness	b		100		ft	49.80 cfm
Storativity	S_1		0.01			71,712.00 cfd
	S_2		0.001			1.65 af/d
Transmissivity Conversions	T_f2pd	500	1000	5000	ft ² /day	
	T_ft2pm	0.34722222	0.69444444	3.47222222	ft ² /min	
	T_gpdft	3740	7480	37400	gpd/ft	

Recalculate

