WATER RESOURCES DEPARTMENT MEMO 1-05, 2015

TO: **Application G-** 17932

FROM: Jen Woody **- Groundwater Section**

SUBJECT: **Scenic Waterway Interference Evaluation**

_____ YES
X NO — The source of appropriation is within or above a Scenic Waterway

_____ YES
X NO — Use the Scenic Waterway condition (condition 7J)

_____ Per ORS 390.835, the Groundwater Section is able to calculate groundwater interference with surface water that contributes to a Scenic Waterway. The calculated interference distribution is provided below.

_____ Per ORS 390.835, the Groundwater Section is unable to calculate groundwater 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 flows necessary to maintain the free-flowing character of a scenic waterway.

DISTRIBUTION OF INTERFERENCE

Calculate interference as the monthly fraction of the annual consumptive use and fill in the table below. If interference cannot be calculated, per criteria in 390.839, do not fill in the table but check the "unable" option above, thus informing the Water Rights Section that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in the _____ Scenic Waterway by the following amounts, expressed as a proportion of the annual consumptive use pumped from the well.

Monthly Fraction of Annual Consumptive Use

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 12/30/2014

FROM: Groundwater Section Jen Woody
Reviewer's Name

SUBJECT: Application G- 17932 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: Wigrich Farm, Inc. by Roger Fitts County: POLK

A1. Applicant(s) seek(s) 3.3 cfs from 1 well(s) in the Willamette Basin, _____ subbasin Quad Map: Monmouth

A2. Proposed use Irrigation Seasonality: March 1- 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	**PROP 999999**	**Well SHP**	Alluvium	**3.3**	T9S/R4W-2 NW ¼ SE ¼	2650' N, 1540' W fr SE cor S2
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	160		8**		40	18*	0-40		18-**40***			

Use data from application for proposed wells.

A4. **Comments:** The well in not yet constructed.
*Well is proposed as 16" diameter. For the purpose of this review an 18 foot seal is assumed, with perforations below that (18-40 feet below land surface).
**Nearby well logs of similar depth report water levels of 8- 16 feet bls. This review uses 8 feet bls as the expected static water level.

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: According to **690-502-0240,** permits may be issued for the use of water from a well in an unconfined aquifer that is hydraulically connected to groundwater, within a quarter mile of a stream, provided that surface water impacts are mitigated through storage releases. This well is hydraulically connected but greater than ¼ mile from the river.

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) **7C, 7F, 7P**;
   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 **alluvial** 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 proposed well will access alluvial sand, gravel and silt (Conon et al., 2005).

Nearby water level data are sparse and no long-term trend can be identified (see hydrograph). Given the hydraulic connection to the river, groundwater availability will largely be controlled by surface water availability.

Other groundwater rights within a quarter mile of the proposed well are held by Wigrich Farm or Mr. Fitts. Claim GR 65 is the nearest POD; location accuracy is questionable but the estimated distance is 150-300 feet between the proposed POA and that claim. Based on T = 225,000 gpd/ft (~30,000 ft2/d) and S = 0.2, nad a pumping rate of 1000 gpm, well to well interference will likely be less than 5 feet at 150 feet after 180 days of pumping (see attached Theis drawdown estimates).

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	**Alluvial**	☐	☒
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: While there is surficial clay reported in many well logs, the high yields, small drawdowns and observed groundwater response to river stage indicate the aquifer is more unconfined than confined.

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	**Willamette River**	**152**	**140-145**	**2400**	☒	☐	☐	☐	☒
1	2	**Duck Slough**	**152**	**150-160**	**4700**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Water levels in nearby wells and water level contours (Conlon et al., 2005) indicate groundwater flows toward the river. Given the uncertainty in estimating elevations (plus or minus 5 feet), groundwater can reasonably be assumed coincident with surface water locally, indicating hydraulic connection.

Water Availability Basin the well(s) are located within: **Watershed ID #183:** WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191000

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	☐	☐	MF 183A	**1300**	☐	**3,620**	☐	**>25%**	☒
1	2	☐	☐	**n/a**	**n/a**	☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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: Aquifer parameters (thickness, K, S) used to estimate stream depletion reference Conlon et al. Nearby pump tests at POLK 3840 and POLK 3713 resulted in T values on the order of 500 to 1000 ft^2/d, so the higher end of value ranges from Conlon et al were used.
Stream depletion estimates are >25% at 30 days using the Hunt (2003) model with a range of reasonable aquifer parameters (see attached model results).

Because the proposed well is closer to the Willamette River than Duck Slough, the cone of depression is expected to intersect the Willamette River first. Duck Slough is also a seasonal stream Therefore, analysis focuses on impacts to the Willamette.

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.

Gannett, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32 p.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82 p.

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 Analysis

Detailed Reports

WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191000

WILLAMETTE BASIN

Water Availability as of 12/29/2014

Watershed ID #: 183 (Map)

Exceedance Level:

Date: 12/29/2014

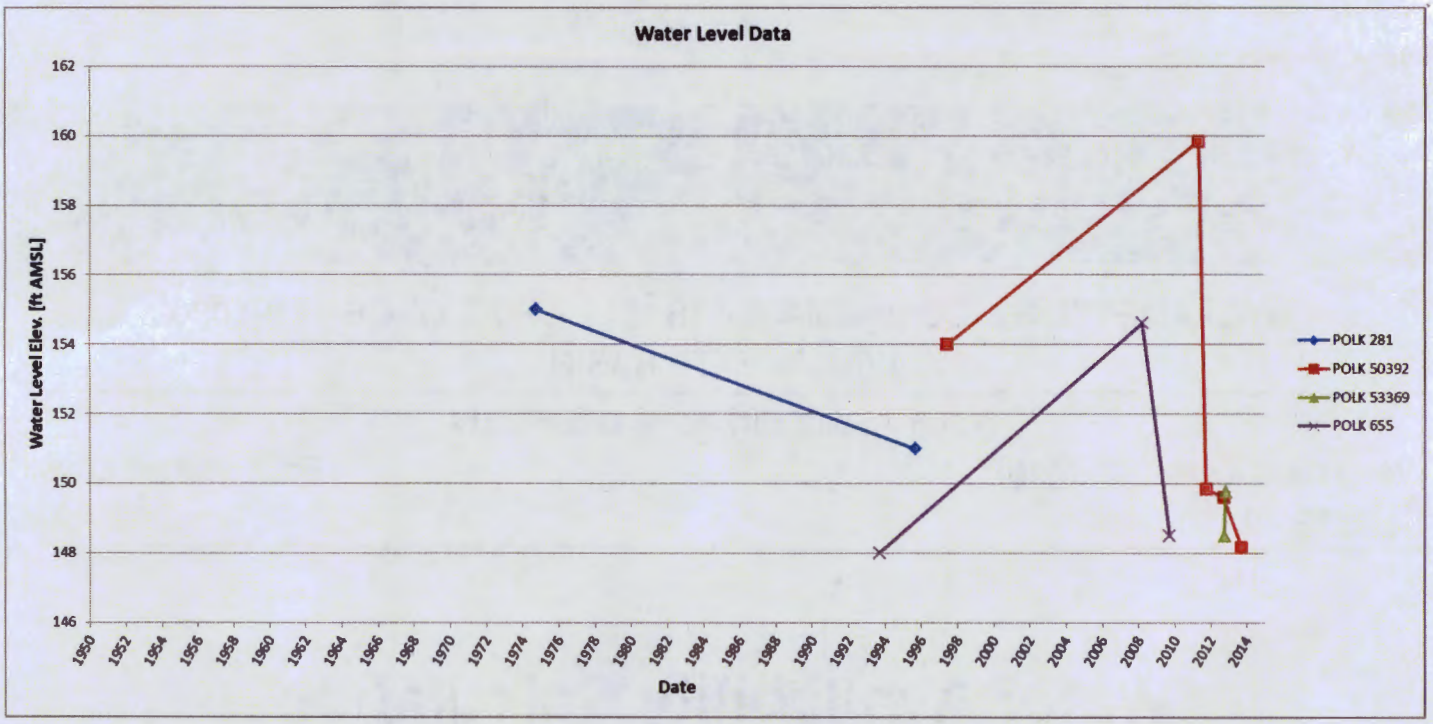
Time: 9:17 AM

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	18,400.00	2,240.00	16,200.00	0.00	1,300.00	14,900.00
FEB	20,100.00	7,430.00	12,700.00	0.00	1,300.00	11,400.00
MAR	19,600.00	7,220.00	12,400.00	0.00	1,300.00	11,100.00
APR	18,000.00	6,870.00	11,100.00	0.00	1,300.00	9,830.00
MAY	15,500.00	4,160.00	11,300.00	0.00	1,300.00	10,000.00
JUN	8,310.00	1,690.00	6,620.00	0.00	1,300.00	5,320.00
JUL	4,710.00	1,450.00	3,260.00	0.00	1,300.00	1,960.00
AUG	3,620.00	1,330.00	2,290.00	0.00	1,300.00	989.00
SEP	3,680.00	1,160.00	2,520.00	0.00	1,300.00	1,220.00
OCT	4,650.00	747.00	3,900.00	0.00	1,300.00	2,600.00
NOV	9,400.00	856.00	8,540.00	0.00	1,300.00	7,240.00
DEC	16,700.00	912.00	15,800.00	0.00	1,300.00	14,500.00
ANN	13,500,000.00	2,160,000.00	11,300,000.00	0.00	942,000.00	10,400,000.00


Water Level Data
Water Level Elev. [ft AMSL]
162
160
158
156
154
152
150
148
146
1950
1952
1954
1956
1958
1960
1962
1964
1966
1968
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
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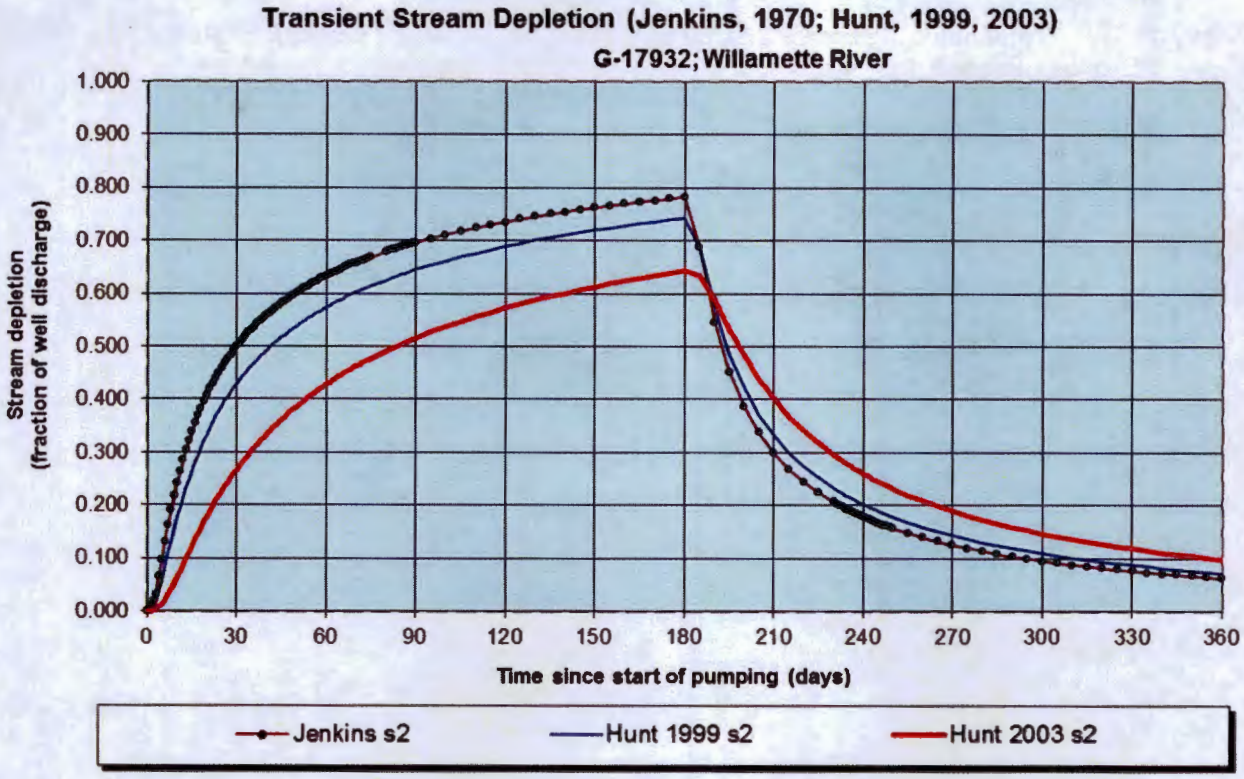
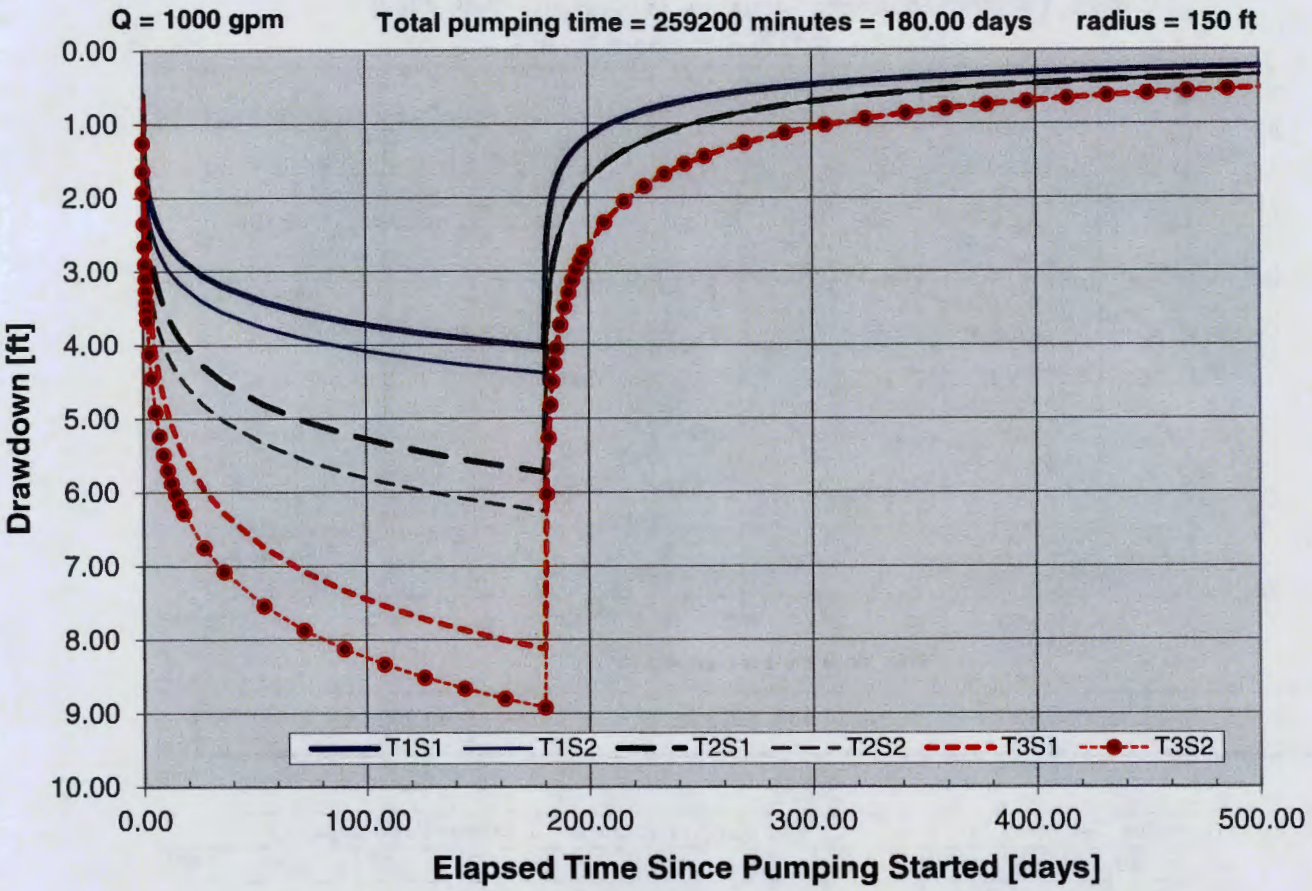
2012
2014
Date
POLK 281
POLK 50392
POLK 53369
POLK 655



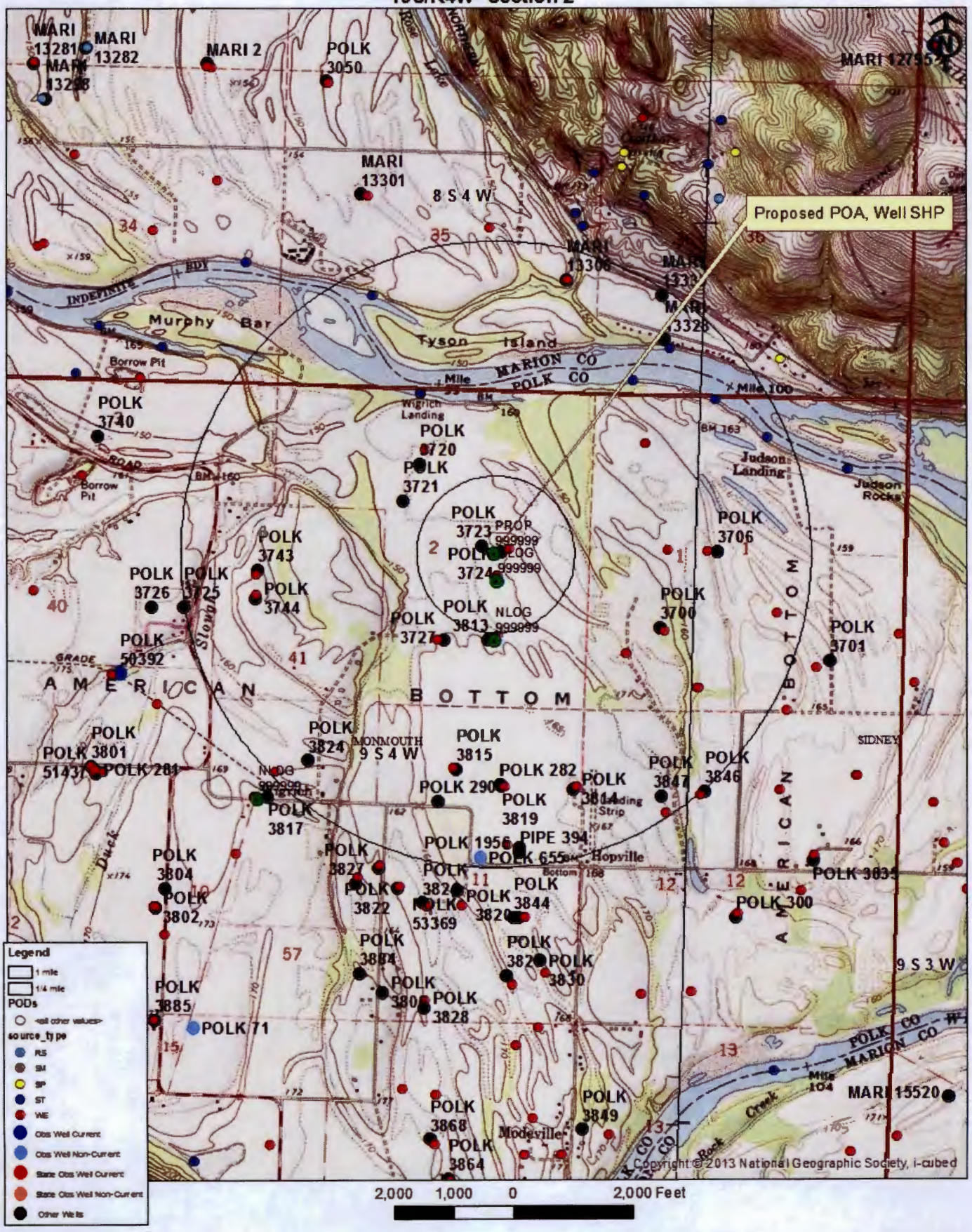
Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 180 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	49.9%	63.3%	69.6%	73.5%	76.2%	78.3%	29.9%	17.8%	12.5%	9.5%	7.6%	6.3%
H SD 1999	42.9%	57.4%	64.5%	68.9%	72.0%	74.3%	33.2%	20.2%	14.3%	10.9%	8.8%	7.2%
H SD 2003	26.75%	42.81%	51.59%	57.27%	61.32%	64.40%	40.09%	26.02%	18.92%	14.66%	11.84%	9.85%
Qw, cfs	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300	3.300
H SD 99, cfs	1.416	1.893	2.128	2.274	2.375	2.451	1.095	0.666	0.472	0.361	0.289	0.239
H SD 03, cfs	0.883	1.413	1.702	1.890	2.024	2.125	1.323	0.859	0.624	0.484	0.391	0.325

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	3.30	3.30	3.30	cfs
Time pump on (pumping duration)	tpon	180	180	180	days
Perpendicular from well to stream	a	2400	2400	2400	ft
Well depth	d	40	40	40	ft
Aquifer hydraulic conductivity	K	500	1200	2000	ft/day
Aquifer saturated thickness	b	35	35	35	ft
Aquifer transmissivity	T	17500	42000	70000	ft*ft/day
Aquifer storativity or specific yield	S	0.2	0.2	0.2	
Aquitard vertical hydraulic conductivity	Kva	1	1	1	ft/day
Aquitard saturated thickness	ba	3	3	3	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	600	600	600	ft
Streambed conductance (lambda)	sbc	200.000000	200.000000	200.000000	ft/day
Stream depletion factor	sdf	65.828571	27.428571	16.457143	days
Streambed factor	sbf	27.428571	11.428571	6.857143	
input #1 for Hunt's Q_4 function	t'	0.015191	0.036458	0.060764	
input #2 for Hunt's Q_4 function	K'	109.714286	45.714286	27.428571	
input #3 for Hunt's Q_4 function	epsilon'	1.000000	1.000000	1.000000	
input #4 for Hunt's Q_4 function	lamda'	27.428571	11.428571	6.857143	

Theis Drawdown and Recovery at r = 150 ft From Pumping Well



T1 = 225,000 gpd/ft T2 = 150,000 gpd/ft T3 = 100,000 gpd/ft

S1 = 0.20000 S2 = 0.10000

G-17932 Wigrich Farm, Inc.
T9S/R4W- Section 2