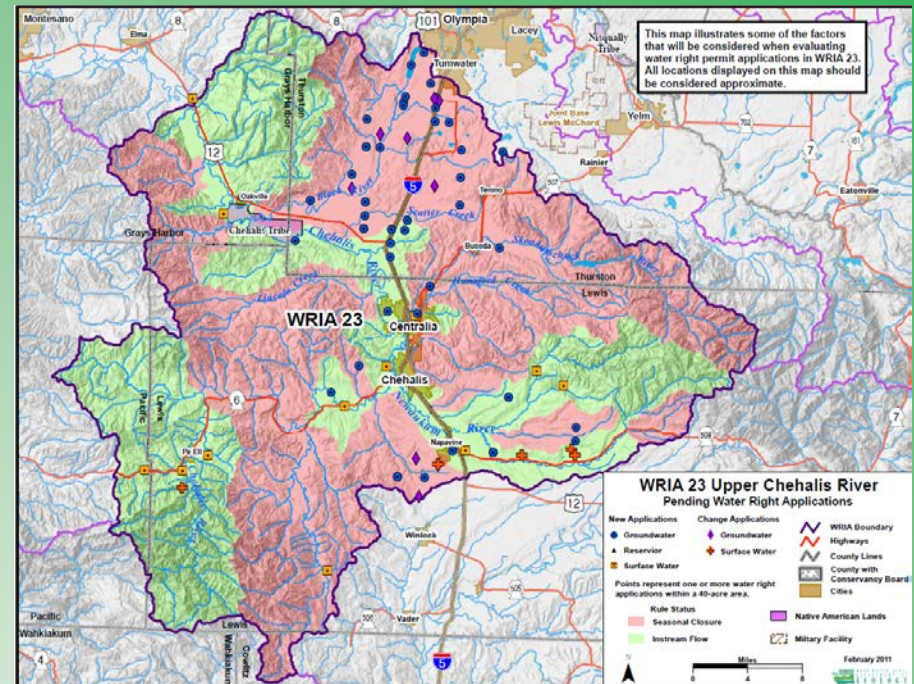
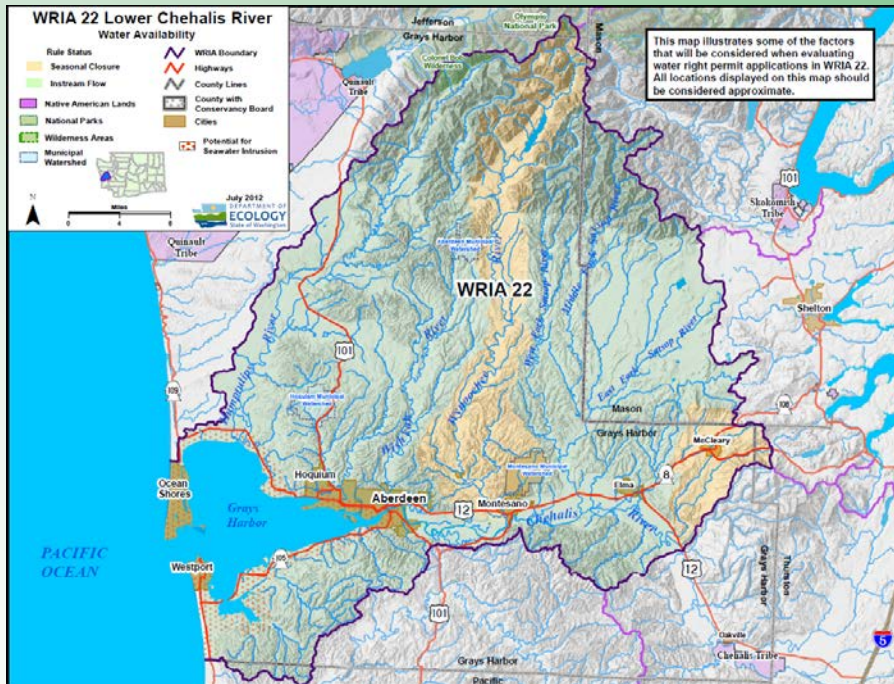


Impacts of Permit-Exempt Wells



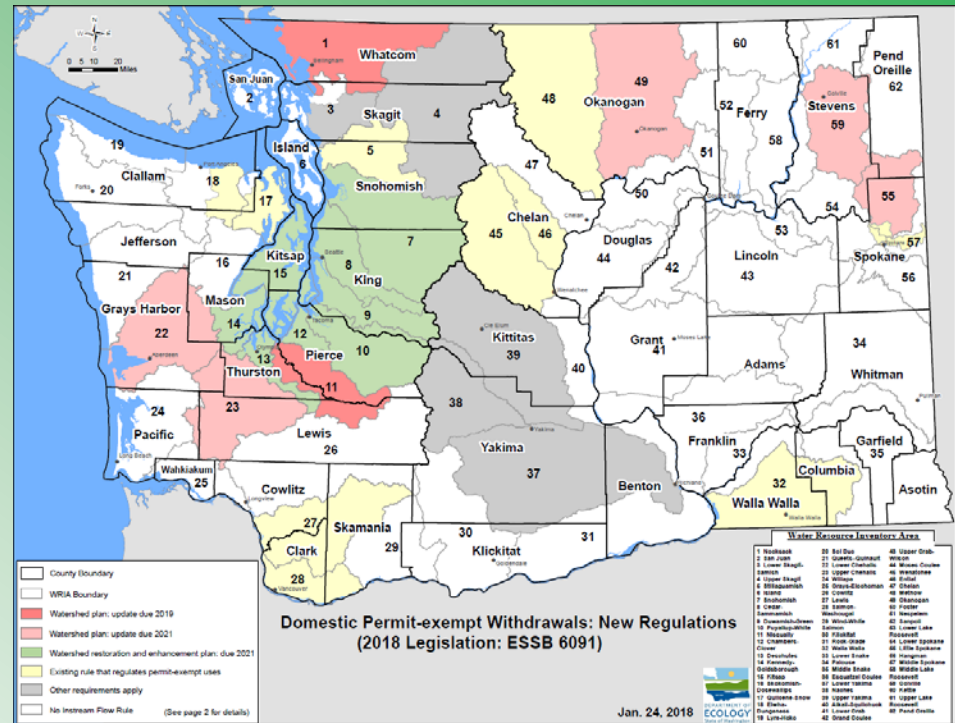
Dave Nazy, LHG
August 24, 2018

Impacts of Permit-Exempt Wells

- Introduction
- ESSB 6091
- Example Impacts Calculation
- Basin Estimate & 20-year Projections
- Offsetting Impacts & Net Ecological Benefits
- Summary

ESSB 6091

- **Section 202**
 - Watershed plan update by 2/1/2021
 - 3000 GPD annual average limit
 - P-E wells limitations still apply
 - \$500 fee for each building permit
 - Only domestic uses affected
 - One project = One P-E use
- **Watershed Plan Update**
 - Limited to objectives of ESSB 6091
 - Impacts of P-E wells (consumption)
 - Evidence of conservation
 - ID projects to improve watershed health
- **Watershed Plan Implementation**
 - Track building permits using P-E wells
 - Construct projects to offset impacts



Estimating Impacts

- Total Use per Building Permit
 - Indoor use
 - Outdoor use
- Consumptive Use per Building Permit
 - Indoor use
 - Outdoor use
- How Many Building Permits?
 - OFM population
 - OFM growth rate
 - Building permit data
 - Well construction data
- 20-Year Projections
- WRIA vs. Sub-Basin



ESSB 6091

Recommendations for Water Use Estimates

This document provides the Department of Ecology's recommendations for estimating water use by permit-exempt domestic wells in compliance with the provisions in Engrossed Substitute Senate Bill (ESSB) 6091. The methods described are not rigid requirements, and planning units and watershed restoration and enhancement committees can modify these methods based on credible, location-specific information with Ecology concurrence. Ultimately, restoration plans and plan updates will be judged by two tests: that the total quantity of water consumed by permit-exempt domestic wells is offset, and that a "net ecological benefit" is provided over the subsequent 20 years. Any methods used must be sufficient to allow Ecology to make that determination.

General approach

Permit-exempt domestic wells may be used to supply houses, and in some cases other Equivalent Residential Units (ERUs) such as small apartments. For the purposes of this document, the terms "house" or "home" refer to any permit-exempt domestic groundwater use, including other ERUs.

Interpretation of Law Requirements

Sections 202 and 203 of ESSB 6091 contain several provisions regarding how watershed restoration and enhancement plans and updated watershed plans are to offset or account for projected water use. Specifically, sections 202(4)(b) and 203 (3)(b) state,

At a minimum, the [watershed] plan must include those actions that the planning units determine to be necessary to offset potential impacts to instream flows associated with permit-exempt domestic water use. The highest priority recommendations must include replacing the quantity of consumptive water use during the same time as the impact and in the same basin or tributary. Lower priority projects include projects not in the same basin or tributary and projects that replace consumptive water supply impacts only during critical flow periods.

Timeframe: To evaluate and offset potential consumptive impacts from permit-exempt domestic wells, a timeframe over which new domestic use will be considered must be designated. Since a "subsequent twenty years" is referenced throughout other sections of ESSB 6091 (such as sections 202(4)(c), 203 (3)(c), 203(3)(d), and 203(3)(e)), Ecology interprets the timeframe for 202(4)(b) and 203 (3)(b) to be the next twenty years.

Scope of "water use": Ecology interprets all projected water use referenced in sections 202(4)(c), 203(3)(c), 203(3)(d), and 203(3)(e) to refer to only consumptive permit-exempt domestic groundwater water use (as opposed to water use associated with municipalities, for example). Ecology's [Initial Policy Interpretations](#) document provides additional explanation.

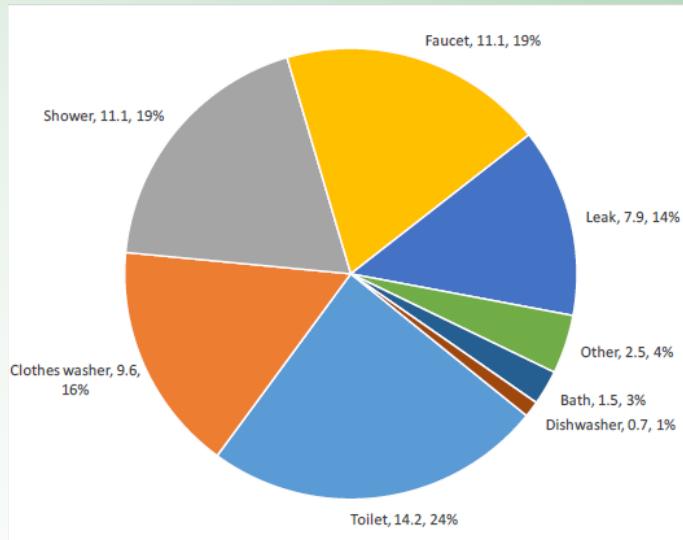
Consumptive use: Water Resources Program Policy 1020 (1991) states, "Consumptive water use causes diminishment of the source at the point of appropriation," and that, "Diminishment is defined as to make smaller or less in quantity, quality, rate of flow, or availability." This guidance document is focused on estimating only quantity diminishment, so for the purposes described here, consumptive water use is

Page 1
March, 2018

Indoor Water Use

- Indoor Use

- Per capita use – 60 GPD (Ecology guidance)
- People per home ~ 2.5 (US Census data)
- Total indoor use = 150 GPD

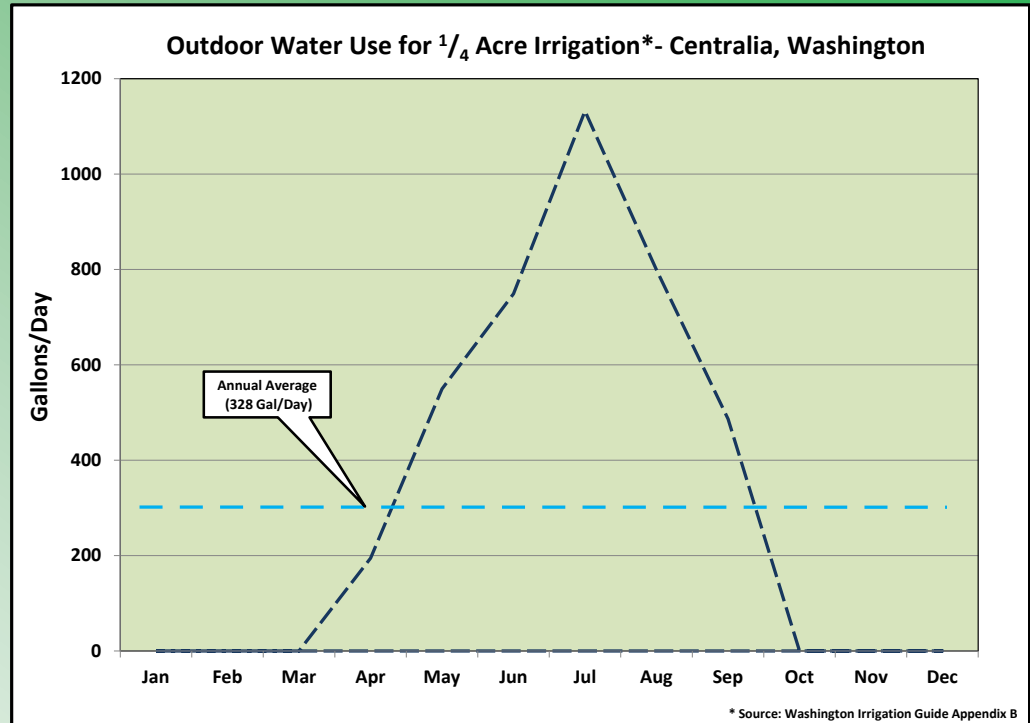


DeOreo, E.M., P.W. Mayer, Davis, B. Dziegielewski, and J.C. Kiefer, 2016, Residential End Uses of Water, Version 2, Denver, CO: Water Research Foundation.

Outdoor Water Use

Outdoor Use

- Washington Irrigation Guide
- Pasture/Turf water duty
- Area irrigated (e.g., ¼ acre)
- Peak use = 1132 GPD in July
- Average use = 328 GPD

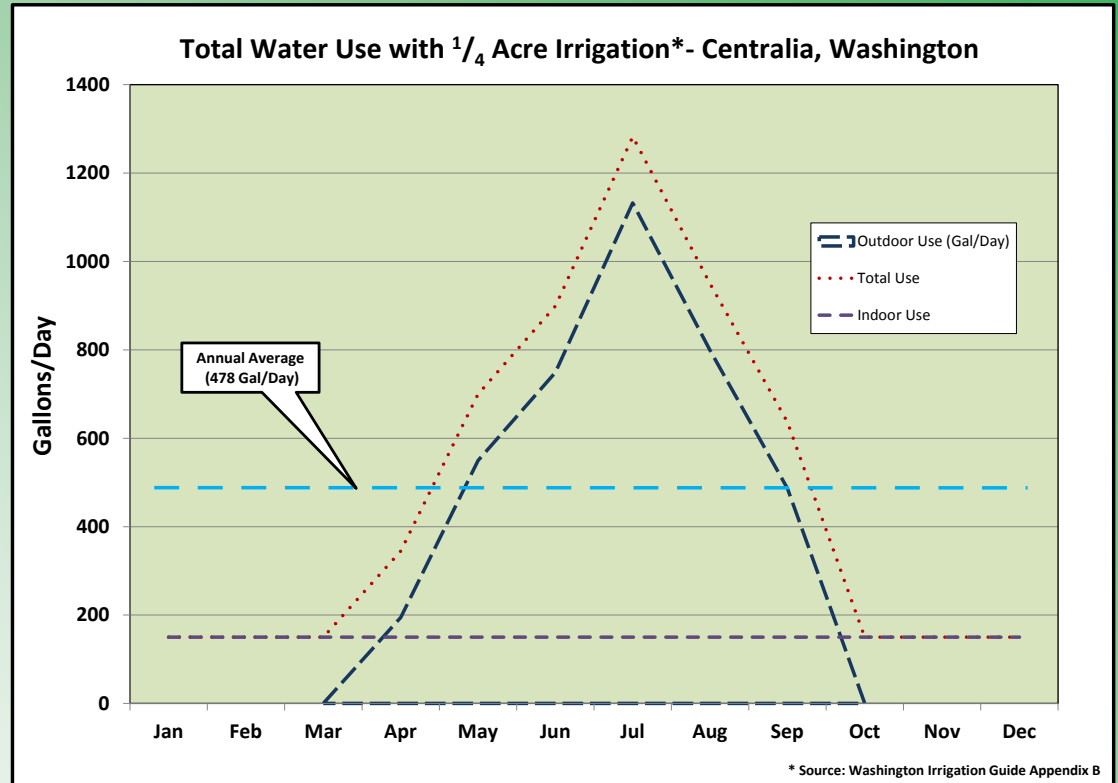


CENTRALIA 46.72 LATITUDE		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
MEAN TEMPERATURE (F)		39.3	42.4	45.5	50.3	56.0	60.7	64.9	64.8	60.5	52.7	44.9	40.9	
TOTAL PRECIPITATION (IN)		6.60	5.26	4.76	2.92	2.06	1.80	0.80	1.16	2.07	4.23	6.80	7.51	46.05
REFERENCE CROP ET (IN)		0.11	0.61	1.34	2.90	4.19	4.91	6.11	4.73	3.79	1.61	0.35	0.00	30.65
EFFECTIVE PRECIP (IN)		0.11	0.61	1.32	1.90	1.47	1.36	0.64	0.85	1.45	1.58	0.35	0.00	11.7
PASTURE/TURF														
BEG END		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	SEASON
CIR 2/11 12/31		0.00	0.00	0.00	0.86	2.51	3.31	5.17	3.65	2.15	0.00	0.00	0.00	17.65
CU		0.00	0.35	1.27	2.76	3.98	4.66	5.80	4.49	3.60	1.53	0.33	0.00	28.79

Total Use with $\frac{1}{4}$ Acre Irrigation

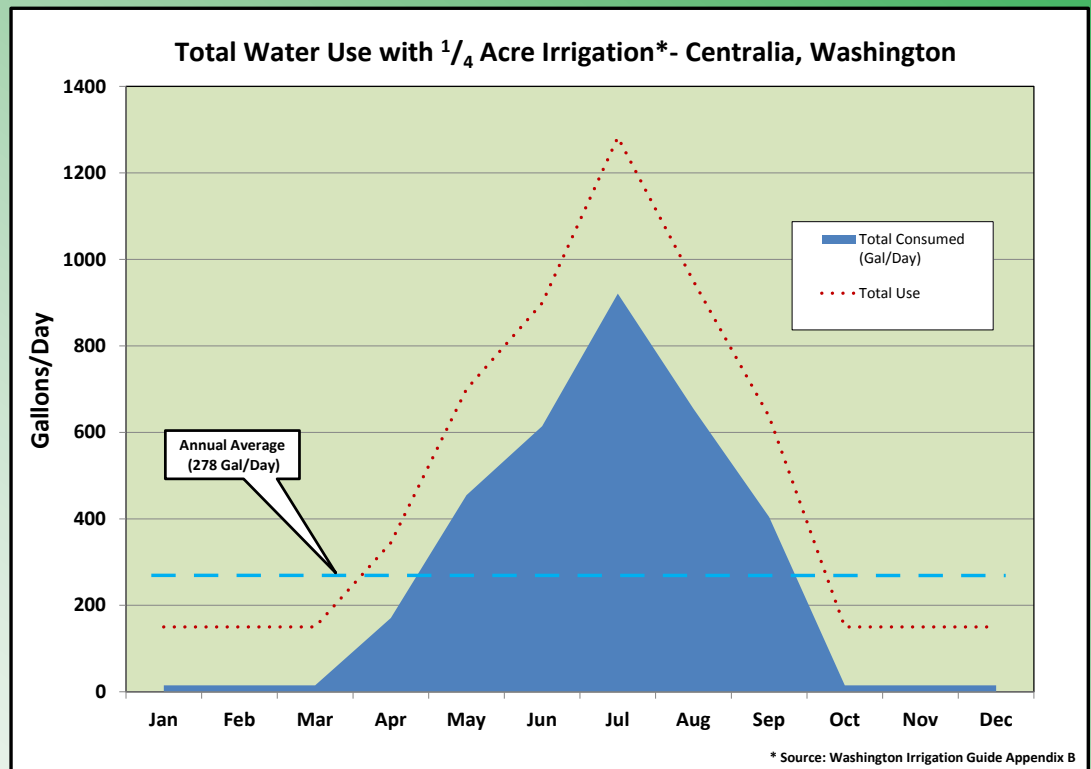
- **Total Use**

- Indoor use = 150 GPD
- Outdoor use variable, average 328 GPD
- Peak use = 1282 GPD
- Annual average = 478 GPD
- Annual total = 0.54 Acre-feet
- 350 GPD ave. = $\sim \frac{1}{6}$ acre
- 3000 GPD ave. = ~ 6 acres



Impact with 1/4 Acre Irrigation

- **Indoor Consumption**
 - 10 % = 15 GPG
- **Outdoor Consumption**
 - 80 % = 0 – 906 GPG
 - Annual average = 263 GPD
- **Total Consumption**
 - Annual average = 278 GPG
 - Annual total = 0.31 Acre-feet



Potential Range of Impacts

Total Household Water Use in Gallons per Day

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total (Gallons)	Annual Daily Ave (GPD)	Annual Total (Acre-Ft)
Indoor Use			150	150	150	150	150	150	150	150	150	150	150	150	54,788	150	0.17
Indoor + Outdoor Water Use	Centralia	1/12 Acre	150	150	150	215	333	400	527	416	312	150	150	150	94,877	260	0.29
		1/4 Acre	150	150	150	345	700	899	1,282	949	637	150	150	150	174,756	478	0.54
		1/2 Acre	150	150	150	539	1,249	1,648	2,414	1,749	1,123	150	150	150	294,574	806	0.90
	Aberdeen	1/12 Acre	150	150	150	150	205	266	345	276	164	150	150	150	70,483	193	0.22
		1/4 Acre	150	150	150	150	314	498	735	527	193	150	150	150	101,575	278	0.31
		1/2 Acre	150	150	150	150	478	847	1,319	903	236	150	150	150	148,212	406	0.45

Total Household Consumptive Water Use in Gallons per Day

			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total (Gallons)	Annual Daily Ave (GPD)	Annual Total (Acre-Ft)
Indoor Use Only			15	15	15	15	15	15	15	15	15	15	15	15	5,479	15	0.02
Indoor + Outdoor Water Use	Centralia	1/12 Acre	15	15	15	67	162	215	317	228	145	15	15	15	37,445	103	0.11
		1/4 Acre	15	15	15	171	455	614	921	654	404	15	15	15	101,348	278	0.31
		1/2 Acre	15	15	15	326	894	1,213	1,826	1,294	793	15	15	15	197,203	540	0.61
	Aberdeen	1/12 Acre	15	15	15	15	59	108	171	115	26	15	15	15	17,930	49	0.06
		1/4 Acre	15	15	15	15	146	294	483	316	49	15	15	15	42,804	117	0.13
		1/2 Acre	15	15	15	15	278	573	951	618	84	15	15	15	80,114	219	0.25

20 Year Projection

- **Well Construction Data**
 - Ecology database
 - 46 wells/year 2010-2017 in WRIA 22
 - 118 wells/year 2010-2017 in WRIA 23
 - Uncertainty and not 1:1
- **OFM Population Data**
 - Low, medium, high growth rates
 - Difficult to match to new P-E uses
- **Building Permit Data**
 - Most reliable
 - Matched to parcel
 - Fees associated with ESSB 6091
 - Can be used to quantify by sub-basin

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State of Washington

Home Map Search Text Search Forms Site Info Contact Us Water Portal

TEXT SEARCH RESULTS

Back New Search

- **Search Criteria Used:** WRIA: [Upper Chehalis](#), Completed From: [01/01/2010](#), Completed To: [12/31/2017](#), Well Log Type: [Water Well Reports Only](#)
- There are **950** Well Reports that match your search criteria.
- The results are sorted by [Well Owner Name](#)

[Download all 950 images](#) | [Download all 950 data records](#) | [Print this page](#) | [Help](#)

Displaying 1 - 20 of **950** well report results Sort results by [Well Owner Name](#)

1.	ABE MEYER - { View PDF } Public Land Survey: SW, SW, S-14, T-13-N, R-03-W , Tax Parcel Number: 018829002002 County: Lewis , Well Address: 0 COUSINS RD Well Report ID: 1641062 , Well Tag ID: BKJ928 , Notice of Intent Number: WE27854 Well Diameter: 6 in. , Well Depth: 200 ft. Well Type: Water Well Completion Date: 06/08/2017 , Well Report Received Date: 07/18/2017
2.	Addison DeBoer - { View PDF } Public Land Survey: NW, NW, S-04, T-13-N, R-03-W , Tax Parcel Number: 018615004000 County: Lewis , Well Address: 123 Deboer Dr Well Report ID: 938206 , Well Tag ID: BHV029 , Notice of Intent Number: WE18999 Well Diameter: 6 in. , Well Depth: 148 ft. Well Type: Water Well Completion Date: 08/28/2014 , Well Report Received Date: 09/22/2014
3.	Alan Heuer-Blodgett - { View PDF } Public Land Survey: NW, NE, S-18, T-16-N, R-01-W , Tax Parcel Number: 11618110409 County: Thurston , Well Address: 14420 Simon Dew Ln SE Well Report ID: 1107349 , Well Tag ID: BIG159 , Notice of Intent Number: WE22634 Well Diameter: 6 in. , Well Depth: 155 ft. Well Type: Water Well Completion Date: 12/04/2015 , Well Report Received Date: 12/21/2015

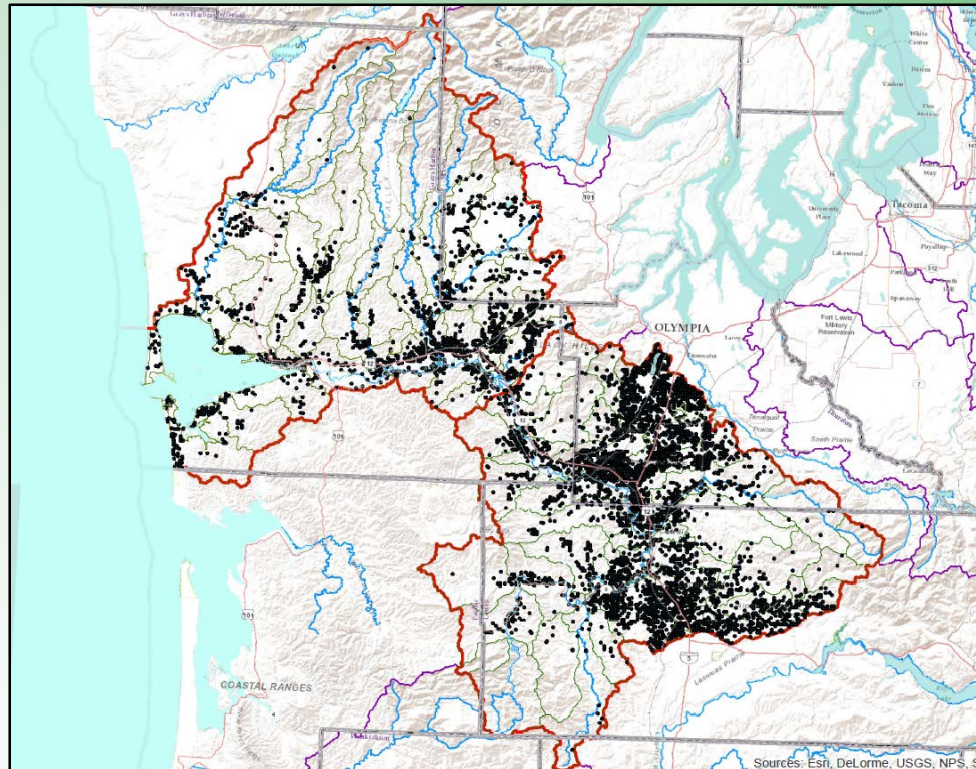
Impacts of Permit-Exempt Wells

Domestic Consumptive Use (Acre-Feet)

Basin	Building Permits/Yr*	Indoor Only		Indoor + $\frac{1}{12}$ acre		Indoor + $\frac{1}{4}$ acre		Indoor + $\frac{1}{2}$ acre	
		Annual	20 Year	Annual	20 Year	Annual	20 Year	Annual	20 Year
Upper Chehalis	100	2.00	40.00	11.00	220.00	31.00	620.00	61.00	1,220.00
Lower Chehalis	39	0.78	15.60	2.34	46.80	5.07	101.40	9.75	195.00

* 85% of number of water wells constructed per year (2010-2017)

492 Acre-Feet/Yr = 0.68 cfs = 306 GPM



Offsetting Impacts & Net Ecological Benefits



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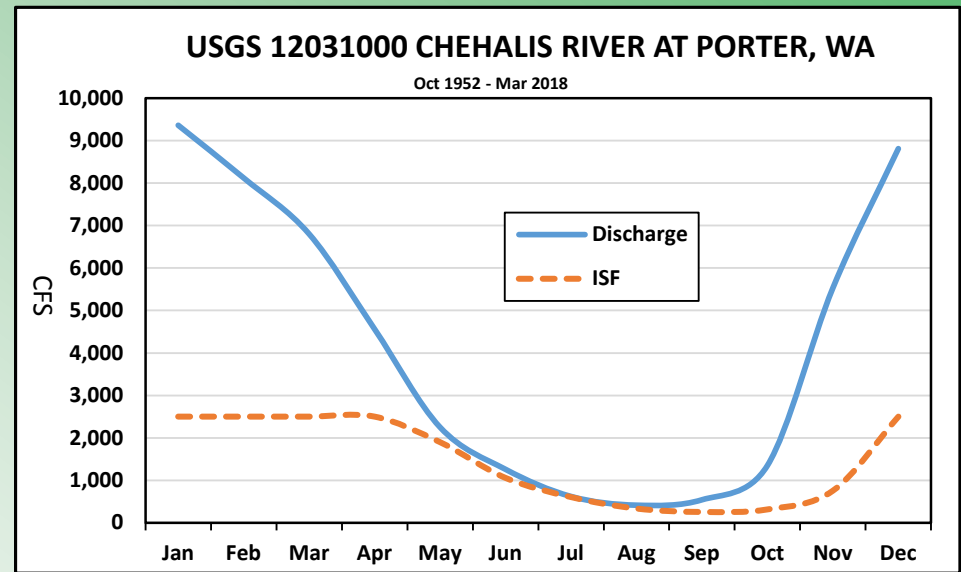
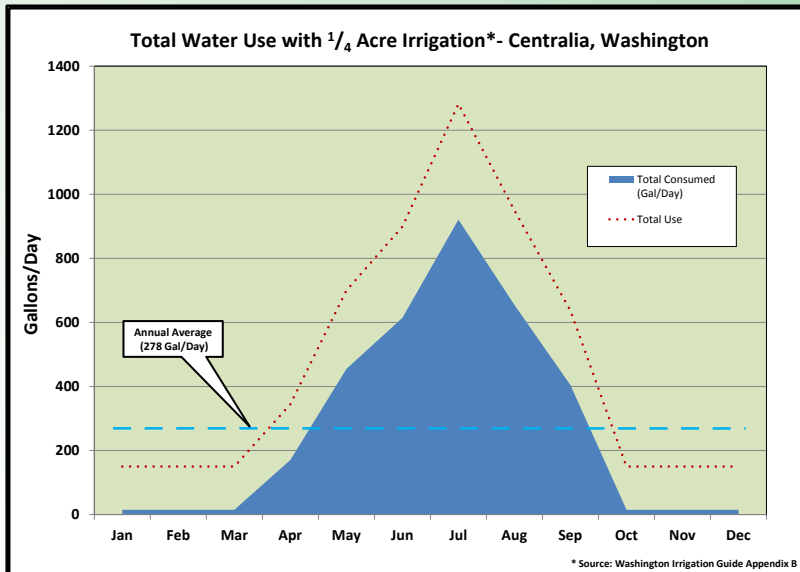
Interim Guidance for Determining Net Ecological Benefit

*for streamflow restoration planning
and water permit mitigation pilots
under the 2018 Streamflow
Restoration Act*

A Net Ecological Benefit determination means anticipated benefits to instream resources from actions designed to restore streamflow will offset and exceed the projected impacts to instream resources from new water use.

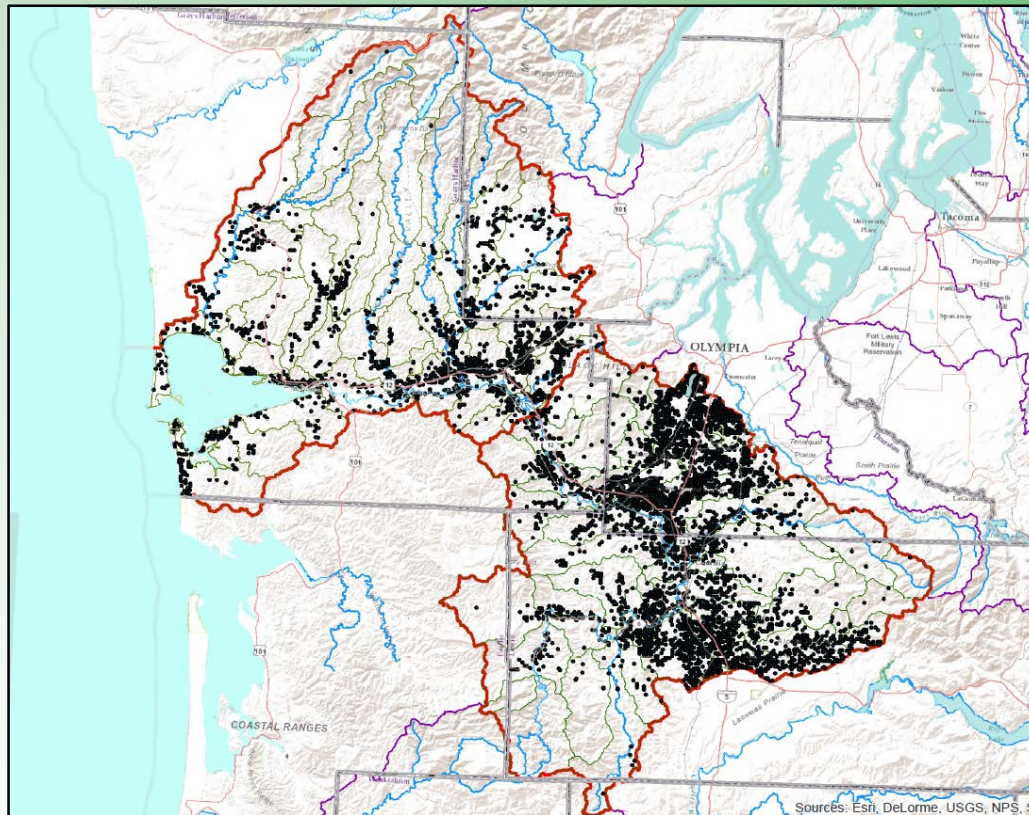
Offsetting Impacts & Net Ecological Benefits

- Highest priority are projects that replace consumptive domestic water use impacts during the same time and in the same subbasin as the impacts occur.
- Lower priority are projects that replace consumptive domestic water use impacts elsewhere within the WRIA or only during critical flow periods.



Offsetting Impacts & Net Ecological Benefits

- Highest priority are projects that replace consumptive domestic water use impacts during the same time and in the same subbasin as the impacts occur.
- Lower priority are projects that replace consumptive domestic water use impacts elsewhere within the WRIA or only during critical flow periods.



Summary

- **ESSB 6091**
 - Plan update due February 1, 2021
 - Quantify P-E domestic impacts (consumptive use)
 - Identify timing and location of impacts
 - ID and implement projects to offset impacts
- **Quantifying Impacts**
 - Ecology guidance
 - Building permit data
 - Quantify by sub-basin
 - 20-year projection

Domestic Consumptive Use (Acre-Feet)									
Basin	Building Permits/Yr*	Indoor Only		Indoor + $\frac{1}{12}$ acre		Indoor + $\frac{1}{4}$ acre		Indoor + $\frac{1}{2}$ acre	
		Annual	20 Year	Annual	20 Year	Annual	20 Year	Annual	20 Year
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Lower Chehalis	39	0.78	15.60	2.34	46.80	5.07	101.40	9.75	195.00

* 85% of number of water wells constructed per year (2010-2017)

Summary

- **Offsetting Impacts and Net Ecological Benefits**
 - Ecology guidance
 - Mitigation must replace consumptive impacts
 - Offset & exceed potential new P-E impacts to instream resources
 - Highest priority is in-kind mitigation (same time and sub-basin)
 - Lower priority is elsewhere in basin or only during low flow periods
 - Lowest priority is non-water projects to improve the composition, structure, and function of aquatic systems



Summary

- **Recommendations**
 - Coordination among counties
 - Quantify impacts by sub-basin
 - Identify mitigation alternatives
 - Water acquisitions and water right changes
 - Storage alternatives
 - Managed aquifer recharge
 - Stormwater management
 - Floodplain restoration/levee removal
 - Streamflow augmentation
 - Conservation
 - Riparian and fish habitat improvement
 - Screen and prioritize mitigation alternatives
 - Implement streamflow restoration projects