

Groundwater Application Review Summary Form

Application # G- 19007

GW Reviewer Travis Brown Date Review Completed: 12/24/2020

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

December 24, 2020

TO: **Application G- 19007**

FROM: **GW: Travis Brown**
 (Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

YES The source of appropriation is hydraulically connected to a State Scenic
 NO 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 12/24/2020
 FROM: Groundwater Section Travis Brown
Reviewer's Name
 SUBJECT: Application G- 19007 Supersedes review of _____
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: Aaron and Wendy Nofziger County: CLACKAMAS

A1. Applicant(s) seek(s) 0.36^a cfs from 2 well(s) in the Willamette Basin,
Molalla-Pudding subbasin

A2. Proposed use Irrigation (28.77 acres; 71.93 af/yr) 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 ID	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	Well 1	Alluvium	0.516 ^a	4S/1E-25 SW-SW	875' N, 105' E fr SW cor S 25
2	PROPOSED	Well 2	Alluvium	0.516 ^a	4S/1E-25 SW-SW	65' N, 185' E fr SW cor S 25

* 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	~253 ^b	N/A	N/A	N/A	400	0-20	0-400 (10")	N/A	TBD	N/A	N/A	N/A
2	~258 ^b	N/A	N/A	N/A	400	0-20	0-400 (10")	N/A	TBD	N/A	N/A	N/A

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU are ~2.5 miles northwest of Molalla, Oregon.

^a The proposed POA are also the subject of transfer application T-13488. The proposed rates listed in the table above include the 0.156 cfs proposed to be transferred from Certificate 79974*.

^b Ground surface elevation at proposed POA location, estimated from LIDAR (Watershed Sciences, 2009)

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 proposed POA are greater than ¼ mile from the nearest surface water source. Per OAR 690-502-0240, the relevant basin rules do not apply.

A6. **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: N/A

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 measurements); 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:** Groundwater for the proposed use cannot be determined to be over-appropriated due to insufficient available data regarding rates of recharge and the current quantity of groundwater withdrawals from the aquifer system.

The proposed POA would produce groundwater from the alluvial aquifer system. Nearby well logs generally indicate ~20-60 ft of water-bearing sand and/or gravel beginning at ~40-90 ft below land surface (bls). However, mapping by Gannett and Caldwell (1998) indicates the thickness of the Willamette Aquifer (coarser grained sediments) as greater than 120 ft in the area of the proposed POA, with 20-40 ft of overlying fine-grained sediments (the “Willamette Silt”). The applicant’s proposed total depth (400 ft) for the POA is greater than the majority of wells in this area (see attached Well Statistics). The proposed POA would likely be partially completed in the predominantly fine-grained “Willamette Confining Unit” (Gannett and Caldwell, 1998). Deeper wells in this area have generally reported higher yields, and the applicant’s combined requested rate (0.516 cfs / ~232 gpm) is less than the median yield (275 gpm) reported for wells deeper than 200 ft bls (see attached Well Statistics – Wells >200 ft bls). Water levels measured in nearby wells are generally very stable (see attached Hydrograph).

The nearest neighboring well to the proposed POA is CLAC 56632, ~1,030 ft north of proposed POA Well 1. CLAC 56632 is reportedly completed to ~171 ft bls. Interference with CLAC 56632 was quantitatively estimated using the Theis (1935) equation for drawdown in a confined aquifer. Hydraulic parameters used for the analysis were derived from regional data and studies (Pumping Test Reports; Conlon et al., 2003, 2005; Iverson, 2002; McFarland and Morgan, 1996; Woodward et al., 1998) or are within a typical range of values for the given parameter within the hydrogeologic regime (Domenico and Mifflin, 1965; Freeze and Cherry, 1979; Halford and Kuniansky, 2002). At a combined rate of 0.516 cfs, the proposed use is unlikely to cause interference with CLAC 56632 or similarly located wells which would meet the definition of injury (see attached Well Interference Analysis).

The conditions specified in Item B1(d) and B2(c), above, are recommended for any permit issued pursuant to this application.

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	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Alluvial	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: Reported water levels in nearby wells are predominantly above the applicable water-bearing zones (see attached Well Statistics). Additionally, groundwater mapping in this area indicates water levels are above the estimated top of the coarse-grained Willamette aquifer sediments (Woodward et al., 1998). The available evidence indicates the proposed aquifer is confined.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Gribble Creek	~200-220 ^a	~220-236 ^b	~1,450	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Creamery Creek	~200-220 ^a	~210-230 ^b	~2,100	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	3	Dove Creek	~200-220 ^a	~213-223 ^b	~2,640	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Gribble Creek	~200-220 ^a	~221-236 ^b	~2,130	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Creamery Creek	~200-220 ^a	~210-230 ^b	~1,500	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	3	Dove Creek	~200-220 ^a	~220-223 ^b	~4,330	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: Estimated groundwater elevations near the proposed POA are roughly coincident with nearby surface water elevations. Groundwater mapping in this area indicates groundwater discharging to surface water (Woodward et al., 1998). SW 1-3 transition from intermittent to perennial as they descend from the upland around the proposed POA (NHD, 2014; USGS, 2017). The available evidence indicates that the proposed POA would be hydraulically connected to SW 1-3.

^a Based on nearby reported water levels and groundwater mapping (Woodward et al., 1998)

^b Estimated from LIDAR, within 1 mile of proposed POA (Watershed Sciences, 2009)

Water Availability Basin the well(s) are located within: WID #69796 MOLALLA 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 (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	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	<input type="checkbox"/>	134	<input type="checkbox"/>	<25%	<input type="checkbox"/>
1	2	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	<input type="checkbox"/>	134	<input type="checkbox"/>	<25%	<input type="checkbox"/>
1	3	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	<input type="checkbox"/>	134	<input type="checkbox"/>	<25%	<input type="checkbox"/>
2	1	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	<input type="checkbox"/>	134	<input type="checkbox"/>	<25%	<input type="checkbox"/>
2	2	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	<input type="checkbox"/>	134	<input type="checkbox"/>	<25%	<input type="checkbox"/>
2	3	<input type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	<input type="checkbox"/>	134	<input type="checkbox"/>	<25%	<input type="checkbox"/>

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?
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: Interference with nearby surface water was quantitatively estimated using the Hunt (2003) analytical model. Hydraulic parameters used for the analysis were derived from regional data and studies (Pumping Test Reports; Conlon et al., 2003, 2005; Iverson, 2002; McFarland and Morgan, 1996; Woodward et al., 1998) or are within a typical range of values for the given parameter within the hydrogeologic regime (Domenico and Mifflin, 1965; Freeze and Cherry, 1979; Halford and Kuniandy, 2002). Results indicate that interference with surface water is not anticipated to exceed 25 percent of the rate withdrawal within 30 days of continuous pumping (see attached Stream Depletion Analysis).

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													
(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: N/A

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:

Application File: G-19007, T-13488

Conlon, T.D., Lee, K.K., and Risley, J.R., 2003, Heat tracing in streams in the central Willamette Basin, Oregon, in Stonestrom, D.A. and Constantz, Jim, eds., Heat as a tool for studying the movement of groundwater near streams: U.S. Geological Survey Circular 1260, chapter 5, p. 29-34.

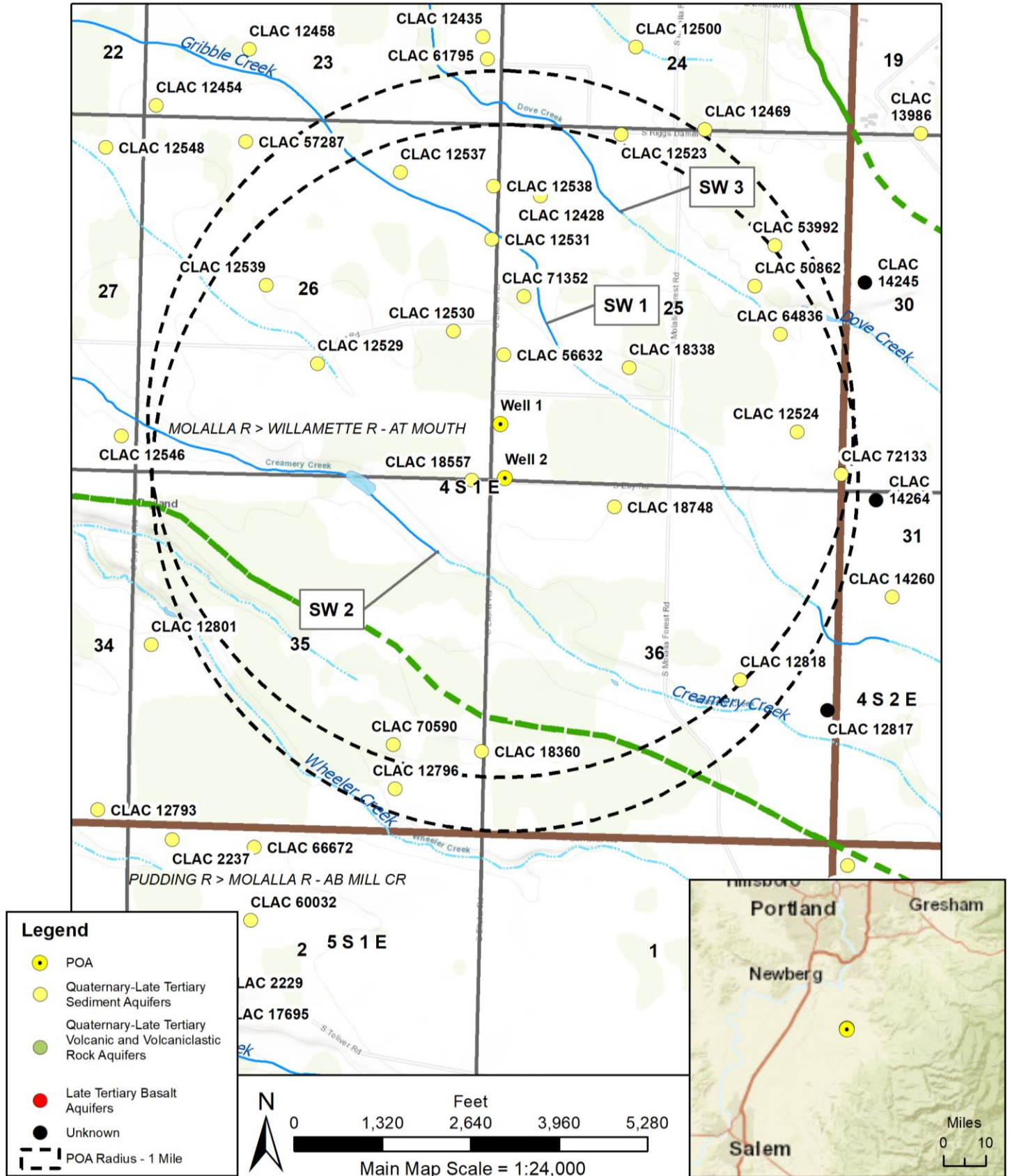
- Domenico, P.A. and Mifflin, 1965, Water from low-permeability sediments and land subsidence: Water Resource Research, v. 1, no. 4, p. 563-576.
- Freeze, R.A. and Cherry, J.A., 1979, Groundwater, Prentice Hall, Englewood Cliffs, New Jersey, 604 p.
- Gannett, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington, Professional Paper 1424-A, 32 p: U. S. Geological Survey, Reston, VA.
- Halford, K.J., and Kuniansky, E.L., 2002, Documentation of Spreadsheets for the Analysis of Aquifer-Test and Slug-Test Data, Open File Report 02-197, 51 p: U. S. Geological Survey, Reston, VA.
- Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, Vol 8, p. 12-19.
- Iverson, J., 2002, Investigation of the hydraulic, physical, and chemical buffering capacity of Missoula flood deposits for water quality and supply in the Willamette Valley of Oregon: Unpublished M.S. thesis, Oregon State University, 147 p.
- McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington, Water Supply Paper 2470-A, 58 p: U. S. Geological Survey, Reston, VA.
- United States Geological Survey, 2014, National Hydrography Dataset (NHD), 1:24,000, U. S. Department of the Interior, Reston, VA.
- United States Geological Survey, 2017, Yoder quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, VA.
- Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Willamette Valley Phase I, Oregon: Portland, OR, December 21.

D. WELL CONSTRUCTION, OAR 690-200

- D1. Well #: _____ Logid: _____
- D2. **THE WELL does not appear to meet current well construction standards based upon:**
- review of the well log;
 - field inspection by _____;
 - report of CWRE _____;
 - 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.**
-

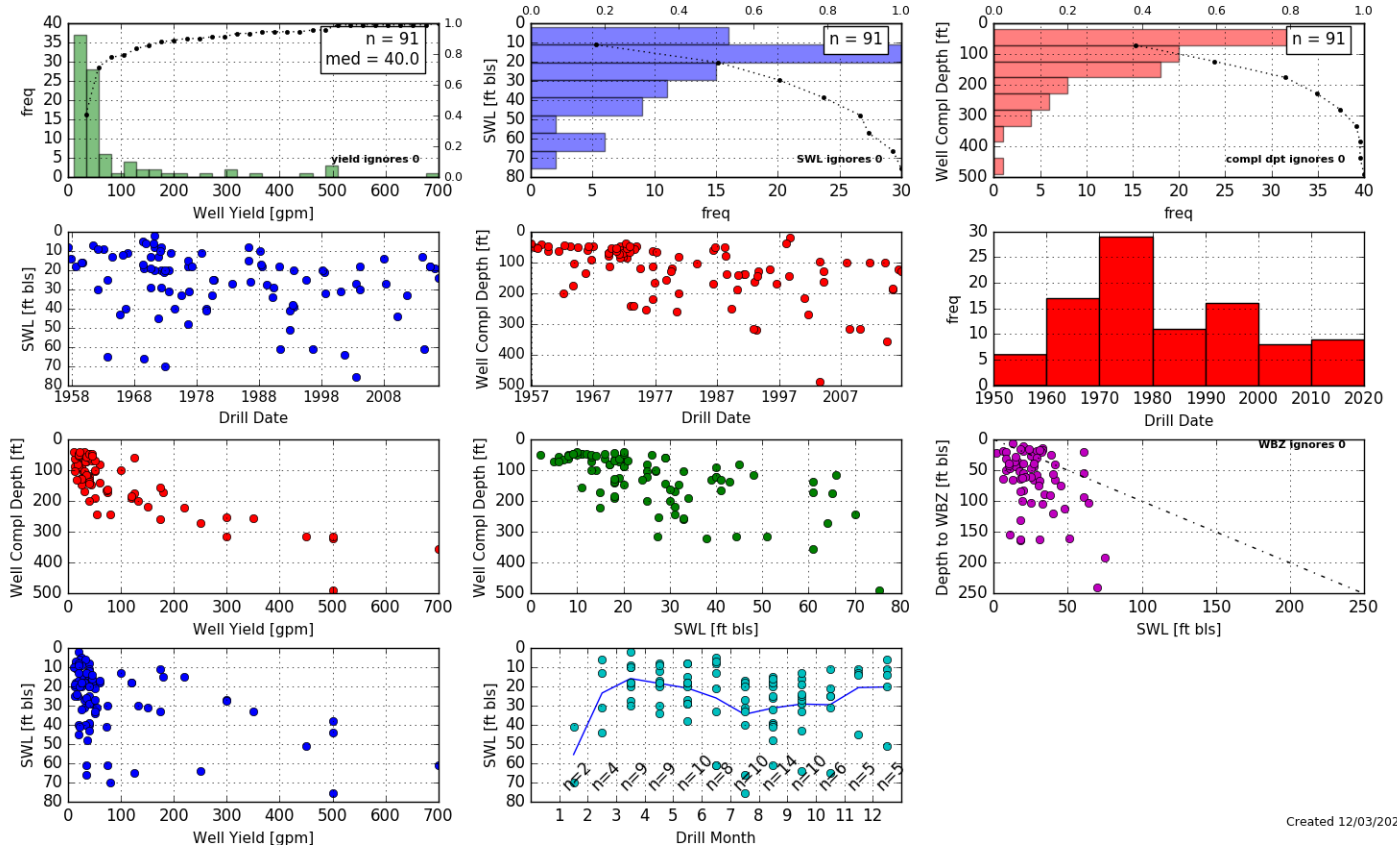
Well Location Map

G-19007 Nofziger

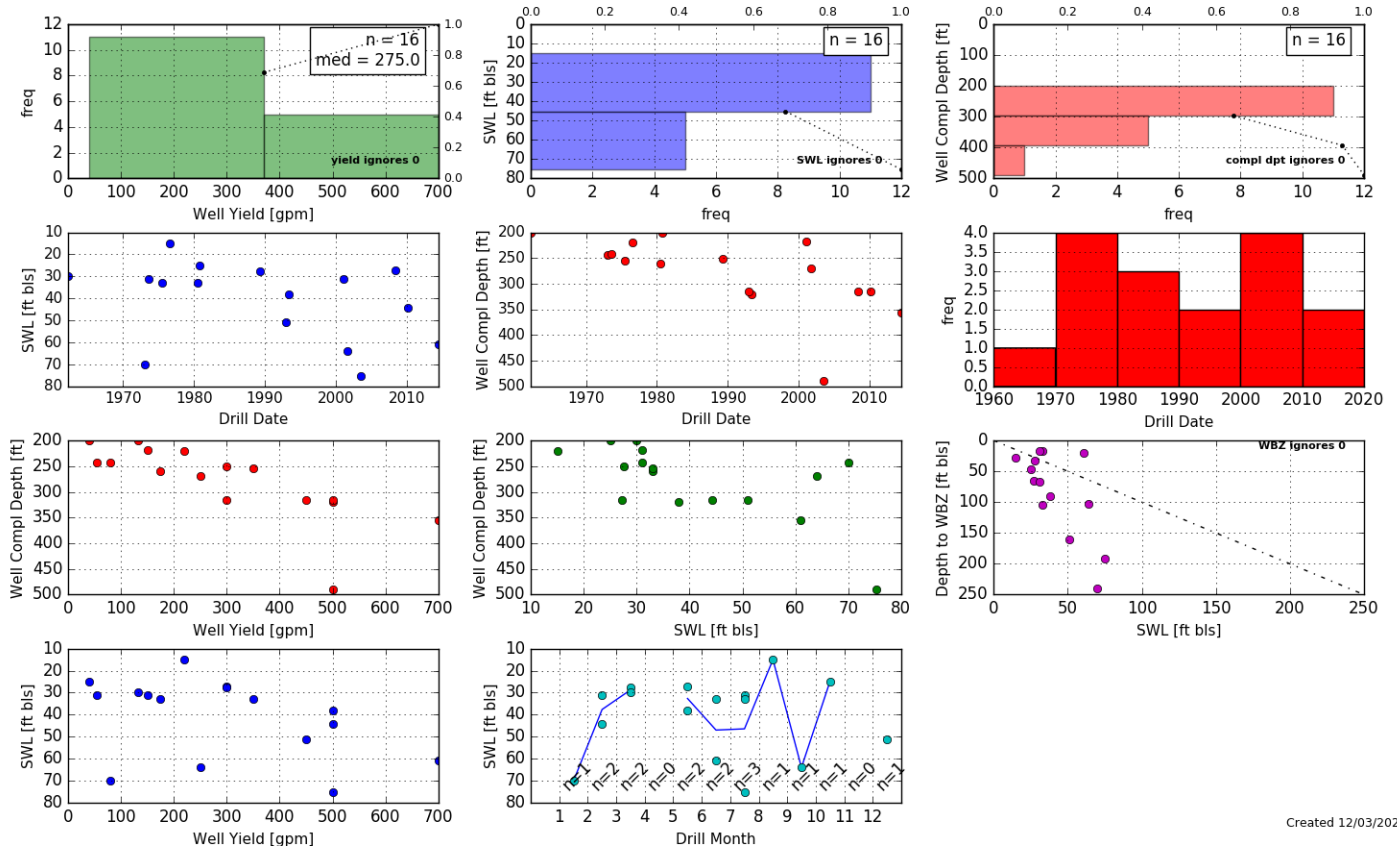


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Well Statistics – T4S/R1E-S25, 26, 35, 36

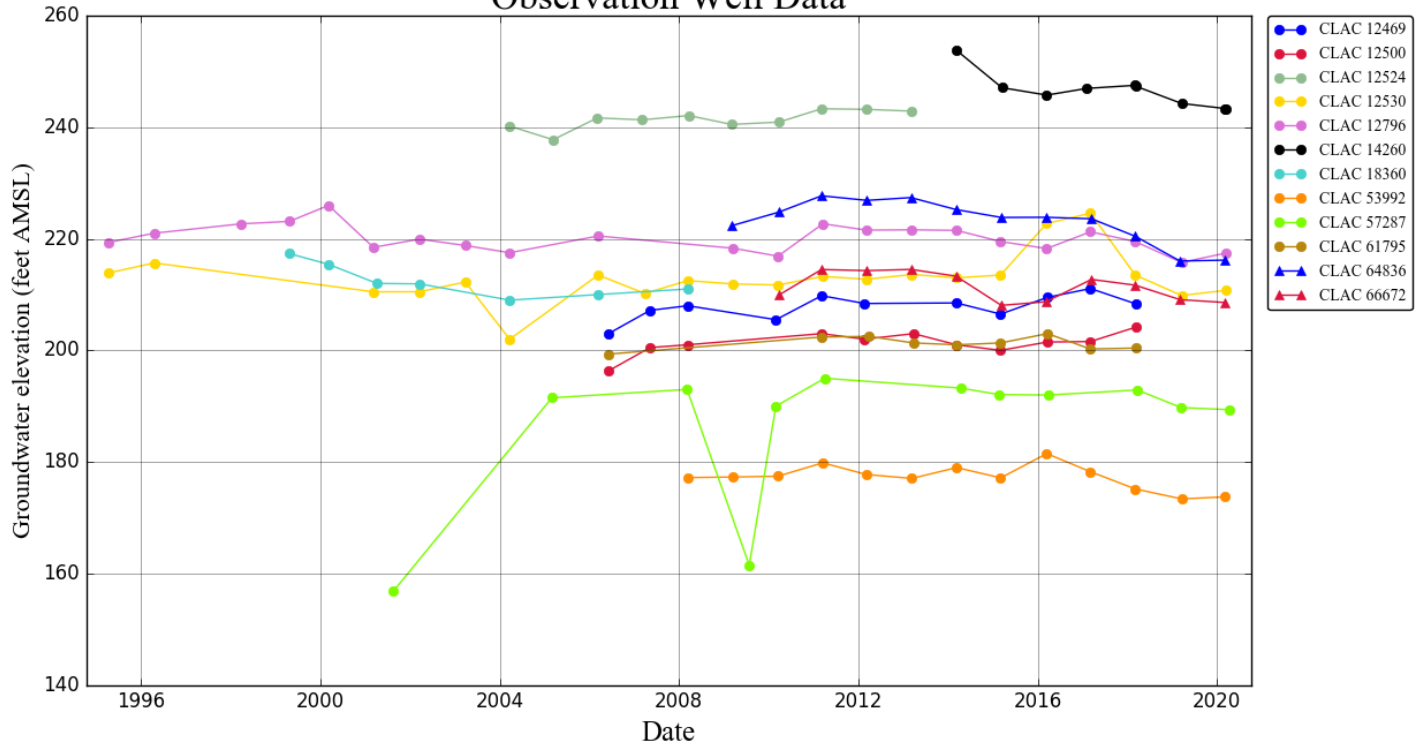


Well Statistics – Wells > 200 ft bls – T4S/R1E-S25, 26, 35, 36



Hydrograph

Observation Well Data



Well Interference Analysis

This Time-Drawdown Worksheet

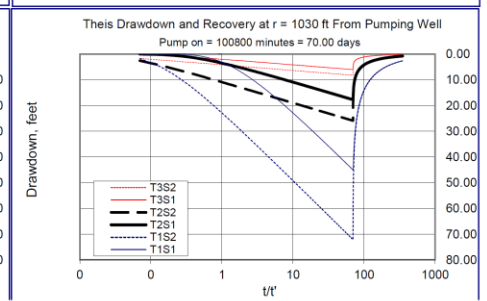
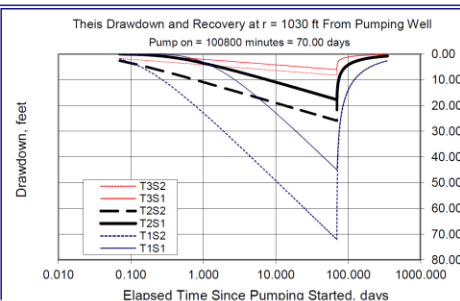
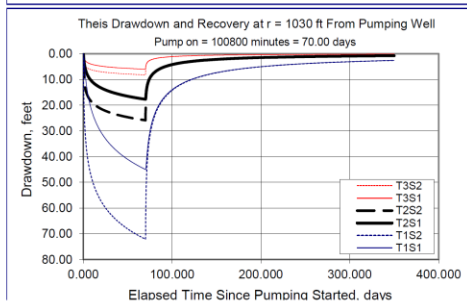
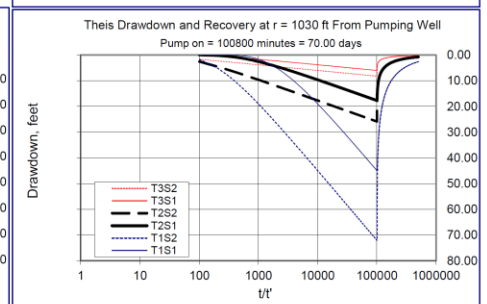
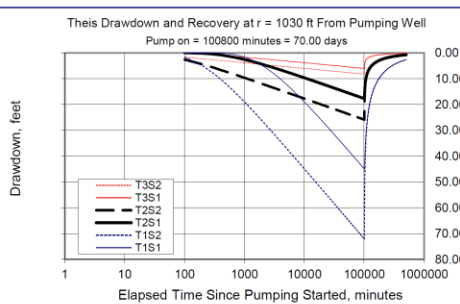
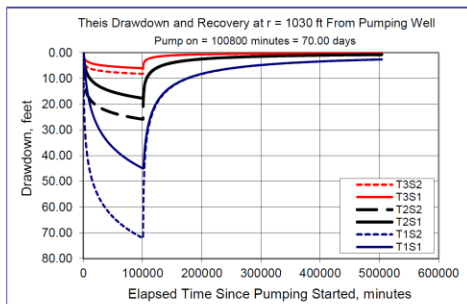
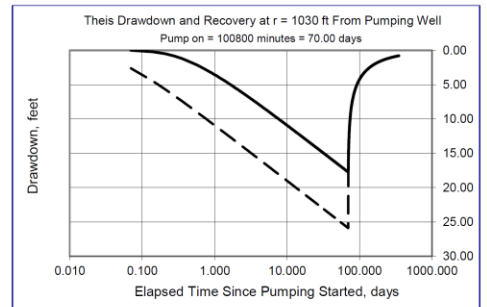
v.3.00

Calculates This nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and different 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		70		d
Radial distance from pumped well:	r		1030		ft
Pumping rate	Q		0.516		cfs
Hydraulic conductivity	K	3	10	37	ft/day
Aquifer thickness	b		100		ft
Storativity	S 1		0.001		
	S 2		0.0001		
Transmissivity Conversions	T ft2pd	300	1000	3700	ft2/day
	T ft2pm	0.2083333	0.6944444	2.5694444	ft2/min
	T gdpdft	2244	7480	27676	gpd/ft

Use the Recalculate button if recalculation is set to manual



Water Availability Tables

Water Availability Analysis

Detailed Reports

MOLALLA R > WILLAMETTE R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 12/18/2020

Watershed ID #: 69796 ([Map](#))

Exceedance Level:

Date: 12/18/2020

Time: 11:01 AM

- 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	1,870.00	155.00	1,710.00	0.00	500.00	1,210.00
FEB	2,010.00	145.00	1,870.00	0.00	500.00	1,370.00
MAR	1,830.00	113.00	1,720.00	0.00	500.00	1,220.00
APR	1,530.00	86.80	1,440.00	0.00	500.00	943.00
MAY	927.00	97.50	829.00	0.00	500.00	329.00
JUN	431.00	119.00	312.00	0.00	500.00	-188.00
JUL	204.00	184.00	20.10	0.00	200.00	-180.00
AUG	139.00	155.00	-15.60	0.00	100.00	-116.00
SEP	134.00	82.30	51.70	0.00	150.00	-98.30
OCT	188.00	39.70	148.00	0.00	450.00	-302.00
NOV	637.00	79.90	557.00	0.00	500.00	57.10
DEC	1,700.00	150.00	1,550.00	0.00	500.00	1,050.00
ANN	1,320,000.00	85,000.00	1,240,000.00	0.00	295,000.00	966,000.00

Stream Depletion Analysis

Application type:	G
Application number:	19007
Well number:	1
Stream Number:	1
Pumping rate (cfs):	0.516
Pumping duration (days):	70
Pumping start month number (3=March)	3.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	1450	1450	1450	ft
Aquifer transmissivity	T	300	1000	3700	ft ² /day
Aquifer storativity	S	0.001	0.0005	0.0001	-
Aquitard vertical hydraulic conductivity	Kva	0.001	0.005	0.01	ft/day
Aquitard saturated thickness	ba	40	30	20	ft
Aquitard thickness below stream	babs	40	30	20	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	5	5	5	ft

Stream depletion for Scenario 2:

Days	10	30	60	90	120	150	180	210	240	270	300
Depletion (%)	0	0	0	0	0	0	0	0	0	0	0
Depletion (cfs)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

