Water Right Conditions Tracking Slip

*Groundwater/Hydrology Section

FILE # # 618079

ROUTED TO: _____

TOWNSHIP/
RANGE-SECTION: T3S/R3W-S33

CONDITIONS ATTACHED?: [X] yes [ ] no

REMARKS OR FURTHER INSTRUCTIONS:

_____

_____

_____

Reviewer: Jen Woody

WATER RESOURCES DEPARTMENT

MEMO 8-13, 2015

TO: **Application** G- 18079

FROM: **GW:** Jen Woody
(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 8/13/2015

FROM: Groundwater Section Jen Woody
Reviewer's Name

SUBJECT: Application G- 18079 Supersedes review of n/a
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: Evan Karp, CFO, Foxglove Properties LLC and Domaine Serene
County: Yamhill

A1. Applicant(s) seek(s) 0.17 cfs from 1 well(s) in the Willamette Basin, Yamhill River subbasin Quad Map: Dundee

A2. Proposed use Irrigation, supplemental irrigation, commercial Seasonality: March 1-October 31, March 1-October 31, year-round, respectively

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	**PROP 999999**	**7**	**CRBG**	**0.17**	**T3S/R3W-S 33**	**1074' S, 1642' E fr NW cor S 33**
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	**865**		**50**		**375**	**0-50**	**0-50**					

Use data from application for proposed wells.

A4. **Comments:** The well is proposed to 375 feet deep, which would access one or more water-bearing zones in the Columbia River Basalt Group (CRBG). The water level is estimated from nearby well logs of similar depth.

A5. ☒ **Provisions of the** Willamette 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: In the basin rules, wells in unconfined alluvium within ¼ mile of surface water are assumed to be hydraulically connected to surface water. The proposed well will access a confined aquifer, so these provisions are not activated.

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) **7I, Large Water Use Reporting Condition, 7T**;
   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:** _____

The applicant's proposed well will produce from one or more water-bearing zones in the Columbia River Basalt Group (CRBG), a series of lava flows with a composite thickness that ranges from 200 to 400 feet in this area (Conlon et al., 2005). Each flow is characterized by a series of internal features, including a thin rubble zone at the contact between flows and a thick, dense, low porosity and low permeability interior zone. In some cases, sedimentary layers were deposited during the time between basalt flow emplacements. A flow top, sedimentary interbed and flow bottom are collectively referred to as an interflow zone. Unconfined groundwater occurs near the weathered top of the basalts, but most water occurs in interflow zones at the contacts between lava flows. CRBG flow features result in a series of stacked, thin aquifers that are confined by dense flow interiors. The low permeability of the basalt flow interiors usually results in little connection between stacked aquifers, which generally results in tabular aquifers with unique water level heads (Reidel et al., 2002).

Constructing a well that is open to multiple water-bearing zones with distinct water level heads can commingle multiple aquifers. When the pump is off, water migrates through the well bore from an aquifer of higher pressure to an aquifer of lower pressure. Over time, this can depressurize the aquifer and exacerbates water level decline. Well construction conditions are specified to protect the resource and other existing users. _____

Vertical offset is mapped along northwest - trending faults mapped in the vicinity of this well. The faults juxtapose the Grande Ronde Basalt Formation against Tertiary marine sedimentary rocks, and against other undifferentiated flows within the Grande Ronde Basalt. Vertical offset of CRBG flows can cause juxtaposition of permeable interflows with dense flow interiors, resulting in a low flow boundary at the fault trace. At the subject site, the degree of compartmentalization by

faulting is unknown. Compartmentalization will likely limit the aquifer extent. The CRBG overlies Tertiary marine sediments, which are typically low-permeability, fractured and consolidated rocks. The unconformity between the marine sediments and the basalts locally limits the thickness and extent of individual CRBG aquifers.

Groundwater elevations in the area suggest the water-bearing zone in the applicant's proposed well may be shared by other groundwater users. Nearby basalt wells have mixed water level trends. The enarest wells (YAMH 54028, 54029, 51799) shoe relatively stable water level trends, while wells located to the east show a downward trend (see Figure 2). The limited extent of the CRBG flows and the universally low storativity of CRBG aquifers limit their potential productivity, both in rate and total volume. Water level measurement conditions are recommended to address resource capacity uncertainties.

Special Conditions:

1. The well shall be open to a single aquifer in the Grande Ronde Basalt Formation in the Columbia River Basalt Group and shall meet applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval shall be no greater than 50 feet. However, a larger open interval may be approved by the Department if the applicant can demonstrate to the satisfaction of the Department that the well is only open to a single aquifer. Following well completion, the well shall be thoroughly developed to remove cuttings and drilling fluids. Substantial evidence of a single aquifer completion may be collected by video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods approved by the Department. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval.

2. Drill cuttings shall be collected at 10-foot intervals and at changes in formation in the well and a split of each sampled interval shall be provided to the Department.

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	**CRBG**	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: The static water level in the CRBG wells generally rises above the water bearing zones, indicating a confined aquifer. Nearby well logs (i.e. YAMH 51799) display this characteristic.

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	**Unnamed tributary to Hess Creek –Section 33**	**825**	**700**	**1475**	☒	☐	☐	☐	☒
1	2	**Henry Creek**	**825**	**575**	**3960**	☒	☐	☐	☐	☒
1	3	**Unnamed tributary to Yamhill River, headwaters and spring in 3S/3W-S33 SW ¼ SE ¼**	**825**	**550-575**	**3880**	☒	☐	☐	☐	☒
1	4	**Big Spring**	**825**	**680**	**2200**	☒	☐	☐	☐	☒
1	5	**Unnamed spring near Big Spring**	**825**	**720**	**2000**	☒	☐	☐	☐	☒
1	6	**Unnamed tributary to Hess Creek- Section 28**	**825**	**575**	**3190**	☒	☐	☐	☐	☒
1	7	**Unnamed tributary to Yamhill River-Section 4**	**825**	**700**	**4500**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: The water-bearing zone in YAMH 51799, located 625 feet southwest of the POA, is reported on the well log from 675-775 feet above sea level. The water bearing zone is expected at about the same elevation in the proposed well, and that interval is incised by a several nearby perennial streams and coincident with springs. That incision allows groundwater discharge to surface water down gradient from the subject well. Pumping at the proposed POA will capture groundwater that would otherwise discharge to these surface water features, many of which are associated with surface water rights.

Water Availability Basin the well(s) are located within: Watershed ID #: 182 WILLAMETTE R > COLUMBIA R - AB MOLALLA R; Watershed ID #: 188 YAMHILL R > WILLAMETTE R - AB PALMER CR; Watershed ID #: 30200801 YAMHILL R > WILLAMETTE R - 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?
1	**1**	☐	☐	**n/a**	**n/a**	☐	**3890**	☐	*	☐
1	**2**	☐	☐	**n/a**	**n/a**	☐	**56.30**	☐	*	☐
1	**3**	☐	☐	**n/a**	**n/a**	☐	**3890**	☐	*	☐
1	**4**	☐	☐	**n/a**	**n/a**	☐	**56.30**	☐	*	☐
1	**5**	☐	☐	**n/a**	**n/a**	☐	**56.30**	☐	*	☐
1	**6**	☐	☐	**n/a**	**n/a**	☐	**3890**	☐	*	☐
1	**7**	☐	☐	**IS 73547A**	**31.70**	☐	**56.50**	☐	*	☐

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: *There is no appropriate model to estimate streamflow depletion from pumping in CRBG interflow zones that are incised by streams or discharge to point sources such as springs. Therefore, the percentage of interference at 30 days is not calculated.

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													
		%	%	%	%	%	%	%	%	%	%	%	%
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.												
(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:

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**

References Used:

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, B.J., Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5168.

Reidel, S.P., Johnson, V.G., and Spane, F.A., 2002, Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA—A guide to site characterization: Richland, Wash., Pacific Northwest National Laboratory, 277 p.

US Geological Survey Topographic Quadrangle Maps.

OWRD water level database, includes reported water levels, accessed 8/13/2015.

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

Water Availability Analysis

Detailed Reports

WILLAMETTE R > COLUMBIA R - AB MOLALLA R

WILLAMETTE BASIN

Water Availability as of 8/12/2015

Watershed ID #: 182 (Map) Exceedance Level: 80%

Date: 8/12/2015 Time: 10:58 AM

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	21,400.00	2,290.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,470.00	15,700.00	0.00	1,500.00	14,200.00
MAR	22,400.00	7,250.00	15,100.00	0.00	1,500.00	13,600.00
APR	19,900.00	6,910.00	13,000.00	0.00	1,500.00	11,500.00
MAY	16,600.00	4,230.00	12,400.00	0.00	1,500.00	10,900.00
JUN	8,740.00	1,980.00	6,760.00	0.00	1,500.00	5,260.00
JUL	4,980.00	1,800.00	3,180.00	0.00	1,500.00	1,680.00
AUG	3,830.00	1,650.00	2,180.00	0.00	1,500.00	682.00
SEP	3,890.00	1,400.00	2,490.00	0.00	1,500.00	993.00
OCT	4,850.00	749.00	4,100.00	0.00	1,500.00	2,600.00
NOV	10,200.00	880.00	9,320.00	0.00	1,500.00	7,820.00
DEC	19,300.00	961.00	18,300.00	0.00	1,500.00	16,800.00
ANN	15,200,000.00	2,250,000.00	13,000,000.00	0.00	1,090,000.00	11,900,000.00

Water Availability Analysis

Detailed Reports

YAMHILL R > WILLAMETTE R - AB PALMER CR

WILLAMETTE BASIN

Water Availability as of 8/13/2015

Watershed ID #: 188 (Map) Exceedance Level: 80%

Date: 8/13/2015 Time: 8:00 AM

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	1,780.00	62.10	1,720.00	0.00	31.00	1,690.00
FEB	2,010.00	60.10	1,950.00	0.00	31.00	1,920.00
MAR	1,710.00	38.20	1,670.00	0.00	31.00	1,640.00
APR	1,030.00	45.60	984.00	0.00	31.00	953.00
MAY	512.00	55.80	456.00	0.00	31.00	425.00
JUN	229.00	76.80	152.00	0.00	31.00	121.00
JUL	107.00	96.80	10.20	0.00	31.00	-20.80
AUG	66.60	86.00	-19.40	0.00	31.00	-50.40
SEP	56.30	55.80	0.48	0.00	31.00	-30.50
OCT	72.70	15.70	57.00	0.00	31.00	26.00
NOV	465.00	31.80	433.00	0.00	31.00	402.00
DEC	1,640.00	59.30	1,580.00	0.00	31.00	1,550.00
ANN	1,150,000.00	41,300.00	1,100,000.00	0.00	22,500.00	1,080,000.00

Water Availability Analysis

Detailed Reports

YAMHILL R > WILLAMETTE R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 8/13/2015

Watershed ID #: 30200801 (Map) Exceedance Level: 80%

Date: 8/13/2015 Time: 11:46 AM

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	1,840.00	70.30	1,770.00	0.00	31.70	1,740.00
FEB	2,070.00	68.00	2,000.00	0.00	31.70	1,970.00
MAR	1,760.00	43.80	1,720.00	0.00	31.70	1,680.00
APR	1,060.00	52.30	1,010.00	0.00	31.70	976.00
MAY	523.00	65.50	457.00	0.00	31.70	426.00
JUN	232.00	88.40	144.00	0.00	31.70	112.00
JUL	108.00	112.00	-3.59	0.00	31.70	-35.30
AUG	66.90	99.20	-32.30	0.00	31.70	-64.00
SEP	56.50	64.30	-7.82	0.00	31.70	-39.50
OCT	72.50	17.10	55.40	0.00	31.70	23.70
NOV	462.00	37.90	424.00	0.00	31.70	392.00
DEC	1,670.00	67.10	1,600.00	0.00	31.70	1,570.00
ANN	1,180,000.00	47,400.00	1,130,000.00	0.00	23,000.00	1,110,000.00

G-18079 Karp
T3S/R3W-Section 33

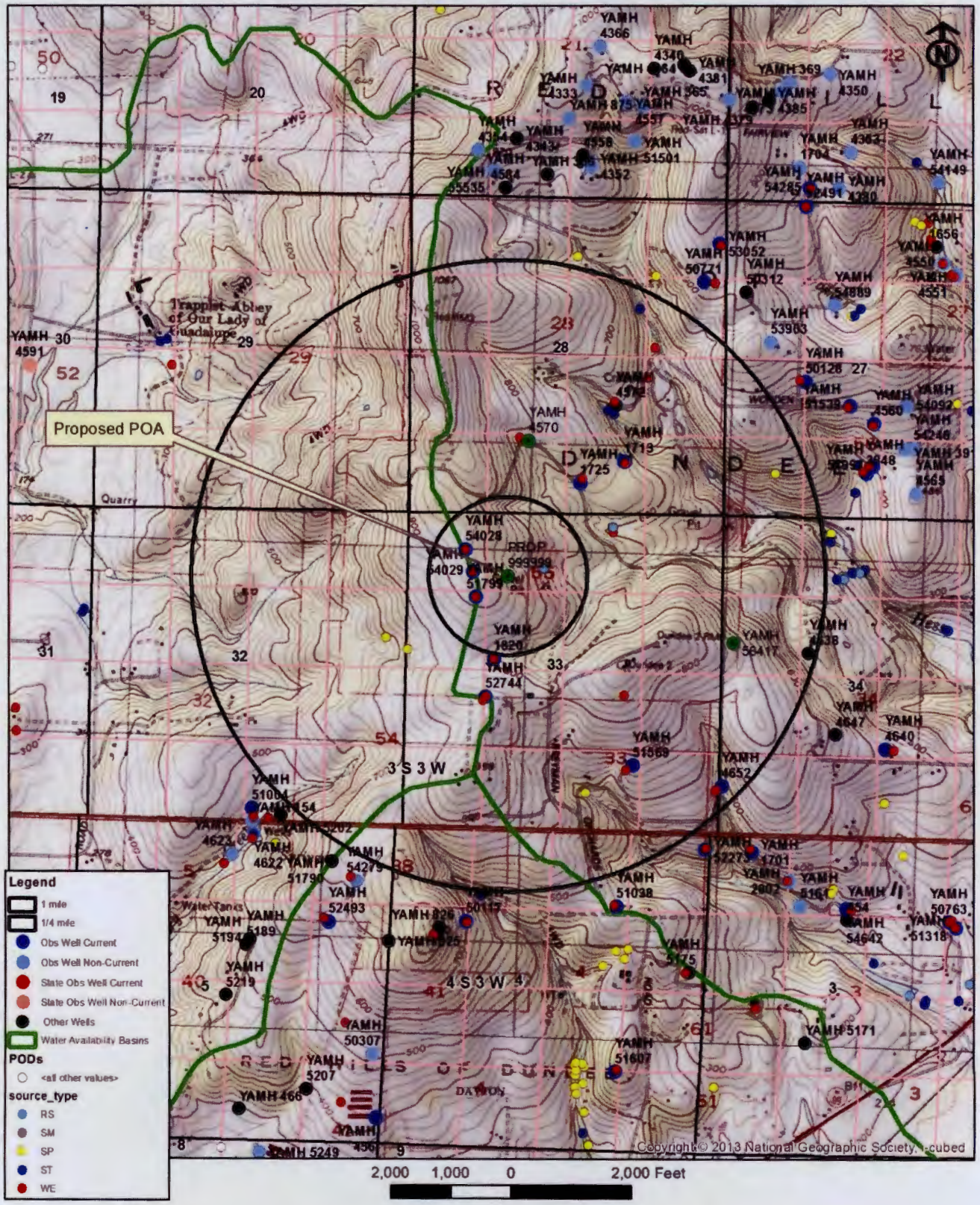
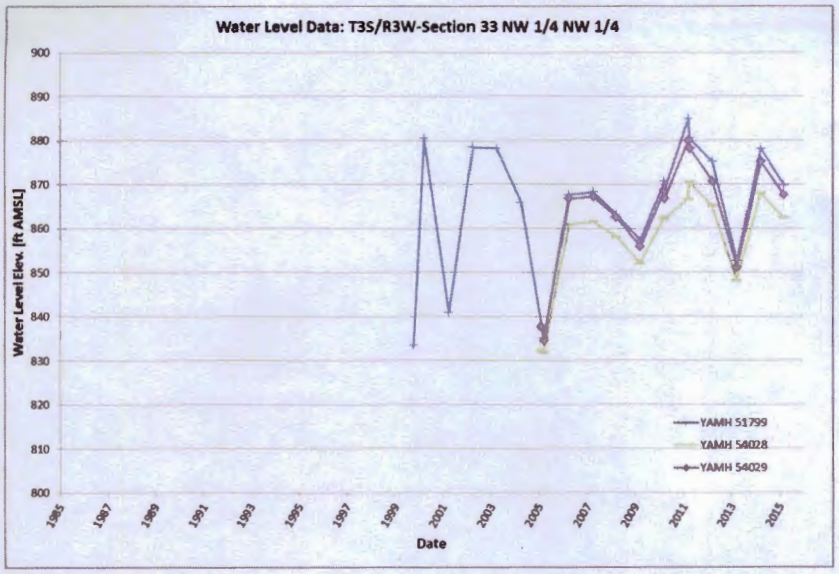
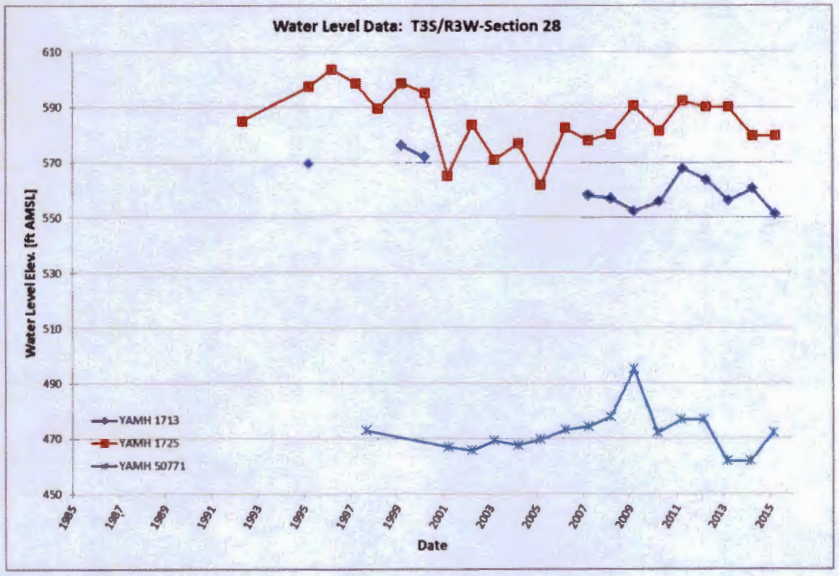


Figure 1. Well location Map.





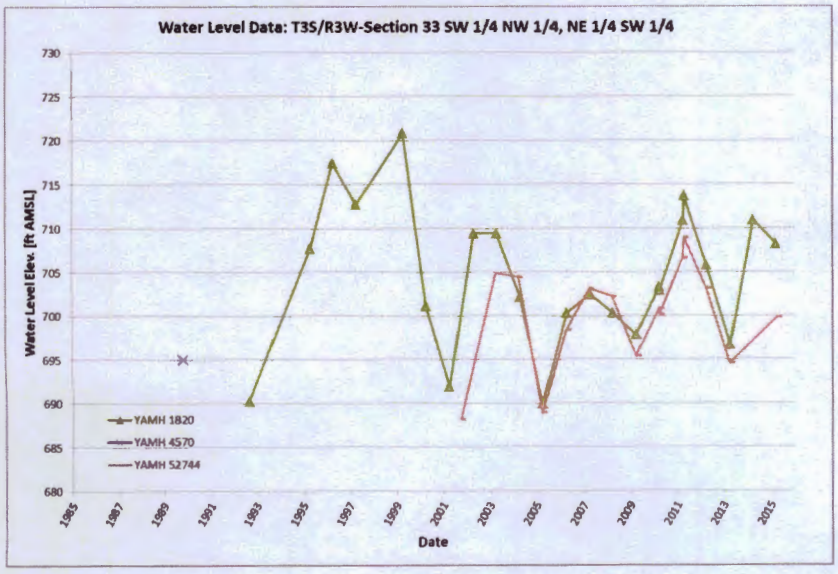


Figure 2. Water levels at wells closest to the proposed POA are stable (top and bottom hydrographs) at the current level of use. Wells to the east, at lower elevations, show a slight downward trend (middle hydrograph).