Groundwater Application Review Summary Form

Application # G- 18432

GW Reviewer Phillip Marcy **Date Review Completed:** 6/8/2017

Summary of GW Availability and Injury Review:

[X] 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 June 8 ,20 17

TO: **Application G-** 18432

FROM: **GW:** Phillip Marcy
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES
The source of appropriation is within or above a Scenic Waterway
☒ 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 _____ 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 **06/06/2017**

FROM: Groundwater Section **Phillip I. Marcy**
Reviewer's Name

SUBJECT: Application G- **18432** 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: **Monte Heid; Gum Creek Farms** County: **Malheur**

A1. Applicant(s) seek(s) **1.11** cfs from **1** well(s) in the **Malheur** Basin, **Willow Creek** subbasin

A2. Proposed use **Supplemental Irrigation (1001.4 acres)** Seasonality: **March 1st-October 31st (244 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	21	Alluvium	1.11	16S/42E-1 SE-SE	1100'N, 1250'W fr SE cor S 1
2						
3						
4						
5						

* 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	2789	NA	NA	NA	400	Unknown	Unknown	Unknown	Unknown	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The POA well on this application is proposed to produce groundwater from the Glenns Ferry Formation, with local well logs reporting a succession of clay/silt with occasional sandy stratum below 50 feet in depth. Wells completed in the uplands above Willow Creek are considered hydraulically connected to valley-fill alluvium incised by Willow Creek with no demonstrable barrier to vertical migration of groundwater.

A5. ☒ **Provisions of the** Malheur (690-510) 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: _____

A6. ☐ **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: _____
Comments: _____

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

a. ☐ **is** over appropriated, ☐ **is not** over appropriated, *or* ☒ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;

b. ☒ **will not** *or* ☐ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;

c. ☒ **will not** *or* ☐ **will** likely to be available within the capacity of the groundwater resource; or

d. ☐ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
   i. ☐ The permit should contain condition #(s) **7N, "Large 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:** Water levels were measured between the years of 1999 and 2016 on five existing authorized POAs under permit G-13533 (Fig. 2). All five wells are located within one mile of the proposed POA on this application, and are completed into the same local alluvial aquifer system as the proposed wells here, likely terrace sediments overlying Glenns Ferry Formation (QTg of Gannett, 1990 and Tig of Ferns, et al., 1993, respectively). Measured groundwater elevations during this time suggest that the local alluvial aquifer system does not have the capacity to support new uses without increasing groundwater decline rates. The current permitted rights in the area show 20 to 25 feet of decline between the years of 1999 and 2016 (Fig. 2). Additional withdrawals from this upland system would likely exacerbate this decline.

Furthermore, with additional declines in the upland sand and gravel aquifer (QTg of Gannett, 1990), groundwater elevations will soon reach the level of those within the valley-fill alluvium (Fig. 3). Gannett's (1990) characterization of the groundwater flow system in this region included discharge from the upland gravels into the valley-fill alluvium (Fig. 4). Under present circumstances, the hydraulic gradient toward Willow Creek continues to diminish as head elevations in the uplands continue to decline.

During the past three years, water levels in the valley-fill alluvium adjacent to Willow Creek have also shown declines (Fig. 5). Given the likelihood that the upland aquifer and the valley-fill alluvium behave as an interconnected aquifer system, increased pumping in the uplands is likely to have widespread implications, including potential injury to groundwater rights in the uplands and on the valley floor.

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	**QTg of Gannett (1990)**	☐	☒
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: There is no evidence of a laterally continuous barrier to vertical migration of groundwater in the vicinity of the proposed POA. In addition, variability of groundwater elevations between wells at any time appears to correlate with variability of surface elevation more than any other factor.

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**	**Willow Creek**	**~2620**	**2532**	**9000**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Groundwater from the upland aquifers in this region discharges into the valley-fill sequences, sustaining year-round flow in streams such as Willow Creek (Gannett, 1990).

Water Availability Basin the well(s) are located within: Gum Creek > Willow Creek – 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 source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and 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 perennial surface waters are located within one mile of the proposed POA location.

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**	**.01** %	**.01** %	**.03** %	**.03** %	**.03** %	**.03** %	**.03** %	**.03** %	**.04** %	**.04** %	**.01** %	**.01** %
Well Q as CFS		**0.0**	**0.0**	**1.11**	**1.11**	**1.11**	**1.11**	**1.11**	**1.11**	**1.11**	**1.11**	**0.0**	**0.0**
Interference CFS		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

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													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

(A) = Total Interf.	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
(B) = 80 % Nat. Q	**12.6**	**27.9**	**45.3**	**65.6**	**54.8**	**41.4**	**14.8**	**6.36**	**4.41**	**6.74**	**7.14**	**8.59**
(C) = 1 % Nat. Q	**.13**	**.28**	**.45**	**.66**	**.55**	**.41**	**.15**	**.64**	**.44**	**.67**	**.71**	**.86**
(D) = (A) > (C)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100	**0** %	**0** %	**0** %	**0** %	**0** %	**0** %	**0** %	**0** %	**0** %	**0** %	**0** %	**0** %

(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 following evaluation for PSI against Willow Creek utilizes flow statistics computed for the water availability basin Willow Creek > Malheur River – Above Gum Creek (ID# 31011910).

The model of Hunt (2003) was employed to assess any expected impacts to Willow Creek from pumping at the proposed POA location. Model parameters were derived from local pump test data and information from area well logs. Results of the calculations display little impact during the first year of pumping at the proposed rate and location. As stated above, impacts to Willow Creek are likely to become more significant over time as pumping continues and the hydrologic gradient decreases from upland aquifers to the valley bottoms. Therefore, the long-term outlook for development from this aquifer system appears quite limited, as declines are observable and quite consistent for the previous two decades.

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, the following conditions shall apply: 7N – Annual measurement condition; "Large Water Use Reporting".

References Used:

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Gannett, M.W. 1990, Hydrogeology of the Ontario Area, Malheur County, Oregon: Oregon Water Resources Department Groundwater Report No. 34.

Local well logs, regional geologic maps, local pump tests, OWRD groundwater level database, application review for G-14461 (Zwart, 1997).

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

GUM CR > WILLOW CR - AT MOUTH

Watershed ID #: 31011909 Basin: MALHEUR Exceedance Level: 80
Time: 1:42 PM Date: 06/08/2017

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
	Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.					
JAN	0.15	0.05	0.10	0.00	0.00	0.10
FEB	0.66	0.15	0.51	0.00	0.00	0.51
MAR	0.97	0.37	0.60	0.00	0.00	0.60
APR	0.70	0.80	-0.10	0.00	0.00	-0.10
MAY	0.93	1.84	-0.91	0.00	0.00	-0.91
JUN	0.77	1.50	-0.73	0.00	0.00	-0.73
JUL	0.12	0.49	-0.37	0.00	0.00	-0.37
AUG	0.03	0.19	-0.16	0.00	0.00	-0.16
SEP	0.01	0.10	-0.09	0.00	0.00	-0.09
OCT	0.01	0.05	-0.04	0.00	0.00	-0.04
NOV	0.03	0.01	0.02	0.00	0.00	0.02
DEC	0.11	0.02	0.09	0.00	0.00	0.09
ANN	724	337	472	0	0	472

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

WILLOW CR > MALHEUR R - AB GUM CR

Watershed ID #: 31011910 Basin: MALHEUR Exceedance Level: 80
Time: 1:43 PM Date: 06/08/2017

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
	Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.					
JAN	12.60	20.00	-7.38	0.00	0.00	-7.38
FEB	27.90	77.80	-49.80	0.00	0.00	-49.80
MAR	45.30	116.00	-70.50	0.00	0.00	-70.50
APR	65.60	163.00	-96.90	0.00	0.00	-96.90
MAY	54.80	159.00	-105.00	0.00	0.00	-105.00
JUN	41.40	135.00	-93.10	0.00	0.00	-93.10
JUL	14.80	71.10	-56.30	0.00	0.00	-56.30
AUG	6.36	44.00	-37.60	0.00	0.00	-37.60
SEP	4.41	30.10	-25.70	0.00	0.00	-25.70
OCT	6.74	19.00	-12.30	0.00	0.00	-12.30
NOV	7.14	13.20	-6.02	0.00	0.00	-6.02
DEC	8.59	14.70	-6.10	0.00	0.00	-6.10
ANN	30,700	51,900	0	0	0	0

Well Location Map

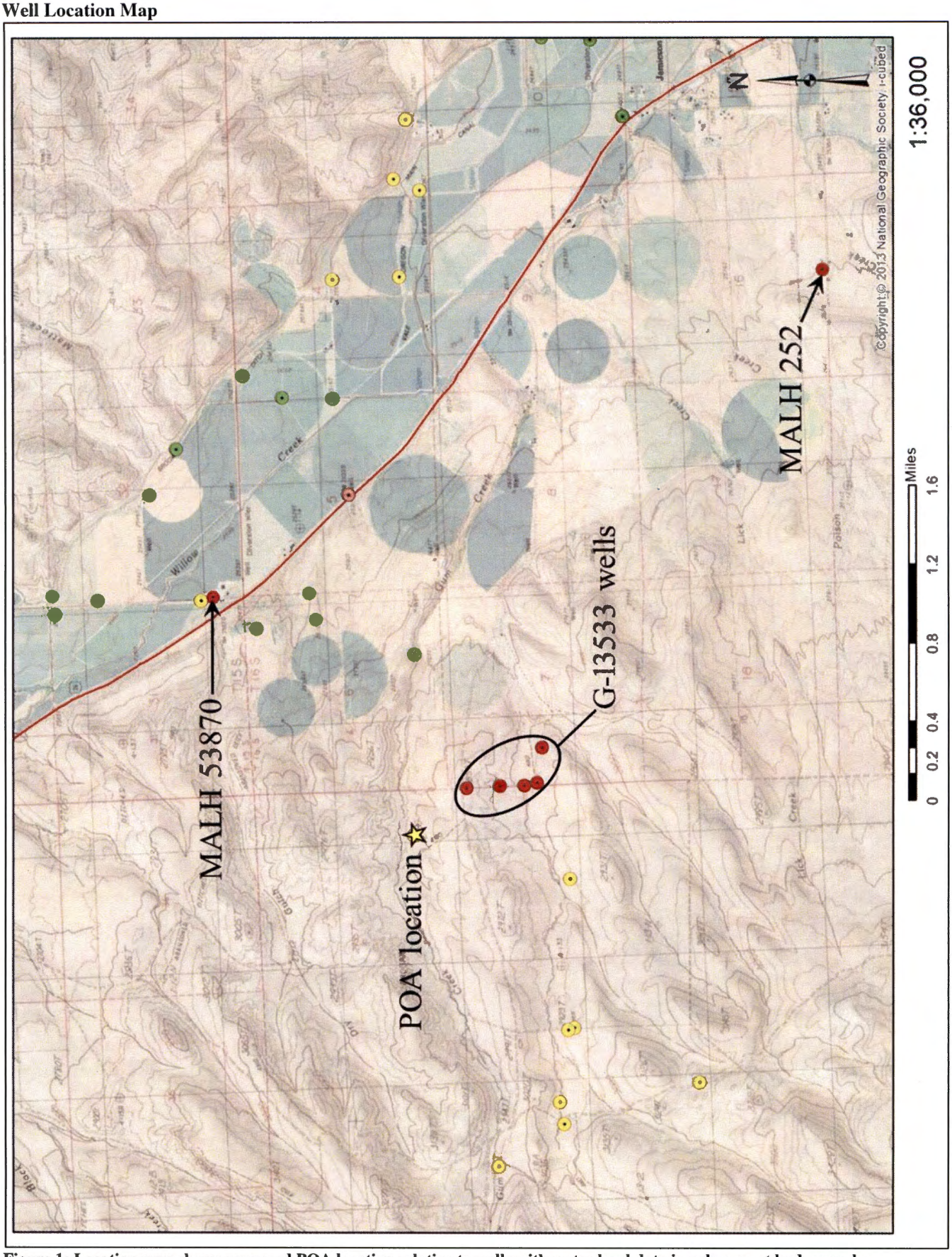

Figure 1: Location map shows proposed POA location relative to wells with water level data in subsequent hydrographs.

Water-Level Trends in Nearby Wells

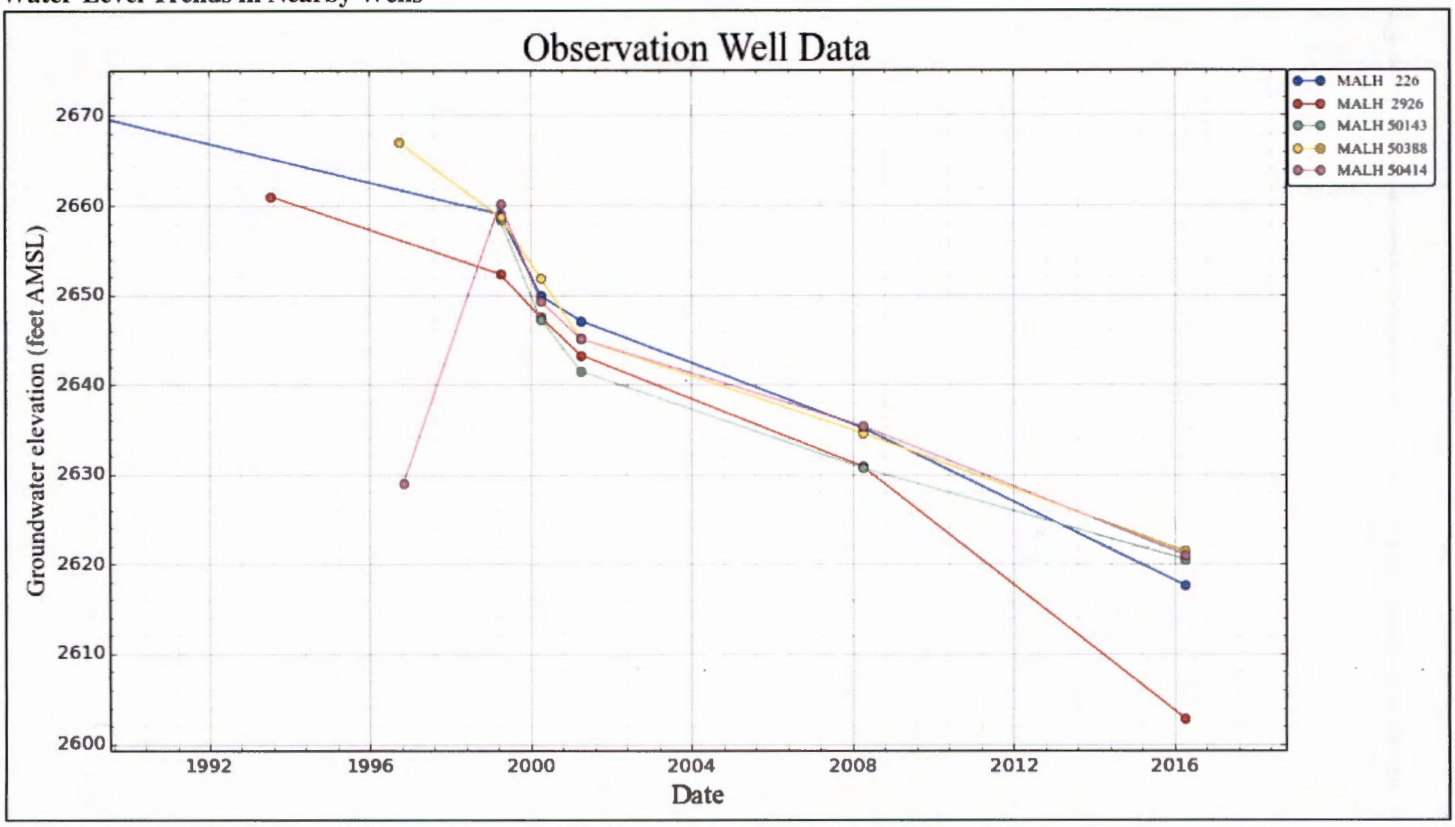

Figure 2: POA wells authorized under permit G-13533 display consistent declines since 1999.

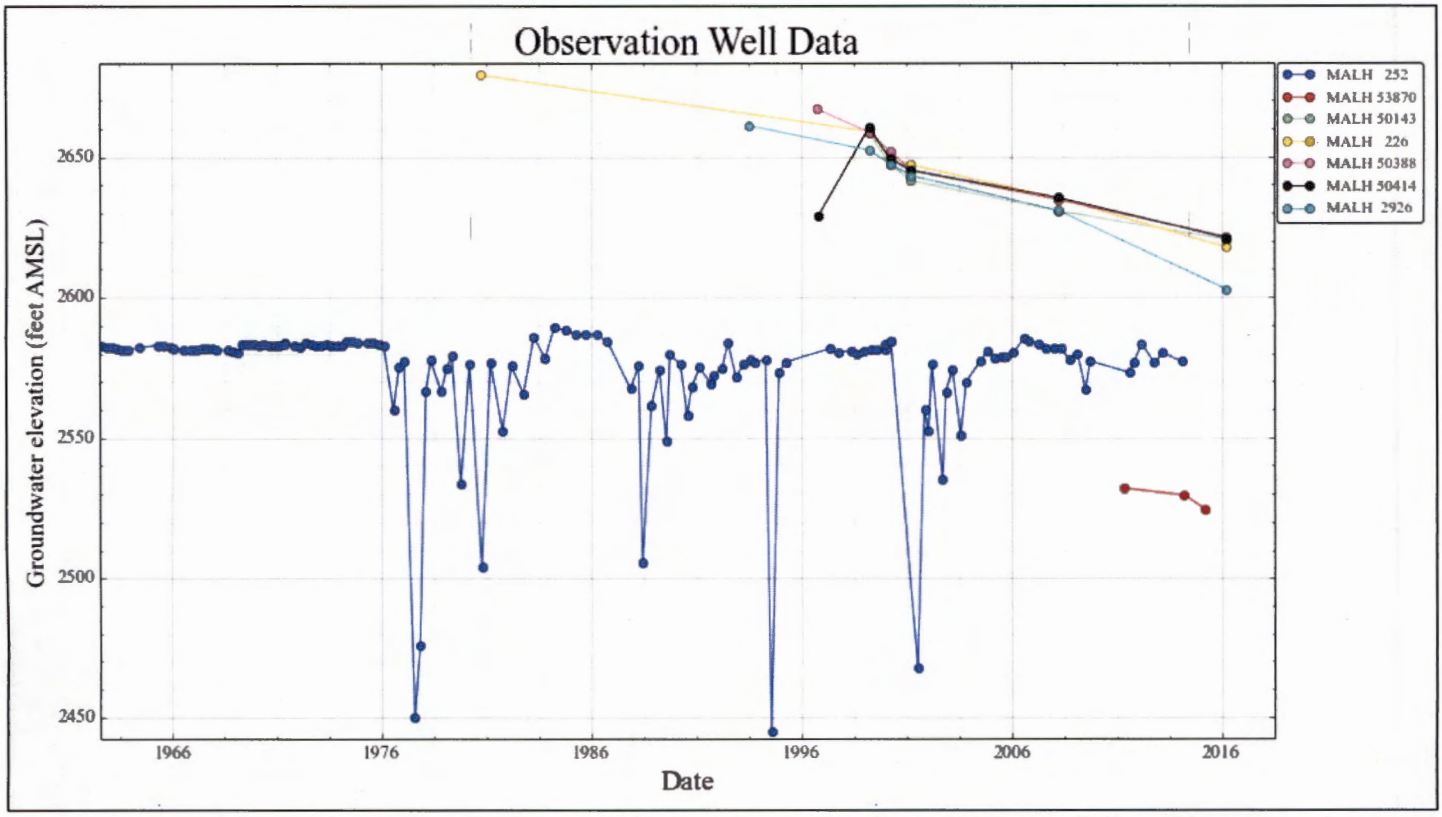

Figure 3: Water levels for permit G-13533 wells are approaching levels in valley-fill alluvium adjacent to Willow Creek (see map for locations).

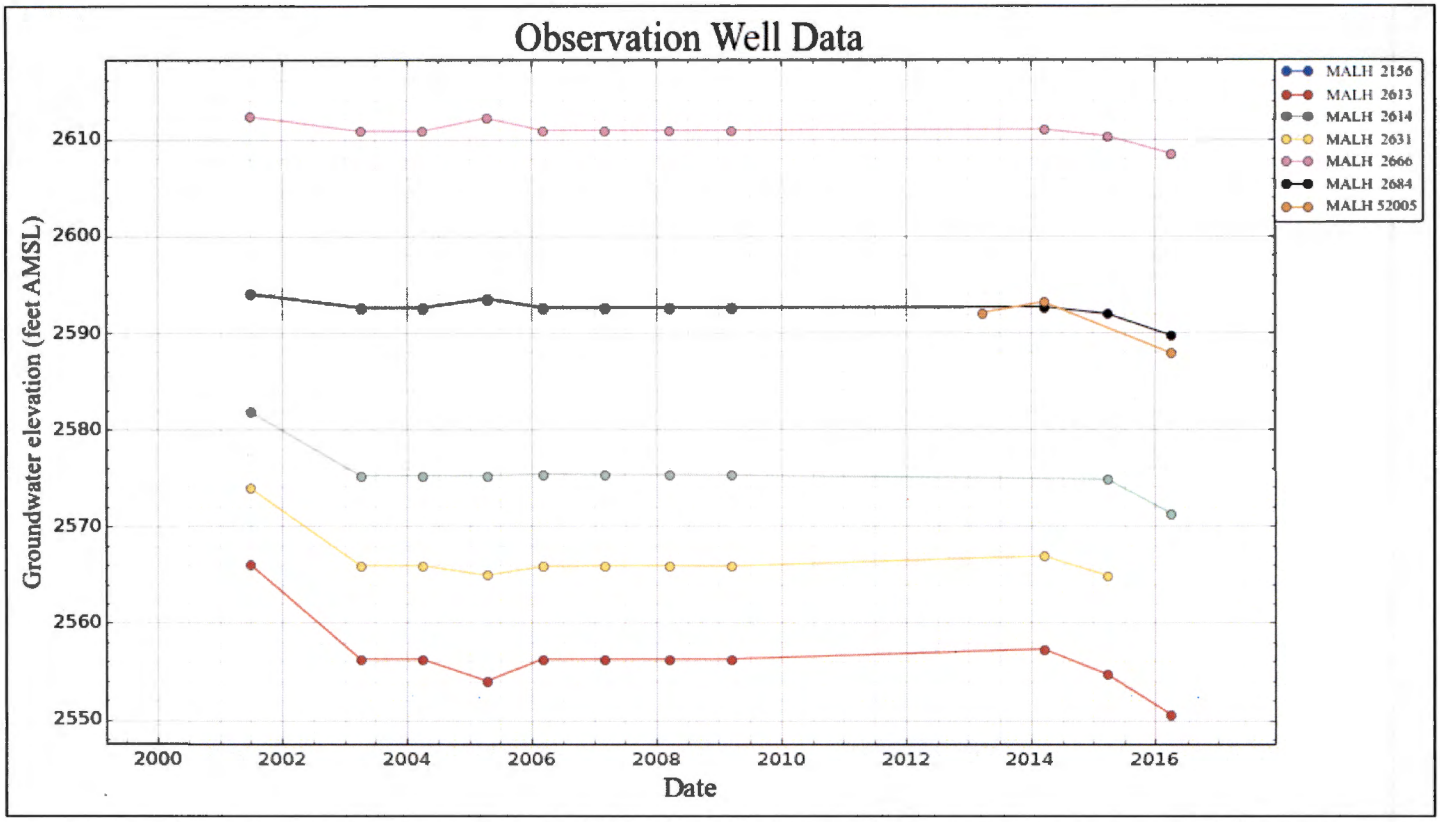

Figure 4: Groundwater elevation data from wells in the Willow Creek alluvial basin display declines during the recent (2014-2015) drought. By comparison, groundwater trends in the upland aquifer from which the proposed POA well would produce have been declined for a much longer span of time (Figure 2).