# Groundwater Application Review Summary Form

**Application # G- _19002_**

**GW Reviewer _Travis Brown / Aurora C Bouchier_ Date Review Completed: _8/12/2021_**

**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** **_8/12/2021_**

**TO:** **Application** G-**_19002_**

**FROM:** **GW:** **_Travis Brown / Aurora C Bouchier_**
(Reviewer's Name)

**SUBJECT: Scenic Waterway Interference Evaluation**

☐ **YES**
☒ **NO**

The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ **YES**
☒ **NO**

Use the Scenic Waterway Condition (Condition 7J)

☐ 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 _[Enter]_ 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 8/12/2021

FROM: Groundwater Section Travis Brown / Aurora C Bouchier
Reviewer's Name

SUBJECT: Application G- **19002** Supersedes review of 12/1/2020
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: **J and S Farms** County: **Marion**

A1. Applicant(s) seek(s) 3* cfs from 3 well(s) in the Willamette Basin, Main Stem Willamette subbasin

A2. Proposed use IR (78.7 acres) & NU Seasonality: 3/1 – 10/31 & 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 | MARI 2892 | 1 | Alluvium | 2.23* | 5S/3W-11 NE-SW | 850' S, 2940' W fr E ¼ Cor S 11 |
| 2 | MARI 2900 | 2 | Alluvium | 2.23* | 5S/3W-12 SE-SW | 880' S, 2320' W fr SE cor DLC 71 |
| 3 | MARI 2890 | 3 | Alluvium | 0.77* | 5S/3W-11 NW-NE | 1725' N, 2130' W fr E ¼ Cor S 11 |
| 4 | | | | | | |

* 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 | 90 | 18 | 6.5 | 5/9/1969 | 63 | 0-30 | 0-63 | -- | 43-52, 59-62 | 75 | 12 | P |
| 2 | 180 | 130 | 55 | 5/21/1968 | 156 | 0-20 | 0-130 | -- | 101-119 | 218 | 26 | P |
| 3 | 79 | 4 | 3 | 7/26/1982 | 40 | 0-10 | -1-40 | -- | 10-33 | 500 | 5 | P |
| | | | | | | | | | | | | |

Use data from application for proposed wells.

A4. **Comments:** *The application is requesting 2.23 cfs from Wells 1 & 2 for irrigation of 17.5 acres and nursery use of 162.9 acres, and 0.77 cfs from Well 3 for irrigation of 61.2 acres. Each of the wells is authorized by other water rights, and there appears to be substantial overlap between the proposed POU on this application and that from the other water rights which include these wells.

Well 1 (MARI 2892) is authorized for 1.44 cfs for irrigation of 114.9 acres under Certificate 43676 owned by Opal M Mahony. It appears that the 114.9 acres irrigated under Certificate 43676 are proposed as nursery use from wells 1 & 2 under this application. Well 1 is also authorized for 0.04 cfs for irrigation of 9.5 acres under Certificate 75639 owned by Michael W Mahony. **This groundwater review evaluates against a stacked rate of 3.71 cfs.**

Well 2 (MARI 2900) is authorized for 0.18 cfs for irrigation of 14.2 acres under Certificate 55955 owned by John Stockfleth. It appears that the 14.2 acres irrigated under Certificate 55955 are proposed as nursery use from wells 1 & 2 under this application. **This groundwater review evaluates against a stacked rate of 2.41 cfs.**

Well 3 (MARI 2890) is authorized for 2.16 cfs for irrigation of 172.6 acres under Permit G-11145 owned by Gerald A Baker. It appears that up to 30.2 acres irrigated under Permit G-11145 are proposed for irrigation from Well 3 under this application. **This groundwater review evaluates against a stacked rate of 2.93 cfs.** In November 2019, a pump test was rejected for this water right as it only measured the water level to the nearest foot. A new test has been submitted, although it has not yet been analyzed.

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: Well 2 is greater than ¼-mile from the nearest surface water source, so per OAR 690-502-0240 the pertinent basin rules do not apply.
Well 1 & 3 are less than ¼-mile from the nearest surface water source and produce from an unconfined aquifer, so per OAR 690-502-0240 the pertinent basin rules (OAR 690-502-0050) 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) **7N (annual measurement), 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:**

Well 2 produces groundwater from a confined aquifer in the older alluvial sands and gravels that occur beneath approximately 80 feet of Willamette Silt on the terraces east of the Holocene floodplain of the Willamette River. Wells 1 & 3 are located in the Holocene (recent) floodplain of the Willamette River and produce from an unconfined to very weakly confined aquifer in the Holocene sands and gravels. The limited saturated thickness of fine-grained sediments identified in the log for Well 1 and the seemingly discontinuous areal extent of the fine-grained sediment layer suggest that Well 1 will respond to pumping stress similarly to an unconfined aquifer.

The water level in nearby wells that produce from the confined aquifer show no systemic long-term declines (as seen in MARI 2541 – located approximately 3 miles to the southeast and MARI 2218 – located approximately 7 miles to the east). Water levels in the Holocene floodplain aquifer are expected to be stable since the water level in this aquifer is likely influenced by river stage of the adjacent reaches of the Willamette River.

## 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** | **Holocene alluvium** | ☐ | ☒ |
| **2** | **Older alluvium** | ☒ | ☐ |
| **3** | **Holocene alluvium** | ☐ | ☒ |
| | | ☐ | ☐ |

**Basis for aquifer confinement evaluation:** Proposed POA 1 & 3 are located in the low elevation Holocene floodplain of the Willamette River. Well 1 appears to have a ~15 foot thick layer of fine-grained sediment near land surface; however, the limited saturated thickness of fine-grained sediments identified in the log for Well 1 and the seemingly discontinuous areal extent of the fine-grained sediment layer suggest that Well 1 will respond to pumping stress similarly to an unconfined aquifer. Well 3 does not appear to have a confining layer. The water-bearing zone in Well 2 is confined by approximately 80 feet of fine grained sediment which are likely saturated within 5-15 feet of land surface

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 R** | **~80** | **76-82** | **2340** | ☒ | ☐ | ☐ | ☐ | ☒ |
| **2** | **1** | **Willamette R** | **~150** | **76-83** | **4120** | ☒ | ☐ | ☐ | ☐ | ☒ |
| **3** | **1** | **Willamette R** | **~80** | **76-82** | **2050** | ☒ | ☐ | ☐ | ☐ | ☒ |
| **1** | **2** | **Unnamed Slough of Willamette R** | **~80** | **81** | **200** | ☐ | ☐ | ☒ | ☒ | ☐ |
| **3** | **2** | **Unnamed Slough of Willamette R** | **~80** | **76-82** | **800** | ☐ | ☐ | ☒ | ☒ | ☐ |

**Basis for aquifer hydraulic connection evaluation:** Water-level maps indicate that ground water discharges from the alluvial aquifer to streams in the area (Woodward and others, 1998, Plate 1).

**Water Availability Basin the well(s) are located within:** 182: Willamette R> Columbia R – Ab Molalla R

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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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** | ☐ | ☐ | **NA** | **NA** | ☐ | **3830** | ☐ | **<25%** | ☐ |
| **2** | **1** | ☐ | ☐ | **NA** | **NA** | ☐ | **3830** | ☐ | **<25%** | ☐ |
| **3** | **1** | ☐ | ☐ | **NA** | **NA** | ☐ | **3830** | ☐ | **<<25%** | ☐ |
| **1** | **2** | ☒ | ☐ | **NA** | **NA** | ☐ | **3830** | ☐ | **<<25%** | ☒ |
| **3** | **2** | ☒ | ☐ | **NA** | **NA** | ☐ | **3830** | ☐ | **<<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:** Interference with various surface water sources due to the proposed use was quantitatively estimated using the Hunt 1999 analytical model for Wells 1 & 3, and the Hunt 2003 analytical model for Well 2. Hydraulic parameters used for the analysis were derived from regional data and studies (Conlon et al., 2005). Results indicate that none of the proposed POA are anticipated to interfere with nearby surface water sources at a rate greater than 25 percent of the rate of withdrawal within the first 30 days of continuous pumping.

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 | | | | | | | | | | | | | |
| **(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:** NA

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:**

In the vicinity of Well 2, about 80 feet of Willamette Silt overly the Willamette aquifer (Gannett and Caldwell, 1998). The Willamette River is completely incised through the Willamette Silt. The available data indicates that the Willamette River is the regional ground water discharge area for the Willamette aquifer.

**References Used:**

Application G-19002 and recent groundwater review for applications G-17653, G-18502 and G-18961

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., 1999. Unsteady stream depletion from ground water pumping: Groundwater, v. 37, no. 1, p. 98-102.

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, 82 p.

## D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** 1 & 3 **Logid:** MARI 2892 & MARI 2890 (respectively)

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:**
Well 1 (MARI 2892) uses puddle clay as a seal
Well 2 (MARI 2900) appears to meet current well construction standards based upon a review of the well log.
Well 3 (MARI 2890) has a 10 foot seal.

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

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**Water Availability Tables**

WATER AVAILABILITY TABLE

WILLAMETTE R > COLUMBIA R - AB MOLALLA R

Watershed ID #: 182 Basin: WILLAMETTE Exceedance Level: 80
Time: 11:01 AM Date: 11/30/2020

| Nest | # Watershed ID Number | Stream Name | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | STOR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 181 | WILLAMETTE R > COLUMBIA R - AT MOUTH | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| 2 | 182 | WILLAMETTE R > COLUMBIA R - AB MOLALLA R | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

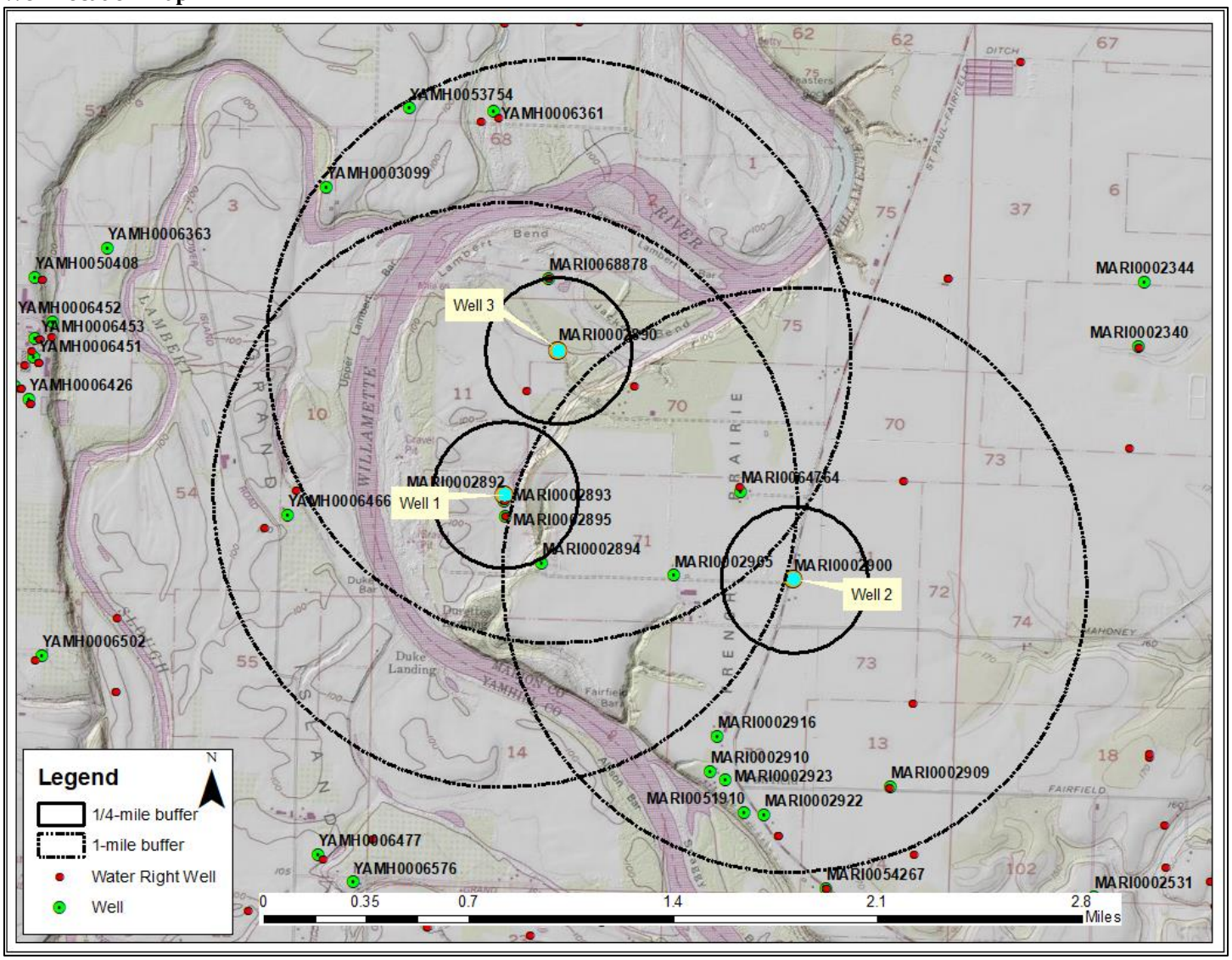
WILLAMETTE R > COLUMBIA R - AB MOLALLA R

Watershed ID #: 182 Basin: WILLAMETTE Exceedance Level: 80
Time: 11:02 AM Date: 11/30/2020

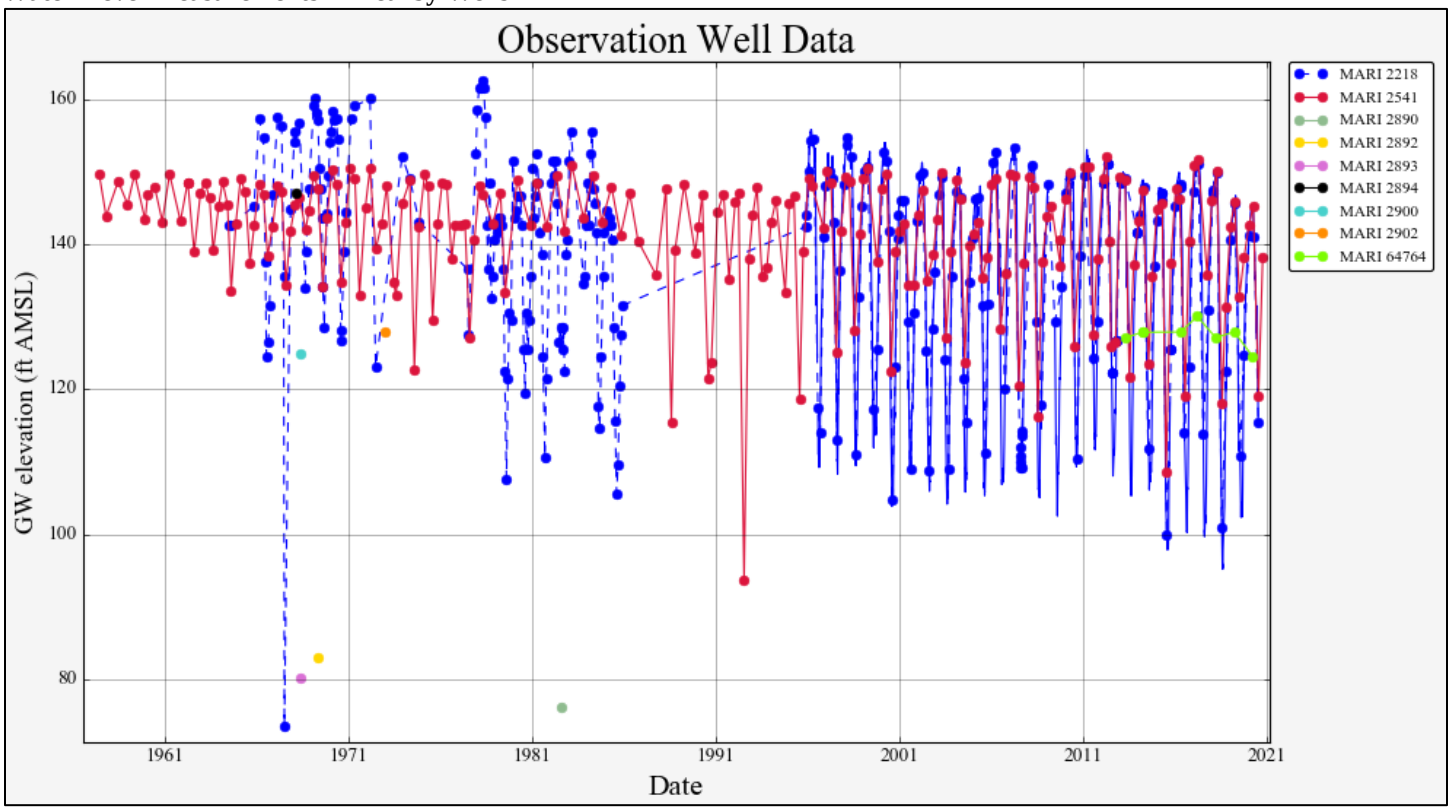
Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

| Month | Natural Stream Flow | Consumptive Use and Storage | Expected Stream Flow | Reserved Stream Flow | Instream Requirements | Net Water Available |
|---|---|---|---|---|---|---|
| JAN | 21,400.00 | 2,300.00 | 19,100.00 | 0.00 | 1,500.00 | 17,600.00 |
| FEB | 23,200.00 | 7,480.00 | 15,700.00 | 0.00 | 1,500.00 | 14,200.00 |
| MAR | 22,400.00 | 7,260.00 | 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 | 4,250.00 | 12,300.00 | 0.00 | 1,500.00 | 10,800.00 |
| 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 | 683.00 |
| SEP | 3,890.00 | 1,390.00 | 2,500.00 | 0.00 | 1,500.00 | 999.00 |
| OCT | 4,850.00 | 752.00 | 4,100.00 | 0.00 | 1,500.00 | 2,600.00 |
| NOV | 10,200.00 | 888.00 | 9,310.00 | 0.00 | 1,500.00 | 7,810.00 |
| DEC | 19,300.00 | 970.00 | 18,300.00 | 0.00 | 1,500.00 | 16,800.00 |
| ANN | 15,200,000 | 2,250,000 | 13,000,000 | 0 | 1,090,000 | 11,900,000 |

**Well Location Map**



**Water-Level Measurements in Nearby Wells**



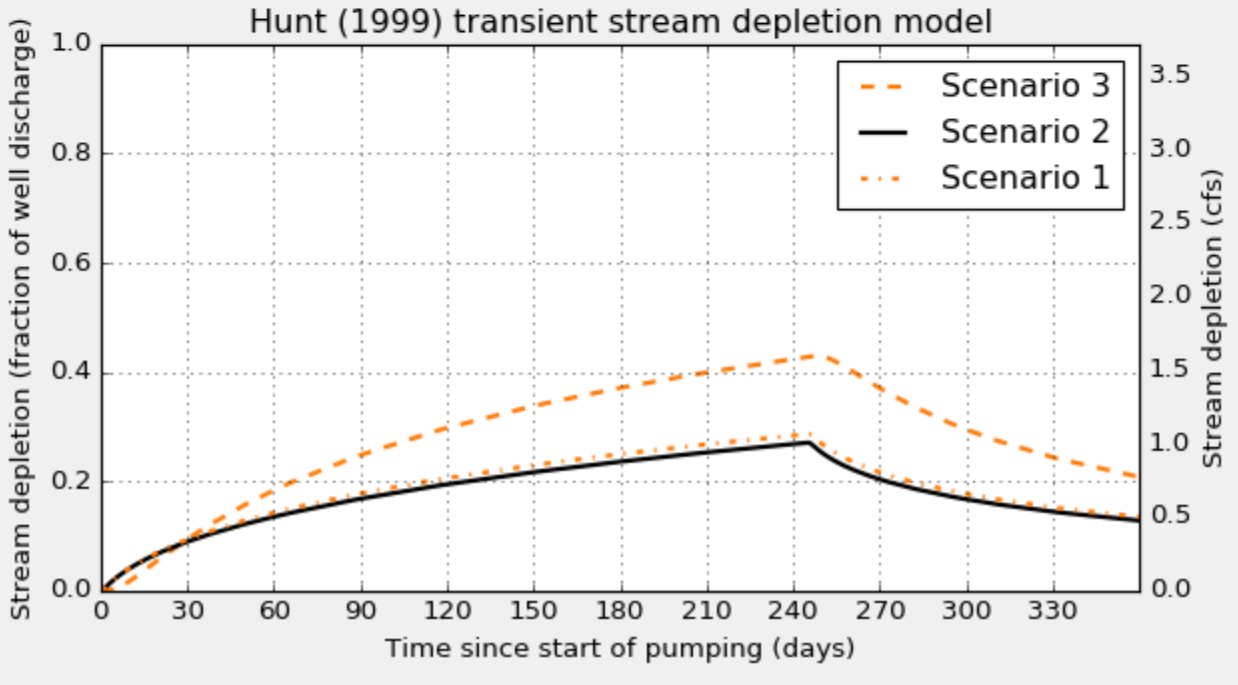
**Stream Depletion: Well 1 to Willamette River**

| | |
|---|---|
| Application type: | G |
| Application number: | 19002 |
| Well number: | 1 |
| Stream Number: | 1 |
| Pumping rate (cfs): | 3.71 |
| Pumping duration (days): | 245 |
| Pumping start month number (3=March) | 3.0 |

| Parameter | Symbol | Scenario 1 | Scenario 2 | Scenario 3 | Units |
|---|---|---|---|---|---|
| Distance from well to stream | a | 2340 | 2340 | 2340 | ft |
| Aquifer transmissivity | T | 2000 | 24000 | 24000 | ft2/day |
| Aquifer storativity | S | 0.002 | 0.02 | 0.20 | - |
| Aquitard vertical hydraulic conductivity | Kva | 0.01 | 0.1 | 1 | ft/day |
| Not used | | 20.0 | 20.0 | 20.0 | |
| Aquitard thickness below stream | babs | 40 | 40 | 40 | ft |
| Not used | | 0.2 | 0.2 | 0.2 | |
| Stream width | ws | 400 | 400 | 400 | ft |

Stream depletion for Scenario 2:

| Days | 10 | 330 | 360 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depletion (%) | 4 | 14 | 13 | 9 | 13 | 17 | 19 | 22 | 24 | 25 | 27 | 20 | 17 |
| Depletion (cfs) | 0.15 | 0.53 | 0.47 | 0.33 | 0.50 | 0.62 | 0.72 | 0.80 | 0.87 | 0.94 | 0.99 | 0.75 | 0.62 |



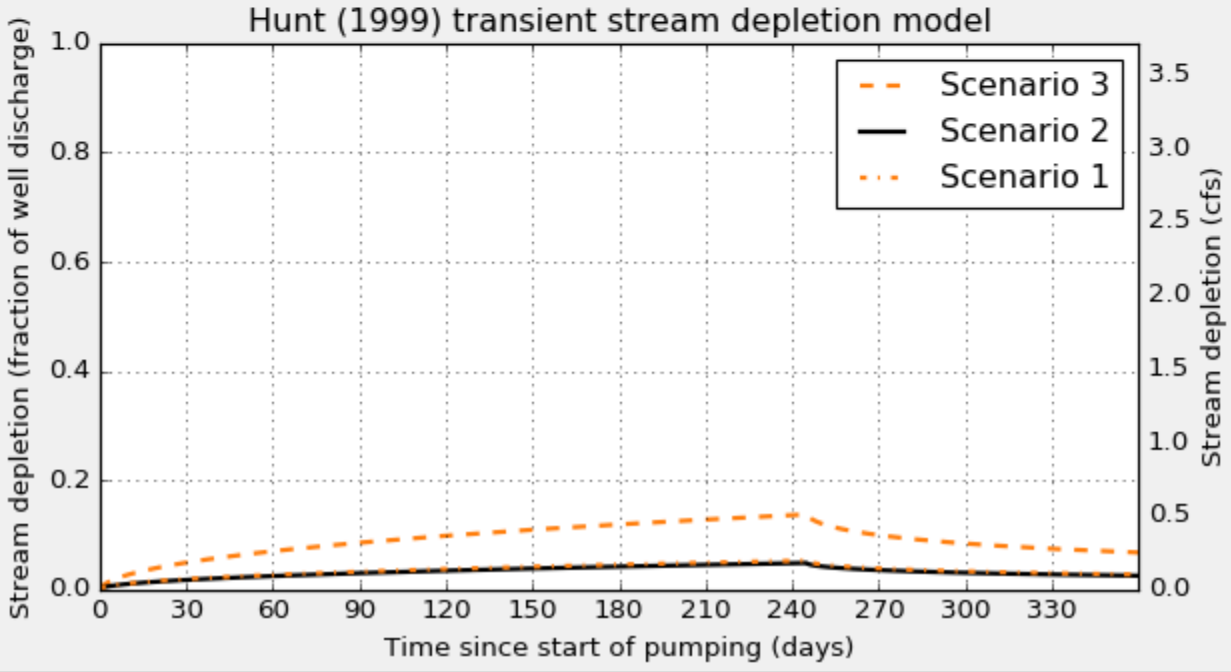
**Stream Depletion: Well 1 to Unnamed Slough**

| | |
|---|---|
| Application type: | G |
| Application number: | 19002 |
| Well number: | 1 |
| Stream Number: | 2 |
| Pumping rate (cfs): | 3.71 |
| Pumping duration (days): | 245 |
| Pumping start month number (3=March) | 3.0 |

| Parameter | Symbol | Scenario 1 | Scenario 2 | Scenario 3 | Units |
|---|---|---|---|---|---|
| Distance from well to stream | a | 200 | 200 | 200 | ft |
| Aquifer transmissivity | T | 2000 | 24000 | 24000 | ft2/day |
| Aquifer storativity | S | 0.002 | 0.02 | 0.2 | - |
| Aquitard vertical hydraulic conductivity | Kva | 0.01 | 0.1 | 1 | ft/day |
| Not used | | 20 | 20 | 20 | |
| Aquitard thickness below stream | babs | 40 | 40 | 40 | ft |
| Not used | | 0.2 | 0.2 | 0.2 | |
| Stream width | ws | 50 | 50 | 50 | ft |

Stream depletion for Scenario 2:

| Days | 10 | 330 | 360 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depletion (%) | 1 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 3 |
| Depletion (cfs) | 0.04 | 0.10 | 0.09 | 0.06 | 0.09 | 0.11 | 0.13 | 0.14 | 0.15 | 0.17 | 0.18 | 0.13 | 0.11 |



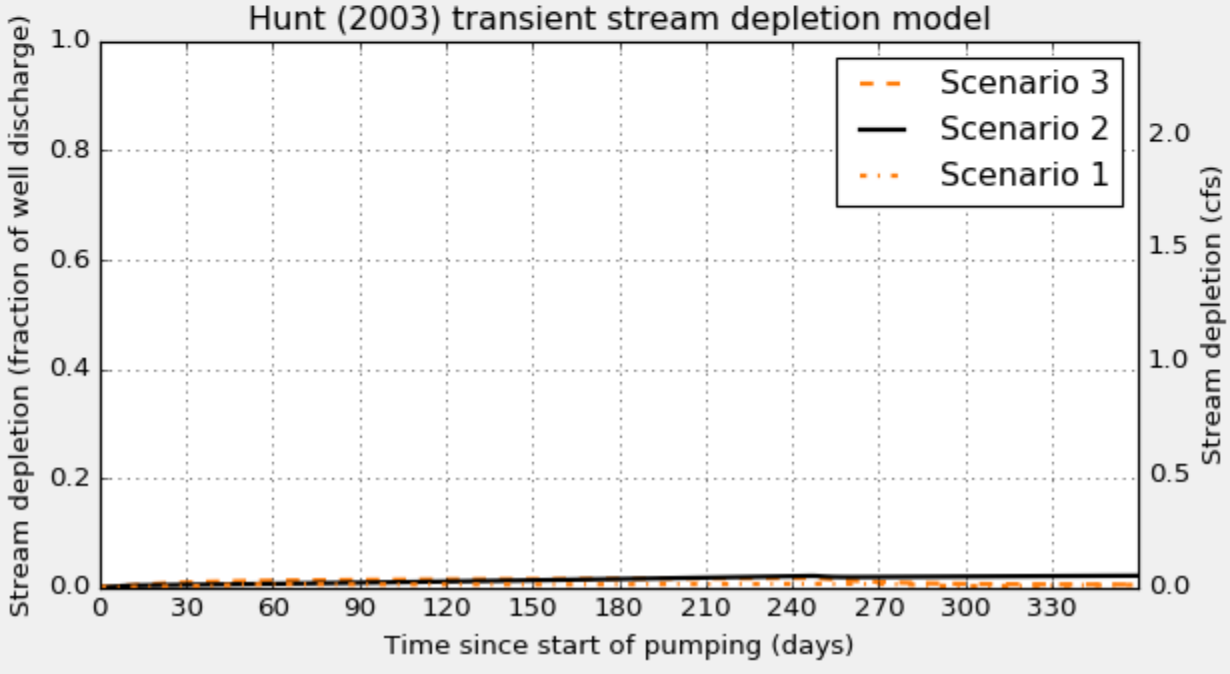
**Stream Depletion: Well 2 to Willamette River**

| | |
|---|---|
| Application type: | G |
| Application number: | 19002 |
| Well number: | 2 |
| Stream Number: | 1 |
| Pumping rate (cfs): | 2.41 |
| Pumping duration (days): | 245 |
| Pumping start month number (3=March) | 3.0 |

| Parameter | Symbol | Scenario 1 | Scenario 2 | Scenario 3 | Units |
|---|---|---|---|---|---|
| Distance from well to stream | a | 4120 | 4120 | 4120 | ft |
| Aquifer transmissivity | T | 600 | 2100 | 6600 | ft2/day |
| Aquifer storativity | S | .001 | .005 | .01 | - |
| Aquitard vertical hydraulic conductivity | Kva | .1 | .05 | .01 | ft/day |
| Aquitard saturated thickness | ba | 30 | 30 | 30 | ft |
| Aquitard thickness below stream | babs | 40 | 40 | 40 | ft |
| Aquitard specific yield | Sya | 0.2 | 0.2 | 0.2 | - |
| Stream width | ws | 400 | 400 | 400 | ft |

Stream depletion for Scenario 2:

| Days | 10 | 330 | 360 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depletion (%) | 0 | 2 | 2 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| Depletion (cfs) | 0.01 | 0.05 | 0.05 | 0.01 | 0.01 | 0.02 | 0.02 | 0.03 | 0.04 | 0.04 | 0.05 | 0.05 | 0.05 |



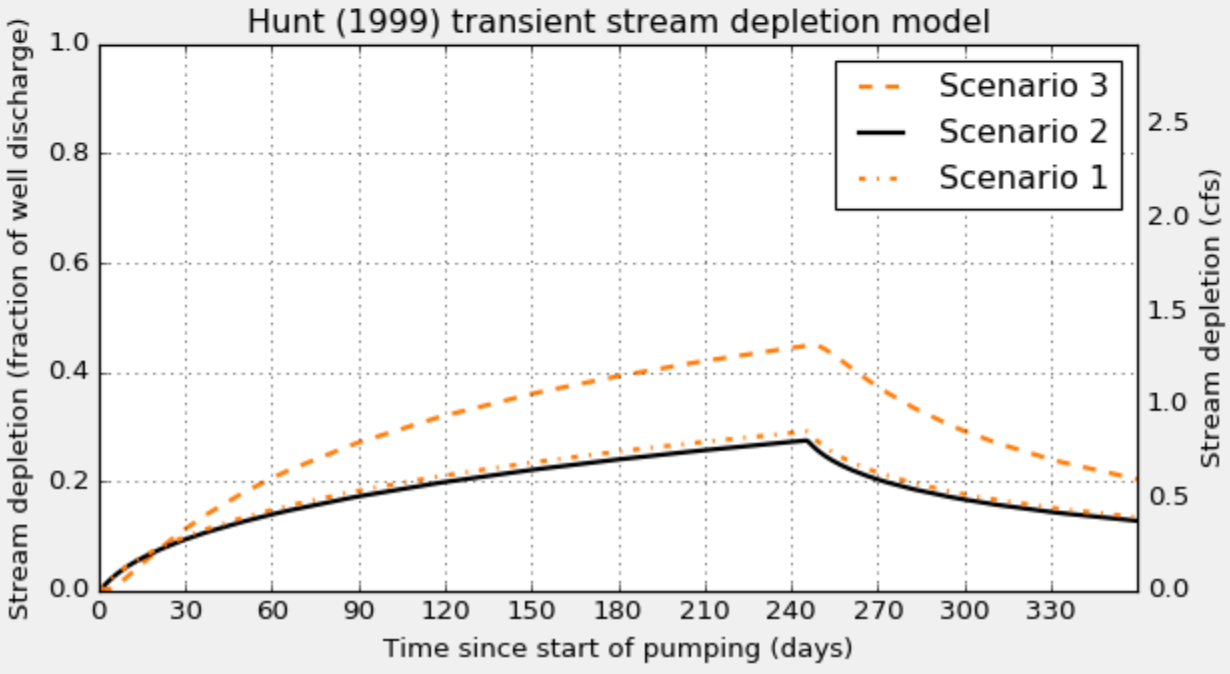
**Stream Depletion: Well 3 to Willamette River**

| | |
|---|---|
| Application type: | G |
| Application number: | 19002 |
| Well number: | 3 |
| Stream Number: | 1 |
| Pumping rate (cfs): | 2.93 |
| Pumping duration (days): | 245 |
| Pumping start month number (3=March) | 3.0 |

| Parameter | Symbol | Scenario 1 | Scenario 2 | Scenario 3 | Units |
|---|---|---|---|---|---|
| Distance from well to stream | a | 2050 | 2050 | 2050 | ft |
| Aquifer transmissivity | T | 2000 | 24000 | 24000 | ft2/day |
| Aquifer storativity | S | 0.002 | 0.02 | 0.20 | - |
| Aquitard vertical hydraulic conductivity | Kva | 0.01 | 0.1 | 1 | ft/day |
| Not used | | 20.0 | 20.0 | 20.0 | |
| Aquitard thickness below stream | babs | 40 | 40 | 40 | ft |
| Not used | | 0.2 | 0.2 | 0.2 | |
| Stream width | ws | 400 | 400 | 400 | ft |

Stream depletion for Scenario 2:

| Days | 10 | 330 | 360 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depletion (%) | 4 | 14 | 13 | 9 | 14 | 17 | 20 | 22 | 24 | 26 | 27 | 20 | 17 |
| Depletion (cfs) | 0.13 | 0.42 | 0.37 | 0.27 | 0.41 | 0.50 | 0.58 | 0.65 | 0.70 | 0.75 | 0.80 | 0.59 | 0.49 |



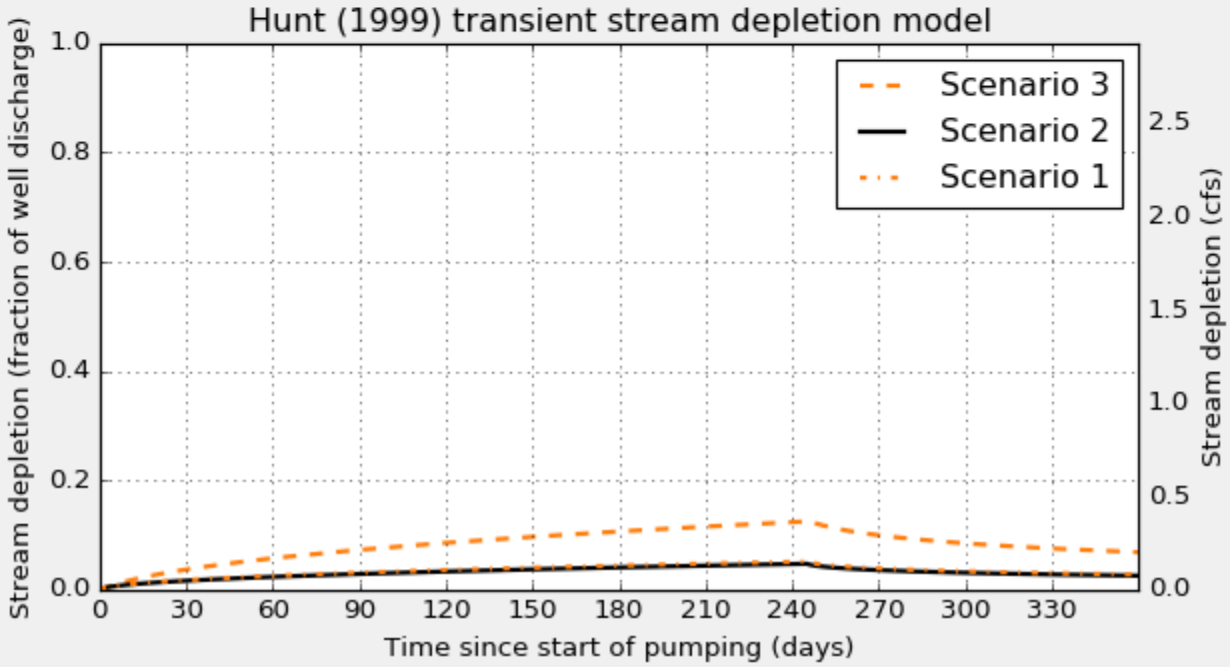
**Stream Depletion: Well 3 to Unnamed Slough**

| | |
|---|---|
| Application type: | G |
| Application number: | 19002 |
| Well number: | 3 |
| Stream Number: | 2 |
| Pumping rate (cfs): | 2.93 |
| Pumping duration (days): | 245 |
| Pumping start month number (3=March) | 3.0 |

| Parameter | Symbol | Scenario 1 | Scenario 2 | Scenario 3 | Units |
|---|---|---|---|---|---|
| Distance from well to stream | a | 800 | 800 | 800 | ft |
| Aquifer transmissivity | T | 2000 | 24000 | 24000 | ft2/day |
| Aquifer storativity | S | 0.002 | 0.02 | 0.2 | - |
| Aquitard vertical hydraulic conductivity | Kva | 0.01 | 0.1 | 1 | ft/day |
| Not used | | 20 | 20 | 20 | |
| Aquitard thickness below stream | babs | 40 | 40 | 40 | ft |
| Not used | | 0.2 | 0.2 | 0.2 | |
| Stream width | ws | 50 | 50 | 50 | ft |

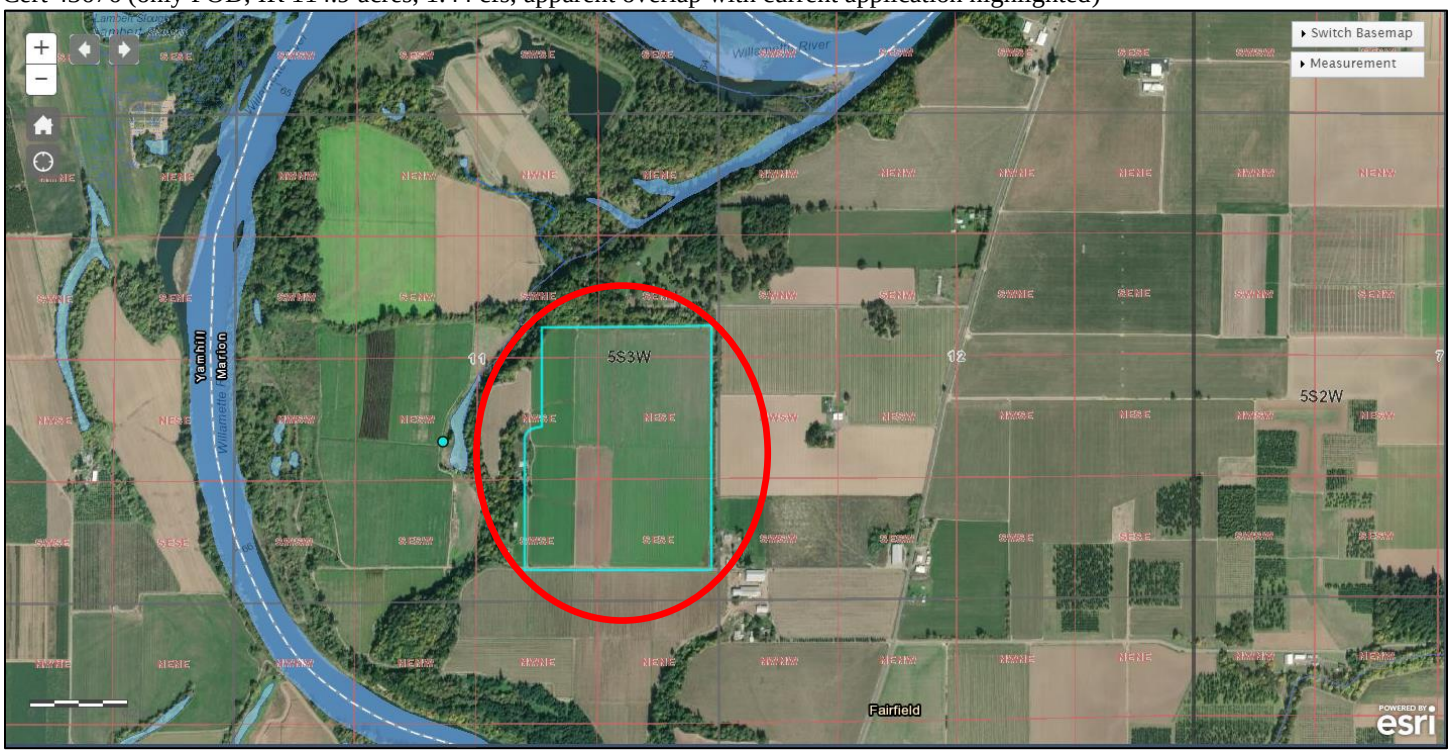
Stream depletion for Scenario 2:

| Days | 10 | 330 | 360 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 | 300 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Depletion (%) | 1 | 3 | 2 | 2 | 2 | 3 | 3 | 4 | 4 | 4 | 5 | 3 | 3 |
| Depletion (cfs) | 0.02 | 0.08 | 0.07 | 0.05 | 0.07 | 0.08 | 0.09 | 0.11 | 0.12 | 0.13 | 0.13 | 0.10 | 0.09 |

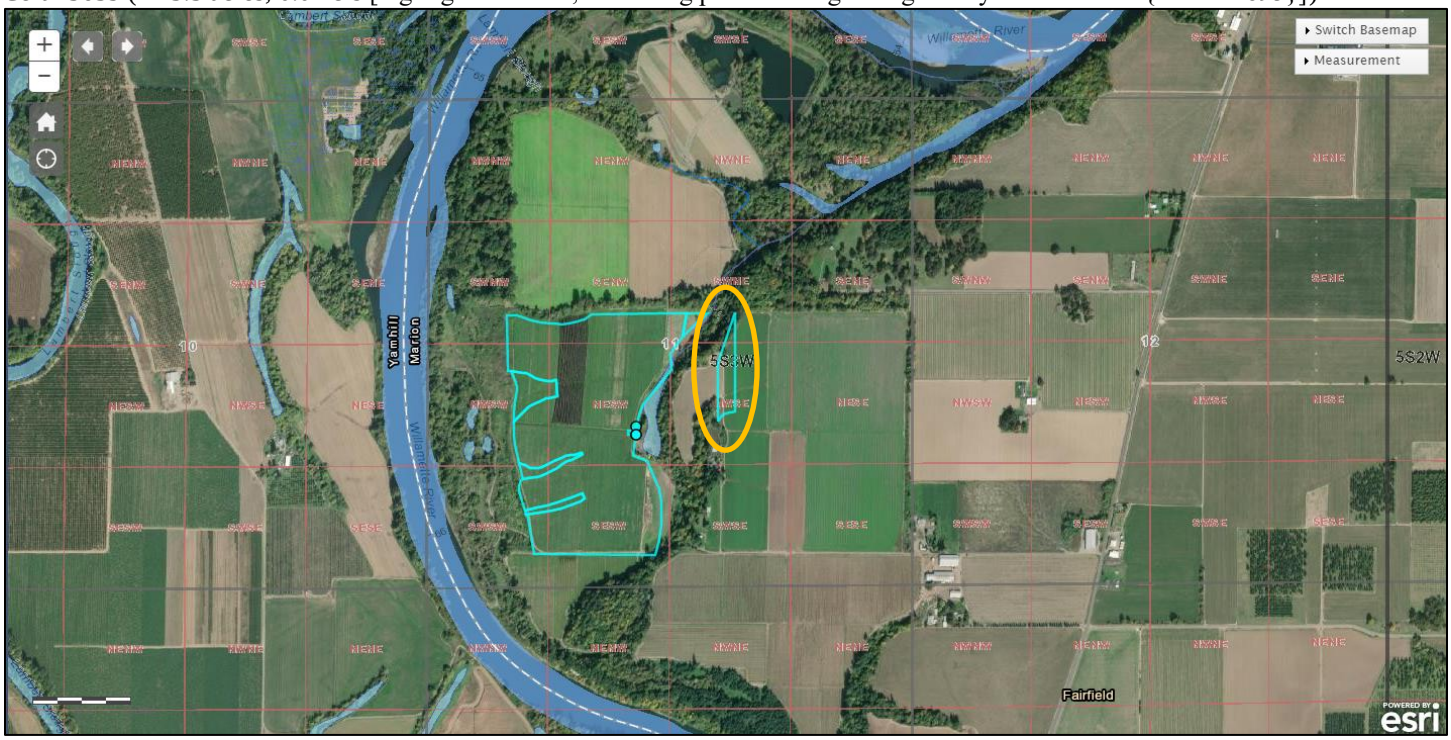


**Well 1, MARI 2892**

Cert 43676 (only POD, IR 114.9 acres, 1.44 cfs, apparent overlap with current application highlighted)

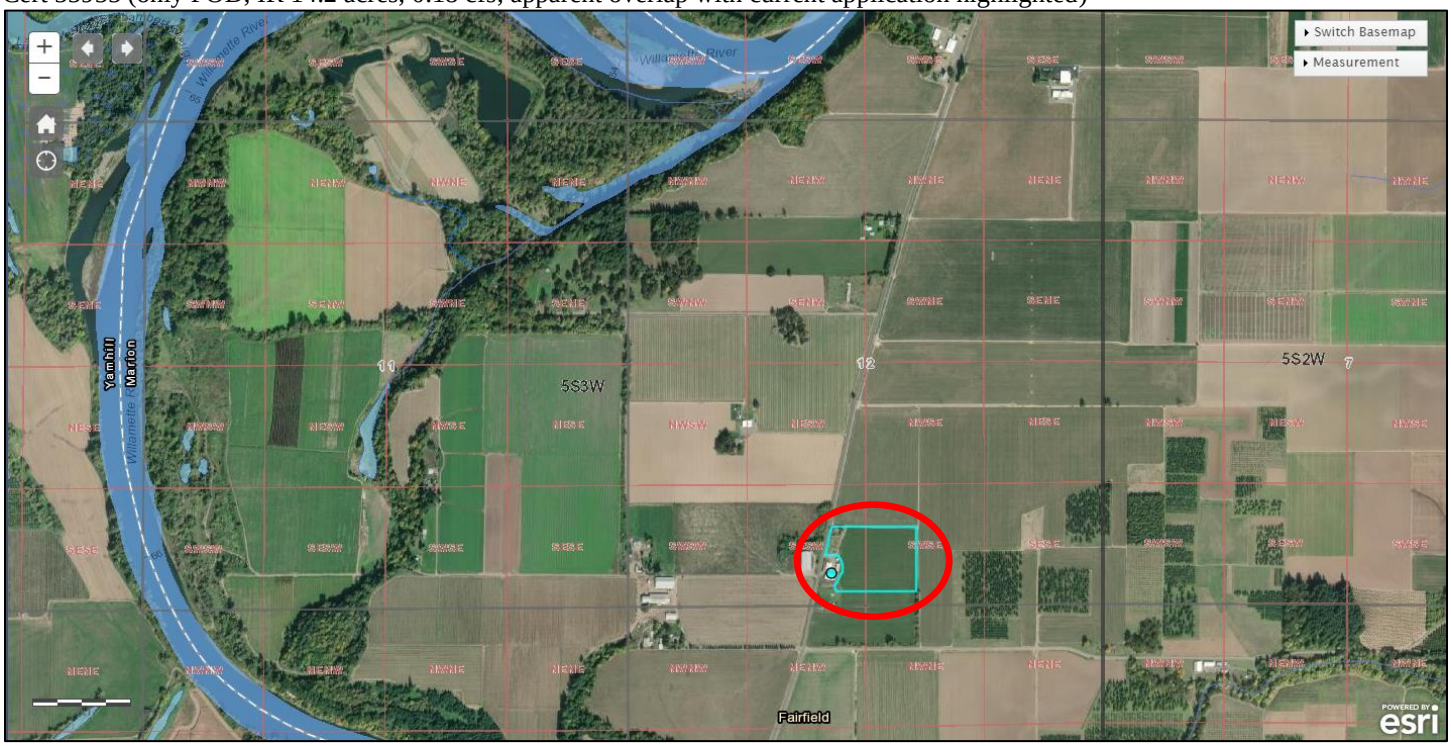



Cert 75639 (IR 3.5 acres, 0.04 cfs [highlighted below, remaining portion of right irrigated by 'South Well' {MARI 2893}])



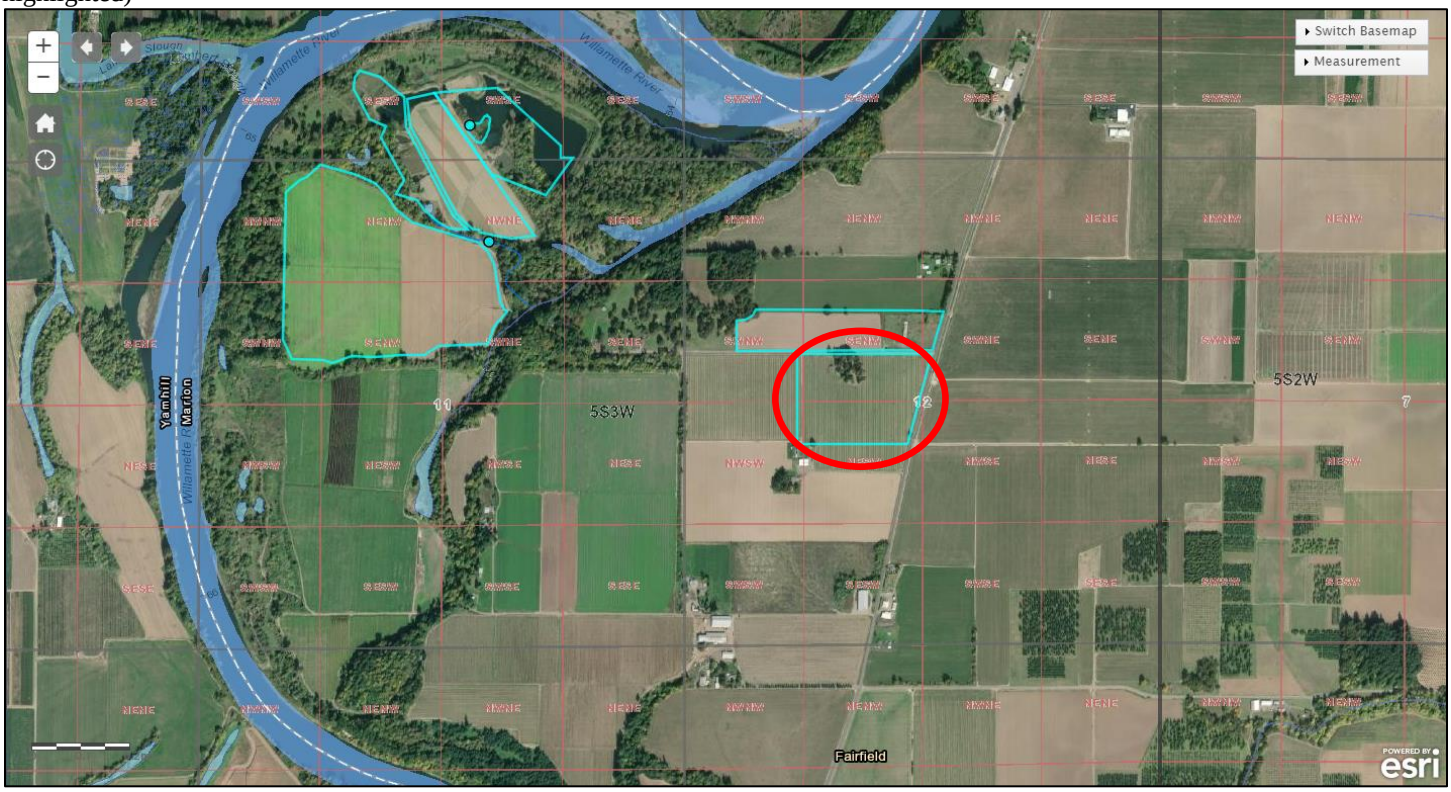
**Well 2, MARI 2900**

Cert 55955 (only POD, IR 14.2 acres, 0.18 cfs, apparent overlap with current application highlighted)

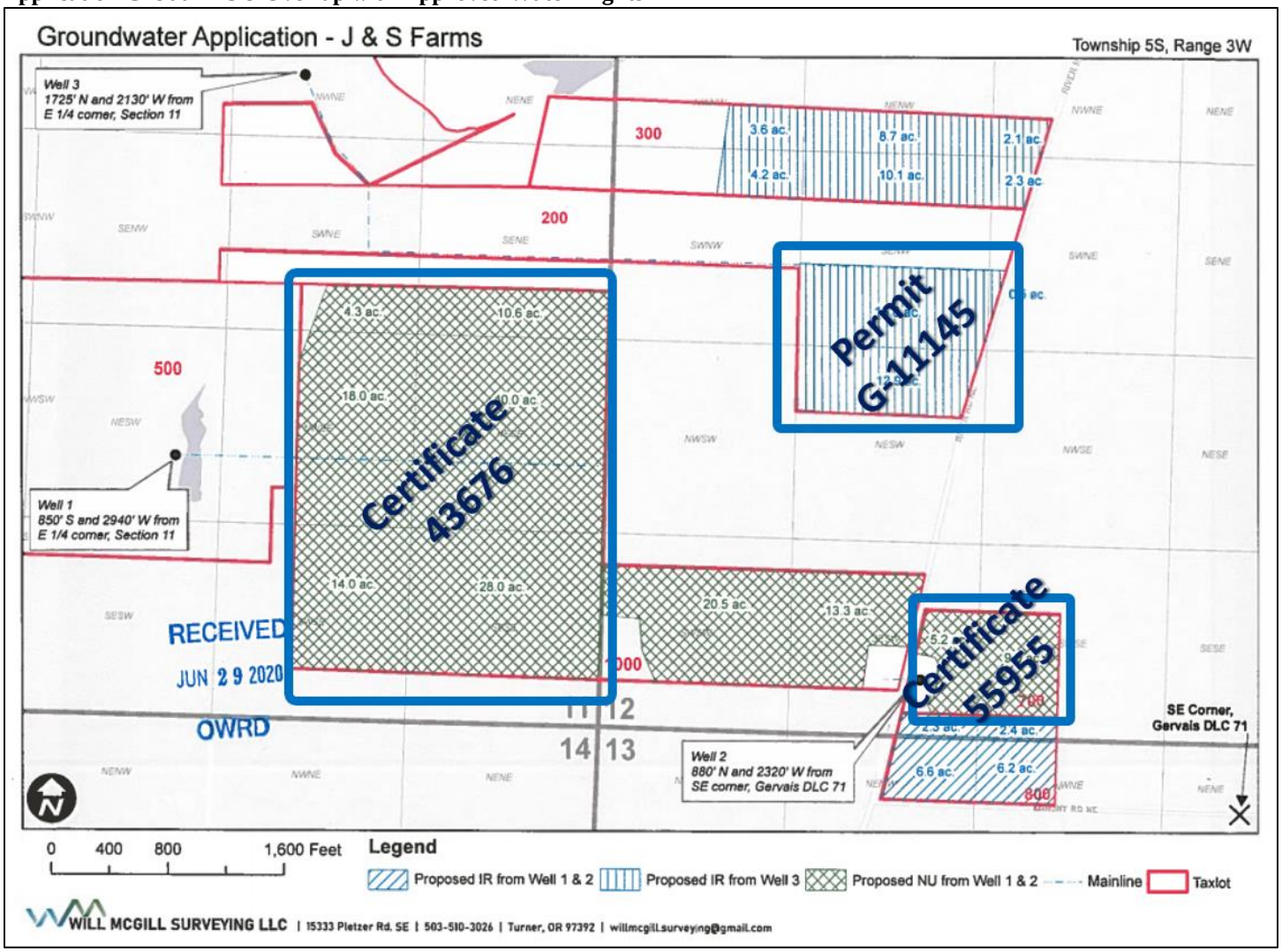



**Well 3, MARI 2890**

Permit G-11145 (IR 172.6 acres, 2.16 cfs, also a sump with different rate for industrial uses, apparent overlap with current application highlighted)



**Application G19002 POU Overlap with Approved Water Rights**



**Well to Well Interference – Current Pumping Rates**

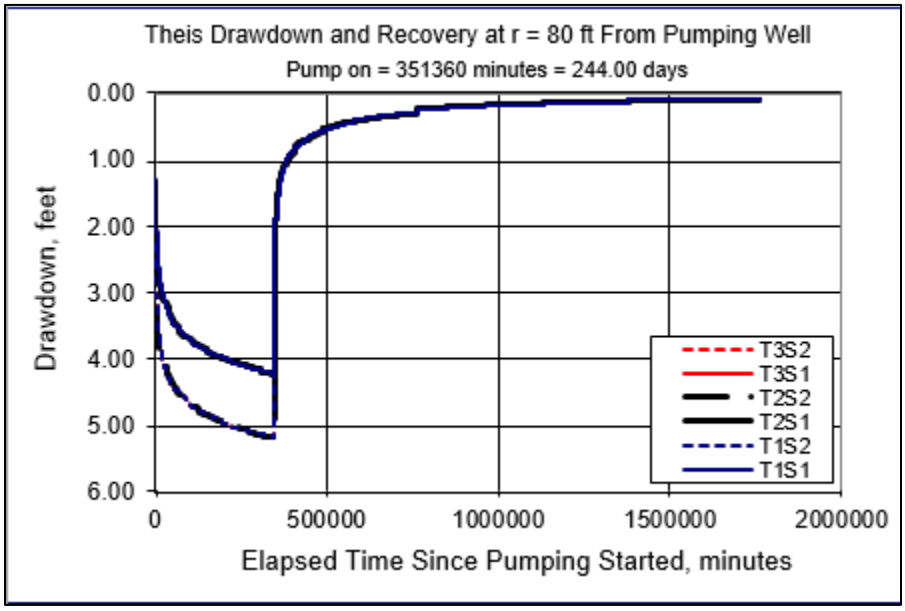
**Theis Time-Drawdown Worksheet** v.3.00

Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

| Input Data: | Var Name | Scenario 1 | Scenario 2 | Scenario 3 | Units | |
|---|---|---|---|---|---|---|
| Total pumping time | t | | 244 | | d | |
| Radial distance from pumped well: | r | | 80 | | ft | Q conversions |
| Pumping rate | Q | | 1.48 | | cfs | 664.22 gpm |
| Hydraulic conductivity | K | 600 | 600 | 600 | ft/day | 1.48 cfs |
| Aquifer thickness | b | | 40 | | ft | 88.80 cfm |
| Storativity | S_1 | | 0.1 | | | 127,872.00 cfd |
| | S_2 | | 0.01 | | | 2.94 af/d |
| Transmissivity Conversions | T_f2pd | 24000 | 24000 | 24000 | ft2/day | |
| | T_ft2pm | 16.66667 | 16.66667 | 16.66667 | ft2/min | Recalculate |
| | T_gpdpft | 179520 | 179520 | 179520 | gpd/ft | |

Use the Recalculate button if recalculation is set to manual



**Well to Well Interference – Additional Pump**

Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

| Input Data: | Var Name | Scenario 1 | Scenario 2 | Scenario 3 | Units | |
|---|---|---|---|---|---|---|
| Total pumping time | t | | 244 | | d | |
| Radial distance from pumped well: | r | | 80 | | ft | Q conversions |
| Pumping rate | Q | | 3.71 | | cfs | 1,665.05 gpm |
| Hydraulic conductivity | K | 600 | 600 | 600 | ft/day | 3.71 cfs |
| Aquifer thickness | b | | 40 | | ft | 222.60 cfm |
| Storativity | S_1 | | 0.1 | | | 320,544.00 cfd |
| | S_2 | | 0.01 | | | 7.36 af/d |
| **Transmissivity Conversions** | T_f2pd | 24000 | 24000 | 24000 | ft2/day | |
| | T_ft2pm | 16.6666667 | 16.6666667 | 16.6666667 | ft2/min | Recalculate |
| | T_gpdpft | 179520 | 179520 | 179520 | gpd/ft | |

Use the Recalculate button if recalculation is set to manual