

Technical Staff

Net Ecological Benefit Determination

RCW 90.94.030 Watershed Restoration and Enhancement Plan

Duwamish-Green Watershed (WRIA 9)

Water Resources Program

Washington State Department of Ecology

Olympia, WA

March 2021



Principal Author – John Covert, LHG

Contributing Author – Jim Pacheco, Habitat Biologist

Related Information

- [Final Approved WRIA 9 Watershed Restoration and Enhancement Plan](https://www.ezview.wa.gov/Portals/_1962/images/WREC/WRIA09/FinalPlan/WRIA9-FinalWREPlan-COMPILED-2021.02.23.pdf)¹
- [Streamflow Restoration Planning](https://ecology.wa.gov/Water-Shorelines/Water-supply/Streamflow-restoration/Streamflow-restoration-planning)²

¹ https://www.ezview.wa.gov/Portals/_1962/images/WREC/WRIA09/FinalPlan/WRIA9-FinalWREPlan-COMPILED-2021.02.23.pdf

² <https://ecology.wa.gov/Water-Shorelines/Water-supply/Streamflow-restoration/Streamflow-restoration-planning>

Table of Contents

1. Overview	4
2.0 Assessment of potential impacts	4
2.1 Evaluation of new PE wells	5
2.2 Evaluation of impacts from new consumptive use	5
2.3 Evaluation of streamflow impacts	9
3.0 Plan water offset and habitat projects	9
3.1 Water offset projects	9
3.2 Habitat projects	12
4.0 Ecology technical staff Net Ecological Benefit analysis	13
4.1 New PE wells and consumptive use estimates	14
4.2 Quantity and spatial distribution of water offset projects	14
4.3 Quantity and spatial distribution of habitat projects	14
4.4 Uncertainty, implementation and adaptive management	15
5. Ecology technical staff NEB determination	16
6. References	19

List of Figures and Tables

Figures

Figure 1. WRIA 9 water offset and habitat projects and the anticipated new consumptive uses by subbasin. Figure 5.1 in the Plan.	8
Figure 2. Plan project locations overlain on WDFW Assessment Unit Habitat Indices	18

Tables

Table 1. Number of anticipated PE wells and their consumptive use	6
Table 2. Subbasin water offset totals compared to offset target	7
Table 3. Water offset projects by subbasin	11
Table 4. Summary of habitat projects by subbasin	13

1. Overview

The Water Resources Inventory Area (WRIA) 9 Watershed Restoration and Enhancement Committee (Committee) has produced and approved a Watershed Restoration and Enhancement Plan (Plan), dated February 2021, which addresses the requirements of chapter 90.94 RCW (RCW 90.94) relative to the Duwamish-Green watershed (WRIA 9). This document provides the Streamflow Restoration Section technical staff's evaluation and determination of Net Ecological Benefit (NEB) as required in RCW 90.94.030(3)(c).

In addition to the coordination and technical assistance provided by the Streamflow Restoration Program to the Committee, the Department of Ecology (Ecology) provided Net Ecological Benefit guidance (NEB Guidance) to help them address the requirements of chapter 90.94 RCW:

Final Guidance for Determining Net Ecological Benefit, GUID-2094 Water Resource Program Guidance, July 31, 2019, Publication 19-11-079, 131 p.

Ecology staff chaired the Committee, were the lead authors of the Plan, and voted to approve the Plan. The Plan includes a chapter summarizing the Committee's NEB evaluation providing reasonable assurances that the projects and NEB will occur. The Plan also includes a clear statement of the Committee's findings that the combined components of the Plan achieve a NEB.

RCW 90.94.030(3)(c) indicates that Ecology "must determine that actions identified in the plan, after accounting for new projected uses of water over the subsequent twenty years, will result in a net ecological benefit to instream resources within the water resource inventory area." Ecology's NEB Guidance indicates that Ecology intends to provide deference to the NEB evaluation in a well-developed plan. However, it is ultimately up to Ecology to support its NEB decision.

All figures and tables provided in this document are taken from the Plan unless otherwise noted. GeoEngineers Inc., a technical consulting firm, was hired by Ecology and worked on behalf of the Committee to conduct much of the technical work that went into development of the Plan.

2.0 Assessment of potential impacts

The Plan provides estimates of how many new permit-exempt domestic wells (PE wells) are likely to be constructed within WRIA 9 over the 2018-2038 planning horizon; how much new consumptive water use will likely result; and what streamflow impacts are likely to occur. To facilitate planning, the Committee divided the watershed into 12 subbasins (see Figure 1 below), then distributed the number of future PE wells and their anticipated consumptive uses across the subbasins. The Committee based their subbasin delineation on existing subwatershed units developed by King County.

2.1 Evaluation of new PE wells

The 482 square mile watershed is located entirely within King County. King County used historical building data to project new potential PE wells, assuming that the rate and general location of past growth will continue over the 20-year planning horizon.

632 new PE wells are projected for WRIA 9. King County projects 612 new PE wells over the planning horizon within the WRIA 9 portions of unincorporated King County. The King County method did not account for potential PE wells that might be in cities or Urban Growth Area (UGAs) so the Committee completed an analysis of potential new PE wells within the UGAs and projected an additional 20 new PE wells. Most of these 632 PE wells are likely to be installed outside of the UGA in the following subbasins: Soos Creek, Lower Middle Green River, Mid Middle Green River, Upper Middle Green River, and Newaukum Creek.

Of the 632 total projected PE wells, 480 are likely to be constructed in the subbasins listed in the previous paragraph. 148 of the remaining 152 PE wells will likely be constructed within the Jenkins Creek, Covington Creek and Coal/Deep Creek subbasins. Three subbasins (Central Puget Sound, Duwamish River, and the Upper Green River) expect no new PE wells over the 20-year planning horizon.

2.2 Evaluation of impacts from new consumptive use

Methods and assumptions recommended in Ecology's NEB Guidance were employed by the Committee when estimating consumptive water use from new PE wells. The Committee used the 20-year projection of new PE wells for WRIA 9 (632) to estimate the new consumptive water use (consumptive use) that the watershed plan must address and offset. Within the 20-year planning horizon, the Committee estimates 247.7 acre-feet per year (AFY) or 0.34 cubic feet per second (cfs) of new consumptive water use from future PE wells in WRIA 9.

Ecology technical staff believe that 247.7 AFY is a conservative number because the outdoor water use component of this value is based on the assumption that every new PE well homeowner will water their lawn at rates high enough to grow commercial-grade turf grass. The Plan points out that many assumptions and inherent uncertainties are incorporated into these consumptive use calculations. The outdoor water use methodology (outlined in Ecology's NEB Guidance) was designed to be conservative to protect the resource.

The Committee added a margin of safety to the consumptive use estimate to account for uncertainties in the PE well projection and consumptive use estimate, including higher rates of outdoor water use that could result from climate change, changing development patterns, and uncertainties related to project implementation. The Committee developed a water offset target of 495.4 AFY by doubling the 247.7 AFY consumptive use estimate. The Committee termed this their "offset target."

The Committee compared the water offset target with a consumptive use scenario that assumes that all of the projected PE wells will withdraw the maximum annual average withdrawal limit of 950 gallons per day for indoor and outdoor household use (456.9 AFY) that was established in RCW 90.94.030(4)(a)(vi)(B).

Ecology technical staff believe the offset target is a very conservative number as it's unlikely that all 632 new homes utilizing a new PE well will each use more than the maximum annual average withdrawal limit. This would require every new home to irrigate more than one-half acre of lawn at a turf grass quality rate.

Table 4.2 in the Plan (modified and reproduced here as Table 1 in this document) identifies the number of anticipated new PE wells and the collective, consumptive use total in AFY for each subbasin.

Table 1. Number of anticipated PE wells and their consumptive use

Subbasin	Projected PE wells	Total CU³ 2018-2038 (AFY)
Central Puget Sound	0	0
Duwamish River	0	0
Lower Green	4	2.1
Soos Creek	83	41.4
Jenkins Creek	45	21.2
Covington Creek	41	21.5
Lower Middle Green River	84	51
Mid Middle Green River	100	31.9
Upper Middle Green River	110	26.9
Newaukum Creek	103	39
Coal/Deep Creek	62	12.6
Upper Green River	0	0
WRIA 9	632	247.7

Table 7.3 in the Plan (reproduced here as Table 2) shows the offset target volume in AFY for each subbasin. It also lists the water offset project totals by subbasin, which will be discussed in Section 3. The fourth column indicates whether, at the subbasin scale, the annual volume from water offset projects added to the subbasin will exceed the offset target volumes forecast for the anticipated new PE wells.

³ CU=consumptive use

Table 2. Subbasin water offset totals compared to offset target

Subbasin	Offset Project Totals (AFY)	Offset Target: 2x Consumptive Use (AFY)¹	Surplus/Deficit (AFY)^{2,3}
Central Puget Sound	0	0	0
Duwamish River	0	0	0
Lower Green River	0	4.2	-4.2
Soos Creek	193	82.8	110.2
Jenkins Creek	0	42.4	-42.4
Covington Creek	411	43	368
Lower Middle Green River	0	102	-102
Mid Middle Green River	0	63.8	-63.8
Upper Middle Green River	114	53.8	60.2
Newaukum Creek	0	78	-78
Coal/Deep Creek	0	25.2	-25.2
Upper Green River	357	0	357
WRIA 9 Total Consumptive Use	1,075	495.4	579.6

Notes:

¹ Values in table have been rounded, which is why totals may differ.

² Surplus water offset is associated with a positive value and a deficit in water offset is associated with a negative value.

³ Water offset projects in the Upper Green and Upper Middle Green subbasins will contribute to offsetting consumptive use downstream, in the Mid Middle Green, Lower Middle Green, and Lower Green River subbasins.

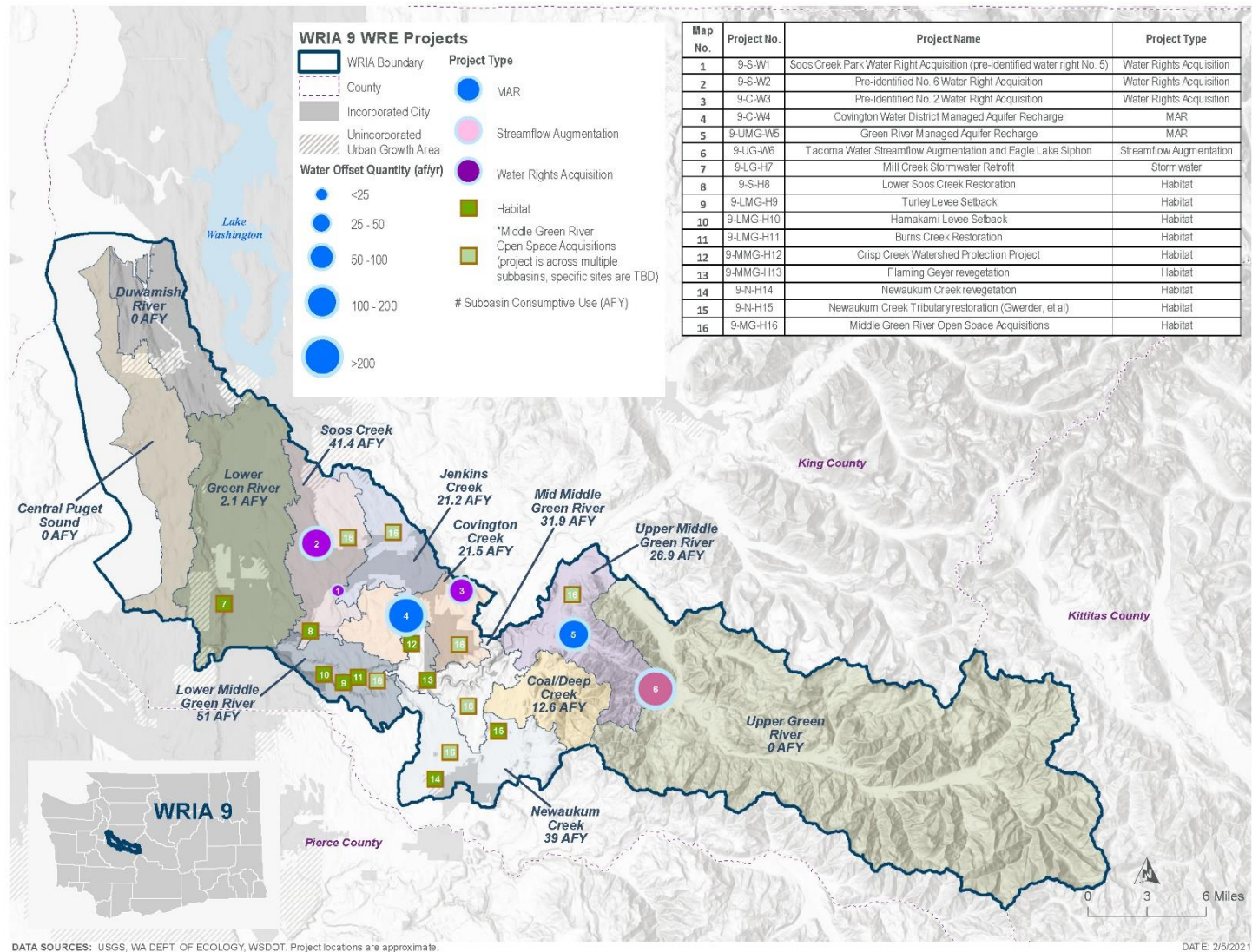


Figure 1. WRIA 9 water offset and habitat projects and the anticipated new consumptive uses by subbasin. Figure 5.1 in the Plan.

Figure 5.1 in the Plan (reproduced here as Figure 1) displays the total consumptive uses from new PE wells in AFY for each subbasin. These are the same offset volumes that are listed in Table 1. It also shows the location of all the offset projects discussed below in Section 3.

Ecology technical staff concurs with the Plan's estimates of both the number of new PE wells anticipated in the WRIA over the 20-year planning horizon, and their projected new consumptive uses. The offset target for each subbasin (as identified in Table 2) will be even more protective of the resource as it adds a safety factor for uncertainties (discussed below in Section 4.4).

2.3 Evaluation of streamflow impacts

PE wells withdraw water from many different hydrogeologic units and at various depths in WRIA 9. As explained in Appendix B in Ecology's NEB Guidance, while water use and pumping associated with residential development will produce seasonal increases, particularly during the summer months, these impacts will be attenuated by the distance from surface water, both laterally and vertically. Therefore, most impacts from new PE wells in WRIA 9 will essentially be "steady-state" (spread evenly over time) throughout the year. While consumptive use impacts will essentially be steady-state, they represent the greatest percentage of surface flow during the low flow periods of late summer and early fall.

3.0 Plan water offset and habitat projects

The Plan includes a suite of projects designed to offset the anticipated impacts from new PE wells. The projects are described as water offset projects and habitat projects. Water offset projects have a quantified streamflow benefit and contribute to offsetting consumptive use. Habitat projects contribute toward achieving NEB by focusing on actions that improve the ecosystem function and resilience of aquatic systems, support the recovery of threatened or endangered salmonids, and protect instream resources, including important native aquatic species. Habitat projects may also result in an increase in streamflow, but the water offset benefits for these projects are frequently difficult to quantify. Therefore, the Committee did not rely on habitat projects to contribute toward offsetting new PE well consumptive use. The Committee believes habitat projects are still critical to achieving NEB, and therefore should be included in the Plan.

3.1 Water offset projects

The Committee identified water rights acquisition projects as a priority for inclusion in the plan. The Committee prioritized those water offset projects in subbasins in the Middle Green area with higher projected PE wells and thus consumptive use: Soos, Jenkins, Covington, Lower Middle Green, Mid Middle Green, Upper Middle Green, and Newaukum subbasins.

Table 5.1 in the Plan (modified and reproduced as Table 3 below) provides a summary of the six water offset projects identified by the Committee to offset PE well consumptive use and contribute toward achieving NEB. Detailed project descriptions for each offset project are included in the Plan. The total offset potential of these six projects for WRIA 9 is 1,075 AFY. Offset benefits are anticipated in the subbasins listed in Table 3, as well as downstream of the

respective project locations. Figure 1 is a map of the watershed showing the location of the projects listed in Table 3. For the three water right acquisition offset projects, the Committee used the consumptive use estimate of each water right as generated by a Washington Water Trust analysis. Before these rights are acquired and placed into the Trust Water Rights Program, they would undergo an analysis to confirm that they are valid water rights and have consumptive quantities eligible for acceptance into the Trust Water Rights Program. That analysis usually doesn't happen until after the water right holder agrees to sell.

Ecology's NEB Guidance suggests that offsets need to continue beyond the 20-year planning horizon, for as long as new well pumping continues. The water right acquisition and managed aquifer recharge (MAR) projects are expected to provide offset water for as long as the PE wells are in use. The Committee recognizes that long-term funding is needed to sustain the MAR projects into the future.

All six of these water offset projects have identified project sponsors (listed in Table 3). Municipal water will be used for the source water for the Covington Water District MAR project. The Green River will provide the source water for the Green River MAR project.

The Committee organized the list into tiers to reflect the location of the project with respect to subbasin priorities and the likelihood that the project will be implemented. Tier 1 projects provide benefits to priority subbasins and are more likely to be implemented and provide benefits in the near-term. Tier 2 projects are in lower priority subbasins, or are expected to take longer to implement, because they may need additional outreach to key stakeholders.

Water offset projects and habitat projects were tiered separately. For water offset projects, this evaluation considered the following: magnitude of water offset benefit; timing of water offset benefit; location of water offset benefit with respect to water offset priority subbasins; certainty of implementation; certainty of benefit and effectiveness; resiliency; and durability.

Five of the six water offset projects were ranked as tier 1 projects. Tier 1 projects total an estimated water offset of 893 AFY. The tier 2 project has an estimated water offset of 182 AFY. Together, they would provide 1,075 AFY of offset water.

The Plan lists two tier 1 water right acquisition projects targeting water rights in the Soos Creek and Covington Creek subbasins. The water right holders for these rights have indicated a willingness to have further discussions regarding selling their rights.

The streamflow augmentation project, (9-UG-W6), would add 2 cfs for 90 days to the Green River during the summer low flow period. The water would come from Tacoma Water's existing portfolio of Howard Hanson Dam reservoir water rights and a new dead-storage water right from their Eagle Lake Siphon project.

For the Green River MAR project, (9-UMG-W5), the Committee assumed that 327 AFY would be infiltrated annually, however, they based the offset volume in the Plan (114 AFY) on expected streamflow benefits during periods when flows are typically lower: late summer and early fall. That is about a 1/3 of the recharge volume anticipated to be delivered to the site. Ecology technical staff believe the groundwater baseflow discharge volume that will result from this project will be larger than the 114 AFY estimate included in the Plan. The Committee's more

conservative offset volume for this project will likely be exceeded, which contributes to the reasonable assurance that new PE well consumptive uses will be offset at the WRIA scale.

The second MAR project, (9-C-W4), will be sourced from a Covington Water District pipeline and its offset volume was not discounted by the Committee.

At its core, the planning process has been an effort to develop a blueprint for how to implement the goals of the Plan in WRIA 9. None of these water offset projects are funded, nor are they ready to be implemented. As such, there is uncertainty about how much offset water these projects will ultimately contribute to the watershed.

Ecology technical staff believe the offset amounts indicated in Table 3 and shown in Figure 1 are reasonable, and that these projects, once implemented, will meet the requirements of RCW 90.94.030. As indicated in the Plan, the total estimated water offset benefit from the portfolio of water offset projects is 1,075 AFY and the Plan's offset target is 495 AFY.

Table 3. Water offset projects by subbasin

Project Number	Project Type	Subbasin(s)	Water Offset (Annual AF)	Project Sponsor	Project tier
9-S-W1	Water right acquisition	Soos	11	King County	1
9-S-W2	Water right acquisition	Soos	182	Washington Water Trust	2
Soos Creek Subbasin Subtotal			193		
9-C-W3	Water right acquisition	Covington	54	Washington Water Trust	1
9-C-W4	MAR	Covington	357	Covington Water District	1
Covington Creek Subbasin Subtotal			411		
9-UMG-W5	MAR	Upper Middle Green	114	Washington Water Trust	1
Upper Middle Green River Subbasin Subtotal			114		
9-UG-W6	Streamflow augmentation	Upper Green	357	Tacoma Water	1
Upper Green River Subbasin Subtotal			357		
WRIA 9 Total Water Offset (Cumulative from above)			1,075		
WRIA 9 Consumptive Use Estimate			247.7		
WRIA 9 Offset Target			495.4		

3.2 Habitat projects

The Plan presents a suite of 10 habitat and conservation projects that will provide ecological benefits to the watershed. These benefits vary by project and include floodplain restoration, wetland reconnection, availability of off-channel habitat for juvenile salmonids, increased groundwater levels and baseflow, and increased channel complexity. The ecological and streamflow benefits from habitat projects supplement the quantified water offsets and contribute to achieving a net ecological benefit. Detailed project descriptions for each habitat project are included in Appendix H of the Plan.

The Committee tiered the habitat projects separately from the water offset projects. Criteria used to tier habitat projects included: location of benefit with respect to water offset priority subbasins and habitat priority subbasins; projects which provide multiple benefits; certainty of implementation; certainty of benefit and effectiveness; resiliency; and durability. Since the projects were in different stages of development, with some still conceptual and some ready for implementation, the process to apply the tiering criteria and to create a tiered project list was subjective.

The habitat projects included in the plan are all tier 1 projects because they are in priority subbasins, have project sponsors, and are expected to be implemented within the planning horizon. Although many of these projects have potential streamflow benefits, the Committee has elected not to quantify water offsets from habitat projects.

Table 7.4 in the Plan (modified and reproduced below as Table 4) lists the ten habitat improvement projects by subbasin. Note that some projects are located in more than one subbasin. The location of these ten projects are mapped on Figure 1.

Table 4. Summary of habitat projects by subbasin

Subbasin	Habitat Projects	Benefiting Stream
Central Puget Sound		
Duwamish River		
Lower Green River	1 project: 9-LG-H7	Green River
Soos Creek	2 projects: 9-S-H8 and 9-MG-H16	Soos Creek
Jenkins Creek	1 project: 9-MG-H16	Jenkins Creek
Covington Creek	1 project: 9-MG-H16	Various
Lower Middle Green River	4 projects: 9-LMG-H9, 9-LMG-H10, 9-LMG-H11, and 9-MG-H16	Green River
Mid Middle Green River	3 projects: 9-MMG-H12, 9-MMG-H13, and 9-MG-H16	Green River
Upper Middle Green River	1 project: 9-MG-H16	Various
Newaukum Creek	2 projects: 9-N-H14 and 9-N-H15	Newaukum Creek
Coal/Deep Creek		
Upper Green River		

Four subbasins (Central Puget Sound, Duwamish River, Coal/Deep Creek, and Upper Green River) have no habitat projects.

All habitat projects, if funded, are expected to be implemented within the 20-year planning horizon.

4.0 Ecology technical staff Net Ecological Benefit analysis

RCW 90.94.030(3)(c) requires that,

“Prior to adoption of the watershed restoration and enhancement plan, the department must determine that actions identified in the plan, after accounting for new projected uses of water over the subsequent twenty years, will result in a net ecological benefit to instream resources within the water resource inventory area.”

Sections 4 and 5 represent Ecology’s technical evaluation to support the net ecological benefit determination, as required by the statute.

4.1 New PE wells and consumptive use estimates

As discussed in Section 2.2, the Plan estimates that 632 new PE wells will consumptively use 247.7 AFY (0.34 cfs) by the end of the 20-year planning horizon in WRIA 9. The Plan established an offset target of 495 AFY, after taking into account the inherent uncertainties associated with a planning exercise that looks 20 years into the future, and predicts the water use habits of 632 new residences scattered throughout a large geographic area.

The new consumptive uses were broken out by subbasin as displayed in Figure 1, and Tables 1 and 2. The Committee followed Ecology's NEB Guidance to determine the consumptive use impact these 632 new PE wells will have on the watershed.

4.2 Quantity and spatial distribution of water offset projects

The Plan anticipates that six water offset projects will be developed in four subbasins. Collectively, all six projects will generate 1,075 AFY of offset water across the WRIA. Eight subbasins do not contain offset projects. The Plan does not anticipate any new PE wells in two of those subbasins. WRIA-wide, the Plan anticipates six subbasins will experience water offset deficits (Table 3) that total 315 AFY. Water offset projects in the Upper Middle Green and the Upper Green (that provide a surplus of over 400 AFY above their respective offset targets) will contribute offset water to three of the downstream subbasins that don't directly have water offset projects listed in the Plan (Mid Middle Green, Lower Middle Green, and Lower Green River subbasins). WRIA-wide, the water offset projects will generate a surplus of 580 AFY above the Plan's offset target volume. Figure 1 shows the location of all 16 offset and habitat projects listed in the Plan and the new consumptive uses expected over the 20-year planning horizon from new PE wells for WRIA 9.

4.3 Quantity and spatial distribution of habitat projects

The Plan includes 10 habitat and conservation projects that were chosen because they will provide floodplain restoration, wetland reconnection, off-channel habitat for juvenile salmonids, increased groundwater levels and baseflow, and increased channel complexity. Figure 1 shows the spatial distribution of the habitat projects. Individual project details are found in the individual project descriptions in the Plan.

These projects are expected to provide real benefits to the subbasins and the watershed. Some of these habitat projects will likely contribute offset water, but those quantities were not estimated. The ecological and streamflow benefits from habitat projects are supplemental to the quantified water offset projects and will contribute to achieving a net ecological benefit.

Habitat projects are distributed across eight of the 12 subbasins, including all of the subbasins with the highest new consumptive uses listed in Section 2.1. Two of the projects (H12 and H16) focused on land acquisition and conservation, and their habitat benefits to fish could not be quantitatively evaluated. The remaining eight projects provide detailed descriptions of their likely benefits.

If the projects are implemented as described, Ecology technical staff believe projects H7 through H11, H13, and H14 will provide a combined total of approximately five miles of stream

restoration, 4.5 miles and 153 acres of wetland and riparian restoration, create or reconnect 75 acres of aquatic rearing habitat, infiltrate 2 to 14 acre-feet of stormwater, and 25 acres of floodplain reconnection. These benefits will contribute to improving in-stream conditions for multiple salmonid species. Most of the habitat projects are in the middle to upper portions of their subbasin so their benefits will be felt locally and downstream. The habitat benefits from the remaining projects, while not quantifiable at this time, will also provide on-the-ground improvements and will contribute to NEB once they are implemented.

4.4 Uncertainty, implementation and adaptive management

There is uncertainty associated with all of the analyses presented in the Plan – ranging from the projected number of new PE wells, the amount of consumptive use anticipated from these PE wells, the water offset benefits likely to occur from the proposed projects, to the likelihood that all projects will get funding for implementation and secure funding to cover annual operations and maintenance costs when needed.

The Committee used a tiering process to identify projects (both water offset and habitat) that are more likely to be implemented. The tier 1 water offset projects (considered by the Committee most likely to be implemented and located in the subbasins with the highest new consumptive use) will generate 893 AFY of offset water. The tier 2 project will generate 182 AFY of water offset. Some of the tier 1 habitat projects are likely to provide additional water offset but were not quantified in the Plan. Most of the subbasins that do not have water offset projects identified, will still benefit from water offset projects that are located higher in the watershed.

The Committee has recommended adaptive management measures in the Plan for the purpose of addressing uncertainty in plan implementation that contribute to a reasonable assurance of achieving NEB. Adaptive management measures include PE well tracking, project implementation tracking, and periodic watershed plan implementation reporting with recommended adjustments to the Plan. The Committee recommends that Ecology issue four watershed plan implementation reports, one each in 2027, 2032, 2037, and 2042 detailing the successes, challenges, and gaps related to implementation of the watershed plan.

The Committee identified funding availability, especially for larger capital projects, as an implementation challenge. The Plan recommends projects that infiltrate water (e.g. managed aquifer recharge projects and stormwater projects) include estimated operations and maintenance costs in applications for streamflow restoration funding.

The Committee established an offset target that is double the consumptive use estimate, to account for the uncertainties that ultimately could affect the actual consumptive use resulting from the new PE wells within the watershed over the 20-year planning horizon.

At the WRIA scale, the Plan anticipates a water surplus of 580 AFY above the offset target. The adaptive management measures, in addition to the surplus water offset and supplemental habitat improvement projects, provide reasonable assurance that the Plan will adequately offset new consumptive use from PE wells anticipated during the planning horizon.

The Plan indicates that over the first 2.5 years of the 20-year planning horizon, ten new PE wells per year have been constructed within WRIA 9.⁴ The Plan anticipates 632 wells over the planning horizon, which averages to 32 new PE wells per year. 2.5 years (12%) through the 20-year planning horizon, the Plan has already overestimated the number of new PE wells per year. The Plan's early overestimation of new PE wells suggests that by the end of the 20-year planning horizon, the total number of new PE wells constructed within the WRIA will be less than the number forecast in the Plan.

5. Ecology technical staff NEB determination

Ecology's NEB Guidance indicates that the agency will review a NEB evaluation in a submitted plan, and will give it considerable deference in light of the knowledge, insights, and expertise of the partners and stakeholders who influenced the preparation of their plan.

The NEB Guidance identifies planning requirements to help each committee organize their plan to aid in their evaluation. The Committee has followed this guidance and produced a well-developed plan. The Committee has included their own NEB evaluation in their Plan and stated in Chapter 7.5 of their Plan:

“Based on the information and analyses summarized in this plan, the WRIA 9 Committee finds that this plan, if implemented, achieves a net ecological benefit, as required by RCW 90.94.030 and defined by the Final NEB Guidance (Ecology 2019).”

While Ecology intends to provide deference to the recommendations in this well-developed Plan, it is ultimately up to the agency to support its NEB determination and Ecology technical staff conducted our own NEB analysis of the offset and habitat projects.

Ecology technical staff concludes that the Plan adequately describes and evaluates the collective effects of new PE wells and offset projects. The Plan's narratives, and quantitative and qualitative assessments are as thorough as they can be at this stage in their development, and followed a clear and systematic logic. The Plan provides a well-organized and transparent evaluation of benefits from projects. The Plan appendices include maps, pictures, figures, quantification of benefits where available, and cost estimates when appropriate.

Figure 1 shows the distribution of water offset projects and habitat projects, along with an accounting by subbasin of the anticipated consumptive uses. All water offset projects combined to provide an offset benefit of 1,075 AFY, compared to the basin-wide offset target of 495 AFY. This indicates that the water offset projects provide more than enough water to offset the estimated PE well demand at the WRIA level, as required.

Consistent with Ecology's interpretation provided in the NEB Guidance, the Plan assumed that the impacts of new PE wells on instream flows will generally be steady-state and well dispersed (i.e., no significant seasonal variations in instream flow impacts will occur). In addition, the water offset project list includes projects that are intended to provide instream flow benefits, specifically during the summer and early fall, when streamflow is typically at its lowest. The

⁴ The number of new PE wells from January 2018 through June 2020 is based on data provided by King County.

water right acquisition projects will cease historical uses that occurred during the summer months. The MAR projects will augment groundwater baseflow during the summer low flow months as well as during the rest of the water year.

The combined water balance at the WRIA-scale indicates a basin-wide surplus of 580 AFY, supporting attainment of NEB by providing additional benefits to instream resources beyond those necessary to merely offset the anticipated new, 20-year PE well demand in WRIA 9. This surplus provides reasonable assurance that new PE well demand will be offset at the WRIA scale. If some offset projects are not developed due to funding constraints or other issues, a subset of projects can still provide sufficient water offset to meet the projected new consumptive uses.

Ecology technical staff concludes that the Plan identifies and addresses water offset and habitat projects at an appropriate scale that allows Ecology to make a NEB determination. Water offset projects were tiered to reflect the location of the project with respect to subbasin priorities, and the likelihood that the project will be implemented. Although six subbasins show a net water deficit totaling 315 AFY, three of these subbasins will benefit from offset surpluses developed in upstream subbasins. WRIA-wide, there is a net surplus of water of 580 AFY which contributes toward ecological benefits at the watershed scale.

Ecology technical staff compared the spatial distribution of the Plan's habitat projects against the Washington Department of Fish and Wildlife (WDFW) watershed characterization study (Wilhere et. al., 2013) which was conducted at the small drainage area Assessment Unit scale in the Puget Sound. Figure 2 (produced by Ecology staff) shows WDFW's habitat index (A3ns_avg) for each of their Assessment Unit drainages in WRIA 9.

The watershed characterization study is an index of relative conservation value. The index has three components: the density of hydro-geomorphic features, local salmonid habitats, and the accumulative downstream habitats. Quantity and quality of habitats were assessed for eight salmonid species. The index is the relative value of a small watershed based on an average of:

- The density of wetlands and undeveloped floodplains inside it.
- The quantity and quality of salmonid habitats inside it.
- The quantity and quality of salmonid habitats outside and downstream of it.

Overlain on this habitat index is the location of all of the projects listed in the Plan.

The ten tier 1 habitat projects (green squares on the map) are located predominately in higher value index areas (green and yellow shaded drainages) on the map. As such, most of the Plan's habitat projects are located in higher-valued conservation index areas. This contributes to a reasonable assurance that the Plan's habitat projects are located in areas that will contribute to NEB.

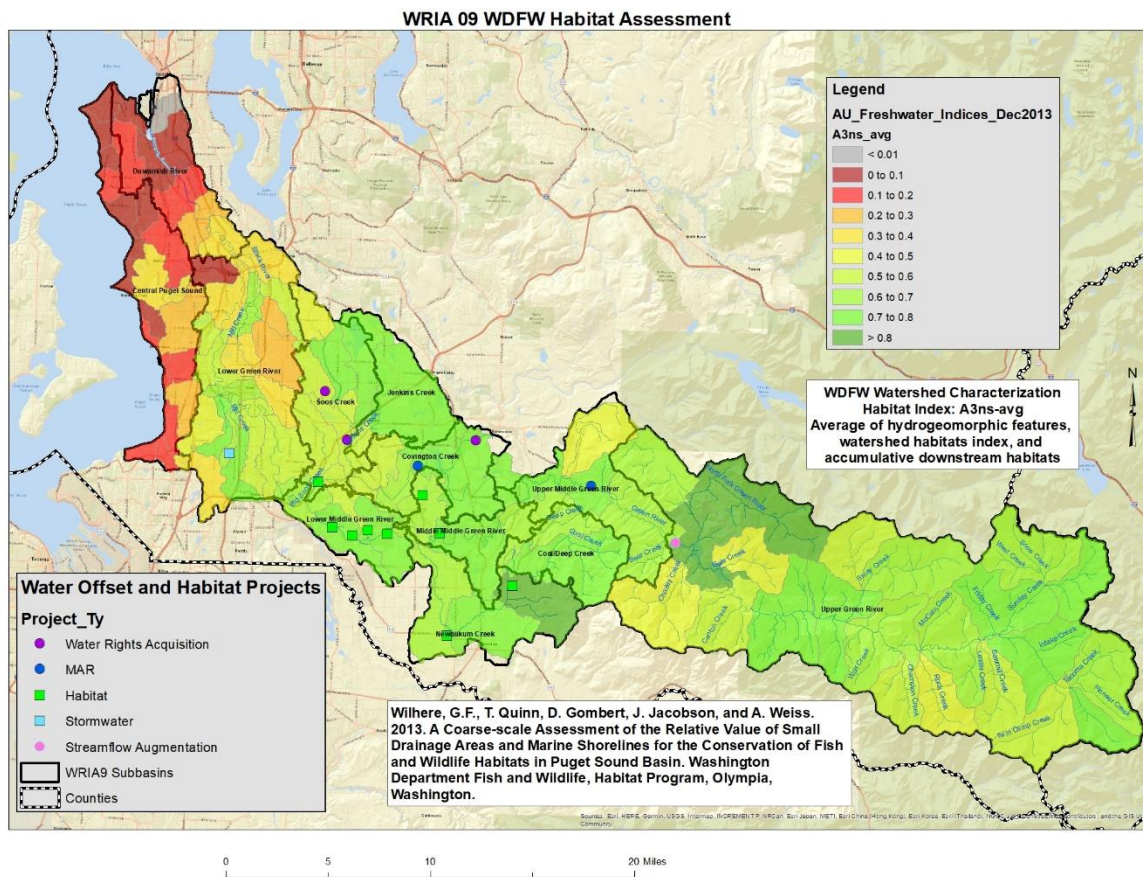


Figure 2. Plan project locations overlain on WDFW Assessment Unit Habitat Indices

Adaptive management is included in the Plan and reflects the Committee's goal of successful Plan implementation, to the extent possible, based on available offset project funding from Ecology and from other sources. Adaptive management will add flexibility to the implementation process, allowing adjustments based on actual PE well demand, offset project status, and new, prospective projects that may be identified following adoption of the Plan. Given the length of the planning horizon, Ecology's technical staff agrees with the Committee that adaptive management will be an important component of successful Plan implementation, as it aims to reduce uncertainty over time, and improve reasonable assurances that the Plan will achieve a NEB.

Ecology technical staff find that the Plan submitted by the Committee meets the requirement of chapter 90.94 RCW, to identify projects and actions necessary to offset the potential consumptive use associated with new PE well withdrawals anticipated through 2038.

All of the water offset and habitat projects have project sponsors who will likely pursue funding to implement their respective projects.

The portfolio of projects will offset projected impacts from PE wells in multiple subbasins, and at the WRIA scale. The projects will enhance streamflow in subbasins that have a surplus of offset water and will improve biological function in all of the subbasins that implement habitat projects. Collectively, the projects will result in a net ecological benefit in WRIA 9.

The Plan makes clear statements that the Committee believes a NEB will be achieved. There is a reasonable assurance that the offsets and NEB within the Plan will occur.

In conclusion, Ecology technical staff's analyses of the Plan indicate that relative to the impacts created by future PE wells anticipated in WRIA 9 over the twenty-year planning horizon, the offset strategies proposed will result in a net ecological benefit for the watershed.

Therefore Ecology technical staff conclude that the Plan meets the intent of the legislation and requirements of RCW 90.94, and, when implemented, will result in a net ecological benefit to instream resources within WRIA 9 in the context of RCW 90.94.

6. References

Ecology 2019. Washington State Department of Ecology (July 2019). Final Guidance for Determining Net Ecological Benefit GUID-2094. Publication 19-11-079 131p.
<https://fortress.wa.gov/ecy/publications/documents/1911079.pdf>.

Wilhere, G.F., T. Quinn, D. Gombert, J. Jacobson, and A. Weiss. 2013. A Coarse-scale Assessment of the Relative Value of Small Drainage Areas and Marine Shorelines for the Conservation of Fish and Wildlife Habitats in Puget Sound Basin. Washington Department Fish and Wildlife, Habitat Program, Olympia, Washington.