WATER RESOURCES DEPARTMENT MEMO March 17, 2015

TO: **Application G-** 18003

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 3/17/2015

FROM: Groundwater Section Jen Woody
Reviewer's Name

SUBJECT: Application G- 18003 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: Woodburn Organic Farms LLC County: Marion

A1. Applicant(s) seek(s) 0.49 cfs from 2 well(s) in the Willamette Basin, Molalla –Pudding River subbasin Quad Map: Woodburn

A2. Proposed use Irrigation and temperature control 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	**MARI 1762**	**1**	Sand and Gravel	**0.49**	T5S/R1W-16 NW SW	1360' N, 20'E fr SW cor S 16
2	MARI 1813	2	Sand and Gravel	0.49	T5S/R1W-17 SW NE	120'N, 1120'E fr NW cor Fitzgerald DLC 54
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	165	108	30	03/20/1973	220	0-20	0-215		108-130,153-173,181-197,217-219	900	68	Pump
2	175	70	60	10/17/1970	280	0-20	0-240		135-160, 190-223	700	45	Pump

Use data from application for proposed wells.

A4. **Comments:**

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 aquifer is confined, so 690-502-0240 does not apply.

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, 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 wells on this application will likely produce water from the Willamette aquifer (Woodward and Gannett, 1998). About 60 feet of saturated sand and gravel are confined beneath about 100 feet of Willamette Silt in the vicinity of the subject wells. The Willamette Aquifer is underlain by approximately 1000 feet of the Willamette Confining unit.

Groundwater level data are sparse in the immediate vicinity of this application. MARI 1758 , located about 2 miles to the east, is reasonably stable and located also in the Willamette Aquifer. Another group of wells in Sections 21, 22 and 28 show similar water level stability (see attached hydrograph). This suggests that the resource is generally stable at the current level of use.

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	**Sand and Gravel of the Willamette Aquifer**	☒	☐
2	**Sand and Gravel of the Willamette Aquifer**	☒	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Well logs and Gannett and Caldwell (1998) report 40 to 60 feet of saturated Willamette Aquifer (sand and gravel of alluvial origin), overlain by 80 to 100 feet of low permeability Willamette Silt. Aquifer test data from the Willamette aquifer suggests storage values consistent with confined aquifers.

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	**Pudding River**	**135**	**110**	**1720**	☒	☐	☐	☐	☒
2	1	**Pudding River**	**115**	**110**	**3500**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Groundwater is coincident with the Pudding River at the given distances, indicating hydraulic connection. There are approximately 100 feet of clay overlying the Willamette Aquifer. This prevents an efficient hydraulic connection to the Pudding River and the unnamed tributary.

Water Availability Basin the well(s) are located within: Watershed ID #: 151. PUDDING R > MOLALLA R - AB MILL CR

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	☐	☐	IS73532B	**36**	☒	**67.3**	☐	**<<25%**	☒
2	1	☐	☐	IS73532B	**36**	☒	**67.3**	☐	**<<25%**	☒
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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: The proposed rate (0.49 cfs) triggers PSI because it is greater than 1% of the instream water right on the Pudding River.
Because the Willamette Silt acts as a resistor to streambed flux, calculated stream depletion using the Hunt 2003 model indicates interference with the Pudding River at 30 days is much less than 25% at both wells.

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.

US Geological Survey Topographic Quadrangle Maps.

OWRD water level database, includes reported water levels, accessed 3/17/2015.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** _____ **Logid:** _____

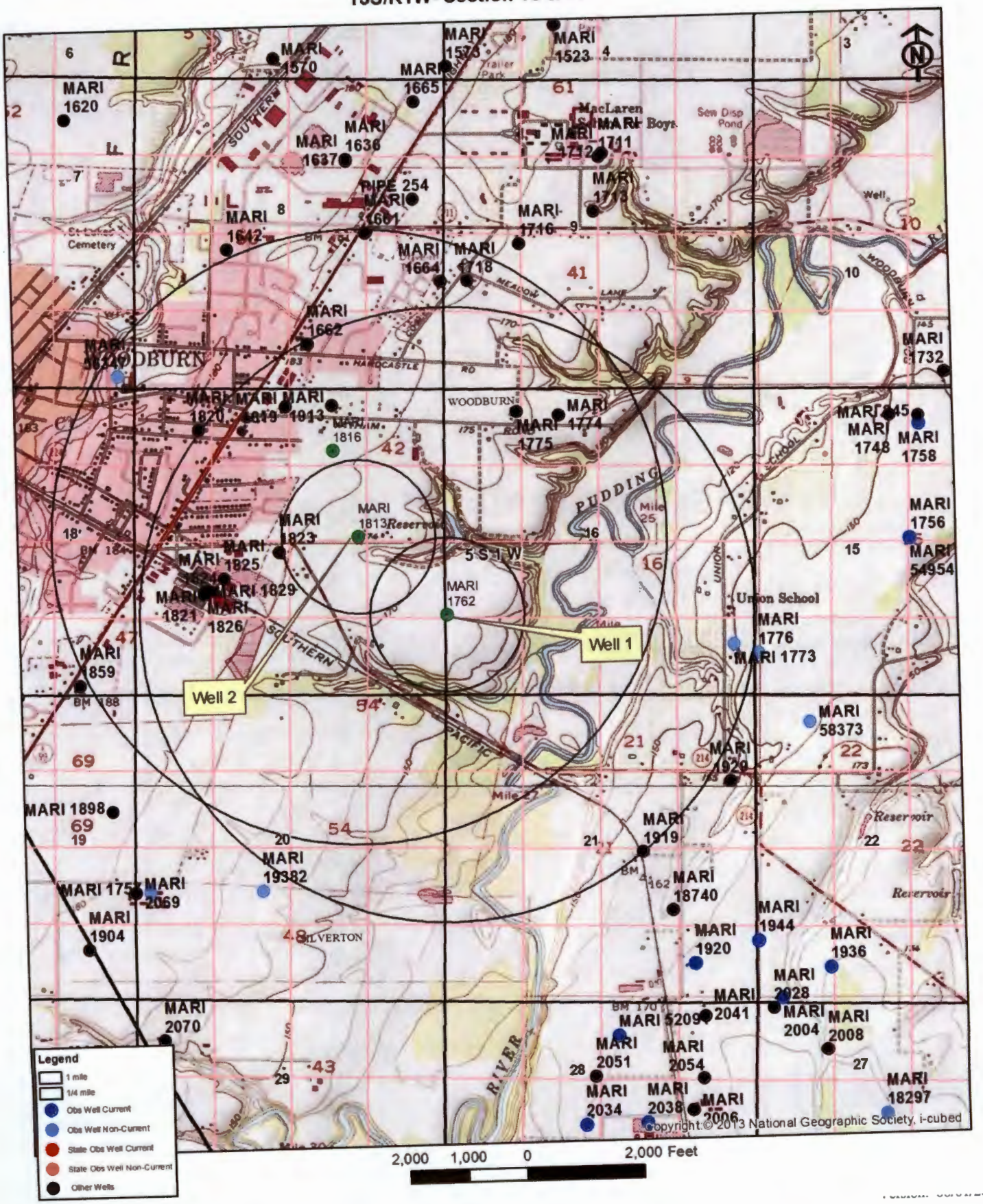
D2. **THE WELL does not appear to meet current well construction standards based upon:**

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.**

G-18003 Woodburn Organic Farms LLC
T5S/R1W- Section 16 & 17



Water Availability Tables

Water Availability Analysis

Detailed Reports

PUDDING R > MOLALLA R - AB MILL CR
WILLAMETTE BASIN

Water Availability as of 3/17/2015

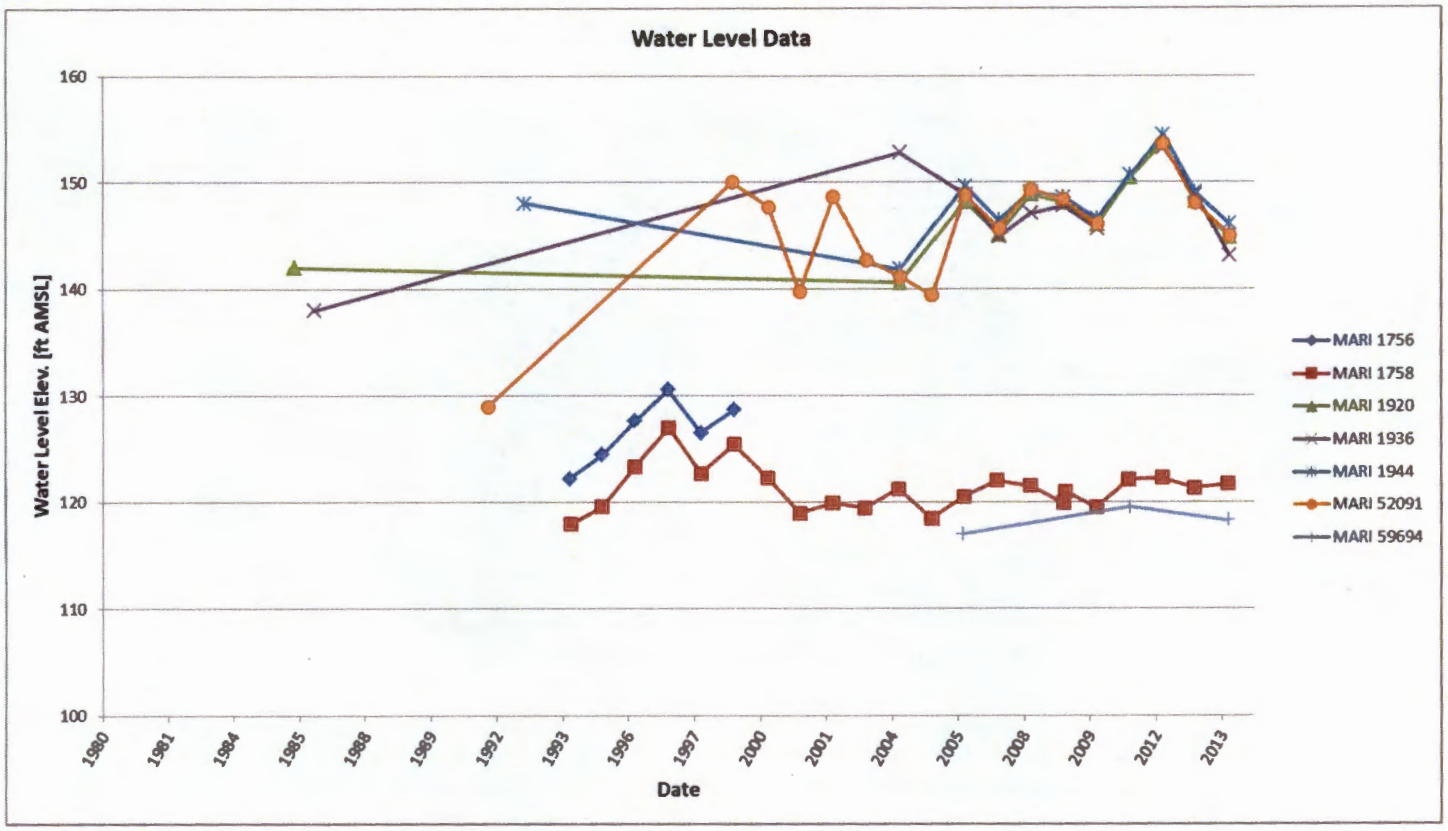
Watershed ID #: 151 (Map) Exceedance Level:80%

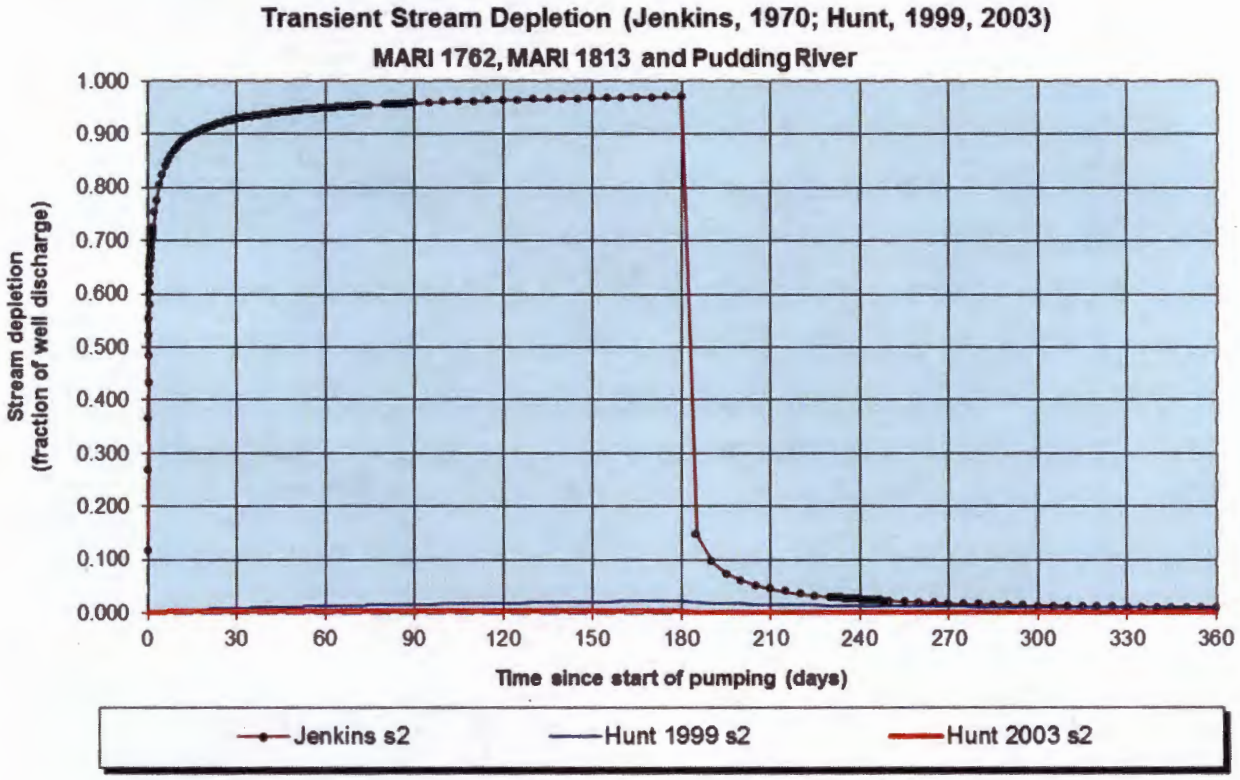
Date: 3/17/2015 Time: 11:22 AM

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	1,040.00	125.00	915.00	0.00	36.00	879.00
FEB	1,180.00	115.00	1,070.00	0.00	36.00	1,030.00
MAR	1,010.00	79.90	930.00	0.00	36.00	894.00
APR	787.00	55.70	731.00	0.00	36.00	695.00
MAY	425.00	52.70	372.00	0.00	36.00	336.00
JUN	224.00	72.90	151.00	0.00	36.00	115.00
JUL	109.00	113.00	-4.01	0.00	36.00	-40.00
AUG	71.00	93.30	-22.30	0.00	36.00	-58.30
SEP	67.30	54.50	12.80	0.00	36.00	-23.20
OCT	91.60	14.00	77.60	0.00	36.00	41.60
NOV	363.00	48.60	314.00	0.00	36.00	278.00
DEC	957.00	119.00	838.00	0.00	36.00	802.00
ANN	706,000.00	56,900.00	649,000.00	0.00	26,100.00	625,000.00


Water Level Data
Water Level Elev. [ft AMSL]
160
150
140
130
120
110
100
1980
1981
1984
1985
1988
1989
1992
1993
1996
1997
2000
2001
2004
2005
2008
2009
2012
2013
Date
MARI 1756
MARI 1758
MARI 1920
MARI 1936
MARI 1944
MARI 52091
MARI 59694



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	92.8%	94.9%	95.8%	96.4%	96.8%	97.0%	4.5%	2.6%	1.8%	1.3%	1.1%	0.9%
H SD 1999	0.9%	1.3%	1.6%	1.9%	2.1%	2.3%	1.6%	1.4%	1.2%	1.1%	1.0%	1.0%
H SD 2003	0.31%	0.31%	0.31%	0.32%	0.32%	0.32%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
Qw, cfs	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490	0.490
H SD 99, cfs	0.004	0.006	0.008	0.009	0.010	0.011	0.008	0.007	0.006	0.006	0.005	0.005
H SD 03, cfs	0.002	0.002	0.002	0.002	0.002	0.002	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	220.00	220.00	220.00	gpm
Time pump on (pumping duration)	tpon	180	180	180	days
Perpendicular from well to stream	a	3650	1720	1320	ft
Well depth	d	220	220	220	ft
Aquifer hydraulic conductivity	K	10	50	100	ft/day
Aquifer saturated thickness	b	60	60	60	ft
Aquifer transmissivity	T	600	3000	6000	ft*ft/day
Aquifer storativity or specific yield	S	0.0003	0.0005	0.003	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.008	0.0004	ft/day
Aquitard saturated thickness	ba	100	100	100	ft
Aquitard thickness below stream	babs	40	40	40	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft
Streambed conductance (lambda)	sbc	0.005000	0.004000	0.000200	ft/day
Stream depletion factor	sdf	6.661250	0.493067	0.871200	days
Streambed factor	sbf	0.030417	0.002293	0.000044	
input #1 for Hunt's Q_4 function	t'	0.150122	2.028123	1.147842	
input #2 for Hunt's Q_4 function	K'	2.220417	0.078891	0.001162	
input #3 for Hunt's Q_4 function	epsilon'	0.001500	0.002500	0.015000	
input #4 for Hunt's Q_4 function	lamda'	0.030417	0.002293	0.000044	