Technical Review Report

CHEHALIS WATERSHED (WRIA 22/23) RESPONSE TO 2018 STREAMFLOW RESTORATION LAW

ADDENDUM TO THE CHEHALIS WATERSHED MANAGEMENT PLAN

Water Resources Program

Washington State Department of Ecology

Olympia, WA

November 2020

Principal Author – Tom Culhane, LHG
Contributing Author – Jim Pacheco, Habitat Biologist

Table of Contents

List of Figures and Tables

Figures

Tables

I. Verification of Compliance with Submittal Requirements of RCW 90.94.020

The Washington Department of Ecology (Ecology) has reviewed the WRIAs 22/23 Watershed Plan Addendum (Addendum) in light of the requirements of RCW 90.94.020, and affirms that the document was submitted by the WRIAs 22/23 Planning Unit (Planning Unit) prior to the February 1, 2021 deadline, and that the planning process followed the statutory process outlined in the law.

II. RCW 90.94.020 Technical Review

1.0 Overview

The Planning Unit (the Chehalis Basin Partnership) has approved an Addendum to the Chehalis Watershed Basin Watershed Management Plan, dated November 17, 2020, to address the requirements of chapter 90.94 RCW. This document provides the Department of Ecology Water Resources Program Streamflow Restoration Section technical staff's (Program) review of this Addendum to the WRIA 22/23 Watershed Management Plan.

In addition to the coordination and technical assistance provided by the Program to the Planning Unit, 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.

Sections 2 through 5 of this Ecology technical review document summarize the Program's assessment of the elements discussed in the Planning Unit's Addendum. All figures and tables are taken from the Addendum, and much of the text in Sections 2 through 5 comes directly from that document as well. Section 6 discusses the State Environmental Policy Act (SEPA) review for this project, and Sections 7 and 8 provide the Ecology Water Resources Program technical staff's NEB determination and conclusions.

2.0 Assessment of potential impacts

Note: This section presents information and conclusions provided in the Addendum.

To address the requirements of RCW 90.94 the Planning Unit divided WRIAs 22/23 into 19 subbasins (Figure 1). These subbasins were adapted from the Washington State Department of Natural Resources Watershed Administrative Unit boundaries, with variations dependent on such factors as watershed boundaries and anticipated permit-exempt well densities.

2.1 Population projections

Once the subbasins were delineated, the number of permit-exempt domestic wells expected over the planning horizon and the associated water use were estimated. For Addendum planning purposes the Planning Unit selected the planning horizon to be through the year 2040, which is more conservative than the year 2038 required by statute. To develop its projections, the Addendum relied on available population forecasting, data on building and development trends, and local knowledge.

The Planning Unit considered all of the available information, and evaluated which results they felt were the most appropriate. For Thurston County, Thurston Regional Planning Council-based projections were selected, while for Lewis, Mason, and Grays Harbor counties the Planning Unit evaluated the building permit-based projections versus Office of Financial Management (OFM)-based projections. The resultant permit-exempt domestic well projections are shown in Table 1.

2.2 Consumptive use estimates

Methods and assumptions recommended by Ecology in the NEB Guidance, were employed by the Planning Unit when estimating consumptive water use from new permit-exempt domestic well connections. Two aspects of consumptive use were evaluated:

Indoor consumptive use

Total indoor use was estimated by taking average rural household size and multiplying by an assumed use rate of 60 gallons per person per day, then multiplying by 10 percent. The 10 percent factor was to account for the consumptive use portion of total indoor water use, assuming all subject homes will be on septic systems.

Outdoor consumptive use

An assessment was conducted to estimate the typical size of outdoor irrigation areas associated with newer permit-exempt domestic residential development. The resultant 0.074 acres area was multiplied by an assumed watering requirement for commercial turf production, and a factor representing an assumed irrigation efficiency of 75 percent. That quantity was subsequently multiplied by a factor of 80 percent to account for the amount of water lost to evapotranspiration.

Following these methods, annual consumptive use for homes with average-sized yards for each of the subbasins were estimated as shown in Table 1. Information in the last column of this table is dsiplayed visually in Figure 3 on page 17. For WRIAs 22 and 23 collectively, the total

annual consumptive water use associated with new permit-exempt domestic wells through 2040 was estimated to be 504.8 acre-feet per year (af/yr).

Table 1. Annual consumptive use for homes with average-sized yards (Table 3 in Addendum)

Subbasin	# PE Wells Anticipated in Subbasin	Irrigated Area per Well (ac)	Per Well Consumptive Use (gpd)			Total Consumptive Use (af/yr)
			Indoor	Outdoor	Total	
Black River	1,215	0.074	15.0	88.7	103.7	141.1
Chehalis - Salzer	76	0.074	14.4	93.5	107.9	9.2
Chehalis Headwaters	50	0.074	14.4	77.7	92.1	5.2
Cloquallum - N Delezene	333	0.074	15.2	62.7	77.9	29.1
W Capitol Forest	18	0.074	15.0	74.1	89.1	1.8
Elk - Johns River	25	0.074	15.0	38.5	53.5	1.5
East Willapa	350	0.074	14.5	87.0	101.4	39.8
Hanaford	35	0.074	14.4	91.9	106.3	4.2
Hoquiam	49	0.074	15.0	42.2	57.2	3.1
Humptulips	13	0.074	15.0	53.4	68.4	1.0
Mox Chehalis	51	0.074	15.0	63.9	78.9	4.5
Newaukum	703	0.074	14.4	87.3	101.7	80.1
Satsop	289	0.074	15.9	71.9	87.9	28.4
Scatter Creek	526	0.074	15.0	93.9	108.9	64.2
Curtis	168	0.074	14.4	86.0	100.4	18.9
Skookumchuck	539	0.074	14.6	88.8	103.4	62.4
Northeast Willapa	95	0.074	15.0	67.0	82.0	8.7
Wishkah	2	0.074	15.0	54.3	69.3	0.2
Wynoochee	18	0.074	15.0	56.1	71.1	1.4
WRIA 22/23 Aggregated	**4,555**	**0.074**	**14.8**	**84.1**	**98.9**	**504.8**

2.3 Distribution of Consumptive Use Impacts

The Planning Unit noted that new consumptive water use from permit-exempt domestic wells will not be evenly distributed. To provide a sense of possible future distribution, Figure 1 shows the distribution of single family residential building permits from 2009 to 2018. The Black River, Scatter Creek, Skookumchuck, and Newaukum subbasins, in Lewis and Thurston counties, are projected to have the greatest increases, while most subbasins in Grays Harbor County are projected to have a very small increase.

Impacts to streamflow as a result of new permit-exempt domestic wells will be more complex than just the consumptive use estimates. If new use is well distributed and most is located far enough away from streams, streamflow impacts will tend to be spread evenly throughout the year, essentially steady state. To be conservative in addressing potential instances where these assumptions might not apply, the Planning Unit focused on developing projects in subbasins with the highest projected consumptive use.

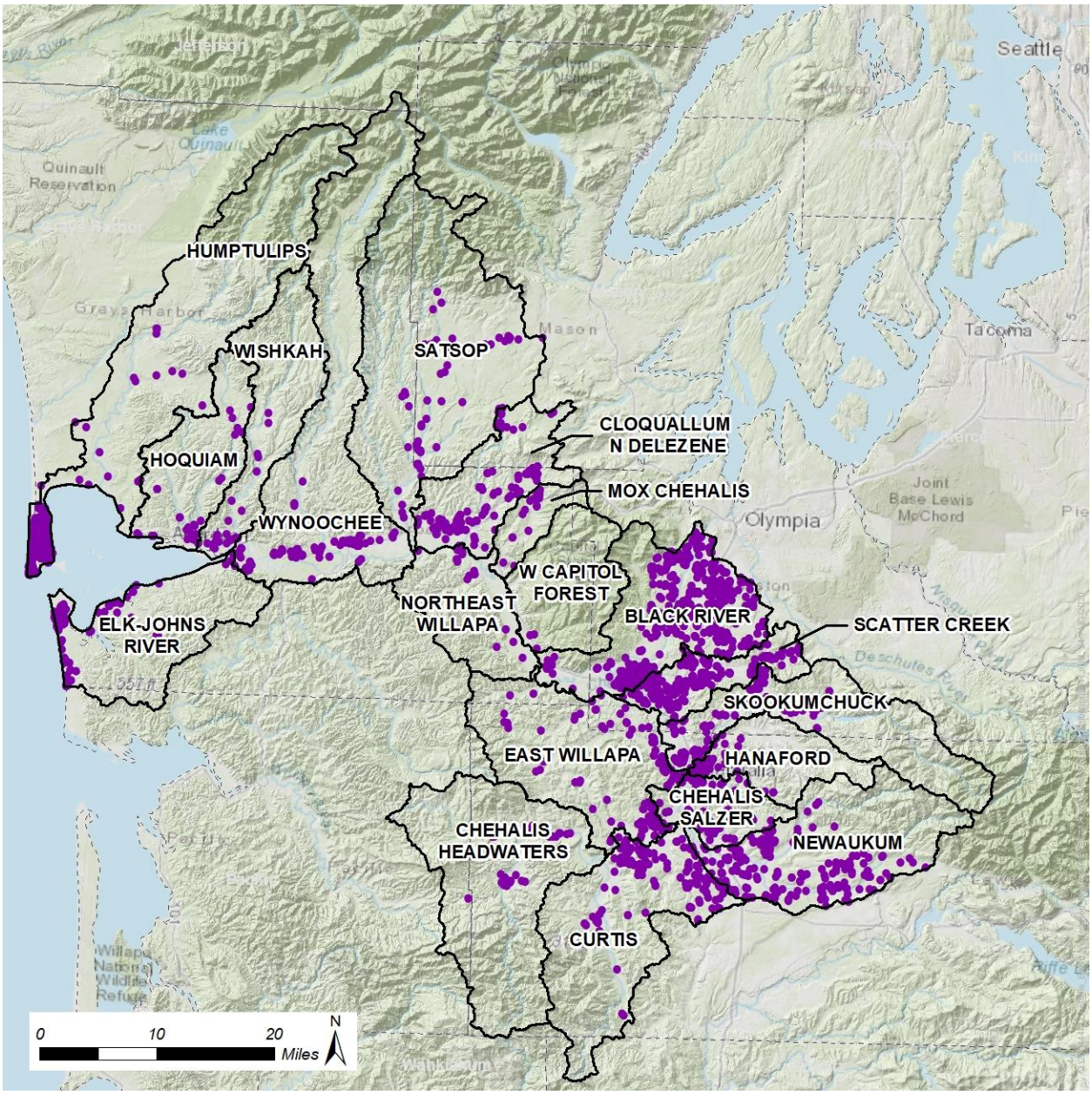

Figure 1. Distribution of single family residential homes on permit-exempt wells 2008-2018 (Figure 3 in Addendum)

2.4 Consideration of Ecological Needs

The Addendum notes that streamflow is a major component and foundation of the basin's ecology. However, other conditions, such as healthy riparian areas and instream habitat diversity are also necessary to the overall ecosystem function, structure, and composition. Therefore these other factors and actions that improve them were considered by the Planning Unit and factored into the Addendum.

3.0 Addendum offset projects

Note: This section presents information and conclusions provided in the Addendum.

The Planning Unit developed a portfolio of projects to offset the impacts of permit-exempt domestic wells anticipated in WRIAs 22 and 23, by the year 2040. All projects proposed were categorized into three broad categories identified in Ecology's NEB Guidance (Ecology, 2019):

- Water right acquisitions
- Non-acquisition water projects
- Habitat and Other project types

The first two categories have associated water offsets that were estimated, when possible, to count toward the target of matching or exceeding consumptive water use from new permit-exempt domestic wells. In some cases, project concepts lacking confident estimates were classified as water offset projects, but not counted toward the offset target. Although some Habitat and Other projects will produce both water offset and habitat benefits, these were evaluated in the plan for aquatic resource benefits only.

In total, the Addendum project portfolio contains 74 separate projects, in these three categories, distributed over 17 of the 19 subbasins. Figure 2 indicates the proposed project locations, with basin-wide-concepts not shown. Table 5, provided at the end of this Ecology technical review report, lists 37 water right acquisition and non-acquisition water projects presented in the Addendum – many of which have habitat values as well. In addition, there are 37 habitat-only projects listed in tables that can also be found in Section 6 of the Addendum.

3.1 Project certainty ratings

Two types of certainty ratings were assigned by the Planning Unit to those projects that are expected to contribute water benefits (Table 5) assuming implementation by 2040. The table's implementation certainty ratings were assigned qualitatively based on many factors, including the Planning Unit's understanding about project readiness, project sponsor commitments, and funding. Benefits certainty ratings were assigned through Planning Unit sub-committee work, and in consultation with Program staff, Washington Department of Fish and Wildlife (WDFW), and Quinault Indian Nation specialists. Conceptual projects and those with no site-specific analysis were assigned a low benefit certainty (L) or a non-quantified water offset (NQ).

3.2 Project categories and general descriptions

All of the projects were divided into eight categories in Section 6.0 in the Addendum. The following are descriptions of those categories, and some information on the 20 core projects with higher certainty of implementation that the Planning Unit focused on during its NEB analysis (Table 2 in Section 5).

Water offset projects

These projects typically acquire and place into trust all or a portion of active water rights. Water associated with these rights would no longer be used consumptively, and would remain in the streams. Two such projects included in Table 2 are SK-00 and BW-06.

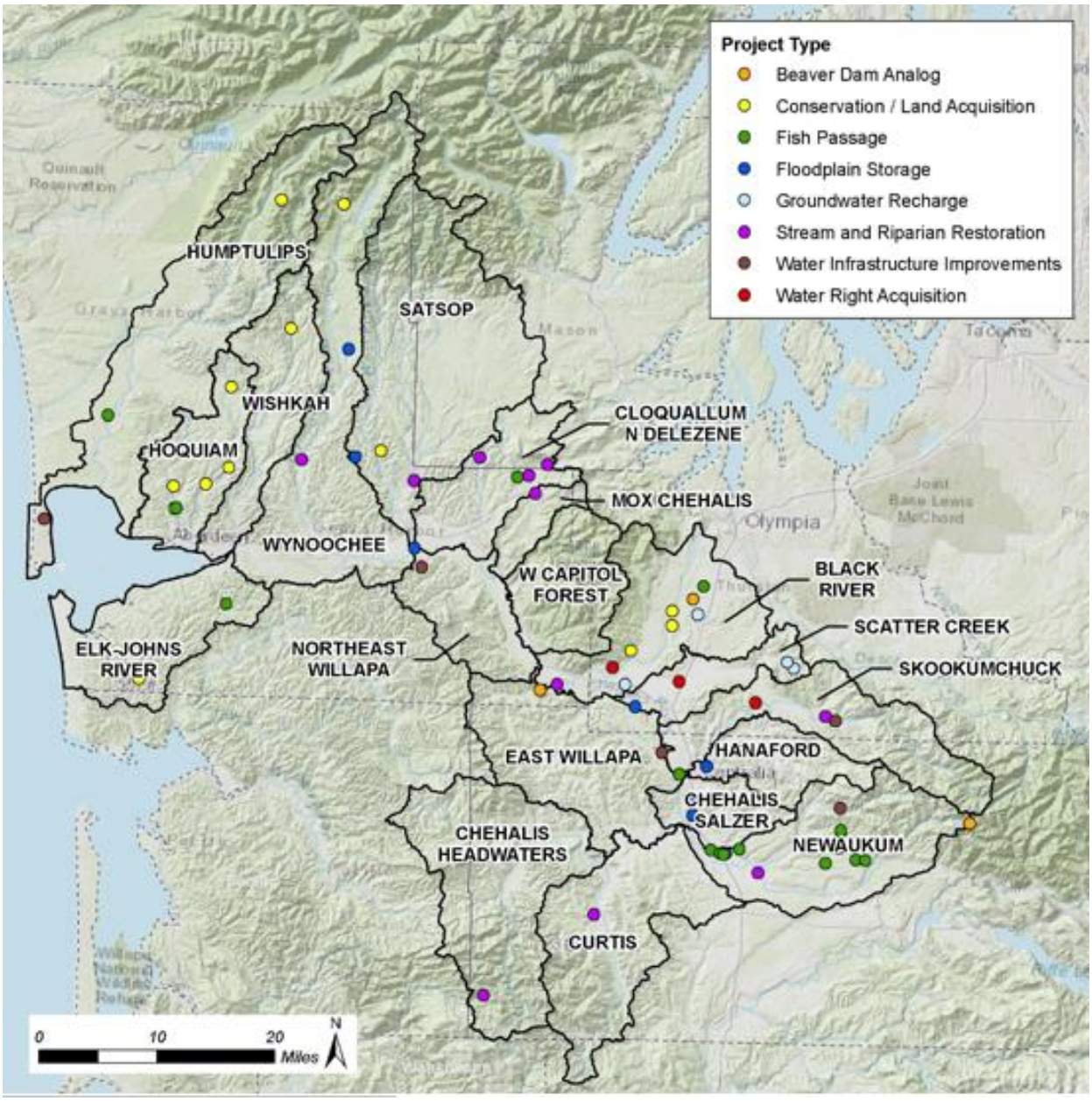

Figure 2. Proposed project locations (Figure 4 in Addendum) (basin-wide projects not shown)

The largest and highest certainty water right acquisition in the Addendum is SK-00 - TransAlta water right acquisition from the Skookumchuck River. This water right is associated with a coal-fired power plant undergoing a phased closure, and the Addendum claims 2,898 af/yr (4 cfs) of offset for this project, which is a very sizeable amount.

BW-06, titled Trust Water Rights Acquisitions represents a collection of potential water right acquisitions currently in the Ecology Trust Water Rights Program, and some active water rights that may present potential opportunities. These acquisition opportunities, and others not yet identified, do not have sponsors. Therefore, BW-06 has no offset amount assigned in Table 2.

Water infrastructure improvements

These projects would transfer sources for existing water uses to new points of diversion, to benefits streams in critical times or locations. Offset quantities were estimated based on the rate of replaced or relocated water use and the time period over which the shift would occur. The most developed of these projects, N-00 - City of Chehalis Water Diversion Relocation, is included in Table 2. That project would relocate an active diversion from the North Fork Newaukum River to the mainstem Chehalis River. While it would not decrease consumptive water use, it would return flow to a stream segment that suffers from low flows and high water temperatures, in an area with some of the most depressed salmon stock – spring Chinook.

Groundwater recharge

Groundwater recharge projects benefit streams by directing surface water flow (e.g. flood flows, stormwater runoff) into the ground, thus providing additional storage and more gradual release to streams during the summer critical flow period. Managed aquifer recharge (MAR) and stormwater infiltration projects fall into this category. Water offset quantities for these projects can be estimated based on surface diversion rates or infiltration rates, and groundwater flow characteristics. Four of these projects are included in Table 2.

Project B-05 - Albany Street Stormwater Pond has already been implemented. It was supported during the first round of Streamflow Restoration and Enhancement grant funding and has been implemented by Thurston County. Additionally, Thurston County is interested in three additional MAR projects in the Scatter Creek and Black River subbasins (SC-02, SC-03 and BW-05).

Floodplain storage

Floodplain storage projects involve construction or enhancement of storage capacity in floodplains with the ability to effect the timing of releases of flood storage back to the stream. In some places flows from large floods can be detained in floodplain reservoirs and slowly released back to a stream, while in others, a portion of the stored floodwater will infiltrate and return to the stream via groundwater. Floodplain storage is often a component of larger floodplain restoration and reconnection projects that can provide other habitat benefits.

Seven floodplain storage projects are included in Table 2. For the Addendum, offset amounts were estimated using modeling, where available, or were based upon modeled results for similarly-sized projects. Project H-00 - China Creek Phase 2 Wetland Restoration, which is currently under construction, is an example where hydraulic modeling developed for the project design was available. The City of Centralia is the owner and sponsor for this project.

Two projects, CS-00 - Berwick Creek Flood Reduction Restoration, and CS-03 - Flood Hazard Reduction Master Plan and Chehalis Wastewater Treatment Plant Project, had benefits estimated using extrapolated model results. These estimates only represent surface flow back to the stream, and do not claim groundwater infiltration, which also would benefit streamflow.

Three projects(S-00, S-02, and WY-02), located in the Satsop and Wynoochee subbasins, would employ large wood installations instream to raise the streambed and induce shallow aquifer recharge and storage. Several similar projects have been implemented statewide, but results on

extent of the aquifer recharge and contribution to streamflow are inconclusive, so no water benefits were provided for these projects. Various habitat-improvement and floodwater storage projects are planned for the SC-01 -TC #90 Weins Farm Restoration site.

Beavers and beaver dam analogs (BDAs)

Engineered BDAs seek to replicate the natural floodplain settings created by beaver dams. Strategic addition of woody debris raises water levels and floods low-lying areas, promoting lateral infiltration into banks that effectively raises the local water table. BDAs are a relatively new concept, but some studies have indicated measurable benefits to baseflow (Yokel et al., 2018). Based on a study by Dittbrenner (2019) the Addendum suggests that water offsets from BDA projects might be 2.5 af/yr. However, it also recognizes that there is uncertainty associated with these projects and thus takes a conservative approach when assigning offset amounts.

B-00 - TC #91 Holm Farm Ditch Removal and Floodplain Reconnection and EW-00- Garrard Creek Floodplain Restoration Opportunity Assessment have 6.8 and 2.5 af/yr, respectively, assigned in Table 2. These numbers are relatively small and the projects involve more than just the BDA portion of the projects. N-12 - Beaver Dam Analog Pilot Implementation has 6.25 af/yr assigned. BW-00 and BW-03 are proposed basin-wide projects with sites yet unknown, and no offset amounts are assigned in Table 2. The Addendum stresses that in addition to water offset potential, BDAs also offer measurable benefits to aquatic habitat.

Conservation and land acquisition

Conservation and land acquisition projects preserve and restore natural land cover and ecological function through protection of land for that purpose. These projects are generally not assumed to provide direct water offsets, and are not included in Table 2.

Stream and riparian restoration

This category encompasses stream and riparian corridor habitat restoration and enhancement projects, including introduction of large woody debris, floodplain reconnection, backwater and side channel habitat enhancement, and riparian plantings, as well as other actions. Some of these projects may provide limited water offset benefit through mechanisms similar to floodplain storage or BDAs, and one, BW-06 - USGS Groundwater Discharge Zone Delineation, was included in Table 2 with no benefit quantity assigned. That project involves a study to produce information that could help in designing subsequent stream and riparian restoration projects that could benefit streamflows. The other projects in this category that were included in the Addendum's general list mainly help to ensure that ecological benefits were distributed throughout the subbasins.

Fish passage

Fish passage barrier removals can provide significant benefits to salmonids and other aquatic species by opening up high quality habitat areas that fish were previously unable to access. These projects do not provide water offset benefits, but are included in the Addendum to help ensure habitat benefits are distributed throughout the basin. The only project in this category included in Table 2 was HT-00 - Kirkpatrick Road Fish Passage Construction, with no offset estimate provided.

4.0 Planning unit Net Ecological Benefit evaluation

Note: This section presents information and conclusions provided in the Addendum.

According to chapter 90.94 RCW, watershed plan updates must result in a NEB in addition to offsetting new consumptive use from permit-exempt well connections over the planning horizon. Although it is not required under the regulation, Ecology NEB Guidance encourages planning groups to evaluate NEB to provide reasonable assurance that the offsets in their watershed plans and a NEB of will occur. The Planning Unit chose to evaluate NEB in their Addendum.

4.1 Water offset evaluation – core NEB water benefit projects

When the Planning Unit performed its NEB evaluation it focused on a subset of 20 water right acquisition and non-acquisition water projects with a higher certainty of implementation, as shown in Table 2 (Note: This table is derived from Table 15 in the Addendum, which included some minor errors that have been corrected by the Program). This reduced project list was used to convey reasonable assurance that the identified projects would offset future streamflow impacts from new permit-exempt domestic well connections.

To further account for uncertainty in water offset benefits in the Addendum, Table 2 water offset values were scaled from the estimates shown in Table 5. Water offset values were scaled to 50 percent of estimates for all projects with a medium (M) certainty of water benefit rating, and 25 percent for projects with a low (L) water benefit certainty. Those values with high (H) certainty rating were not scaled. As shown in Table 2, the total credited water offset benefit from projects with high or medium certainty of implementation is 3,290 af/yr, more than six times the projected streamflow impacts of 504.8 af/yr. The bulk of this comes from the TransAlta water right acquisition (SK-00), located in the Skookumchuck subbasin. This is the highest priority project identified in the Addendum by the Planning Unit.

According to the Addendum, the remaining projects not included in Table 2 hold high value for aquatic habitat restoration, in addition to their water offset values. The Addendum indicates the Planning Unit strongly believes these projects are necessary and fundamental to restoring streamflow in the Chehalis Basin, and that they clearly contribute to the NEB of the strategy.

Table 2. Highest certainty projects water offset evaluation (Table 15 in Addendum)

Project ID	Project Name	Credited Water Offset (af/yr)	Certainty of Implementation	Certainty of Water Benefit
Black River		**18.7**		
B-00	TC #91 Holm Farm Ditch Removal and Floodplain Reconnection	6.8	M	M
B-05	Albany Street Stormwater Pond	11.9	H[1]	M
Chehalis-Salzer		**0**		
CS-00	Berwick Creek Flood Reduction Restoration (Port of Chehalis)	NQ[2]	H	M
CS-03	Flood Hazard Reduction Master Plan and Chehalis Wastewater Treatment Plant Project	NQ	M	M
East Willapa		**2.5**		
EW-00	Garrard Creek Floodplain Restoration Opportunity Assessment	2.5	H	M
Hanaford		**1.5**		
H-00	China Creek Phase 2 wetland restoration	1.5	H	M
Humptulips		**0**		
HT-00	Ocean Shores Water Reclamation and Reuse[3]	0	M	L
Newaukum		**286.3**		
N-00	City of Chehalis Water Supply Diversion Relocation	280	M	H
N-12	Beaver Dam Analog Pilot Implementation	6.25	H	M
Satsop		**0**		
S-00	Satsop/Wynoochee Tributary Assessment	NQ	H	M
S-02	Lower Satsop Restoration, Protection, and Aquifer Recharge-Phase II	NQ	H	M
Scatter Creek		**78**		
SC-01	TC #90 Weins Farm Restoration	5	M	L
SC-02	TC #89 Upper Scatter Creek MAR	26.8	M	M
SC-03	TC #81 Sampson Wetlands Restoration and MAR	46	M	M
Skookumchuck		**2,898**		
SK-00	TransAlta Water Right Acquisition	2,898	H	H
Wynoochee		**0**		
WY-02	Satsop/Wynoochee Tributary Assessment	NQ	H	M
Basinwide Concepts		**2.5**		
BW-00	Beaver Dam Analog Implementation	NQ	M	M
BW-03	Eager Beaver Collaboration	NQ	H	M
BW-05	Stormwater Recharge Opportunity Assessment	2.5	M	M
BW-06	Trust Water Rights Acquisitions	NQ	M	H
Totals		**3,290**		

1 - Albany Street Stormwater Pond was completed in 2020.
2 - NQ: Water offset expected; insufficient data to quantify
3 - Local water benefit from project would not offset projected consumptive use.

4.2 Geographic distribution of projects

Table 3 summarizes the anticipated water offsets provided by the Addendum's entire suite of projects for each subbasin and the basin as a whole. The table includes estimated offsets by subbasin for all projects, along with the credited (scaled) offsets from the group of projects with the highest certainty of implementation (from Table 2). Figures 3 and 4 indicate information from this table on maps, with unscaled results in the former, and scaled results in the latter. In both figures the consumptive water use numbers are on top in red and offset project quantities are below in green. Comparison of both maps conveys how scaling impacted the portrayal of offset potentials associated with the projects.

Table 3. Water offset summary for projects (Table 16 in Addendum)

Subbasin	Consumptive Use Estimate (af/yr)	Number of Proposed Projects		Estimated Water Offset (af/yr)		Credited Water Offset (af/yr)
		Water Offset[1]	Habitat / Other	All Projects	Highest Certainty	
Black River	141.1	4	6	192	25.4	18.7
Chehalis - Salzer	9.2	2	3	NQ[3]	NQ	NQ
Chehalis Headwaters	5.2	0	1	0	0	0
Cloquallum - N Delezene	29.1	0	5	0	0	0
W Capitol Forest	1.8	0	0	0	0	0
Elk - Johns River	1.5	1	1	23	0	0
East Willapa	39.8	2	2	9.5	5	2.5
Hanaford	4.2	1	2	3	3	1.5
Hoquiam	3.1	1	6	17	0	0
Humptulips	1.0	2	2	20	0	0
Mox Chehalis	4.5	0	0	0	0	0
Newaukum	80.1	5	13	601	293	286
Satsop	28.4	2	4	NQ	NQ	NQ
Scatter Creek	64.2	5	5	866	166	78
Curtis	18.9	0	1	0	0	0
Skookumchuck	62.4	2	2	3,221	2,898	2,898
Northeast Willapa	8.7	1	0	NQ	0	0
Wishkah	0.2	1	1	10	0	0
Wynoochee	1.4	2	3	2	NQ	NQ
WRIA 22/23 Total[2]	**504.8**	**37**	**62**	**5,175**	**3,399**	**3,290**

1. Includes water right acquisitions and non-acquisition water offset projects.
2. Includes basinwide projects not assigned to individual subbasins.
3. NQ: Water offset expected; insufficient data to quantify.

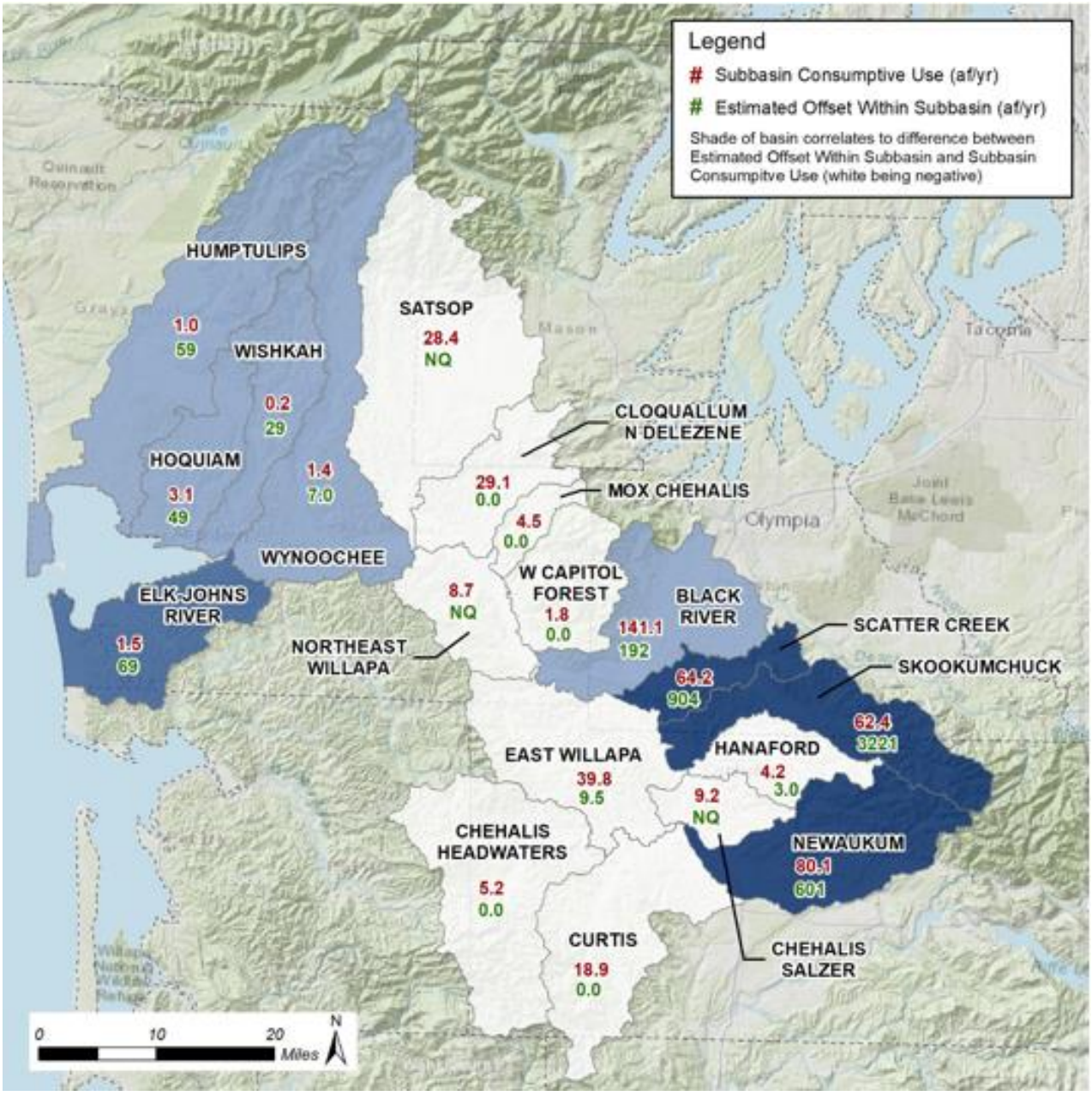

Figure 3. Estimated water offset (unscaled) vs. consumptive use by 2040 by subbasin for all projects (all quantiles in af/yr)(Figure 5 in Addendum)

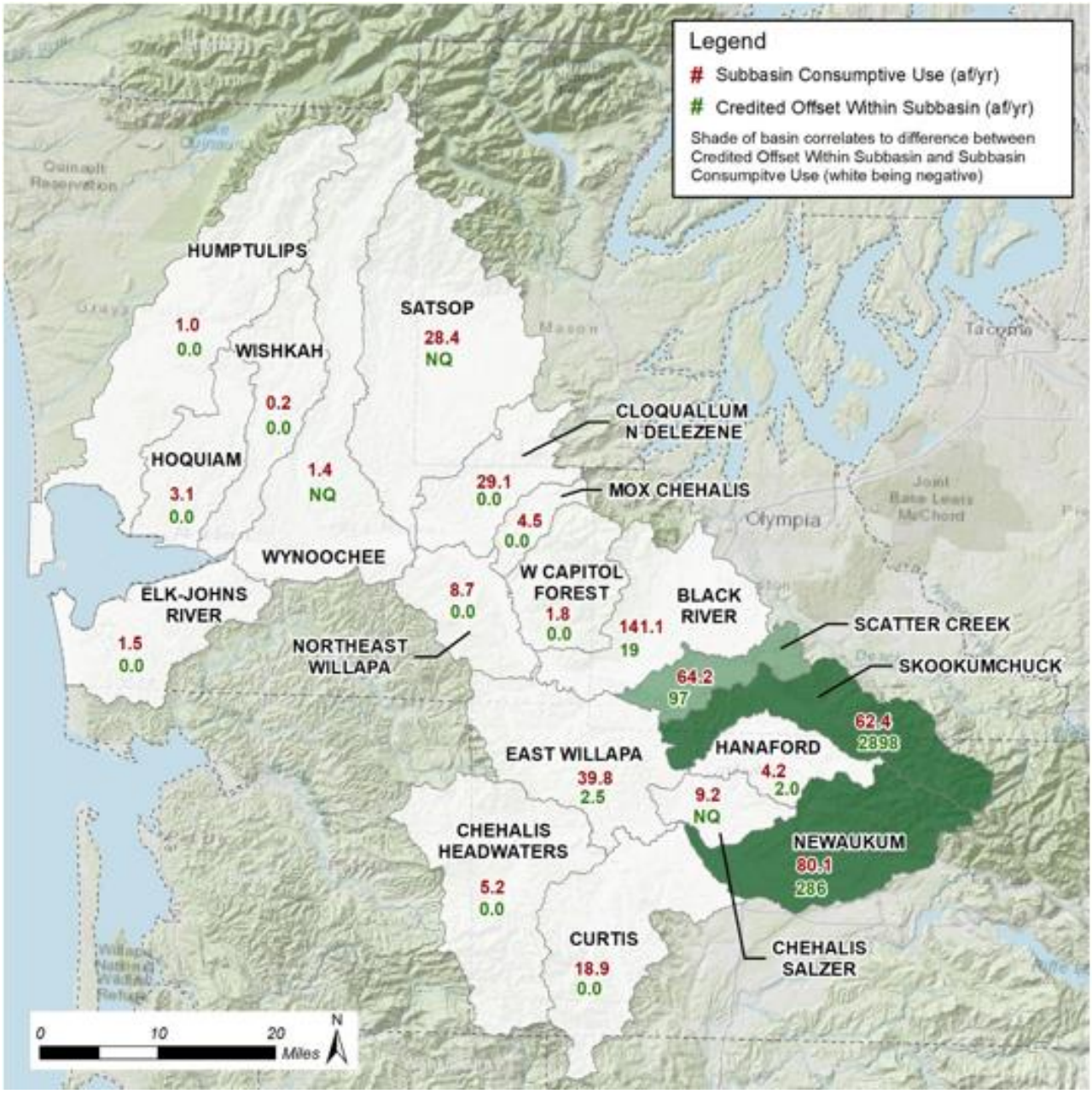

Figure 4. Credited water offset (scaled) vs. consumptive use by 2040 by subbasin for medium to high certainty projects (all quantiles in af/yr)(Figure 6 in Addendum)

Projected new consumptive water use is concentrated in a limited number of subbasins. There are just four subbasins with 60 af/yr or more of anticipated new consumptive water use (Black River, Scatter Creek, Skookumchuck, and Newaukum), and anticipated use in those subbasins comprised nearly 70 percent of all anticipated new consumptive water use in the basin. The Addendum presented several large water offset projects located in the upper reaches of the basin, which it concludes could produce downstream benefits for significant portions of the basin, and in some of the most critical areas for depressed salmon stocks (spring Chinook).

The Addendum indicates that at the basin-scale, anticipated water offsets exceed the projected consumptive use by a factor of six, even when considering only those projects already on track for implementation and adjusting for uncertainty in water offset estimates. Based on the full suite of projects, water benefit projects are well distributed throughout the basin. 14 of the 19 subbasins have at least one identified offset project, and in each of the four subbasins with the highest projected consumptive use, projects are expected to provide offsets exceeding that subbasin's water offset target. While there are a number of subbasins with no water offset projects anticipated, the projected consumptive water use in those subbasins is generally small (under 10 af/yr).

The Addendum indicates that the largest water benefit in the basin would be achieved through one project—the TransAlta water right acquisition. While the benefits associated with this acquisition are substantial due to the large quantity and strategic location, reliance on a single project does present some risk. The entire water right has significantly more water available than the 2,898 af/yr anticipated for this project, there is clear evidence of beneficial use, and there are no doubts that the current use will end – all pointing toward some certainty. Additionally, the Quinault Indian Nation currently has an approved Streamflow Restoration and Enhancement grant to study the feasibility of acquiring part of this water right. To address potential uncertainty concerns, the Addendum contains a robust adaptive management strategy that includes mechanisms to adapt the list of projects, if any do not fulfill expectations. Additionally, the Planning Unit strove to develop projects of all types (water right acquisitions, non-acquisition water projects, and habitat and other project types) in all of those subbasins with the highest projected consumptive use.

4.3 Additional benefits to instream resources

Two major salmon and aquatic species restoration programs in the Chehalis Basin were used to define priority needs for instream resources. The Addendum considers these the best source to identify ecological needs and priority protection and restoration actions for the basin:

- Chehalis Basin Salmon Restoration and Preservation Strategy (CBSRPS)
- Chehalis Basin Strategy Aquatic Species Restoration Plan, Draft (ASRP)

The CBSRPS identified levels of concern for seven salmonid-limiting factors, for more than 30 drainage basins. The ASRP is a multispecies-focused restoration plan focused on aquatic and semi-aquatic species.

The Addendum includes 62 projects that address the ecological needs by restoring, enhancing, and providing access to stream and riparian habitat throughout the Chehalis Basin. These projects align with the priority restoration and protection actions identified by the ASRP and are well targeted. Some of these projects also provide water offset benefits, and are included in Tables 2 and 6.

Habitat-related projects were identified in 16 of the 19 subbasins, ensuring that ecological benefits will be distributed throughout the basin. The Addendum indicates that the listed projects will enhance more than 120 miles of stream and riparian habitat, mostly in the more heavily impacted Newaukum and Skookumchuck subbasins; preserve 2,180 acres of forested

uplands and riparian wetlands; and reconnect more than 40 miles of salmonid habitat by removing fish barriers. Many of the fish barrier and restoration projects included in the Addendum were identified through the CBSRPS and the ASRP, and are already funded through various stages of design and construction.

4.4 Planning Unit Net Ecological Benefit summary

Table 4 summarizes why the Planning Unit believes the Addendum satisfies the NEB criteria of RCW 90.94.020. The Addendum presents several large water offset projects located in the upper reaches of the basin, that will produce downstream benefits for significant portions of the basin, in some of the most critical areas for depressed salmon stocks (spring Chinook). Nearly 70 percent of the consumptive use from new permit-exempt wells through 2040 is anticipated to occur in four of the 19 subbasins: Newaukum River, Scatter Creek, Skookumchuck and Black River. Scaled, higher-certainty offset projects in first three of these subbasins far exceed the projected consumptive use there.

The largest water offset project - acquisition of a portion of the surface water right from the retiring TransAlta coal-fired power plant - is located in the Skookumchuck subbasin and would provide 2,898 af/yr of water - which is more than eight times the estimated consumptive use in all high growth areas combined. And this project would benefit not just the Skookumchuck subbasin. Placing this water permanently into the Trust Water Rights Program would contribute cooler water to the mainstem Chehalis, which most salmon in the Chehalis Basin migrate through, and in some cases hold, during the summer. In that respect, 15 of 19 of the subbasins in the Chehalis Basin would benefit from this one project.

Given that the TransAlta project would not benefit the Black River subbasin directly, and that that subbasin is expected to experience the greatest growth in new permit-exempt domestic wells, the Addendum indicates that the Planning Unit plans to focus on developing near-term projects in that subbasin.

In addition to the TransAlta water right acquisition, there are significant water offset projects located in the Newaukum and Scatter Creek subbasins that are anticipated to provide 286.3 and 97 af/yr, respectively. Beyond the proposed water offset projects, the Addendum relies on an extensive list of Habitat and Other projects to provide benefits to 16 of 19 of the watershed's subbasins. The Addendum includes 62 targeted habitat projects that address ecological needs that have been identified through two major salmon and aquatic species restoration programs.

Ultimately the Planning Unit concluded that the Addendum will provide a NEB to the Chehalis River Basin by implementing projects that will fully offset, and substantially exceed, the projected consumptive use impacts of permit exempt domestic wells, while also addressing habitat and temperature issues in the basin.

Table 4. Addendum compliance with Ecology NEB criteria (Table 20 in Addendum)

Ecology NEB Guidance Criteria	Chehalis Basin Watershed Plan Addendum
3.2.3.1 Clear and Systematic Logic Watershed plans must be prepared with implementation in mind.	Plan Addendum prepared through collaborative process with longstanding Watershed Planning Unit – the Chehalis Basin Partnership. This group has been actively working together since 1998, and is committed to implement this Addendum. Offset projects are strong actions to both restore streamflow and contribute ecological benefits that are identified needs in the basin.
3.2.3.2 Delineate Subbasins Planning groups must divide the WRIA into suitably-sized subbasins to allow meaningful analysis of the relationship between new consumptive use and offsets.	The Partnership divided the basin into 19 subbasins that reflect manageable and meaningful management units for tracking permit-exempt well development, streamflow impacts, and offset with projects that address impacts in those areas. Subbasin delineation is described in Section 2.4.
3.2.3.3 Estimate New Consumptive Water Uses Watershed plans must include a new consumptive water use estimate for each subbasin, and the technical basis for such estimate.	Consumptive use estimates were developed using basin-specific data and accepted Ecology references. Consumptive use estimate is described in Chapter 4.
3.2.3.4 Evaluate Impacts from New Consumptive Water Use Watershed plans must consider both the estimated quantity of new consumptive water use from new domestic permit-exempt wells initiated within the planning horizon … and how those impacts will be distributed.	The distribution of consumptive use from new permit-exempt well connections was based on regional growth modeling (Thurston County), spatial distribution of recently-built self-supplied single family homes, and availability of supply from water purveyors. This is described in Chapters 3 and 4, and in Appendix A.
3.2.3.5 Describe and Evaluate Projects and Actions for their Offset Potential Watershed plans must, at a minimum, identify projects and actions intended to offset impacts	This Watershed Plan Addendum identifies 74 projects that could provide water and/or instream flow benefits to support NEB. 36 projects total, and 13 medium-high certainty projects are included that could provide water benefit. This project suite far exceeds the estimated consumptive use and streamflow impact, and when implemented will result in a NEB to the basin.

5.0 Implementation and adaptive management

Note: This section presents information and conclusions provided in the Addendum.

The Planning Unit states that once the Addendum has been adopted by Ecology, it intends to continue as lead entity for implementation. The Addendum states that with the Planning Unit's membership participation, including the four counties with projected new permit-exempt well connections, most cities, the Chehalis Tribe, the Quinault Indian Nation[1], and stakeholder representatives, it is well-suited to this role.

5.1 Implementation work plan

Immediately following adoption of the Addendum and if funding is available, the Planning Unit plans to develop an Implementation Work Plan. The Planning Unit plans to work with project sponsors, or to secure a project sponsor where one is not committed. The project portfolio will be managed to ensure that projects with high confidence in water benefits that substantially contribute to NEB are prioritized. Information on initial project sequencing and project development is provided Tables 22 and 23 in the Addendum.

5.2 Implementation tracking

The Addendum identifies the Planning Unit's belief in the need to track streamflow restoration projects and new domestic permit-exempt well connections, and its understanding that implementation of project tracking using the Salmon Recovery Portal will be piloted through a program coordinated by WDFW in collaboration with Ecology and the Recreation & Conservation Office (RCO). Tracking will be conducted not only to monitor progress toward meeting project and plan goals, but also to assess how these efforts align with salmon recovery efforts in the watershed.

5.3 Adaptive management approach

The Addendum states that maintaining the Planning Unit as the implementing body will enable it to adaptively manage plan implementation and provide the best assurances that future impacts to streamflow from permit-exempt wells will be offset and that a NEB is provided to the basin. The Planning Unit intends to achieve adaptive management through the following:

Monitoring implementation of approved Addendum

This activity will include:

1. Verification of new permit-exempt domestic well water use.

[1] The Quinault Indian Nation was not a signatory to the Chehalis Basin Partnership Initiating Governments Agreement and is therefore not listed as a Partnership member in the Operating Procedures Manual. RCW 90.94.020(3) requires that Initiating Governments invite participation from any "federally recognized Indian tribe that has usual and accustomed harvest area within the water resource inventory area." The Quinault Indian Nation has historically participated regularly in Partnership meetings and conveyed its intent to participate in the RCW 90.94 Watershed Management Plan Update, and the Partnership welcomed the Quinault Indian Nation for full participation, as if they were formal signatory members, for development of the Addendum.

2. Comparison of actual new well development data against well growth projections used in development of the Addendum.
3. Adaptive management of streamflow restoration project implementation.
4. Comparison of new permit-exempt water use with actual water use offsets produced or likely to be produced water offsets for each subbasin.

The Planning Unit also recommends that Ecology track new permit-exempt domestic well construction and keep records of the location/site of water withdrawals, and that those well location records be made available through Ecology's well records database. The Planning Unit further recommends that Ecology well records be regularly uploaded to the Salmon Recovery Portal database. Ecology has not committed to any of these recommendations at this time.

Assessment of Net Ecological Benefit

As part of the implementation and adaptive management strategy, the Planning Unit intends to assess whether the implementation of projects is on track to meet the goals of achieving a NEB for the watershed. Specific steps toward this are described in Addendum, including evaluating progress toward NEB from each project during each of the five-year reviews.

Five-Year Implementation Progress Reviews

The Planning Unit will prepare brief progress reports at five-year intervals, including information on updated estimated water use, actual numbers of new wells, and estimated quantities of offset water/other environmental benefits generated. The reports will include cost information, such as the amount of funds awarded to projects, estimated costs for unfunded projects, and estimated administrative costs associated with implementation. Based on these assessments, projects may be added and/or reshaped to maximize streamflow restoration efforts. The Planning Unit also recommends that these assessments inform Ecology for awards of Streamflow Restoration and Enhancement grants in future application rounds.

5.4 Resources needed for implementation and adaptive management

The Addendum indicates the Planning Unit will need permanent, stable, administrative support to coordinate the outlined tasks. As such, it recommends that the state Legislature provide funding to support the administrative functions of the Planning Unit, and facilitate implementation and monitoring associated with the Addendum. Specifically the document indicates that the costs for implementation of projects necessary to meet NEB should be provided. The Planning Unit also recommends that the state Legislature fund Ecology and the Planning Unit to develop processes to adaptively manage implementation of the Addendum.

In the interim, the Planning Unit requests that well fees collected in WRIAs 22/23 be directed to Grays Harbor County, as fiscal agent, to fund the watershed coordinator position, and that some of that money be spent on costs related to Planning Unit meetings and coordination, and preparation of the five-year progress reviews. The Planning Unit also indicates that it understands that a local financial or in-kind match will demonstrate member commitments.

6. State Environmental Policy Act

The State Environmental Policy Act (SEPA) (chapter 43.21C RCW) requires state and local governments to consider potential environmental consequences of proposed actions, including project and non-project actions, during the decision-making stage. Under SEPA rules, non-project actions are defined as governmental actions involving changes to policies, plans, and programs (WAC 197-11-774). Any non-project action must be reviewed under SEPA unless specifically exempted. The SEPA review consists of identification and evaluation of probable impacts of a proposed action, reasonable alternatives to the proposed action, and mitigation measures, before committing to a particular action.

Grays Harbor County is the SEPA lead agency, and Mark Cox, the Director of Utilities and Community Development, was identified as the SEPA Responsible Official. On September 28, 2020, the SEPA Responsible Official submitted a SEPA checklist for the adoption of an addendum to the Chehalis Basin Watershed Management Plan, and issued a Threshold Determination of Non Significance (DNS) in accordance with WAC 197-11-340, identifying the proposal would not have a probable, significant, and adverse environmental impact. The date of publication in Grays Harbor County's legal periodical of record was October 1, 2020, and public comments were received through October 15, 2020. The DNS was upheld after all received comments were reviewed and were determined not to provide probable, significant, and adverse impacts from the proposal.

7.0 Ecology technical staff Net Ecological Benefit determination

7.1 Adequacy of plan analysis

RCW 90.94.020(4)(c) states that,

> Prior to adoption of the updated watershed plan, the department must determine that actions identified in the watershed 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.

The law requires Ecology to determine that a NEB will result prior to adopting watershed plan updates. NEB is not a technical term that has been defined in the natural sciences, and instead is a creation of the Washington State Legislature. Therefore Ecology prepared the document Final Guidance for Determining Net Ecological Benefit (Publication 19-11-079).

Although it is not a requirement, Ecology's Guidance encourages planning groups to articulate NEB evaluations in their watershed plans. The document states that plans that include NEB evaluations significantly contribute to reasonable assurances that actions within the plans will occur, and that Ecology will review any such plans with considerable deference to the knowledge, insights, and expertise of those who prepared the plans. The Planning Unit conducted an evaluation as described in Section 4.0 above, and concluded that the Addendum would achieve a NEB.

7.2 NEB evaluation

Program staff participated in Planning Unit subcommittee discussions, including those regarding how to evaluate NEB. Consequently, the structure and content of the Planning Unit's NEB analysis is consistent with how the Program has conducted its analysis.

Well growth/consumptive use estimate

The forecast of new permit-exempt domestic wells involved estimating which parcels are currently served by permit-exempt wells, and selecting growth rate forecasts to extrapolate through the year 2040, which is more conservative than the 2038 requirement. Following methods recommended by NEB Guidance, estimates of annual consumptive water use associated with new permit-exempt domestic wells supplying homes with average-sized yards were developed. For WRIAs 22 and 23 collectively, the total annual consumptive water use associated with new permit-exempt domestic wells from 2018 through 2040 was estimated to be 504.8 af/yr. Estimates for each of the 19 subbasins individually are presented in Table 1. Ecology technical staff concurs with this analysis.

Water offset amounts

The Planning Unit developed a suite of projects to offset the potential impacts to instream flows associated with the anticipated new, permit-exempt, domestic wells, and produced estimates of offset quantities associated with these projects. All totaled, a portfolio of 74 projects was generated, distributed over 17 of the 19 subbasins (see Figure 2). Those projects fall into three categories: water right acquisitions, non-acquisition water projects, and habitat and other project types. To facilitate its NEB determination, the Planning Unit separated out the

37 projects that fall under the water right acquisition and non-acquisition water project categories, and listed the offset quantities associated with each project (Table 5). To help address uncertainty, two types of certainty ratings were assigned to each project in this table - one regarding the likelihood that project implementation would occur, and the other regarding how much confidence there is in the estimated water quantity amounts. Ratings designations, including high (H), medium (M), and low (L), were assigned, as well as a non-quantified (NQ) designation for the benefit amount in instances where information was insufficient to make a reasonable estimate. While performing the Addendum analyses, the Planning Unit's further took the 37 projects found in Table 5, and separated out 20 of those projects that it considered core in making its NEB determination (Table 2).

During the planning process Ecology and some Planning Unit members expressed concerns regarding some project descriptions, methods used for estimating water offset benefits, and estimated benefit amounts, in a draft version of the report. The Planning Unit addressed those concerns by improving some project descriptions and analyses, and by reducing estimates for certain projects. Following those improvements and subsequent discussions, a decision was made to further qualify the estimated benefit amounts for some of the 20 core water right acquisition and non-acquisition water projects presented in Table 2.

To understand the nature of the estimates provided in Table 2, it is useful to understand the processes used to generate these numbers. Firstly, it is important to note that Table 14 and 15 in the Addendum pertain to Tables 5 and 2 in this Ecology report, with the sequential number order being reversed by Ecology to allow oversized Table 5 to appear at the end of this report. This is significant because the information in Table 5 was developed by the Planning Unit prior to the information presented in Table 2. Bearing this in mind, the following steps were followed by the Planning Unit when determining the offset quantities presented in the Addendum:

- The estimates provided by the Planning Unit began with the methods described in each of the Addendum project descriptions, and the results produced by those methods are shown as the water offset estimates in Table 5.
- Only 20 projects from Table 5 were transferred to Table 2. Generally only projects with higher levels of certainty in terms of project implementation and estimated offset benefits were transferred, with two exceptions[2].
- When projects were transferred from Table 5 to Table 2, some credited amounts were scaled (reduced) based on a factor of 25 percent and 50 percent for projects with low and medium certainty of project benefits, respectively.

[2] Project HT-00 - Ocean Shores Water Reclamation and Reuse was transferred to Table 2 despite a low probability of project benefits, and it was assigned zero benefits in Table 2. Project C-01 - TC #90 Weins Farm Restoration was also transferred despite a low project benefits probability, and it was assigned 5 af/yr of benefits in Table 2, which is 25 percent of the amount that project was assigned in Table 5.

All totaled, only 11 of the 20 projects transferred from Table 5 to Table 2 were credited with any water offset quantity, and out of those 11 projects, only five have more than 10 af/yr of benefits credited in Table 2. In addition, of the five projects that were credited with the potential to supply more than 10 af/yr in Table 2, all but one, the TransAlta project, had the credited amount reduced. What this means is that by the time estimated project benefits from the original project descriptions made their way from Table 5 to Table 2, they went through a significant culling process where many projects were left out, and the amounts of claimed project benefits for some projects were significantly reduced.

Although uncertainty remains for all projects, due to the selective process used to generate offset amounts for the 20 core water-offset projects used in the Addendum's NEB analysis, the Program believes the scaled offset amounts indicated in Table 2 are reasonable, and these projects will perform as necessary to meet the requirements of chapter 90.94 RCW. As indicated in Table 3, the total estimated water offset benefit from the core projects is 3,399 af/yr, and the credited (scaled) offsets from these projects is 3,290 af/yr. Both those numbers are more than six times greater than the projected streamflow impact of 504.8 af/yr.

Distribution of water offset projects

Figure 3 indicates the anticipated water offsets provided by the entire suite of projects for each subbasin, while Figure 4 indicates similar information for scaled (higher certainty) results.

Based on the full suite of projects presented in Figure 3, projected water benefits are well-distributed throughout the basin. 14 of the 19 subbasins have at least one identified offset project, and all four subbasins with the highest projected consumptive use impacts have projects that are expected to provide offsets exceeding the consumptive use target. While there are some subbasins with no water offset projects, the unmet consumptive water use in each of those subbasins is under 10 af/yr.

Figure 4 indicates the subbasin distribution of medium to high certainty projects with water benefits versus consumptive use in the basin (see Table 1). Greater certainty of implementation is attributed to these projects, since they have committed sponsors, are currently funded or partially funded, and have landowner willingness and interest. Furthermore, the estimated benefit amounts have been scaled (reduced), in some instances, to account for uncertainty in the estimated water offset amounts. Four Table 2 projects are not included in Figure 4, since those projects are basin-wide.

Most projected consumptive water use will be concentrated in a limited number of subbasins. There are just four subbasins with 60 af/yr or more of anticipated new consumptive water use: Black River, Scatter Creek, Skookumchuck, and Newaukum. Anticipated use in those subbasins comprises nearly 70 percent of all projected watershed consumptive water use. The Addendum has large water offset projects located in some of the upper reaches of the basin, that will produce downstream benefits for significant portions of the basin, and in some of the most critical areas for depressed salmon stocks (spring Chinook).

Most water benefits in the basin would be achieved through one project—the TransAlta water right acquisition. This project would benefit not just the Skookumchuck subbasin, but would also contribute cooler water to the mainstem Chehalis, thus benefitting 15 of 19 of the

subbasins. While the benefits associated with this project are great due to the large quantity and strategic location, reliance on a single acquisition presents some risk. There are strong indications that this water right acquisition will occur, including the funding of a feasibility study for it in the 2020 Streamflow Restoration and Enhancement competitive grants round, and adaptive management provisions presented in the Addendum that would provide for contingency steps if this project is not implemented. Additionally, the Planning Unit strove to develop projects of all types (water right acquisitions, non-acquisition water projects, and habitat and other project types) in all of those subbasins with the highest projected consumptive use. Specifically, there are significant water offset projects located in the Newaukum and Scatter Creek subbasins, where these projects are estimated to provide 286.3 and 97 af/yr, respectively.

One significant issue in the Addendum regarding the distribution of offset projects involves the Black River. As noted, the Black River subbasin is one of four subbasins with 60 af/yr or more of anticipated new consumptive water use. However, unlike in the other three subbasins, the scaled (more certain) water offset project total here is less than the projected new consumptive water use (19 af/yr versus 141.1 af/yr)(see Figure 4). Given that the TransAlta project would not benefit the Black River subbasin directly, and that that subbasin is expected to experience the greatest growth in new permit-exempt domestic wells, the Planning unit has identified the need to address conditions in this basin. Looking at the unscaled, less certain values in Figure 3, the Black River subbasin is shown to have water offset totals that are greater than the projected new consumptive water use amounts (192 af/yr versus 141.1 af/yr). For this reason, the Planning Unit plans to focus on developing near-term projects in the Black River subbasin.

Additional benefits to instream resources

The Addendum includes a long list of projects that provide habitat benefits but no water offset benefits, to maximize streamflow restoration efforts throughout the watershed. In the Addendum, two major salmon and aquatic species restoration programs played a significant role in shaping the 62 “Habitat and Other” projects contained in Appendix C of the Addendum:

- Chehalis Basin Salmon Restoration and Preservation Strategy (CBSRPS)
- Chehalis Basin Strategy Aquatic Species Restoration Plan, Draft (ASRP)

Table 17 in the Addendum, based on the CBSRPS, identifies levels of concern for seven salmonid limiting factors, for more than 30 drainage basins in the watershed. The plan discusses how the suite of proposed Habitat and Other projects address many of the limiting factors described in Table 17 in the Addendum.

The Addendum does not provide certainty ratings for the suite of Habitat and Other projects, as was provided for the water right acquisition and non-acquisition water projects. This results in less assurances that benefits will accrue from these projects. However, based on the Planning Unit’s long history of protecting and restoring the ecology of the watershed, and involvement by the Chehalis Tribe and the Quinault Indian Nation, Program staff find that it is likely that a large number of these projects will be implemented. Program staff also find that it is reassuring that members of the Planning Unit have obtained funding and have begun implementing some of these Habitat and Other projects.

The bulk of the Addendum's water offset amount comes from the TransAlta water right acquisition, located in the Skookumchuck watershed. As pointed out in the Addendum, many aquatic species rely on this subbasin for multiple life stages, including spring- and fall-run Chinook, coho, winter steelhead and cutthroat trout. Program staff agree with the Addendum conclusions that this project would benefit the downstream Chehalis River, and improve flow and habitat conditions through a highly degraded mainstem reach that all salmonid life stages use for migration corridors, juvenile rearing, and spawning.

The Planning Unit has proposed habitat improvement projects in 16 of 19 subbasins, along with five basin-wide conceptual projects aimed at providing ecological benefits throughout the basin. According to the Addendum, the listed projects will enhance more than 120 miles of stream and riparian habitat, mostly in the more heavily impacted Newaukum and Skookumchuck subbasins; preserve 2,180 acres of forested uplands and riparian wetlands; and reconnect more than 40 miles of salmonid habitat by removing fish barriers. Many of the fish barrier and restoration projects included in the Addendum are already funded through various stages of design and partial construction.

The outlooks appear different when looking at unscaled versus scaled (more certain) water offset estimates presented in Figures 3 and 4 in this document (on pages 15 and 16 above). Figure 3 indicates ten subbasins where the subbasin consumptive use totals are greater than credited offset amounts, while more conservative Figure 4 suggests there are 16 subbasins where the consumptive use totals are greater than credited offset amounts. Out of the latter 16 subbasins, habitat projects are proposed in 13. Due to greater certainty associated with the Figure 4 presentation, Program staff focused its habitat analysis on those 13 subbasins.

Looking at the 13 subbasins that have water offset deficits indicated in Figure 4, and also have proposed habitat projects included in Appendix C of the Addendum, Program staff compared the af/yr amounts to some of the non-water project benefits, such as acres of enhanced riparian and floodplain habitat, miles of restored or enhanced stream reaches, and miles of spawning and rearing access from improved fish passage. Based on that comparison, Program staff find that the habitat benefits that would be achieved are similar to, or far exceed, the habitat lost from projected new consumptive use. There are three remaining subbasins that have water offset deficits in Figure 4 that have no proposed habitat projects. West Capitol Forest, Mox Chehalis, and NW Willapa have consumptive use quantities of 1.8, 4.5 and 8.7 af/yr, respectively. Habitat benefits might occur in some of those subbasins as a result of basin-wide projects as well.

7.3 Relationship to existing plans and current watershed protection efforts

Program staff find that the Addendum recognizes relevant past and on-going planning processes, and describes how the document is linked and coordinated with existing plans and efforts. The Planning Unit was responsible for previous watershed planning effort that occurred under the Watershed Planning Act (RCW 90.82), and has remained engaged in subsequent plans, actions and projects that work to protect and restore the Chehalis Basin Watershed.

Addendum development relied heavily on ecological priorities identified by existing, major aquatic habitat restoration programs in the basin. Between the insights provided by those

strategies, and knowledge derived by the diverse membership of the Planning Unit itself, Program staff find that this Addendum is well-grounded in and integrated with existing plans and current watershed protection efforts for the Chehalis Basin watershed.

7.4 Uncertainty

There is uncertainty associated with all analyses presented in Addendum – ranging from the amount of consumptive use anticipated from future permit-exempt domestic wells, to the benefits likely to occur from the proposed projects. For the 20 core water-offset projects, Program staff find that the analyses presented in the Addendum are reasonable, and these projects will perform as necessary to meet the requirements of chapter 90.94 RCW. For example, the future permit-exempt domestic well consumptive use estimates derive from an assumption that new homes will water their landscaping at rates equivalent to the irrigation requirements for commercial pasture/turf grass presented in the Washington Irrigation Guide (NRCS, 1997). That assumption builds a de facto safety factor into the entire planning effort.

Most water benefits in the basin would be attained through one very large project—the TransAlta water right acquisition. While the benefits associated with this acquisition are great due to the large quantity and strategic location, Program staff find that reliance on a single project presents some risk. Due to the large quantity and strategic location there are strong indications this water right acquisition is viable, and the Quinault Indian Nation has an approved Streamflow Restoration and Enhancement grant to study the feasibility of acquiring a portion of this water right. However, to help address any potential uncertainty concerns for the watershed, the Planning Unit strove to develop projects of all types (water right acquisitions, non-acquisition water projects, and habitat and other project types) in all of those subbasins with the highest projected consumptive use.

In recognition of all of the uncertainty associated with the plan, the Addendum includes adaptive management to be implemented to the extent possible based on available funding. This adaptive management includes monitoring of implementation of the plan's components, periodic assessments of NEB, and production of five-year implementation progress reviews. The proposed adaptive management strategy seeks to add flexibility to the implementation process, and allow adjustments based on actual exempt well demand, offset project status, and new, opportunistic projects that are identified following plan adoption.

One example of a project that might be used as part of adaptive management at some point in the future is BW-06 - Trust Water Rights Acquisitions. This project involves a sizeable collection of potential water right acquisitions currently held in the State Trust Water Right program, and other water rights that are actively being used. Since no specific opportunities have been identified yet and there are no project sponsors, no offset amounts are assigned in Table 2. However, the Planning Unit believes this project has great potential, and a preliminary review has flagged a number of trust water rights that may be pursued in the Satsop, Skookumchuck, Scatter, Newaukum and Curtis subbasins.

8.0 Ecology technical staff conclusions

Program staff find that the WRIA 22/23 Addendum submitted by the Planning Unit meets the requirement of chapter 90.94 RCW to identify projects and actions necessary to offset the potential consumptive use associated with new permit-exempt domestic well withdrawals anticipated through 2040. Although not required under the RCW, the Planning Unit conducted its own NEB evaluation and concluded the plan will provide a NEB to the Chehalis River Basin by implementing projects that will fully offset, and substantially exceed, the consumptive use impacts, while also addressing habitat and temperature issues in the basin. The Addendum follows Ecology's NEB Guidance for determining NEB (Publication 19-11-079), and provides ample information for Ecology to make its own determination.

Program staff conducted its NEB evaluation of the Addendum using a general ledger-type comparison between the magnitude and spatial distribution of impacts caused by the anticipated new consumptive water use, and the estimated benefits from the proposed offset projects. The Planning Unit presented two sets of water offset estimates – one using all of the proposed water offset projects, and another relying on a subset of 20 core water-offset projects that have reduced project offset quantities, when necessary, to account for uncertainty in the original estimates (Table 2). The total credited offset from these 20 core, more-certain, projects is 3,290 af/yr, which is more than six times greater than the projected basin-wide 504.8 af/yr streamflow impact.

Most projected permit-exempt domestic well consumptive water use identified in the Addendum will be concentrated in a limited number of subbasins. There are just four subbasins with 60 af/yr or more of anticipated new consumptive water use: Black River, Scatter Creek, Skookumchuck, and Newaukum. Anticipated consumptive water use in those subbasins comprises nearly 70 percent of all anticipated watershed consumptive water use from permit-exempt domestic wells. The Addendum presents and Ecology Program staff concur that several large water offset projects located in some of the upper reaches of the basin that will produce downstream benefits for significant portions of the basin, and in some of the most critical areas for depressed salmon stocks (spring Chinook).

Most of the Addendum's overall water offset amount comes from the 2,898 af/yr TransAlta water right acquisition, located in the Skookumchuck subbasin. As identified in two major salmon and aquatic species restoration programs in the Chehalis Basin, the CBSRPS and the ASRP, many aquatic species rely on this subbasin for multiple life stages, including spring- and fall-run Chinook, coho, winter steelhead and cutthroat trout. Moreover, this project would improve flow and habitat conditions through the downstream, highly degraded, Chehalis River mainstem that all salmonid life stages use for migration corridors, juvenile rearing, and spawning. With regard to these mainstem improvements, 15 of 19 of the subbasins in the Chehalis Basin would benefit from this one project.

While benefits associated with the TransAlta project are great due to the large quantity and strategic location, reliance on a single acquisition presents some risk. There are strong indications this water right acquisition will occur, and the Addendum describes a robust adaptive management strategy that includes mechanisms to adapt if any projects do not fulfill expectations. Nonetheless, the Planning Unit strove to develop projects of all types (water right

acquisitions, non-acquisition water projects, and habitat and other project types) in all of the subbasins and especially those with the highest projected consumptive use.

Beyond the proposed water offset projects, the Addendum proposes an extensive list of habitat offset projects based on ecological needs identified through two major salmon and aquatic species restoration programs. The Planning Unit has proposed 62 habitat improvement projects in 16 of 19 subbasins, along with five basin-wide conceptual projects. Program staff find that these projects are well distributed and will provide ecological benefits throughout much of the basin. The listed projects will enhance more than 120 miles of stream and riparian habitat, mostly in the more heavily impacted Newaukum and Skookumchuck subbasins, preserve 2,180 acres of forested uplands and riparian wetlands; and reconnect more than 40 miles of salmonid habitat by removing fish barriers.

Therefore, Program staff conclude that the WRIAs 22/23 Addendum is thorough and well executed, and uses reasonable and scientifically-sound methods when conducting the analyses presented. This strategy is well integrated with existing and current watershed protection and restoration efforts, and includes a robust implementation and adaptive management strategy that clearly indicates the Planning Unit's goal to successfully implement the plan. For these reasons, we conclude there is a reasonable assurance that the Addendum will provide significant improvements to stream resources within the WRIAs and achieve a NEB in the context of chapter 90.94 RCW.

9. References

Dittbrenner, Benjamin J., 2019. Restoration potential of beaver for hydrological resilience in a changing climate, PhD Dissertation, University of Washington, 164 p.

Natural Resources Conservation Service (NRCS), 1997. Irrigation Guide. National Engineering Handbook, Part 652. U.S. Department of Agriculture, Natural Resources Conservation Service. Issued September 1997.

Smith, Carol and M. Wenger. 2001. Salmon and steelhead habitat limiting factors: Chehalis Basin and nearby drainages water resource inventory areas 22 and 23. Washington State Conservation Commission, Lacey, WA.

State of Washington Office of Financial Management, 2018. County Growth Management Population Projections by Age and Sex: 2010-2040.

Thurston Regional Planning Council, 2020. Population & Employment Forecasting, https://www.trpc.org/236/Population-Employment-Forecasting

Washington State Department of Ecology, 2019. Final Guidance for Determining Net Ecological Benefit, GUID-2094 Water Resource Program Guidance, July 31, 2019, Publication 19-11-079, 131 p. https://fortress.wa.gov/ecy/publications/SummaryPages/1911079.html

Washington Water Trust, 2020. Aquatic Species Restoration Plan – Water Rights Assessments, Black River and Willapa Hills Ecological Regions, prepared for Office of Chehalis Basin, 250 p.

Yokel, E., S. Witmore, B. Stapleton, C. Gilmore and M.M. Pollock. 2018. Scott River Beaver Dam Analogue Coho Salmon Habitat Restoration Program 2017 Monitoring Report. 57 p. Scott River Watershed Council. Etna, California.

Table 5. Implementation and benefits certainty ratings for offset projects (Table 14 in Addendum)

Project ID	Project Name	Estimated Water Offset (af/yr)	Certainty of Implementation	Certainty of Water Benefit	Basis of Certainty Ratings
Black River					
B-00	TC #91 Holm Farm Ditch Removal and Floodplain Reconnection	13.5	M	M	Partial conservation ownership; acquisition investment from CBLE; good location for enhanced surface and groundwater storage; aquatic species objectives require balancing Oregon Spotted Frog and salmon benefits; permitting challenges; no committed sponsor
B-01	Allen Creek MAR	26	L	L	Marginal location for enhanced surface and groundwater storage due to creek proximity and seasonal closure on stream diversions; aquatic species objectives require balancing Oregon Spotted Frog and salmon benefits; permitting challenges; no committed sponsor or conservation landowner.
B-02	Cooke Aquaculture Water Right - Black River Reach	141	L	H	Flow benefit attained by pumping from deep aquifer and discharging to Black River; no sponsor; ongoing pumping costs; unknown groundwater impacts
B-05	Albany Street Stormwater Pond	11.9	H[1]	H	Implemented project; streamflow benefit estimated from surface and groundwater modeling but not monitored.
Chehalis-Salzer					
CS-00	Coal Creek Floodplain Storage - City of Chehalis	NQ[2]	L	L	No sponsor; no site-specific data and analysis; similar in type and location to H-00 China Creek Phase 2 wetland restoration.
CS-02	Flood Hazard Reduction Master Plan and Chehalis Wastewater Treatment Plant Project	NQ	M	M	Committed sponsor and landowner; no site-specific data and analysis; similar in type and location to H-00 China Creek Phase 2 wetland restoration.
Elk - Johns River					
EJ-01	Grays Harbor County Forest Practices and Flow Assessment	23	L	M	No sponsor; long timeframe for benefit accrual; strong science basis for benefit; no site-specific analysis
East Willapa					
EW-00	Garrard Creek Floodplain Restoration Opportunity Assessment	5	H	M	Committed sponsor; no site-specific data and analysis; assume 2.5 af/yr water benefit, but site conditions could vary.
EW-01	Convert Galvin to Centralia Water	4.5	L	H	No sponsor; high cost; water benefit is based on eliminating consumptive use from existing homes.

Project ID	Project Name	Estimated Water Offset (af/yr)	Certainty of Implementation	Certainty of Water Benefit	Basis of Certainty Ratings
Hanaford					
H-00	China Creek Flood and Habitat Mitigation Phase 2	3	H	M	Funded, design, and permitted project; streamflow benefit estimated from modeling but is not being monitored.
Hoquiam					
HQ-03	Grays Harbor County Forest Practices and Flow Assessment	17	L	M	No sponsor; long timeframe for benefit accrual; strong science basis for benefit; no site-specific analysis
Humptulips					
HT-01	Grays Harbor County Forest Practices and Flow Assessment	20	L	M	No sponsor; long timeframe for benefit accrual; strong science basis for benefit; no site-specific analysis
HT-02	Ocean Shores Water Reclamation and Reuse[3]	0	M	L	Project located on Ocean Shores and benefits groundwater, not streamflow; interested sponsor; not included in NEB evaluation.
Newaukum					
N-00	City of Chehalis Water Supply Diversion Relocation	280	M	H	Interested sponsor; permitting challenges; clear streamflow benefit to North Fork Newaukum and mainstem Newaukum from moving diversion to mainstem Chehalis
N-02	Newaukum Lake Restoration & Enhancement Planning	10	L	H	No sponsor; permitting challenges; straightforward water benefit (increased surface water storage in existing lake)
N-09	Newaukum MAR Concepts	298	L	M	No sponsor; permitting and siting challenges; strong analytical basis, but site-specific analysis necessary to gain certainty of benefits; re-timing approach utilizes high flows.
N-12	Beaver Dam Analog Implementation	12.5	H	M	Committed sponsor; no site-specific data and analysis; assume 2.5 af/yr water benefit, but site conditions could vary.
N-13	Berwick Creek Flood Reduction Restoration (Port of Chehalis)	NQ	H	M	Committed sponsor and landowner; funded project; no site-specific data and analysis; similar in type and location to H-00 China Creek Phase 2 wetland restoration.
Satsop					
S-00	Satsop/Wynoochee Tributary Assessment	NQ	H	M	Committed sponsor; pilot projects identified; monitoring funded; no scientific consensus on streamflow benefit from this project type; no site-specific data and analysis

Project ID	Project Name	Estimated Water Offset (af/yr)	Certainty of Implementation	Certainty of Water Benefit	Basis of Certainty Ratings
S-02	Lower Satsop Restoration, Protection, and Aquifer Recharge-Phase II	NQ	H	M	Committed sponsor and landowner for construction; water benefits similar to floodplain reconnection; no site-specific data or analysis.
Scatter Creek					
SC-00	TC #118/119 Scatter Creek Water Right & Streamflow Augmentation	700	L	H	No committed sponsor; clear streamflow benefit to Scatter Creek from discharge of pumped groundwater; groundwater impacts unknown.
SC-01	TC #90 Weins Farm Restoration	20	M	L	Interested sponsor; conservation landowners; acquisition funded from CBLE; no site-specific data and analysis; water benefit associated with off-channel storage from floodplain reconnection
SC-02	TC #89 Upper Scatter Creek MAR	53.5	M	M	No sponsor; conservation landowner; permitting challenges; strong analytical basis, but site-specific analysis necessary to gain certainty of benefits.
SC-03	TC #81 Sampson Wetlands Restoration and MAR	92	M	M	No sponsor; conservation landowner; permitting challenges; strong analytical basis, but site-specific analysis necessary to gain certainty of benefits.
SC-04	TC #127 Scatter Creek Upper Basin Forestry	NQ	L	M	No sponsor; long timeframe for benefit accrual; strong science basis for benefit; no site-specific analysis
Skookumchuck					
SK-00	TransAlta Water Right Acquisition	2,898	H	H	Committed sponsor; open dialogue with water right holder; straightforward streamflow benefit from eliminating part of an active diversion.
SK-01	Skookumchuck Dam Release	323	L	H	No sponsor; permitting challenges; straightforward water benefit (increased flow release from existing reservoir)
Northeast Willapa					
NW-00	Satsop Business Park Water Right to Reclaimed Water	NQ	L	L	Interested sponsor; requires commitment from new port tenant; conceptual project; no analysis available.
Wishkah					
W-00	Grays Harbor County Forest Practices and Flow Assessment	10	L	M	No sponsor; long timeframe for benefit accrual; strong science basis for benefit; no site-specific analysis

Project ID	Project Name	Estimated Water Offset (af/yr)	Certainty of Implementation	Certainty of Water Benefit	Basis of Certainty Ratings
Wynoochee					
WY-01	Grays Harbor County Forest Practices and Flow Assessment	2.3	L	M	No sponsor; long timeframe for benefit accrual; strong science basis for benefit; no site-specific analysis
WY-02	Satsop/Wynoochee Tributary Assessment	NQ	H	M	Committed sponsor; pilot projects identified; monitoring funded; no scientific consensus on streamflow benefit from this project type; no site-specific data and analysis
Basinwide Concepts					
BW-00	Beaver Dam Analog Implementation	NQ	M	M	Committed sponsor; no site-specific data and analysis; assume 2.5 af/yr water benefit, but site conditions could vary.
BW-02	Agricultural Irrigation Efficiencies & Water Conservation	NQ	L	L	Programmatic project; committed sponsors; interested landowners not yet identified
BW-03	Eager Beaver Collaboration	NQ	H	M	Committed sponsor; no site-specific data and analysis; assume 2.5 af/yr water benefit, but site conditions could vary.
BW-04	Managed Aquifer Recharge Opportunity Assessment	200	L	H	No sponsor; permitting and siting challenges; strong analytical basis, but site-specific analysis necessary to gain certainty of benefits; re-timing approach utilizes high flows.
BW-05	Stormwater Recharge Opportunity Assessment	10	M	M	Conceptual project; no sponsor; streamflow benefit estimated from modeling done elsewhere; Could be add-on to city stormwater projects; no site-specific data and analysis available.
BW-06	Trust Water Rights Acquisitions	NQ	M	H	No sponsor; no open dialogue with water right holders; water benefit is straightforward to evaluate when interested water right holders are identified.
Total - All Projects		**5,175**			

1 - Albany Street Stormwater Pond was completed in 2020.
2 - NQ: Water offset expected; insufficient data to quantify
3 - Local water benefit from project would not offset projected consumptive use.