This Groundwater Technical Review and the included analysis help inform the Water Rights Section's review of whether the proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525 and ORS 537.621. The Water Rights Section also considers other information sources when making its public interest determination, including watermaster input, any comments received, input from other agencies, other Commission rules not evaluated as part of the Groundwater Review, and other information.

PUBLIC INTEREST TECNNICAL REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date: 9/10/2025

FROM: Groundwater Section Byron Ebner
Reviewer's Name

SUBJECT: Application _G_ - _ 19490 _ Supersedes review of _____

Date Reviewed by GW Lead and Returned to WRSD: Travis Brown, 7/2/2026

PUBLIC INTEREST PRESUMPTION: GROUNDWATER

OAR 690-310-0130 (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 if
(a) The proposed use is allowed in the applicable basin program established pursuant to ORS 536.300 and 536.340 or given a preference under ORS 536.310(12);
(b) Water is available;
(c) The proposed use will not injure other water rights; and
(d) The proposed use complies with the rules of the Commission.

Department staff review groundwater applications under OAR 690-310-0140 to determine whether the presumption is established and may modify or condition the proposed use 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:

A1. Application

Applicant's Name: Ivan Barsukoff County: Clackamas

Applicant(s) seek(s) 0.67 cfs from 1 well(s) in the Willamette Basin, Molalla-Pudding River subbasin

Proposed use Primary Irrigation Seasonality: 5/1 – 9/30

A2. Well and aquifer data:

A2 a: Well identifiers, aquifer, rate, and location

POA Well	Well Log ID	Applicant's Well #	Proposed Aquifer	Proposed Rate (cfs)	Location (T/R-S QQ-Q)	Latitude	Longitude
1	PROP 709	1	Alluvium	0.67	5S/1W-14 NESE	45.1356688	-122.7670619

A2 b: Well construction information by depth below land surface. All units in feet.

POA Well	Seal		Casing		Filter Pack		Open / Perforation / Screen		Well Bottom
	Min	Max	Min	Max	Min	Max	Min	Max	
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	280

A2 c: Well construction information by elevation above mean sea level. All units in feet.

POA Well	Land Surface Elevation	Seal		Casing		Filter Pack		Open / Perforation / Screen		Well Bottom
		Min	Max	Min	Max	Min	Max	Min	Max	
1	199.94	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-80.06

A2 d: Information relevant to water levels, including land surface elevation, depth of first water, recent annual high level, and reference levels for permit conditions

POA Well	Depth of First Water from Well Log (ft bls)	Shallowest Static Water Level (ft bls)	Most Recent Annual High WL		Reference Levels for:				Well Tests			
					RSGL	Permit Conditions			(max yield on well log)			
			Depth (ft bls)	WL Date	Depth (ft bls)	Depth (ft bls)	Date	Pro-visional?	Yield (gpm)	Draw-down (ft)	Test Type	Duration (hours)
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A

Use data from application for proposed wells.
"SWL" = static water level (most recent or representative SWL). "amsl" = above mean sea level. "bls" = below land surface

Comments: Proposed well construction details apart from total depth were not provided.

A3. Description of hydrogeologic setting / conceptual model: The proposed POA is located in the Central Willamette Basin, east of Woodburn in the Elliott Prairie area. In this area, the Middle Sedimentary Unit of the Willamette Aquifer consists mainly of slightly to moderately consolidated Pleistocene sands and gravels and is overlain by 60 – 70 ft of the Willamette Silt Unit (Conlon et al., 2005). Water levels in the Middle Sedimentary Unit show a gradual change with depth depending on the thickness and coverage of the Willamette Silt Unit and exhibit characteristics of a confined aquifer in this area. While the Willamette Silt Unit has considerably lower hydraulic conductivity compared to the underlying sands and gravels, the silt unit contains a large volume of water that can be released to adjacent coarse-grained sediments when water is pumped from the underlying sediments. According to Conlon et al. (2005), the groundwater in the Central Willamette Basin likely flows to the Willamette River and the lower reaches of the Pudding and Molalla Rivers.

Applicant lists Lower Columbia as source aquifer but would likely have to drill far deeper than the proposed depth of 280 ft to reach the Columbia River Basalt as the approximate depth to basalt in this area would be -1000 ft AMSL, which would likely be an additional 920 ft of drilling (Conlon et al., 2005). With the proposed depth, the applicant may drill deeper than the Middle Sedimentary Unit and complete the proposed well in the Lower Sedimentary Unit of the Willamette Aquifer. While the Lower Sedimentary Unit can be regionally characterized as a confining unit, there are localities of coarser grained sediments found throughout the Central Willamette Basin and larger Willamette Basin that have proven productive (Conlon et al., 2005). Herrera et al., (2014) modeled streamflow depletion in both the Middle and Lower Sedimentary Units of the Willamette Aquifer in this area. While capture of streamflow was higher in the Middle Sedimentary Unit, additional pumping from the Lower Sedimentary Unit would capture water that would have otherwise flowed towards “Other Rivers” such as Rock and Butte Creek. Review is proceeding with the assumption that the target is the Middle Sedimentary Unit as similar conclusions would be drawn for the Lower Sedimentary Unit regarding well-to-well interference and streamflow depletion.

B. BASIN PROGRAM:

OAR 690-310-0130 (1)(a)

B1. ☒ **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: Proposed well will likely be completed in and produce water from a confined alluvial aquifer and are not located within ¼ mile from any perennial surface water body.

B2. ☐ **Well(s) #** ___ , _____ , _____ , _____ , _____ , are limited by an administrative restriction under the applicable basin program.
Comments: _____

C. WATER AVAILABILITY:

OAR 690-310-0130 (1)(b)

OAR 690-300-0010(57): "Water is Available" […] means: […]
(d) The proposed groundwater source exhibits Reasonably Stable Groundwater Levels, as defined in OAR 690-008-0001; and
(e) The total requested rate of groundwater allocation is obtainable by the expected yield of the well(s) proposed in the application given best available information; and
(f) The proposed groundwater use does not have the Potential for Substantial Interference (OAR 690-009-0020(5)) with a surface water source [that does not have water available]

C1. Reasonably Stable Groundwater Levels

OAR 690-008-0001 (9): "Reasonably Stable Groundwater Levels" means that Annual High Water Levels, based on observed trends over time, remain within a range consistent with sustaining the function and character of a groundwater reservoir indefinitely, and:
(a) The Annual High Water Levels as measured at one or more representative wells in a groundwater reservoir or part thereof:
(A) indicate no decline or an average rate of decline of less than 0.6 feet per year over any immediately preceding averaging period with duration between 5 and 20 years. Four Annual High Water Levels are required to calculate the rate of change; one must have been measured in the year to which the evaluation of reasonably stable applies, and at least one must have been measured between 5 and 20 years prior; and
(B) have not declined by more than 25 feet from a reference level to the level in the year to which the evaluation of reasonably stable applies. The reference level shall be the highest known water level unless Annual High Water Levels have been measurably increased by human activity, in which case the Department may set a different reference level using best available information.
(b) If water level data are insufficient to perform either test in (a) for a given year, then the Department will presume that groundwater levels are not reasonably stable unless:
(A) the most recent evaluation of reasonably stable applies to a year within 5 years of the given year, in which case the Department may presume that the recent evaluation still applies; or
(B) groundwater has not yet been extracted or authorized for extraction from the groundwater reservoir, in which case the Department may presume that groundwater levels are reasonably stable.
(c) The Department may evaluate Reasonably Stable Groundwater Levels for the year of the priority date of a groundwater right application or for a later year if more recent data are available.

C1a. If part (a) of 690-008-0001(9) has been superseded by a basin program rule as per 690-008-0001(9)(B)(d) proceed to C1c. List one or more representative wells in the proposed groundwater reservoir or part thereof that have sufficient data to evaluate part (a) of 690-008-0001(9). Both the Rate (OAR 690-008-0001(9)(a)(A)) and Magnitude (OAR 690-008-0001(9)(a)(B)) tests for a given well must be passed in order to find that the water levels are Reasonably Stable. It is not necessary to include all POAs proposed on this application into this table, as long as they all access the same part of the groundwater reservoir and have the same reasonable stability status indicated in C1b below. If some POAs are found to be reasonably stable while others are not, then all the POAs on the application should be included in the table below, with their POA number indicated in the second column. In that situation, the reviewer does not need to indicate in this table which wells are considered representative for determining reasonable stability status for different POAs, but they should describe those relationships in the comments below.

Well Log ID	POA Well #	Reference Level for Evaluation of Reasonable Stability (ft bls)	Rate Test	Magnitude Test	Water Levels Reasonably Stable
PROP 709	**1**	**N/A**	**Insufficient Data**	**Insufficient Data**	**Insufficient Data**
CLAC 2083	**N/A**	**31**	**Pass**	**Pass**	**Yes**
MARI 63638	**N/A**	**21**	**Pass**	**Pass**	**Yes**
MARI 1758	**N/A**	**24**	**Pass**	**Pass**	**Yes**

Comments: Since the proposed POA hasn't been constructed yet, 3 representative wells were chosen due to their placement around and their proximity to the proposed POA. These wells all seem to be completed in the Middle Sedimentary Unit of the Willamette Aquifer. CLAC 2083 is the closest well to the proposed POA and is located approximately 2960 ft NE, followed by MARI 1758 located approximately 7360 ft NW of the proposed POA, and MARI 63638 the furthest away approximately 10940 ft SW of the proposed POA.

C1b. Summary finding for this application. Check only one primary finding. It is possible that different proposed POAs could access different parts of the GW reservoir, and for some of those parts to be Reasonably Stable while others are not. In that case, summary finding for the application should be "Not Reasonably Stable," and the reviewer should indicate which POAs access part(s) of the groundwater reservoir that are Reasonably Stable. OAR 690-008-0001(9)(a): *Annual High Water Levels as measured at one or more representative wells in a groundwater reservoir or part thereof*:

☒ **Are Reasonably Stable**
- ☐ Groundwater has not yet been extracted or authorized for extraction from the groundwater reservoir

☐ **Are Not Reasonably Stable**
- ☐ If some Proposed POAs are Reasonably Stable, list the Reasonably Stable POAs here: _____

☐ **Sufficient data are not available to evaluate reasonable stability**

List representative wells identified during review that could be measured in order to overcome a finding of Insufficient Data: _____

Comments: _____

C1c. OAR 690-008-0001(d): Evaluation for reasonably stable water levels per superseding basin program rules OAR 690-_____ for the _____ administrative basin.

Comments: _____

C2. Well Yield

C2a. OAR 690-300-0010(57)(e): Is the total requested rate of groundwater allocation obtainable by the expected yield of the well(s) proposed in the application given best available information?

☒ **Yes** ☐ **No**

Comments: Insufficient data currently as proposed POA hasn't been constructed yet, but a well report query for 5S/1W-14 and the surrounding sections shows reported yields of 4 – 1000 GPM and 70 – 500 GPM in the pump test database. However, within section 14 the yields seem to be smaller with a range of 10 – 500 GPM from the well report query and 107 GPM from a pump test in a nearby well (CLAC 2122) that is roughly 2180 ft NW of the proposed POA. CLAC 2122 has a similar construction to the proposed POA. Since there are wells in the area that can supply the requested rate and this well has a deeper proposed depth, there's a chance that this well will be able to obtain the requested rate of 300.7 GPM.

C3. Groundwater Interference with Surface Water

OAR 690-300-0010(57): "Water is Available", when used in OAR 690-310-0080, 690-310-0010 and 690-310-0130, means […]:
(f) The proposed groundwater use does not have the Potential for Substantial Interference (OAR 690-009-0020(5)) with a surface water source [that is not available for further appropriation]

OAR 690-009-0040: (1) When evaluating a Proposed Groundwater Use, Hydraulic Connection and the Potential for Substantial Interference with a surface water source shall be determined by the Department according to these rules. These determinations shall be based upon the application of generally accepted hydrogeologic principles using best available information concerning the hydrologic system of interest and the well(s) under consideration.

(a) Appropriate information that is provided in the application or in the public comment period for the application shall be considered in the process of making these determinations.

(b) Best available information may include, but is not limited to, pertinent water well reports, aquifer test analyses, hydrologic and geologic studies and reports, groundwater and surface water elevation data, available numerical and analytical groundwater flow models, and any other information that is used in applying generally accepted hydrogeologic principals and methodologies.

(2) A determination of Hydraulic Connection is a prerequisite for a determination of the Potential for Substantial Interference.
(3) A determination of the Potential for Substantial Interference with a surface water source shall at a minimum include application of the generally accepted hydrogeological principles described in "Streamflow Depletion by Wells – Understanding and Managing the Effects of Groundwater Pumping on Streamflow" by P. M. Barlow and S. A. Leake, 2012.
(4) The Potential for Substantial Interference with a surface water source exists if the well(s) under consideration will, over the full term of the proposed or authorized groundwater use, obtain water from Streamflow Depletion.

OAR 690-009-0020(4): "Hydraulic Connection" means saturated conditions exist allowing water to move between two or more sources of water, either between groundwater and surface water or between groundwater sources.

OAR 690-009-0020 (7) "Streamflow Depletion" means a reduction in the flow of a surface water source due to pumping a hydraulically connected groundwater source. Streamflow Depletion encompasses:
(a) captured groundwater that would otherwise discharge to a surface water source; or
(b) induced infiltration from a surface water source to the hydraulically connected groundwater source.

C3a. OAR 690-009-0020(5): *Potential for Substantial Interference", or "PSI", means that a groundwater use will cause streamflow depletion based on the assessments described in OAR 690-009-0040, and therefore may cause or has caused substantial interference with or undue interference with a surface water source, based on the definitions in OAR 690-008-0001.*

Summary of surface water sources evaluated for hydraulic connection and Potential for Substantial Interference. For hydraulic connection and potential for substantial interference, a value of 1 means yes, and blank means no.

POA Well	WRD Streamcode	Streamcode Surface Water Name	Water Availability Basin (WAB)	WAB Watershed ID	Hydraulically Connected	Potential for Substantial Interference
1	02114004100020110	Butte Creek	BUTTE CR > PUDDING R - AT MOUTH	69799	1	1
1	02114004100020070	Rock Creek	PUDDING R > MOLALLA R - AB MILL CR	14202000	1	1

Comments**:** Conlon et al. (2003) conducted heat tracing experiments on six streams in the Central Willamette Basin, with Butte Creek near our proposed POA being one of the locations in the study. The results of the heat tracing experiment indicated that seepage was greatest in larger streams with sandier streambeds such as Butte Creek and Lower Pudding River. A perennial reach of Rock Creek is nearby the proposed POA as well and is more than twice the distance from the proposed POA compared to the distance from Butte Creek. While it is likely that most stream depletion would occur from Butte Creek due to proximity, Rock Creek may also contribute a portion of its flow to the proposed POA when pumping. Herrerra et al. (2014) modeled steady state capture of "other rivers" by an increase of pumping in the upper and middle sedimentary units of the Willamette Aquifer. These "other rivers" included Butte and Rock Creek and the findings showed that the simulated increase in pumping from the upper and middle sedimentary units resulted in 30 – 90 % of the pumped water being supplied from streams such as Butte and Rock Creek with the greatest stream capture occurring east of the Pudding River near the Molalla River.

List all surface water sources identified to have PSI and their associated Water Availability Basin:

WRD Streamcode	Streamcode Surface Water Name	Water Availability Basin (WAB)	WAB Watershed ID
02114004100020110	Butte Creek	BUTTE CR > PUDDING R - AT MOUTH	69799
02114004100020070	Rock Creek	PUDDING R > MOLALLA R - AB MILL CR	14202000

Comments**:** Due to the presence of the Willamette Silt Unit from the land surface to the Middle Sedimentary Unit, Hunt (2003) was chosen to estimate streamflow depletion for the above streams. Streamflow depletion estimates from the Hunt (2003) model assume constant use at maximum rate and use hydraulic parameters from pump test reports, Conlon et al. (2003) & (2005), Iverson (2002) and Woodward et al. (1998). The results of these model runs for Butte Creek and Rock Creek are below and included as figures at the end of this review. Estimated percent of pumping rate from stream depletion of Butte Creek at 150 days is 3 – 4.7% . Estimated percent of pumping rate from stream depletion of Rock Creek at 150 days is 0.04 – 7.4%. Depletion of local surface water will be buffered by the low vertical hydraulic conductivity and substantial thickness of fine-grained sediments between the relevant water-bearing zones and local streambeds. However, there will still be some depletion of surface water. Net impacts will be small at the onset of pumping but will increase with time until a new equilibrium between local recharge and discharge is reached, at which time surface water depletion is anticipated to be relatively constant throughout the year. Water isn't available in either WAB for the requested period. Water Availability Analysis included as figures.

D. INJURY:

OAR 690-310-0130 (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 if…(c) The proposed use will not injure other water rights.

To make a finding of injury to an existing water right, the Department must make a finding of "Substantial Interference" as defined in OAR 690-008-0001(10). The finding of "Substantial Interference" with a surface water right is made by the Water Rights Services Division based on the evaluation in section C3. Sections D1 and D2, below, address the finding of "Substantial Interference" with a groundwater right.

OAR 690-008-0001(10): "Substantial or Undue interference", means the spreading of the cone of depression of a well to intersect a surface water source or another well, or the reduction of the groundwater levels as a result of pumping or otherwise extracting groundwater from an aquifer, which contributes to:

(b)The groundwater level being drawn down to the Economic Pumping Level of the senior appropriator(s); or

(c) One or more of the senior groundwater appropriators being unable to obtain either the permitted or customary quantity of groundwater, whichever is less, from a reasonably efficient well that fully penetrates the aquifer where the aquifer is relatively uniformly permeable. However, in aquifers where flow is predominantly through fractures, full penetration may not be required as a condition of substantial or undue interference.

D1a. OAR 690-008-0001(10): Will the proposed groundwater use result in substantial or undue interference with an existing groundwater user?

☐ **Yes** ☐ **No** ☒ **No, as long as the permit is conditioned as indicated in item F below.**

Comments: The nearest GW right is GR-1244 (CLAC 2154) and is 1150 ft SE of the proposed POA. A Theis (1941) drawdown analysis was conducted to assess potential well-to-well interference that may occur due to pumping from the proposed POA. Hydraulic parameters used for the analyses were pulled from pump test reports, Conlon et al. (2003) & (2005), Iverson (2002) and Woodward et al. (1998). Assuming constant use for the requested period of use, drawdown estimates ranged from 16.72 – 68.79 ft (analysis included as figures below). Drawdown from GR-1244's pumping was estimated to be 17.3 – 80.08 ft. CLAC 2154 has 84 ft of water column according to a SWL measurement from the well report. Since it is unlikely that constant use at max rate will occur, the lower end estimates likely are more accurate.

E. OTHER RULES OF THE COMMISSION:

OAR 690-310-0130 (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 if…(d) The proposed use complies with the rules of the Commission.

E1. OAR 690-200, 690-210 and 690-215: Well Construction

Identify any notable well construction deficiencies or hydrogeologic considerations to support review by Well Construction & Compliance.

E1a. Well #: _____ Logid: _____

E1b. Well construction deficiency or other comment is described as follows: _____

E2. OAR 690-310-0260: Water Rights Within or Above State Scenic Waterways

E2a. Are any of the proposed sources of appropriation hydraulically connected to a State Scenic Waterway or its tributaries?
☐ **Yes** ☒ **No**

Hydraulically connected State Scenic Waterway: _____
Comments: _____

E2b. Per ORS 390.835, is the Groundwater Section able to calculate ground water interference with surface water that contributes to a Scenic Waterway?

☐ **Yes. The calculated interference is distributed below:**

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 "No" option below, 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

☐ **No. 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.**

Comments: _____

E3. Other Relevant Rules of the Commission:

Comments: _____

F. RECOMMENDED MODIFICATIONS OR CONDITIONS:

OAR 690-310-0140(2): If the Department determines that the presumption is not established, the Department shall determine whether the proposed use will impair or adversely affect the public welfare, safety and health under ORS 537.525 and may either:
(a) Propose denial of the application upon a finding that the use will impair or adversely affect the public welfare, safety and health; or
(b) Make specific findings to demonstrate that even though the presumption is not established, the proposed use will not impair or adversely affect the public welfare, safety and health and propose approval of the application with appropriate modifications or conditions.

Based on the findings in sections A-D above, the following conditions are recommended if the permit is approved:

7RLN, Large Water Use Reporting

REFERENCES:

Application File: G-19490, G-19464

Conlon, T. D., Wozniak, K. C., Woodcock, D., Herrera, N. B., Fisher, B. J., Morgan, D. S., Lee, K. K., & Hinkle, S. R. (2005). Ground-Water Hydrology of the Willamette Basin, Oregon (C3; USGS Numbered Series Nos. 2005–5168; Scientific Investigations Report, p. 95). U. S. Geological Survey; GW Library. https://pubs.usgs.gov/sir/2005/5168/

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., & Constantz, J. (Eds.). (2003). Heat as a tool for studying the movement of ground water near streams. In *Heat as a tool for studying the movement of ground water near streams* (C1; USGS Numbered Series No. 1260; Circular, Vol. 1260). U.S. Geological Survey; GW Library. https://doi.org/10.3133/cir1260

Herrera, N. B., Burns, E. R., & Conlon, T. D. (2014). Simulation of groundwater flow and the interaction of groundwater and surface water in the Willamette Basin and Central Willamette subbasin, Oregon. In *Simulation of groundwater flow and the interaction of groundwater and surface water in the Willamette Basin and Central Willamette subbasin, Oregon* (C4; USGS Numbered Series Nos. 2014–5136; Scientific Investigations Report, p. 170). U.S. Geological Survey; GW Library. https://doi.org/10.3133/sir20145136

Hunt, B. (2003). Unsteady Stream Depletion when Pumping from Semiconfined Aquifer. *Journal of Hydrologic Engineering*, *8*(1), 12–19. https://doi.org/10.1061/(ASCE)1084-0699(2003)8:1(12)

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* [Oregon State University]. https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/1n79h710k

Oregon Water Resources Department (OWRD). Water Rights Information System. https://apps.wrd.state.or.us/apps/wr/wrinfo/.

Oregon Water Resources Department (OWRD). Groundwater Information System. https://apps.wrd.state.or.us/apps/gw/gw_info/gw_info_report/Default.aspx.

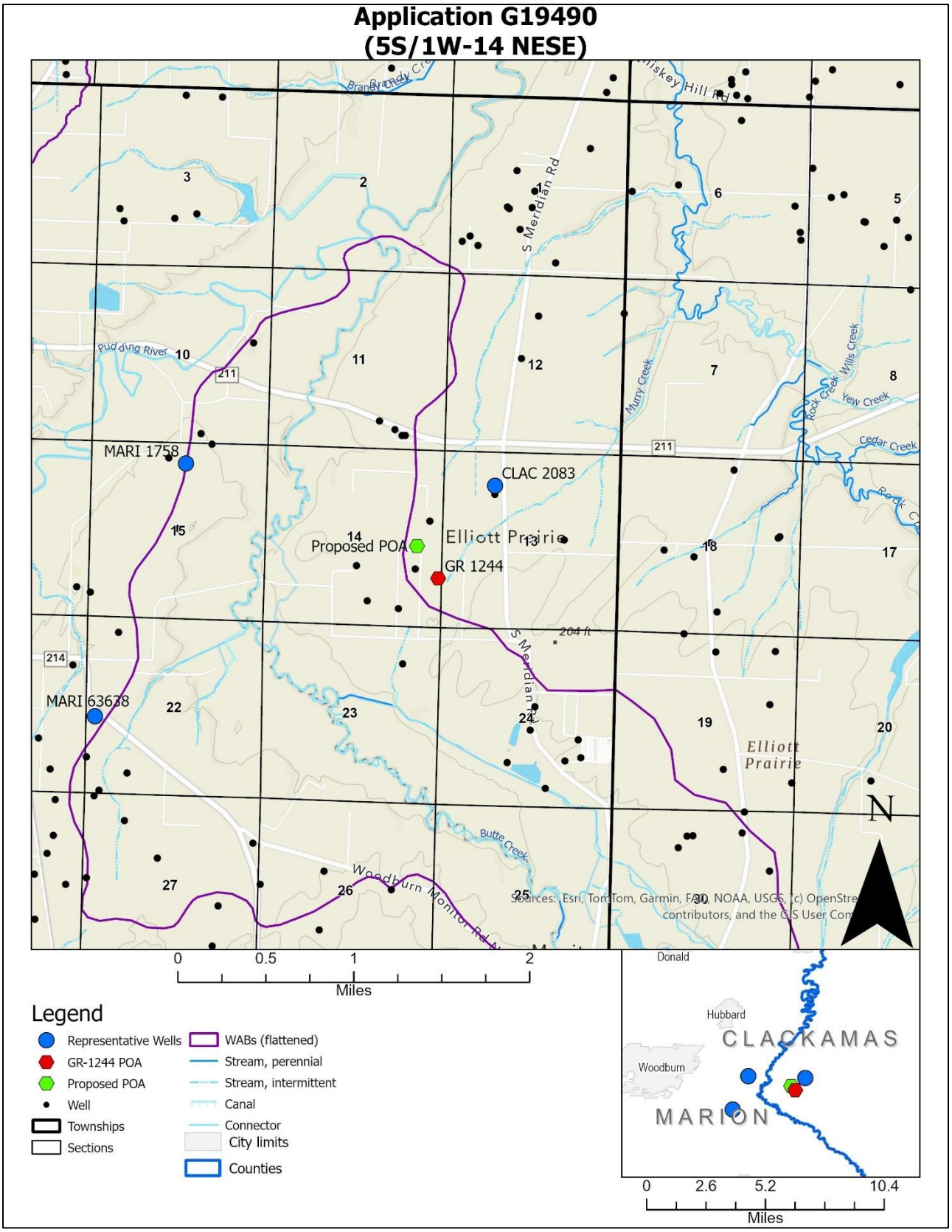
Oregon Water Resources: Pump Tests for CLAC 2083, CLAC 2122, MARI 1759

Theis, C.V., 1941, The effect of a well on the flow of a nearby stream: Am. Geophys. Union Trans., v. 22, pt.3, p. 734-738.

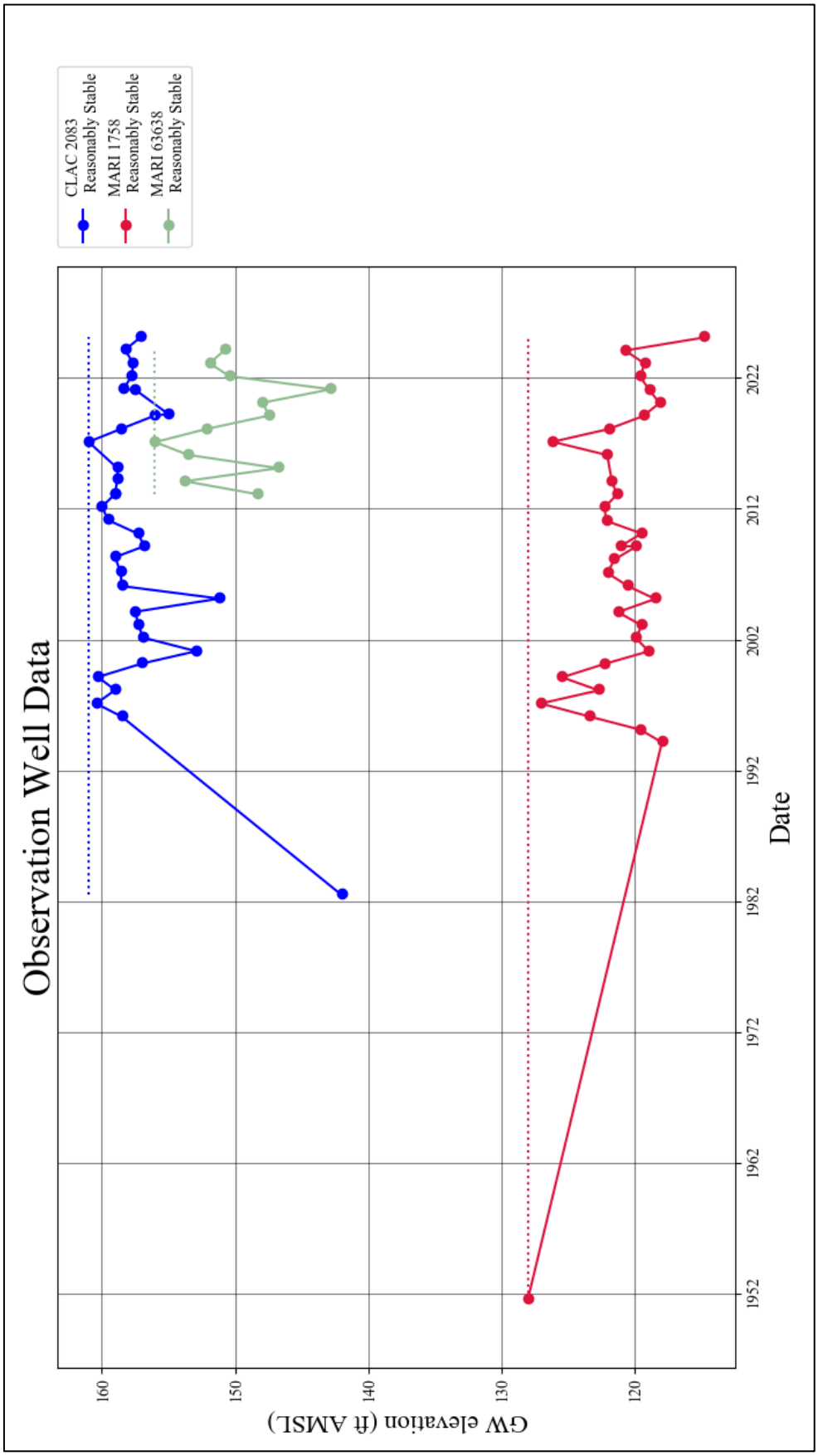
Woodward, D. G., Gannett, M. W., & Vaccaro, J. J. (1998). *Hydrogeologic framework of the Willamette Lowland Aquifer system, Oregon and Washington* (C3; USGS Numbered Series Nos. 1424-B; Professional Paper, p. 82). U. S. Geological Survey; GW Library. https://pubs.er.usgs.gov/publication/pp1424B

ATTACHMENTS:

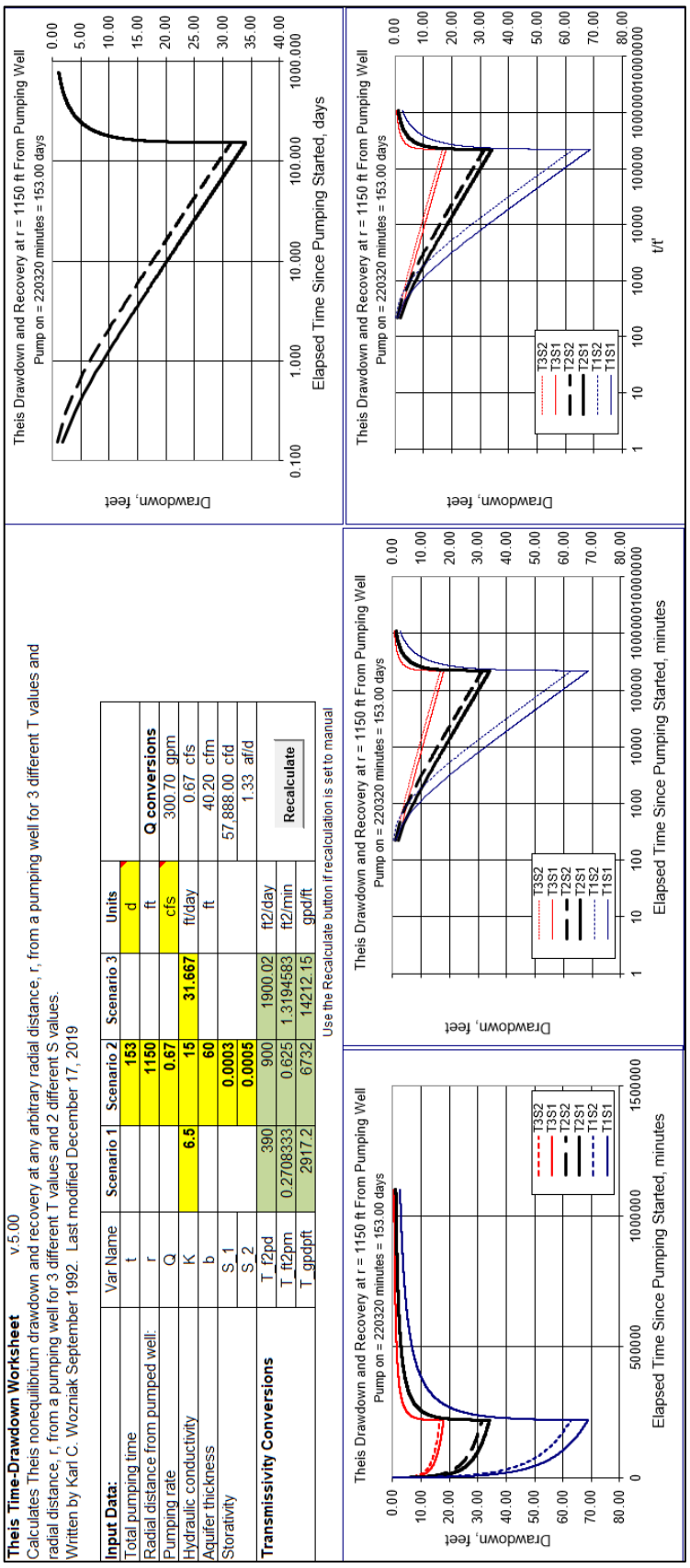
Well Location Map



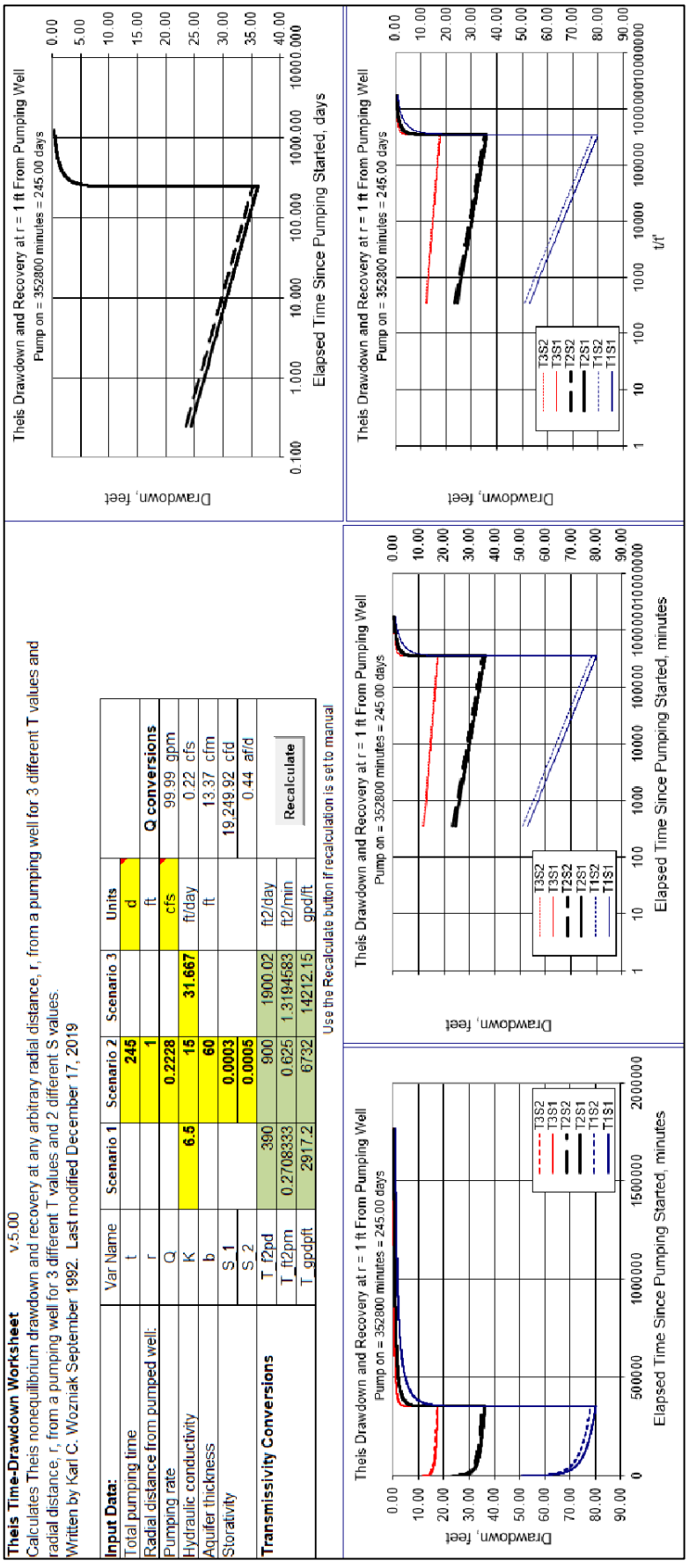
Water-Level Measurements in Nearby Wells



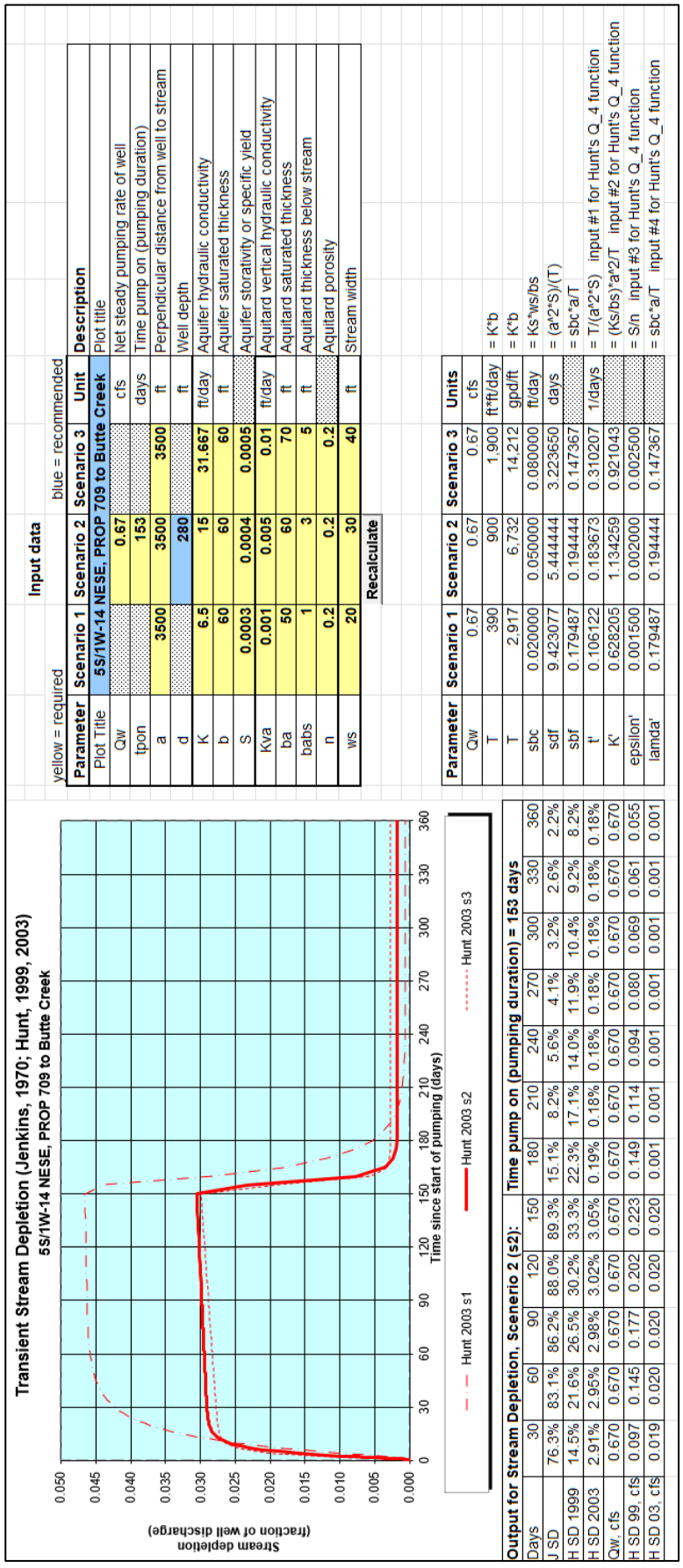
Theis Drawdown Estimates from G-19490 Pumping



Theis Drawdown Estimates from GR-1244 Pumping



Stream Depletion Modeling for Butte Creek



Input data

yellow = required blue = recommended

Parameter	Scenario 1	Scenario 2	Scenario 3	Unit	Description
Plot Title	5S/1W-14 NESE, PROP 709 to Butte Creek				Plot title
Qw		0.67		cfs	Net steady pumping rate of well
tpon		153		days	Time pump on (pumping duration)
a	3500	3500	3500	ft	Perpendicular distance from well to stream
d		280		ft	Well depth
K	6.5	15	31.667	ft/day	Aquifer hydraulic conductivity
b	60	60	60	ft	Aquifer saturated thickness
S	0.0003	0.0004	0.0005		Aquifer storativity or specific yield
Kva	0.001	0.005	0.01	ft/day	Aquitard vertical hydraulic conductivity
ba	50	60	70	ft	Aquitard saturated thickness
babs	1	3	5	ft	Aquitard thickness below stream
n	0.2	0.2	0.2		Aquitard porosity
ws	20	30	40	ft	Stream width

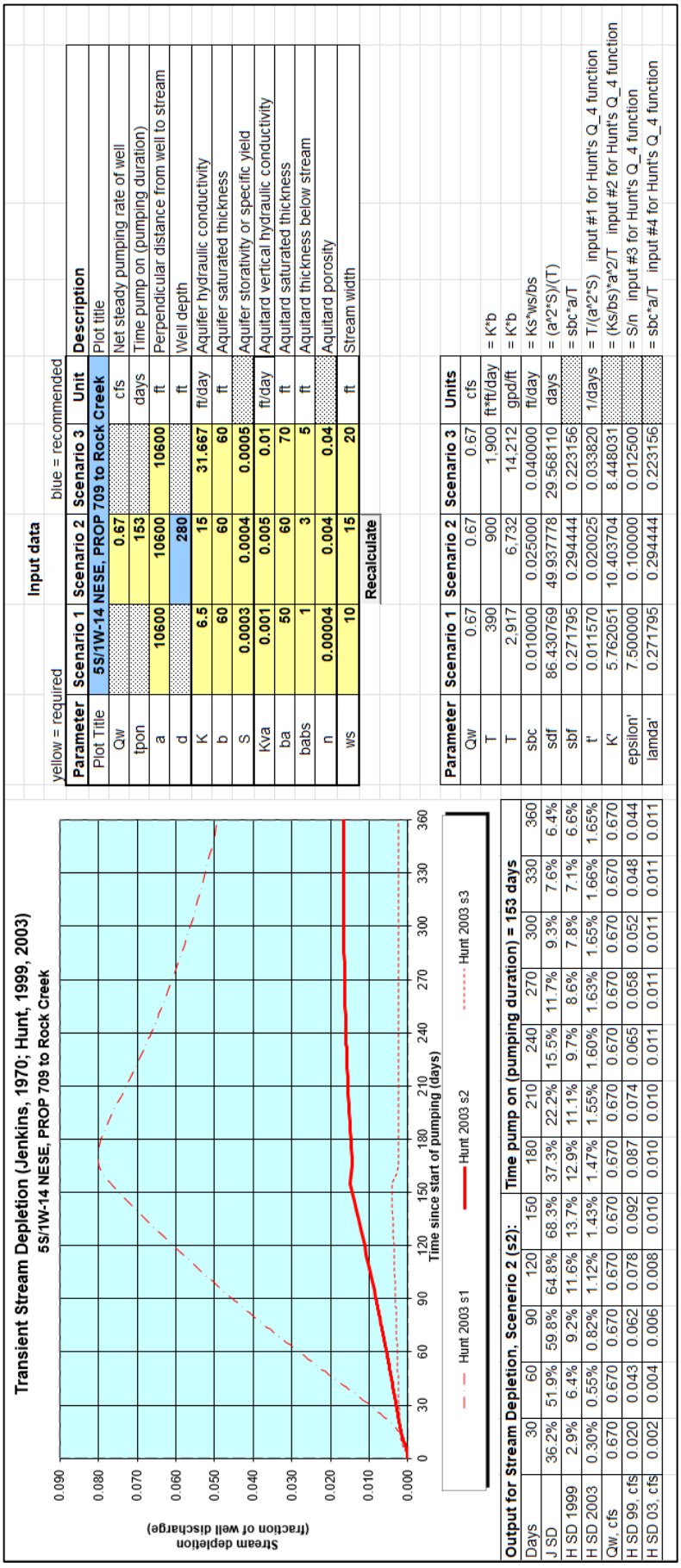
Recalculate

Parameter	Scenario 1	Scenario 2	Scenario 3	Units	
Qw	0.67	0.67	0.67	cfs	
T	390	900	1,900	ft^2/day	= K*b
T	2.917	6.732	14.212	gpd/ft	= K*b
sbc	0.020000	0.050000	0.080000	ft/day	= Ks*ws/bs
sdf	9.423077	5.444444	3.223650	days	= (a^2*S)/(T)
sbf	0.179487	0.194444	0.147367		= sbc*a/T
t'	0.106122	0.183673	0.310207	1/days	= T/(a^2*S) input #1 for Hunt's Q_4 function
K'	0.628205	1.134259	0.921043		= (Ks/bs)*a^2/T input #2 for Hunt's Q_4 function
epsilon'	0.001500	0.002000	0.002500		= S/n input #3 for Hunt's Q_4 function
lamda'	0.179487	0.194444	0.147367		= sbc*a/T input #4 for Hunt's Q_4 function

Output for Stream Depletion, Scenerio 2 (s2): Time pump on (pumping duration) = 153 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	76.3%	83.1%	86.2%	88.0%	89.3%	15.1%	8.2%	5.6%	4.1%	3.2%	2.6%	2.2%
H SD 1999	14.5%	21.6%	26.5%	30.2%	33.3%	22.3%	17.1%	14.0%	11.9%	10.4%	9.2%	8.2%
H SD 2003	2.91%	2.95%	2.98%	3.02%	3.05%	0.19%	0.18%	0.18%	0.18%	0.18%	0.18%	0.18%
Qw, cfs	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670
H SD 99, cfs	0.097	0.145	0.177	0.202	0.223	0.149	0.114	0.094	0.080	0.069	0.061	0.055
H SD 03, cfs	0.019	0.020	0.020	0.020	0.020	0.001	0.001	0.001	0.001	0.001	0.001	0.001

Stream Depletion Modeling for Rock Creek



Parameter	Scenario 1	Scenario 2	Scenario 3	Unit	Description
Plot Title	5S/1W-14 NESE, PROP 709 to Rock Creek				Plot title
Qw		0.67		cfs	Net steady pumping rate of well
tpon		153		days	Time pump on (pumping duration)
a	10600	10600	10600	ft	Perpendicular distance from well to stream
d		280		ft	Well depth
K	6.5	15	31.667	ft/day	Aquifer hydraulic conductivity
b	60	60	60	ft	Aquifer saturated thickness
S	0.0003	0.0004	0.0005		Aquifer storativity or specific yield
Kva	0.001	0.005	0.01	ft/day	Aquitard vertical hydraulic conductivity
ba	50	60	70	ft	Aquitard saturated thickness
babs	1	3	5	ft	Aquitard thickness below stream
n	0.00004	0.004	0.04		Aquitard porosity
ws	10	15	20	ft	Stream width

Parameter	Scenario 1	Scenario 2	Scenario 3	Units	
Qw	0.67	0.67	0.67	cfs	
T	390	900	1,900	ft*ft/day	= K*b
T	2,917	6,732	14,212	gpd/ft	= K*b
sbc	0.010000	0.025000	0.040000	ft/day	= Ks*ws/bs
sdf	86.430769	49.937778	29.568110	days	= (a^2*S)/(T)
sbf	0.271795	0.294444	0.223156		= sbc*a/T
t'	0.011570	0.020025	0.033820	1/days	= T/(a^2*S) input #1 for Hunt's Q_4 function
K'	5.762051	10.403704	8.448031		= (Ks/bs)*a^2/T input #2 for Hunt's Q_4 function
epsilon'	7.500000	0.100000	0.012500		= S/n input #3 for Hunt's Q_4 function
lamda'	0.271795	0.294444	0.223156		= sbc*a/T input #4 for Hunt's Q_4 function

Output for Stream Depletion, Scenerio 2 (s2):	Time pump on (pumping duration) = 153 days											
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	36.2%	51.9%	59.8%	64.8%	68.3%	37.3%	22.2%	15.5%	11.7%	9.3%	7.6%	6.4%
H SD 1999	2.9%	6.4%	9.2%	11.6%	13.7%	12.9%	11.1%	9.7%	8.6%	7.8%	7.1%	6.6%
H SD 2003	0.30%	0.55%	0.82%	1.12%	1.43%	1.47%	1.55%	1.60%	1.63%	1.65%	1.66%	1.65%
Qw, cfs	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670	0.670
H SD 99, cfs	0.020	0.043	0.062	0.078	0.092	0.087	0.074	0.065	0.058	0.052	0.048	0.044
H SD 03, cfs	0.002	0.004	0.006	0.008	0.010	0.010	0.010	0.011	0.011	0.011	0.011	0.011

Water Availability

Select any Watershed for Details

	Nesting Order	Watershed ID #	Stream Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sto
Select	1	181	WILLAMETTE R> COLUMBIA R- AT MOUTH	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Select	2	69796	MOLALLA R> WILLAMETTE R- AT MOUTH	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes
Select	3	69998	PUDDING R> MOLALLA R- AT MOUTH	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes
Select	4	151	PUDDING R> MOLALLA R- AB MILL CR	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes
Select	**5**	**69799**	**BUTTE CR> PUDDING R- AT MOUTH**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**	**No**	**No**	**No**	**Yes**	**Yes**

Download Data (Text - Formatted , Text - Tab Delimited , Excel)

PUDDING R > MOLALLA R - AB MILL CR
WILLAMETTE BASIN

Water Availability as of 8/29/2025

Watershed ID #: 151 (Map)
Date: 8/29/2025

Exceedance Level: 80%
Time: 1:25 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	1,040.00	125.00	915.00	0.00	80.00	835.00
FEB	1,180.00	115.00	1,070.00	0.00	80.00	985.00
MAR	1,010.00	76.60	933.00	0.00	80.00	853.00
APR	787.00	52.50	735.00	0.00	80.00	655.00
MAY	425.00	51.00	374.00	0.00	80.00	294.00
JUN	224.00	73.20	151.00	0.00	50.00	101.00
JUL	109.00	115.00	-6.28	0.00	40.00	-46.30
AUG	71.00	94.50	-23.50	0.00	36.00	-59.50
SEP	67.30	53.60	13.70	0.00	36.00	-22.30
OCT	91.60	11.50	80.10	0.00	50.00	30.10
NOV	363.00	48.60	314.00	0.00	80.00	234.00
DEC	957.00	118.00	839.00	0.00	80.00	759.00
ANN	706,000.00	56,400.00	650,000.00	0.00	46,500.00	606,000.00

BUTTE CR > PUDDING R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 8/29/2025

Watershed ID #: 69799 (Map)
Date: 8/29/2025

Exceedance Level: 80%
Time: 1:26 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	169.00	3.81	165.00	0.00	75.00	90.20
FEB	181.00	3.64	177.00	0.00	75.00	102.00
MAR	172.00	2.73	169.00	0.00	75.00	94.30
APR	142.00	2.28	140.00	0.00	75.00	64.70
MAY	89.20	5.63	83.60	0.00	75.00	8.57
JUN	39.00	10.30	28.70	0.00	75.00	-46.30
JUL	15.10	17.10	-2.01	0.00	25.00	-27.00
AUG	9.90	13.70	-3.81	0.00	12.00	-15.80
SEP	9.78	7.03	2.75	0.00	20.00	-17.20
OCT	15.10	1.01	14.10	0.00	75.00	-60.90
NOV	66.00	1.86	64.10	0.00	75.00	-10.90
DEC	170.00	3.96	166.00	0.00	75.00	91.00
ANN	121,000.00	4,430.00	117,000.00	0.00	44,100.00	79,000.00