Groundwater Application Review Summary Form

Application # G- 18418

GW Reviewer Jen Woody / Joe Kemper **Date Review Completed:** 3/24/2017

Summary of GW Availability and Injury Review:

[ ] 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 5/24 ,20 17

TO: **Application G-** 18418

FROM: **GW:** Jen Woody / Joe Kemper
(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 5/24/2017

FROM: Groundwater Section Joe Kemper / Jen Woody
Reviewer's Name

SUBJECT: Application G- 18418 Supersedes review of NA
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: **Coleman Koch Properties, LLC, c/o Todd Koch** County: **Marion**

A1. Applicant(s) seek(s) 3.18 cfs from 2 well(s) in the Willamette Basin, Champoeg Creek subbasin

A2. Proposed use Irrigation Seasonality: March 1 to 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	Proposed	1	Alluvial	3.18	4S/2W-29 SE/NE	1390 ft N, 465 ft W fr SE cor DLC 94
2	Proposed	2	Alluvial	3.18	4S/2W-29 NW/SE	85 ft N, 1165 ft W fr SE cor, DLC 94
3						

* 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	175	NA	NA	NA	250	50	250	TBD	TBD	NA	NA	NA
2	175	NA	NA	NA	250	50	250	TBD	TBD	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The following evaluations are based upon the proposed well construction above.

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: The wells will produce from a confined aquifer so the pertinent rules (OAR 690-502-240) do not apply.

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

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 **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 wells are located on a terrace about 70 feet above the floodplain of the Willamette River. The terrace is underlain by a thick sequence of fine-grained sediments that extends to depths of approximately 1000 feet. The bulk of the sediments are clays and silts that encase a few relatively-thin beds of sand and gravel that do not appear to be continuous over widespread areas. The upper 60-80 feet of sediments are a sequence of graded beds of fine sand, silt, and clay (the Willamette Silt) deposited by a series of Pleistocene glacial floods which inundated the Willamette Valley. The water table occurs at shallow depths within the Willamette Silt, which acts as a leaky confining layer for productive sands and gravel at depth. Thin zones of sands and gravels below 100 ft blsd are likely the primary water bearing units. The thin, discontinuous geometry and confined conditions suggest that the aquifer system could be vulnerable to long term drawdown and/or interference.

Water level data from state observation well MARI 2331 indicates seasonal fluctuations of about 20 feet, but relatively stable conditions over the last 50 years for shallow wells (see hydrograph in Fig. 3). Long term data is sparse in the deeper water bearing zones which this application proposes to develop, but recent trends indicate water levels are stable (see MARI 53033 & MARI 1213). The thin, lenticular geometry of those zones and the large proposed rate indicate that water-use reporting and water-level measurement conditions are prudent. (Conlon and others, 2005; Gannett and Caldwell, 1998; Swanson and others, 1993).

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**	☒	☐
2	**Alluvial**	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: Water-bearing sands and gravels in the area are overlain by about 80 feet of saturated Willamette Silt. The water table occurs at depths of less than 50 feet within the silt unit, whereas water bearing zones are typically below 100 ft blsd. The available data indicates the silt unit acts as a leaky confining unit for sands and gravels at depth.

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	**Mission Creek**	**140***	**135**	**5590**	☒	☐	☐	☐	☒
1	2	**Unnamed Trib. To Champoeg Creek**	**140***	**130**	**5600**	☒	☐	☐	☐	☒
1	3	**Champoeg Creek**	**140***	**115**	**7460**	☒	☐	☐	☐	☒
2	1	**Mission Creek**	**140***	**135**	**6170**	☒	☐	☐	☐	☒
2	2	**Unnamed Trib. To Champoeg Creek**	**140***	**130**	**5785**	☒	☐	☐	☐	☒
2	3	**Champoeg Creek**	**140***	**115**	**7290**	☒	☐	☐	☐	☒

**GW elev inferred from measurements in adjacent wells and published USGS values (Conlon et al, 2005)*

Basis for aquifer hydraulic connection evaluation: Mission and Champoeg Creeks have their headwaters in the terrace underlain by the Willamette Silt. As these stream drainages traverse the terrace toward the northeast, they progressively cut into the Willamette Silt until they intersect the water table, at which point they transition from ephemeral to perennial streams. This is consistent with published water level maps which indicate that groundwater in the alluvial aquifer system flows toward and discharges into the local stream network (Woodward and others, 1998). These facts indicate that the alluvial aquifer system is hydraulically connected to the local stream network. The depletion of local streams on the terrace by the proposed wells will be buffered, but not eliminated, by the low vertical hydraulic conductivity of the Willamette Silt and other clays and silts that lie above the deeper sands and gravels.

Water Availability Basin the well(s) are located within: CHAMPOEG CR>WILLAMETTE R – AT MOUTH (Watershed ID 30200708

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: NA – Proposed wells are at a distance greater than one mile to adjacent streams.

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**	**.06 %**	**.07 %**	**.01 %**	**.02 %**	**.02 %**	**.03 %**	**.04 %**	**.04 %**	**.05 %**	**.06 %**	**.06 %**	**.06 %**
Well Q as CFS		**0**	**0**	**1.30**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**1.3**	**0**	**0**
Interference CFS		**0.001**	**0.001**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**
(A) = Total Interf.		**0.001**	**0.001**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.001**	**0.001**	**0.001**	**0.001**	**0.001**
(B) = 80 % Nat. Q		**37.30**	**51.70**	**22.40**	**10.90**	**6.15**	**3.04**	**2.94**	**1.88**	**1.08**	**1.00**	**10.10**	**47.80**
(C) = 1 % Nat. Q		**0.373**	**0.517**	**0.224**	**0.109**	**0.062**	**0.030**	**0.029**	**0.019**	**0.018**	**0.010**	**0.101**	**0.478**
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		**0.0 %**	**0.0 %**	**0.0 %**	**0.0 %**	**0.0 %**	**0.0 %**	**0.0 %**	**.05 %**	**.09 %**	**.1 %**	**.01 %**	**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: Potential depletion of Mission Creek (SW 1) by proposed Well 1 was estimated using the Hunt 2003 stream depletion analytical model (Figure 4). For this model, the requested rate (3.18 cfs) was multiplied by 0.41 to prorate across the entire pumping season (244 days) to reflect the disparity between duty (2.5 ft/acre) and max permitted rate (1/80 cfs per acre). This enables the use of a constant pumping rate in the Hunt 2003 analytical model.

Analytical modeling results for the proposed Well 1/SW 1 scenario, using a prorated pumping rate of 1.3 cfs, show that estimated interference is less than 1% of the 80% exceedance of natural flows expected in the Champoeg Water Availability Basin.

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.

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

Swanson, R.D., McFarland, W.D., Gonthier, J.B., and Wilkinson, J.M., 1993, A description of hydrogeologic units in the Portland basin, Oregon and Washington: U.S.Geological Survey Water-Resources Investigations Report 90-4196, 56p.

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.

Application file: G-18418

US Geological Survey Topographic Map, Forest Grove Quadrangle.

OWRD water level database, includes reported water levels, accessed 5/15/2017.

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:** NA – wells are proposed.

D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Figure 1. Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION
Water Availability as of 3/11/2005 for
CHAMPOEG CR > WILLAMETTE R - AT MOUTH

Watershed ID #: 30200708 Basin: WILLAMETTE Exceedance Level: 80
Time: 08:37 Date: 03/11/2005

Month	Natural Stream Flow	CU + Stor Prior to 1/1/93	CU + Stor After 1/1/93	Expected Stream Flow	Reserved Stream Flow	Instream Water Rights	Net Water Available
1	37.30	6.59	0.00	30.70	0.00	0.00	30.70
2	51.70	6.11	0.00	45.60	0.00	0.00	45.60
3	22.40	3.06	0.00	19.30	0.00	0.00	19.30
4	10.90	1.88	0.00	9.02	0.00	0.00	9.02
5	6.15	3.87	0.00	2.28	0.00	0.00	2.28
6	3.04	6.45	0.00	-3.41	0.00	0.00	-3.41
7	2.94	10.60	0.00	-7.65	0.00	0.00	-7.65
8	1.88	8.41	0.00	-6.53	0.00	0.00	-6.53
9	1.08	4.11	0.00	-3.03	0.00	0.00	-3.03
10	1.00	0.30	0.00	0.70	0.00	0.00	0.70
11	10.10	3.74	0.00	6.36	0.00	0.00	6.36
12	47.80	9.46	0.00	38.30	0.00	0.00	38.30
Stor	28100	3910	0	25100	0	0	25100

Figure 2. Well Location Map

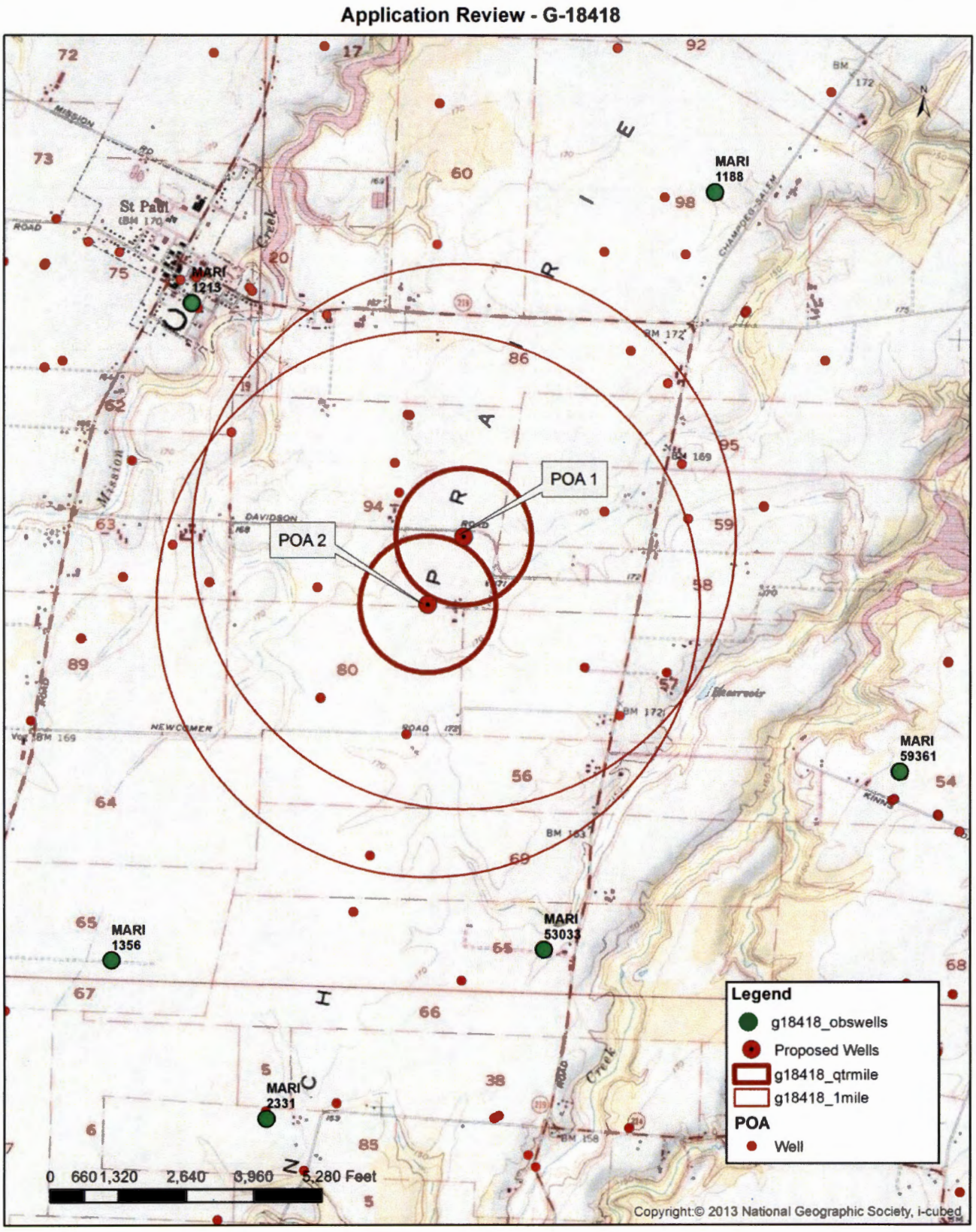


Figure 3. Water-Level Trends in Nearby Wells

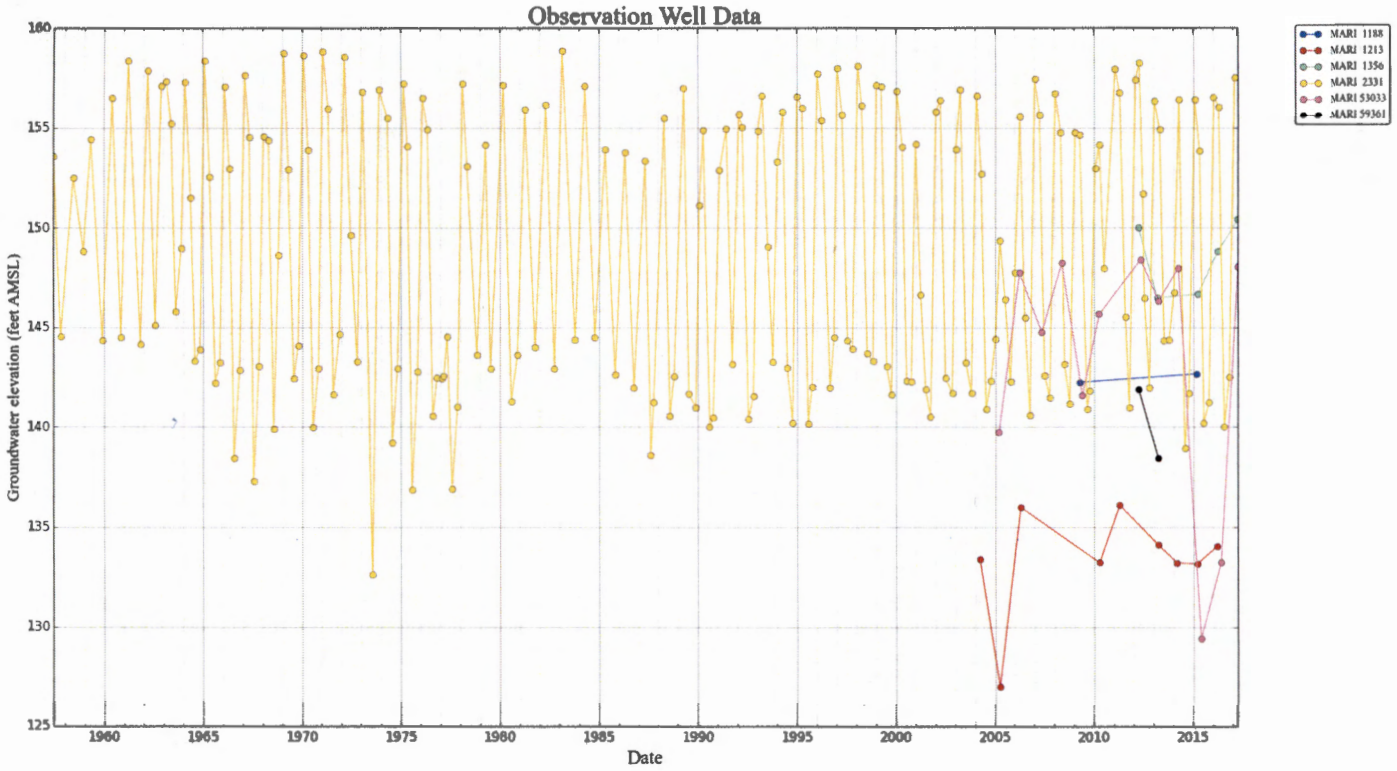
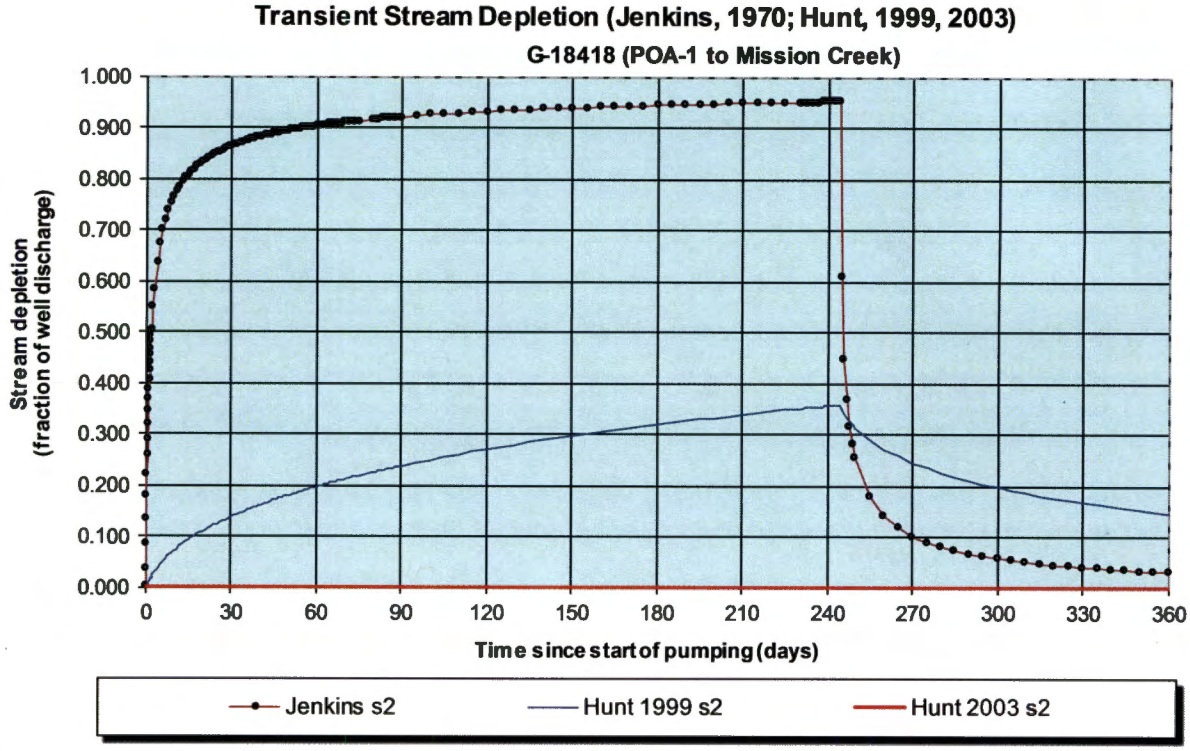


Figure 4. Model Output (Hunt, 2003)



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 244 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	86.3%	90.3%	92.0%	93.1%	93.8%	94.4%	94.8%	95.1%	10.1%	5.7%	4.0%	3.0%
H SD 1999	13.7%	19.6%	23.7%	26.9%	29.6%	31.8%	33.8%	35.6%	24.5%	19.6%	16.7%	14.6%
H SD 2003	0.01%	0.02%	0.02%	0.03%	0.04%	0.04%	0.05%	0.06%	0.06%	0.06%	0.06%	0.07%
Qw, cfs	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300	1.300
H SD 99, cfs	0.178	0.255	0.308	0.350	0.385	0.414	0.440	0.462	0.318	0.255	0.217	0.189
H SD 03, cfs	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	1.30	1.30	1.30	cfs
Time pump on (pumping duration)	tpon	244	244	244	days
Perpendicular from well to stream	a	5590	5590	5590	ft
Well depth	d	250	250	250	ft
Aquifer hydraulic conductivity	K	1.29	12.9	129	ft/day
Aquifer saturated thickness	b	135	135	135	ft
Aquifer transmissivity	T	174.15	1741.5	17415	ft*ft/day
Aquifer storativity or specific yield	S	0.0001	0.0001	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.1	0.1	0.1	ft/day
Aquitard saturated thickness	ba	80	80	80	ft
Aquitard thickness below stream	babs	75	75	75	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft
Streambed conductance (lambda)	sbc	0.026667	0.026667	0.026667	ft/day
Stream depletion factor	sdf	17.943210	1.794321	0.179432	days
Streambed factor	sbf	0.855967	0.085597	0.008560	
input #1 for Hunt's Q_4 function	t'	0.055731	0.557314	5.573139	
input #2 for Hunt's Q_4 function	K'	224.290123	22.429012	2.242901	
input #3 for Hunt's Q_4 function	epsilon'	0.000500	0.000500	0.000500	
input #4 for Hunt's Q_4 function	lamda'	0.855967	0.085597	0.008560	