Duwamish-Green (WRIA 9) WREC

Summary of Technical Work

Updated: February 21, 2020

This document provides a summary of the key technical components of the WRIA 9 Watershed Restoration and Enhancement Plan: subbasins, growth projections, consumptive use, project and action identification, adaptive management and implementation (optional), and net ecology benefit evaluation (optional). This document summarizes the methods, results, Committee decision, and the status of the technical memos. For more information on methods and results, see the technical memos.

	Results	Committee Decision	Technical Memo Status
Subbasin	12 subbasins	- Decision at July WREC meeting	Final draft 2/21/20
Growth Projection	632 new PE wells	- Discussion at August and September WREC meeting. - Agreed to move forward without a vote.	Final draft 2/21/20
Consumptive Use	247.7 – 456.9 acre feet/year	- Discussion at October, November and January WREC meeting. - Requires additional discussion.	Final draft 2/21/20
Projects & Actions			
Adaptive Management & Implementation			
Net Ecological Benefit			

Subbasins

Status

The WRIA 9 WREC approved the subbasin delineations at the July 23, 2019 meeting.

Background

Dividing the Duwamish-Green WRIA into subbasins is an essential step in developing a plan that complies with the law. RCW 90.94.030(3)(b) states "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." The Final Guidance for Determining Net Ecological Benefit (Final NEB Guidance) (GUID-2094; Ecology 2019) states that, "Planning groups must divide the WRIA into suitably sized subbasins to allow meaningful analysis of the relationship between new consumptive use and offsets. Subbasins will help the planning groups understand and describe location and timing of projected new consumptive water use, location and timing of impacts to instream resources, and the necessary scope, scale, and anticipated benefits of projects. Planning at the subbasin scale will also allow planning groups to consider specific reaches in terms of documented presence (e.g., spawning and rearing) of salmonid species listed under the federal Endangered Species Act."

Methods

The technical workgroup used existing King County drainage basins and applied the following guiding principles to develop subbasin delineations:

- Use hydrologic boundaries.
- Combine King County drainage basins within the Urban Growth Area, with lower expected growth of new homes using permit-exempt domestic wells.
- Delineate subbasins at a finer scale in the area of the watershed expected to have the most homes using permit-exempt domestic wells (the Middle Green River).

Results

WRIA 9 is divided into 12 subbasins, described below and shown in Figure 1.

- Central Puget Sound: The Lower Puget Sound tributaries are combined. This includes the following King County drainage basins:
    - Lower Puget Sound (LPS) Seattle, Seola Creek, Salmon Creek, LPS Burien South, LPS Burien North, Miller Creek, LPS Normandy Park, Des Moines Creek and LPS Des Moines/Federal Way.
- Duwamish: Longfellow Creek and Duwamish River drainage basins are combined into one subbasin.
- Lower Green: Lower Green River West, Black River, Mill Creek, and Lower Green River East drainage basins are combined into one subbasin.
- Soos Creek: Soos Creek is one subbasin.
- Jenkins Creek: Jenkins Creek is one subbasin.
- Covington Creek: Covington Creek is one subbasin.
- Lower Middle Green: The Middle Green River drainage basin below the confluence with Newaukum Creek.

- Middle Green: The Middle Green River drainage basin between the confluence with Newaukum Creek and the confluence with Franklin Creek.
- Upper Middle Green: The Middle Green River drainage basin between the confluence with Franklin Creek and Howard Hansen Dam.
- Newaukum: Newaukum Creek is one subbasin.
- Coal Deep: Coal Creek and Deep Creek are combined.
- Upper Green: Upper Green River is one subbasin.

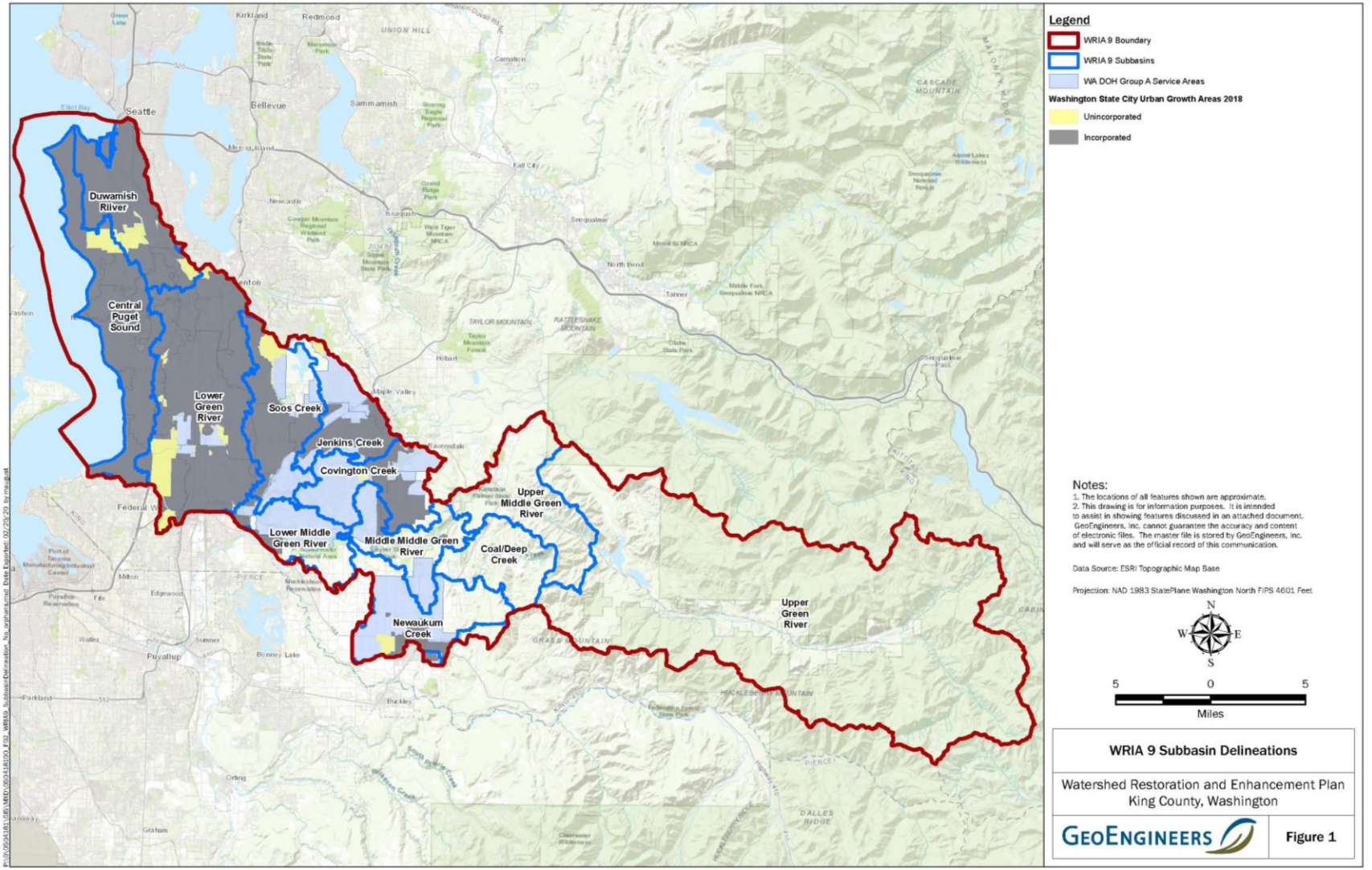

Figure 1: WRIA 9 Subbasins

Growth Projections

Status

At the September 24, 2019 meeting, the WRIA 9 WREC agreed to move forward with 632 as the 20-year permit-exempt well growth projection to develop the consumptive use estimate. The Committee decided not to hold a formal vote. The Committee can revisit the growth projections later in the planning process, if needed.

Background

The WRE Plan needs to address impacts on streamflows from consumptive use from new domestic permit-exempt wells anticipated between January 19, 2018 and January 18, 2038. The WRE Plan must estimate growth projections for the watershed for January 2018 through January 2038 (at a minimum). Based on the projected growth, the plan will estimate the amount of rural growth and associated water use from new permit exempt well connections.

Ultimately, WRE Plan growth projections need to address the following two primary questions:

1. How many new permit-exempt domestic well connections (PE wells) could be installed throughout the watershed over the next 20 years?
2. Where could the PE sourced growth occur at the subbasin level?

WRIA 9 includes parts of unincorporated King County and 15 incorporated cities.

Methods

- King County used historical building permit and year-built data to predict PE well growth over the 20-year planning horizon. This methodology assumes that the rate and general location of past growth will continue over the 20-year planning horizon.
    - King County estimated the number of new homes using PE wells based on past water service connection rates.
- GeoEngineers estimated new wells within the UGA based on analysis of data in the Ecology Well Log Database.
- King County completed a PE Well Potential Assessment to determine whether a subbasin has capacity for the number of wells in the 20-year projection.
    - The PE Well Potential Assessment shows a capacity shortfall of 20 wells in the Newaukum subbasin. Those 20 wells were reallocated to the Middle Middle Green subbasin because it is adjacent and has similar growth patterns.

Results

GROWTH PROJECTIONS FOR NEW PE WELLS IN WRIA 9 – DUWAMISH-GREEN 2018 TO 2038

Subbasins[1]	King County Past Trends[2]	UGA Well Log Spot Check[3]	Total PE Wells[4] per Subbasin[5]
Central Puget Sound	0	0	0
Duwamish	0	0	0
Lower Green	0	4	4
Soos Creek	72	11	83
Jenkins Creek	44	1	45
Covington Creek	41	0	41
Lower Middle Green	81	3	84
Middle Middle Green	100	0	100
Newaukum	102	1	103
Upper Middle Green	110	0	110
Coal Deep	62	0	62
Upper Green	0	0	0
Totals	**612**	**20**	**632**

Notes:

1 = Subbasins from proposal approved at July 23, 2019 WRE Committee meeting.

2 = Based on 20-year estimate of potential new PE wells in unincorporated King County, plus 6% error.

3 = Based on spot-check of Ecology Well Report Viewer database. Accounts for potential wells within the incorporated and unincorporated Urban Growth Areas (UGAs) over the 20-year planning period.

4 = "PE Wells" is used to refer to new homes associated with new permit-exempt wells and also new homes added to existing wells on group systems relying on permit-exempt wells.

5 = Includes redistribution of 20 wells from Newaukum subbasin to Middle Middle Green subbasin.

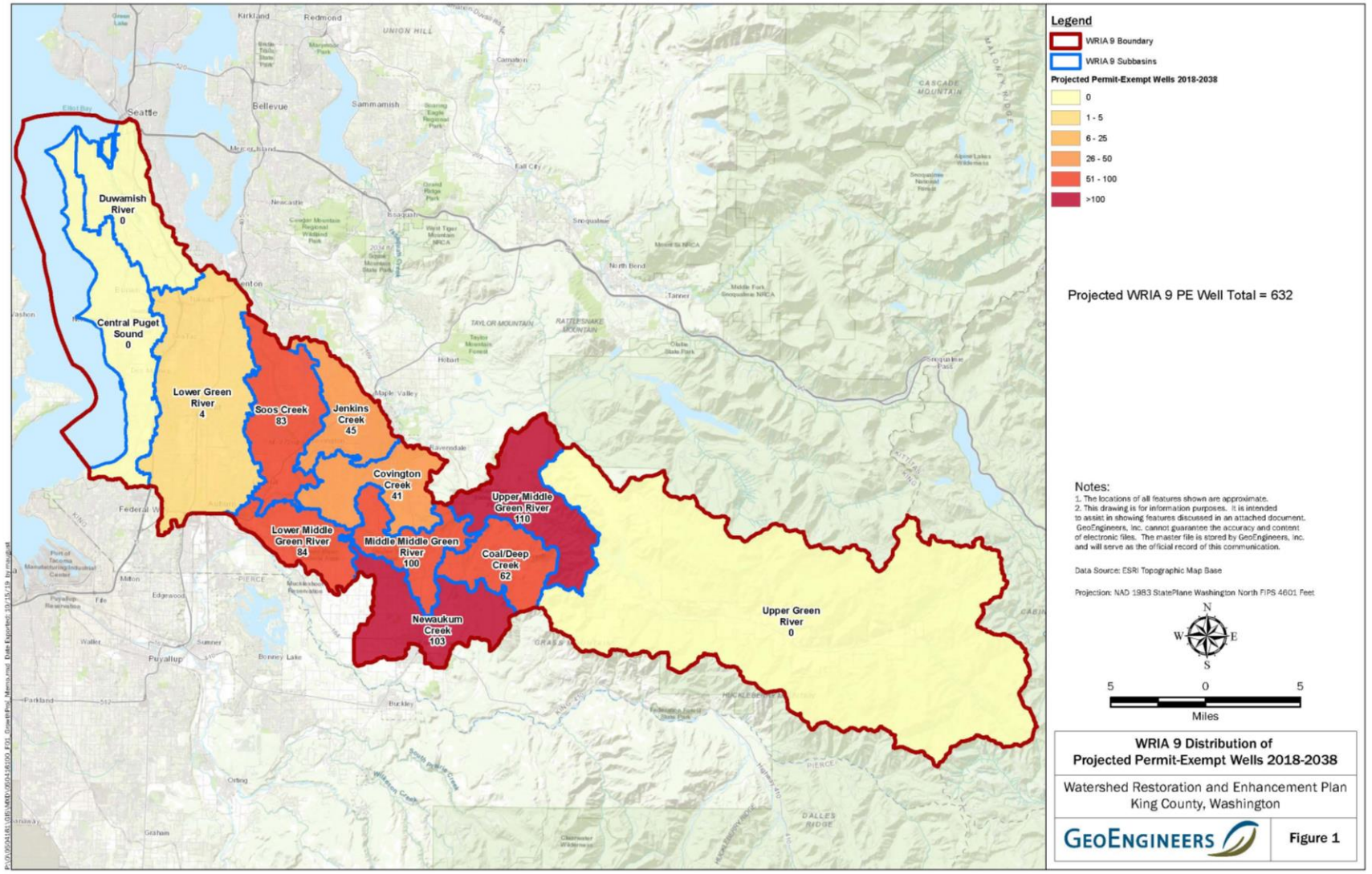

Figure 2: WRIA 9 Projected Permit-Exempt Wells 2018-2038

Consumptive Use

Status

The WRIA 9 WREC discussed the consumptive use estimate at the October, November and January WREC meetings.

At the January 28 meeting, CELP disagreed with using the consumptive use estimate based on average measured yard size. The chair and facilitator will continue to work individually with Committee members to try to get consensus on a consumptive use estimate.

Background

The WRIA 9 Watershed Restoration and Enhancement Plan (Plan) must include projects and actions that offset the consumptive use from future domestic permit-exempt wells. Consumptive water use is water that is evaporated, transpired, consumed by humans, or otherwise removed from an immediate water environment. For watershed planning purposes, consumptive use is water that is drawn from groundwater via a domestic permit-exempt well and not replaced through the septic system, irrigation return flow, or other means.

Methods

Methodology is based on Appendix A of the Department of Ecology's Net Ecological Benefit guidance and documented in further detail in the Consumptive Use Estimates Work plan prepared by the GeoEngineers team. The key assumptions are:

Indoor use:

- 2.73 people per household
- 60 gallons per day per person
- 10% consumptive

Outdoor use:

- Household lawn size based on average irrigated footprint per subbasin
- Crop irrigation requirement based on requirements for turf grass in the Washington Irrigation Guide
- Irrigation efficiency of 75%
- 80% consumptive

The technical consultants also estimated consumptive use for two additional scenarios.

1. One home with legal maximum 0.5-acre irrigated lawn area per permit-exempt well. Assumes 60 gallons per day per person indoor use and 0.5-acre outdoor irrigation use.
2. Legal right to 950 gallons per day (maximum annual average withdrawal) per well connection for indoor and outdoor household use. Assumes 60 gallons per day per person indoor use and remainder to outdoor use.

The Committee was interested in reviewing these consumptive use scenarios to inform the planning process.

Results

WRIA 9 ANNUAL CONSUMPTIVE USE FOR ONE HOME WITH SUBBASIN AVERAGE YARD

Subbasin ID	# PE Wells Anticipated in Subbasin	Irrigated Area per Well (ac)	Per Well Consumptive Use (gpd)			Total Consumptive Use (af/yr)
			Indoor	Outdoor	Total	
Coal/Deep Creek	62	0.17	16.4	165.4	181.8	12.6
Covington Creek	41	0.40	16.4	452.0	468.4	21.5
Jenkins Creek	45	0.34	16.4	404.4	420.8	21.2
Lower Green	4	0.34	16.4	454.6	471.0	2.1
Lower Middle Green River	84	0.44	16.4	525.8	542.2	51.0
Mid Middle Green River	100	0.25	16.4	268.8	285.2	31.9
Newaukum Creek	103	0.31	16.4	321.5	337.9	39.0
Soos Creek	83	0.34	16.4	428.7	445.1	41.4
Upper Middle Green River	110	0.21	16.4	201.6	218.0	26.9
WRIA 9 Aggregated	**632**	**0.30**	**16.4**	**333.4**	**349.8**	**247.7**

WRIA 9 IRRIGATED FOOTPRINT SUMMARY

Subbasin	Parcels Analyzed	Total Irrigated Area (ac)	Average Irrigated Area (ac)
Coal/Deep Creek	21	3.6	0.17
Covington Creek	13	5.2	0.40
Jenkins Creek	24	8.1	0.34
Lower Middle Green River	29	12.8	0.44
Mid Middle Green River	21	5.2	0.25
Newaukum Creek	38	11.7	0.31
Soos Creek	31	10.6	0.34
Upper Middle Green River	34	7.1	0.21
Full Analysis	**211**	**64.2**	**0.30**

WRIA 9 CONSUMPTIVE USE SCENARIOS

The Committee was interested in reviewing these consumptive use scenarios to inform the planning process.

Scenario	Average Annual Total Water Use (gpd) †	Average Indoor Use (gpd)	Average Annual Outdoor Use (gpd)	Annual Consumptive Use (acre-feet/year)
Covington Water District*	200	150	300	38.9
1 home, average measured yard	581	164	417	247.7
1 home, 0.5 ac yard	847	164	683	398.4
1 home using 950 gpd (annual average)	950	164	786	456.9

* Data from 2015 and 2017.

†Reported values are total water use, not consumptive use.

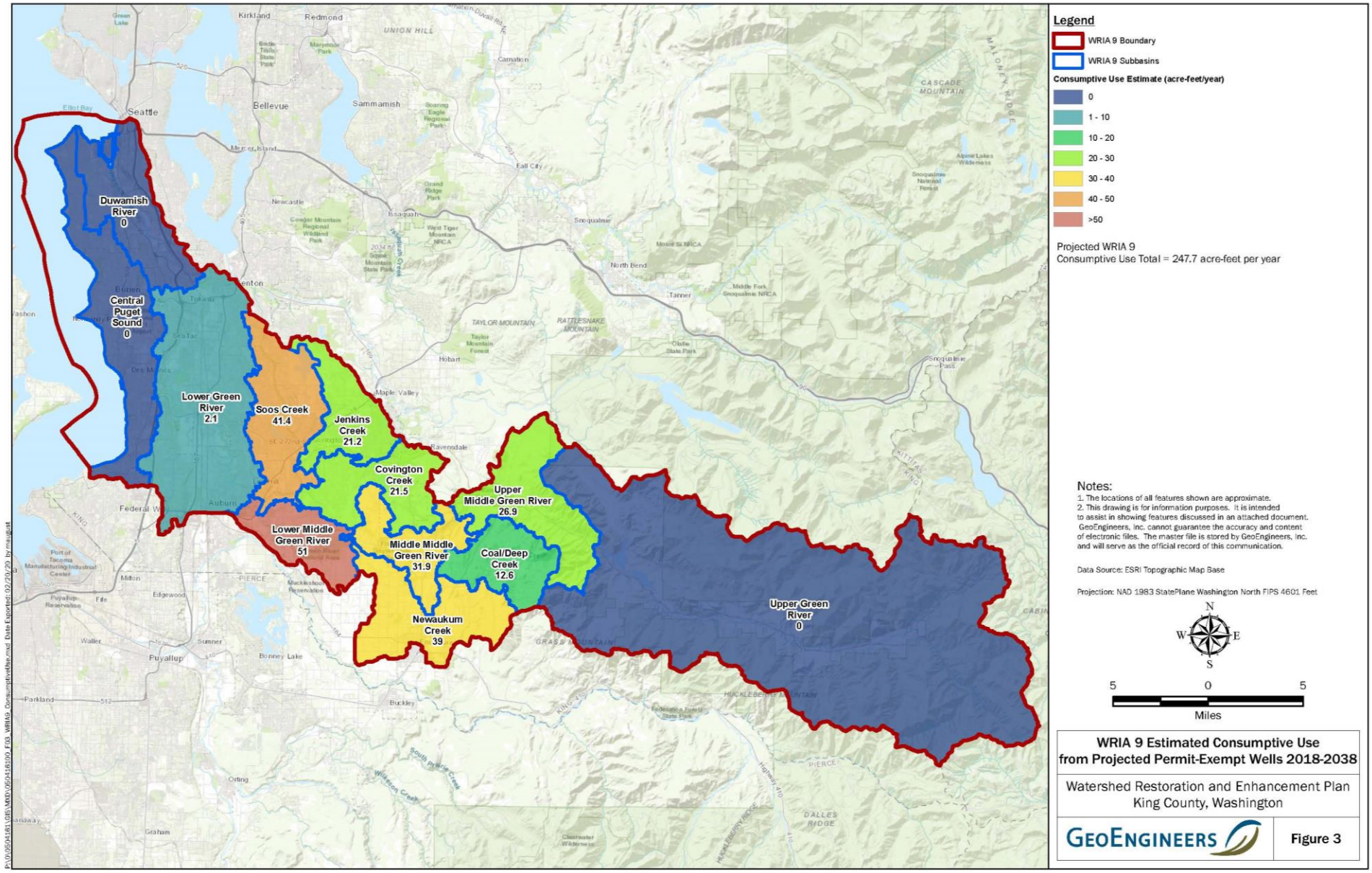

Figure 3: Estimated Consumptive Use from 1 home + measured yard