Groundwater Application Review Summary Form

Application # G- 18539

GW Reviewer Joe Kempa / Jen Woody **Date Review Completed:** 11/20/2017

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:

[X] 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 Nov, 20 ,2017

TO: **Application G-** 18539

FROM: **GW:** Joe Kemper / 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 11/28/2017

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

SUBJECT: Application G- 18539 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: Dayton Natural Meats LLC/Reg Keddie County: Yamhill

A1. Applicant(s) seek(s) 0.11 cfs from 1 well(s) in the Willamette Basin, Yamhill River subbasin

A2. Proposed use Commercial Seasonality: Year-Round

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**	**Alluvium**	**0.11**	**4S/3W-18 SW-NE**	**60'N, 1270'E fr center, S 18**
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	**150**	**NA**		**NA**	**125**	**0-30**	**0-125**	**NA**	**90-125**	**40**	**NA**	**NA**

Use data from application for proposed wells.

A4. **Comments:** Application map indicates POU and POA are in TRS 4S/3W-18 SW of NW, but true location is SW of NE.

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 applicant's well is less than ¼ mile from a perennial surface water body, however it will likely draw from a confined aquifer, so the pertinent basin rules (OAR 690-502-0240) 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) **7C, Medium 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 POA is located on a terrace approximately 75 feet above the adjacent Yamhill River. The terrace consists of a thick sequence of predominately fine-grained sediments. The upper 50-100 feet of sediments are presumably Willamette Silt (Woodward and others, 1998). Thin (5-20 feet) beds of water producing sands and gravels are observed within this sediment package at depths greater than 75 feet. According to observed SWLs (static water levels) and published water table maps, 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 (Conlon and others, 2005). Long term water level trends (see Figure 2) do not show clear evidence of decline as result of over appropriation. Considering the confined conditions and low storage capacity of water wearing zones, medium water use reporting and water-level measurement conditions are prudent to protect senior groundwater rights.

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	**Alluvium**	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Published geologic maps indicate the Willamette Silt is approximately 80 feet thick in this area and overlie water bearing zones (Woodward et al., 1998). Adjacent well logs report water bearing zones below 70 feet BLS and static water levels at approximately 40 ft BLS (see YAMH 5357 & YAMH 5324), indicating the aquifer is more confined than unconfined.

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**	**Yamhill River**	**~100**	**80**	**305**	☒	☐	☐	☐	☒
1	**2**	**Unnamed Stream**	**~100**	**115**	**1050**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Published water table maps and static water level measurements indicate groundwater flows towards and discharges into the Yamhill River (Woodward et al., 1998). The proposed seal is 0-30 feet, leaving the well open from 30 to 124 feet below land surface. Static water levels in nearby wells are coincident with the Yamhill River, indicating hydraulic connection. Given the proximity to the Yamhill River, this review estimates full impact at the Yamhill River.

Water Availability Basin the well(s) are located within: 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**	☒	☐	**IS73547A**	**31.7**	☐	**45.2**	☐	**11%**	☒
1	**2**	☒	☐	**NA**	**NA**	☐		☐	**0.2%**	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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:

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													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(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:** Although the Yamhill River incises through most of the Willamette Silt here, adjacent well logs suggests that several layers of silt/clay lie between the streambed (70-80 ft amsl) and water bearing zones (~50 ft amsl). Thus, stream depletion was estimated using the Hunt 2003 analytical model. Using parameters that maximize potential depletion (see Figure 4), depletion of the Yamhill River was <25% after 30 days of pumping. Note that the requested rate is 0.11 cfs and requested volume is 26 AF. Pumping at the constant rate would take 119 days to reach 26 AF. If use is evenly distributed across a given year, a pumping rate of 0.036 cfs would reach the requested 26 AF. Both scenarios were modeled.

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.

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

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, 82p.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** NA **Logid:** PROPOSED

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.**

Figure 1 – Water Availability Tables

YAMHILL R > WILLAMETTE R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 11/14/2017

Watershed ID #: 30200801 (Map) Exceedance Level: 80%
Date: 11/14/2017 Time: 12:09 PM

Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations | Water Rights | Watershed Characteristics

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	68.30	1,770.00	0.00	31.70	1,740.00
FEB	2,070.00	66.10	2,000.00	0.00	31.70	1,970.00
MAR	1,760.00	41.80	1,720.00	0.00	31.70	1,690.00
APR	1,060.00	49.90	1,010.00	0.00	31.70	978.00
MAY	523.00	66.50	456.00	0.00	31.70	425.00
JUN	232.00	88.60	143.00	0.00	31.70	112.00
JUL	108.00	112.00	-3.96	0.00	31.70	-35.70
AUG	66.90	99.50	-32.60	0.00	31.70	-64.30
SEP	56.50	64.40	-7.95	0.00	31.70	-39.60
OCT	72.50	17.00	55.50	0.00	31.70	23.80
NOV	462.00	38.70	423.00	0.00	31.70	392.00
DEC	1,670.00	65.10	1,600.00	0.00	31.70	1,570.00
ANN	1,180,000.00	47,000.00	1,130,000.00	0.00	23,000.00	1,110,000.00

Detailed Report of Instream Flow Requirements

Instream Flow Requirements in Cubic Feet per Second

Application #	Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
IS73547A	CERTIFICATE	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70	31.70
IS73548A	CERTIFICATE	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50	31.50
Maximum		**31.70**	**31.70**	**31.70**	**31.70**	**31.70**	**31.70**	**31.70**	**31.70**	**31.70**	**31.70**	**31.70**	**31.70**

Figure 2 -Well Location Map

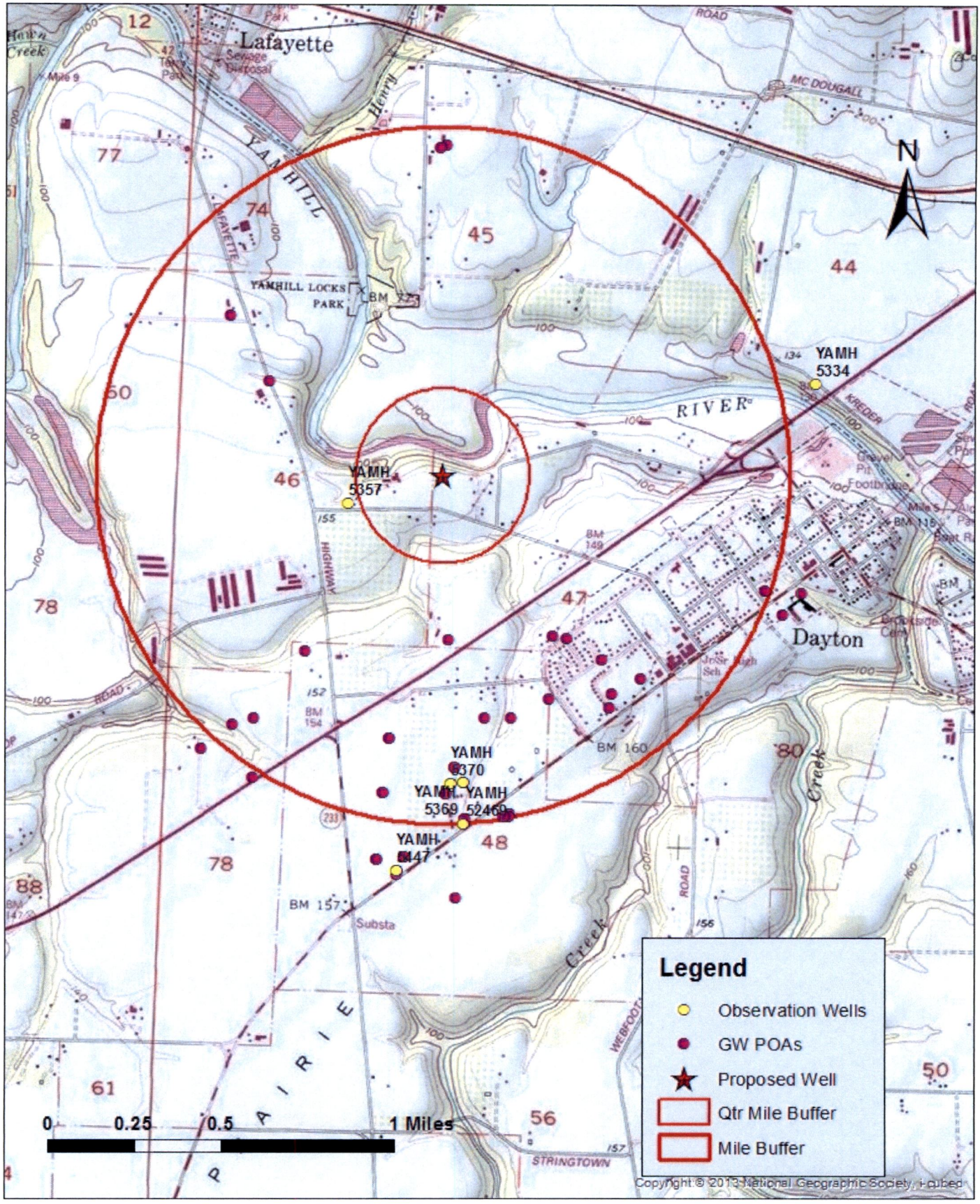


Figure 3 – Water-Level Trends in Nearby Wells

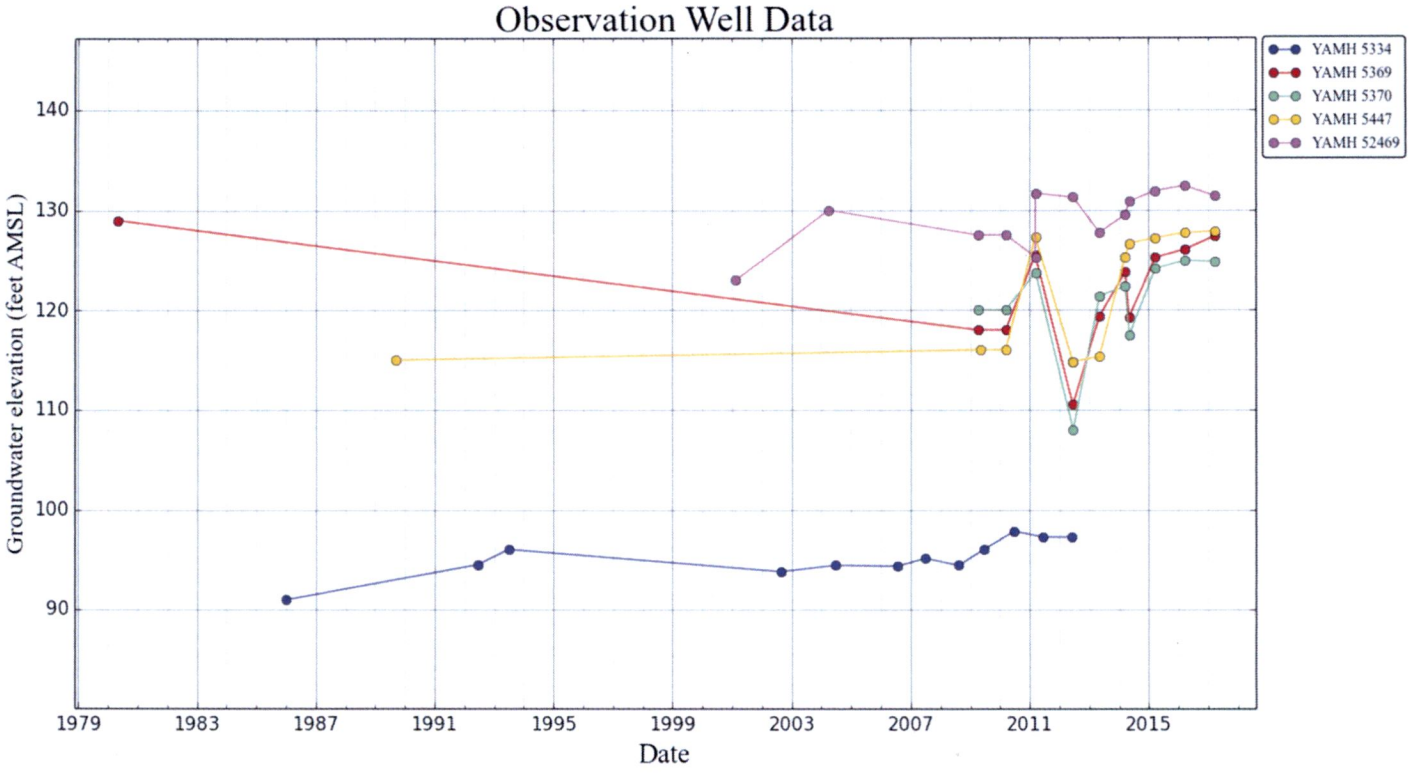
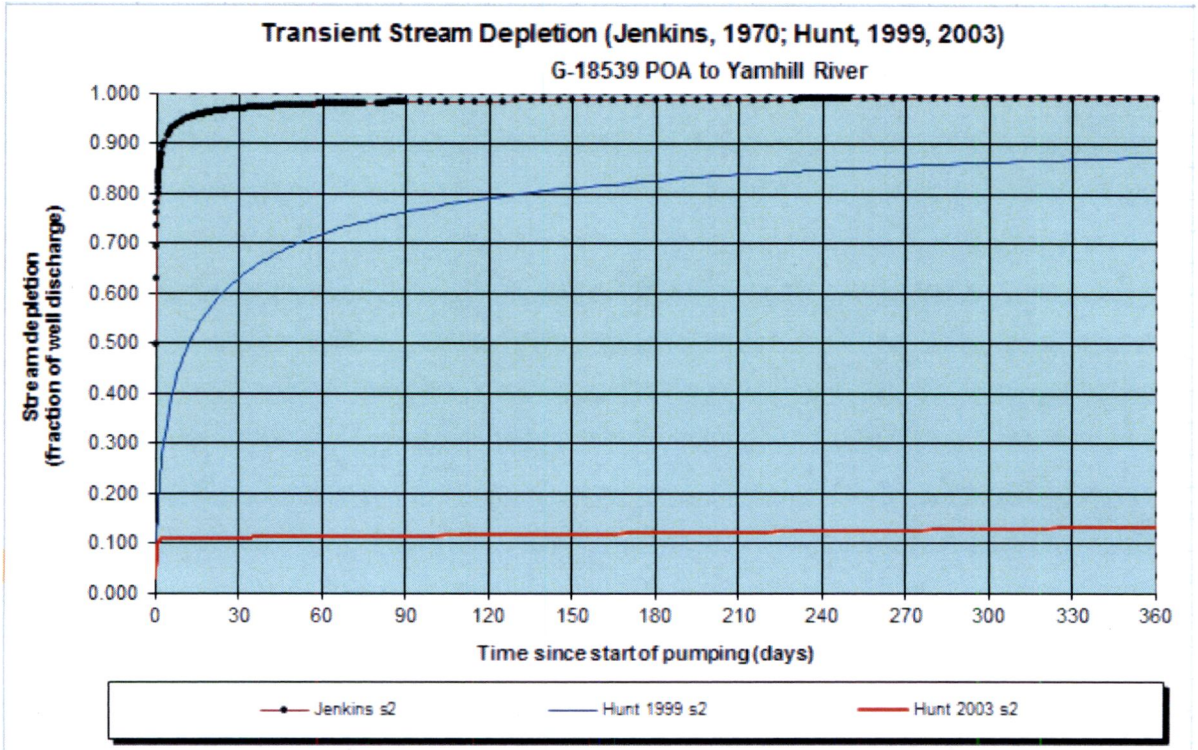
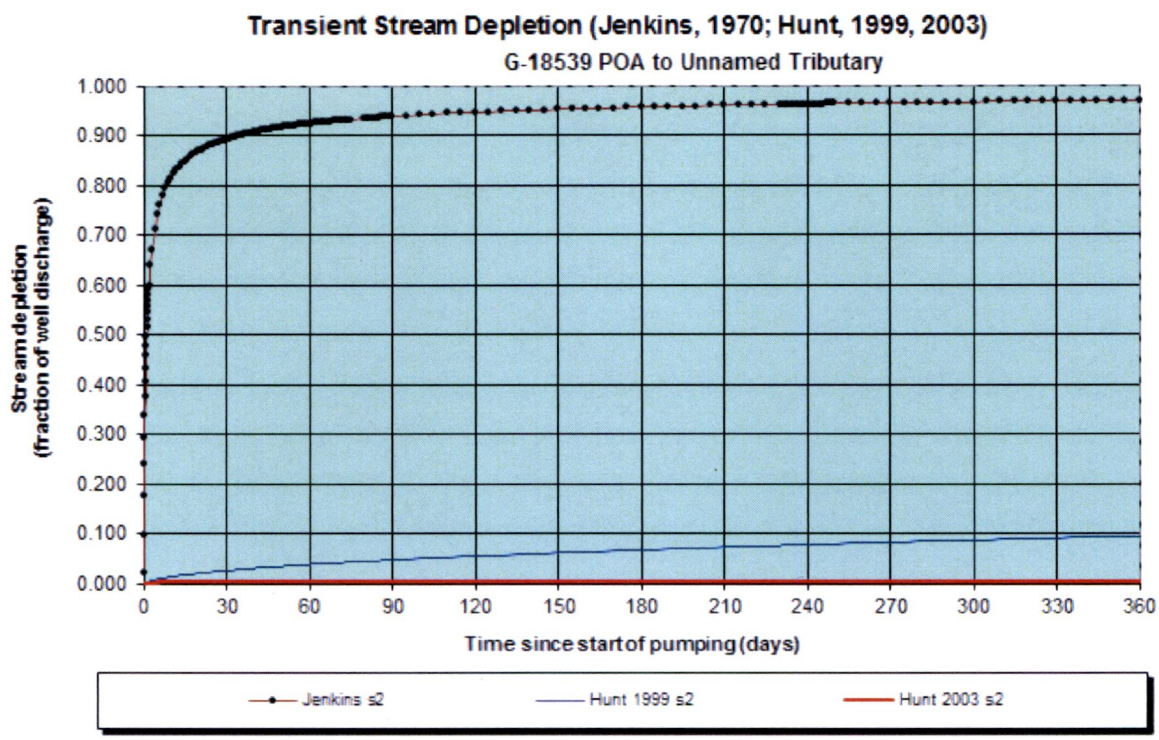


Figure 4 – Stream Depletion Model Outputs



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 365 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	96.9%	97.8%	98.2%	98.4%	98.6%	98.7%	98.8%	98.9%	99.0%	99.0%	99.1%	99.1%
H SD 1999	63.0%	71.8%	76.2%	79.1%	81.1%	82.6%	83.8%	84.8%	85.6%	86.3%	86.9%	87.4%
H SD 2003	11.11%	11.27%	11.44%	11.61%	11.79%	11.97%	12.17%	12.38%	12.60%	12.83%	13.08%	13.34%
Qw, cfs	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036
H SD 99, cfs	0.023	0.026	0.027	0.028	0.029	0.030	0.030	0.031	0.031	0.031	0.031	0.031
H SD 03, cfs	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.004	0.005	0.005	0.005	0.005

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.04	0.04	0.04	cfs
Time pump on (pumping duration)	tpon	365	365	365	days
Perpendicular from well to stream	a	305	305	305	ft
Well depth	d	125	125	125	ft
Aquifer hydraulic conductivity	K	10	10	10	ft/day
Aquifer saturated thickness	b	5	10	20	ft
Aquifer transmissivity	T	50	100	200	ft*ft/day
Aquifer storativity or specific yield	S	0.0001	0.0001	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.005	0.005	0.005	ft/day
Aquitard saturated thickness	ba	25	30	40	ft
Aquitard thickness below stream	babs	5	10	20	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	100	100	100	ft
Streambed conductance (lambda)	sbc	0.100000	0.050000	0.025000	ft/day
Stream depletion factor	sdf	0.186050	0.093025	0.046513	days
Streambed factor	sbf	0.610000	0.152500	0.038125	
input #1 for Hunt's Q_4 function	t'	5.374899	10.749798	21.499597	
input #2 for Hunt's Q_4 function	K'	0.372100	0.155042	0.058141	
input #3 for Hunt's Q_4 function	epsilon'	0.000500	0.000500	0.000500	
input #4 for Hunt's Q_4 function	lamda'	0.610000	0.152500	0.038125	



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 365 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	89.2%	92.4%	93.8%	94.6%	95.2%	95.6%	95.9%	96.2%	96.4%	96.6%	96.7%	96.9%
H SD 1999	2.5%	3.7%	4.7%	5.4%	6.1%	6.7%	7.2%	7.7%	8.2%	8.6%	9.0%	9.4%
H SD 2003	0.19%	0.20%	0.20%	0.20%	0.20%	0.21%	0.21%	0.21%	0.21%	0.22%	0.22%	0.22%
Qw, cfs	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110	0.110
H SD 99, cfs	0.003	0.004	0.005	0.006	0.007	0.007	0.008	0.008	0.009	0.009	0.010	0.010
H SD 03, cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.11	0.11	0.11	cfs
Time pump on (pumping duration)	tpon	365	365	365	days
Perpendicular from well to stream	a	1050	1050	1050	ft
Well depth	d	125	125	125	ft
Aquifer hydraulic conductivity	K	1	10	50	ft/day
Aquifer saturated thickness	b	10	10	10	ft
Aquifer transmissivity	T	10	100	500	ft*ft/day
Aquifer storativity or specific yield	S	0.0001	0.0001	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.005	0.001	ft/day
Aquitard saturated thickness	ba	55	55	55	ft
Aquitard thickness below stream	babs	50	50	50	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	10	10	10	ft
Streambed conductance (lambda)	sbc	0.002000	0.001000	0.000200	ft/day
Stream depletion factor	sdf	11.025000	1.102500	0.220500	days
Streambed factor	sbf	0.210000	0.010500	0.000420	
input #1 for Hunt's Q_4 function	t'	0.090703	0.907029	4.535147	
input #2 for Hunt's Q_4 function	K'	20.045455	1.002273	0.040091	
input #3 for Hunt's Q_4 function	epsilon'	0.000500	0.000500	0.000500	
input #4 for Hunt's Q_4 function	lamda'	0.210000	0.010500	0.000420	