DEPARTMENT OF ECOLOGY
State of Washington

Watershed Restoration and Enhancement Plan

WRIA 14
Kennedy - Goldsborough Watershed

Final Draft Plan
February 3, 2021

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Contact Information

Water Resources Program

Address: 300 Desmond Drive, SE, Lacey, WA 98503
Phone: 360-407-6859
Website[1]**:** Washington State Department of Ecology

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Acknowledgements

This watershed plan was written as a collaboration between the Department of Ecology, the WRIA 14 Committee, and the technical consultants. We express our sincere gratitude to those that supported the development of the plan and supplemental materials.

WRIA 14 Committee Members – Primary Representatives and Alternates

Commissioner Kevin Shutty, Mason County

Commissioner Randy Neatherlin, Mason County

David Windom, Mason County

Joshua Cummings, Thurston County

Kaitlynn Nelson, Thurston County

Brad Murphy, Thurston County

Ken Gill, City of Shelton

Craig Gregory[1], City of Shelton

Jason Dose, City of Shelton

Brent Armstrong, City of Shelton

Mark Ziegler, City of Shelton

Alex Gouley, Skokomish Indian Tribe

Seth Book, Skokomish Indian Tribe

Dana Sarff, Skokomish Indian Tribe

Jeff Dickison, Squaxin Island Tribe

Paul Pickett, Squaxin Island Tribe

Commissioner Ron Gold, Mason County PUD #1

Darin Hall[1], Mason County PUD #1

Brandy Milroy, Mason County PUD #1

Kristen Masteller, Mason County PUD #1

James Reyes, Mason County PUD #1

Elaine Packard, Washington State Chapter Sierra Club

Lois Ward, Washington State Chapter Sierra Club

Shelley Spalding[2], Washington State Chapter Sierra Club

Marilyn Vogler[2], Washington State Chapter Sierra Club

Larry Boltz, Mason-Kitsap Farm Bureau

Paul Miller, Skokomish Valley Farms

Allison Cook, Department of Fish and Wildlife

Darrin Masters, Department of Fish and Wildlife

Tristan Weiss, Department of Fish and Wildlife

Megan Kernan, Department of Fish and Wildlife

Josie Cummings, Building Industry Association of Washington

Erin Hall[1], Olympia Master Builders[2]

John Bolender, Mason Conservation District, (ex officio)

Barbara Adkins, Mason Conservation District (ex officio)

Fern Schultz, Department of Health (ex officio)

Patti Case, Green Diamond (ex officio)

WRIA 14 Technical Consultant Team

Chad Wiseman, HDR

Peter Schwartzman, PGG

HDR, PGG, and Anchor QEA Support Staff

Facilitation Team

Susan Gulick, Sound Resolutions

Jimmy Kralj, ESA

Additional support from Cascadia Consulting staff

Department of Ecology Staff

Angela Johnson, Committee Chair

Tom Culhane, Lead Technical Support

Rebecca Brown, WRIA 14 Committee Support and Alternate Chair

Mike Noone, WRIA 14 Committee Support and Alternate Chair

Paulina Levy, Plan Development Support

Mike Gallagher, Regional Section Manager

Bennett Weinstein, Streamflow Restoration Section Manager

Streamflow Restoration Section Technical Staff

Southwest Region Water Resources Section

Technical and Project Workgroup

Angela Johnson, Department of Ecology

Tom Culhane, Department of Ecology

Jim Pacheco, Department of Ecology

Chad Wiseman, HDR

Peter Schwartzman, PGG

David Windom, Mason County

Kell Rowen, Mason County

Kaitlynn Nelson, Thurston County

Brad Murphy, Thurston County

Kevin Hansen, Thurston County

Ken Gill, City of Shelton

Craig Gregory[1], City of Shelton

Seth Book, Skokomish Indian Tribe

Dana Sarff, Skokomish Indian Tribe

Jon Turk, Aspect Consulting, representing Skokomish Indian Tribe

Paul Pickett, Squaxin Island Tribe

Erica Marbet, Squaxin Island Tribe

Darin Hall, Mason County PUD #1

James Reyes, Mason County PUD #1

Lois Ward, Washington Chapter Sierra Club

Shelley Spalding[2], Washington State Chapter Sierra Club

Marilyn Vogler[2], Washington State Chapter Sierra Club

Larry Boltz, Mason-Kitsap Farm Bureau

Allison Cook, Department of Fish and Wildlife

Darrin Masters, Department of Fish and Wildlife

Tristan Weiss, Department of Fish and Wildlife

Megan Kernan, Department of Fish and Wildlife

Erin Hall[1], Olympia Master Builders[2]

Barbara Adkins, Mason Conservation District (ex officio)

Steve Hagerty, WRIA 14 Lead Entity Coordinator, Mason Conservation District (ex officio)

Evan Bauder, Mason Conservation District (ex officio)

Fern Schultz, Department of Health (ex officio)

Patti Case, Green Diamond (ex officio)

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[1]No longer with entity

[2]No longer on Committee

Executive Summary

In January 2018, the Washington State Legislature passed the Streamflow Restoration law (RCW 90.94) to help support robust, healthy, and sustainable salmon populations while ensuring rural communities have access to water. The law, directs the Department of Ecology to lead local planning Committees to develop Watershed Restoration and Enhancement Plans that identify projects to offset potential consumptive impacts of new permit-exempt domestic groundwater withdrawals on instream flows over the next 20 years (2018 – 2038) and provide a net ecological benefit to the watershed[2]. This Watershed Restoration and Enhancement Plan was written to meet the guidance and policy interpretations as provided by the Department of Ecology.

The Department of Ecology (Ecology) established the Watershed Restoration and Enhancement Committee to collaborate with tribes, counties, cities, state agencies, and special interest groups in the Kennedy-Goldsborough watershed, also known as Water Resource Inventory Area (WRIA) 14. The WRIA 14 Committee met for over 2 years to develop a watershed plan.

To allow for meaningful analysis of the relationship between new consumptive use and offsets, the WRIA 14 Committee divided the watershed into seven subbasins. Subbasins help describe the location and timing of projected new consumptive water use, the location and timing of impacts to instream resources, and the necessary scope, scale, and anticipated benefits of projects.

This watershed plan projects 4,294 permit exempt (PE) well connections over the 20-year planning horizon. The projects and actions in this watershed plan will address and offset the consumptive water use from those 4,294 PE well connections. The projected new consumptive water use associated with the new PE well connections is 759 acre-feet per year in WRIA 14, which the Committee determined to be the “most likely” estimate. This equates to 1.05 cubic feet per second (cfs) or 677,591 gallons per day (gpd). This watershed plan also presents a higher adaptive management goal for project implementation of 1,034 acre-feet per year (1.43 cfs or 923,096 gallons per day) in order to support streamflows.

This watershed plan includes projects that provide an anticipated offset of 891 acre-feet per year to benefit streamflows and enhance the watershed. Additional projects in the plan include benefits to fish and wildlife habitat, such as several thousand feet of streambed improvements, dozens of acres of restoration and protection, and many miles of riparian restoration across WRIA 14.

[2] Some members of the WRIA 14 Committee have different interpretations of RCW 90.94.030. Statements from entities and other documents provided in the Compendium provide more information on their interpretations, which apply throughout this plan.

The project offset benefits provide an estimated offset of 891 AFY and exceeds the “most likely” consumptive use estimate at the WRIA scale. The project offset benefits do not meet the higher adaptive management goal consumptive use estimate. At the subbasin scale, estimated offsets exceed both the “most likely” and higher adaptive management goal consumptive use estimates in the Goldsborough, and Hood, subbasins. Conversely, estimated offsets fall short of both the “most likely” and higher adaptive management goal consumptive use estimates in all other subbasins.

To increase the reasonable assurance for plan implementation and tracking progress, this watershed plan includes policy and regulatory recommendations and an adaptive management process. The nine policy and regulatory recommendations are included to contribute to the goals of this watershed plan, including streamflow restoration and meeting net ecological benefit. These recommendations enhance water conservation efforts; improve research, monitoring, and data collection; plan for better drought response; and finance plan implementation. The watershed plan describes an adaptive management approach, which identifies a lead organization to coordinate an ongoing implementation group to support implementation, a tracking and reporting structure to assess progress and make adjustments as needed, and a funding mechanism to adaptively manage implementation.

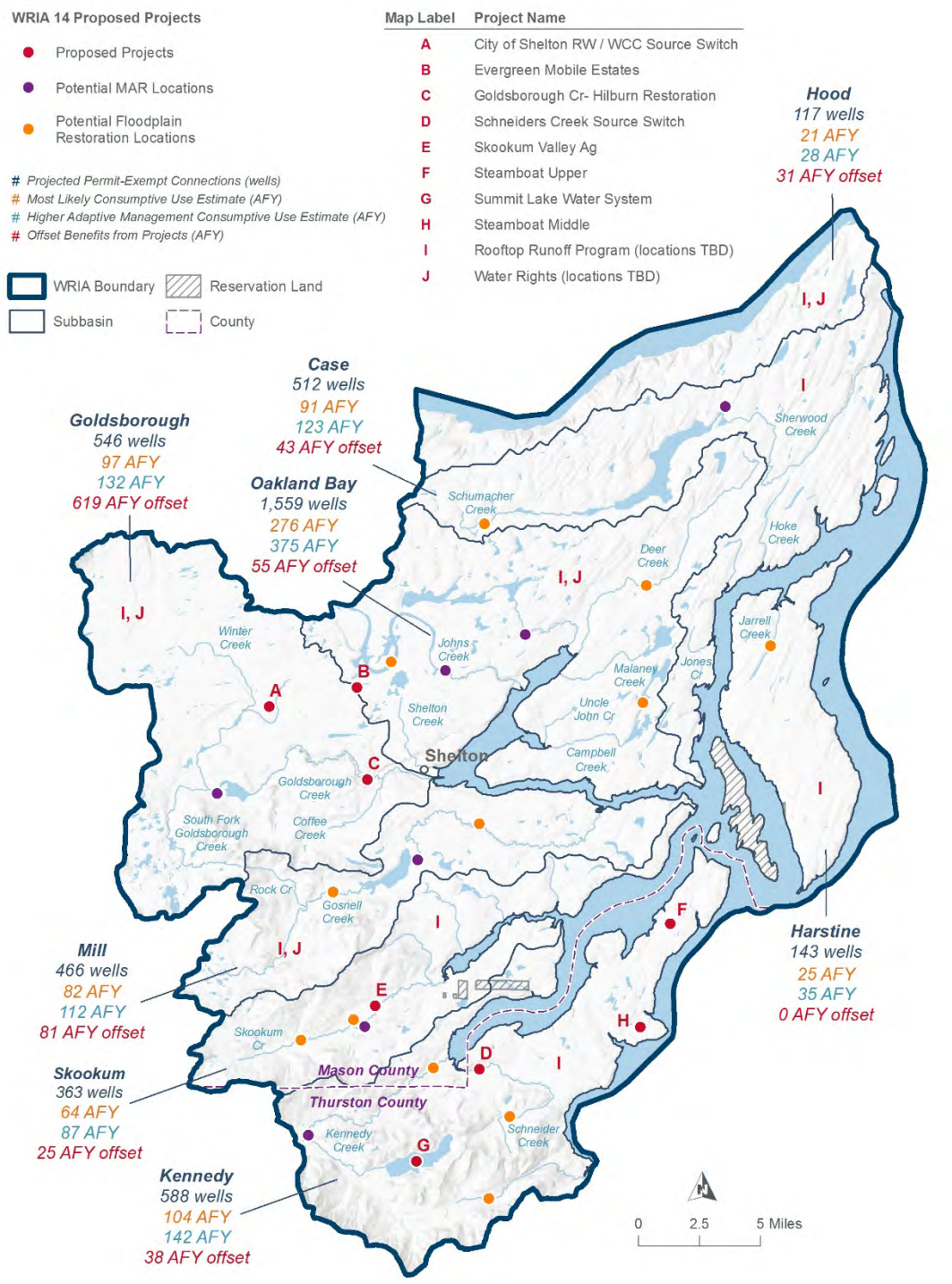

Figure ES 1: Summary of findings of the WRIA 14 Watershed Restoration and Enhancement Plan, including estimates for new domestic permit exempt well growth, consumptive use estimates, and project offset benefits.

Chapter One: Plan Overview

1.1 Plan Purpose and Structure

The purpose of the Water Resource Inventory Area (WRIA) 14 Watershed Restoration and Enhancement Plan is to identify projects and actions needed to offset the impacts of new domestic permit-exempt wells to streamflows. The watershed restoration and enhancement plan is one requirement of RCW 90.94. Watershed restoration and enhancement plans must identify projects to offset the potential consumptive impacts of new permit-exempt domestic groundwater withdrawals on instream flows over 20 years (2018-2038), and provide a net ecological benefit to the WRIA. The WRIA 14 watershed restoration and enhancement plan (watershed plan) considers priorities for salmon recovery and watershed recovery, while ensuring it meets the intent of the law.[3]

Pumping from wells can reduce groundwater discharge to springs and streams by capturing water that would otherwise have discharged naturally, reducing flows (Barlow and Leake 2012). Consumptive water use (that portion not returned to the aquifer) reduces streamflow, both seasonally and as average annual recharge. A well pumping from an aquifer connected to a surface water body can either reduce the quantity of water discharging to the river or increase the quantity of water leaking out of the river (Barlow and Leake 2012). Projects to offset consumptive use associated with permit-exempt domestic water use have become a focus to minimize future impacts to instream flows and restore streamflow.

While this watershed plan is narrow in scope and is not intended to address all water uses or related issues within the watershed, it provides a path forward for future water resource planning.

[Language to be included when appropriate]: The WRIA 14 Committee, by completing the watershed plan, has developed, and come to consensus[4] on, a path forward for a technically and politically complex issue in water resource management. That success sets the stage for improved coordination of water resources and overall watershed health in our WRIA.

This watershed plan is divided into the following chapters:

1. Plan Overview;
2. Overview of the plan purpose and scope, and plan development process, and streamflow;
3. Summary of the subbasins,

[3] Some members of the WRIA 14 Committee have different interpretations of RCW 90.94.030. Statements from entities and other documents provided in the Compendium provide more information on their interpretations, which apply throughout this plan.

[4] The levels of consensus used by the WRIA 14 Committee is described in the Operating Principles in Appendix D.

4. Growth projections and consumptive water use estimates;
5. Description of the recommended actions and projects identified to offset the future permit-exempt domestic water use in WRIA 14;
6. Explanation of recommended policy, monitoring, adaptive management and implementation measures; and
7. Evaluation and consideration of the net ecological benefits.

1.1.1 Legal and Regulatory Background for the WRIA 14 Watershed Restoration and Enhancement Plan

In January 2018, the Washington State Legislature passed Engrossed Substitute Senate Bill (ESSB) 6091 (session law 2018 c 1). This law was enacted in response to the State Supreme Court's 2016 decision in Whatcom County vs. Hirst, Futurewise, et al. (commonly referred to as the "Hirst decision"). As it relates to this Committee's work, the law, now primarily codified as RCW 90.94, clarifies how local governments can issue building permits or approve subdivisions for homes intending to use a permit-exempt well for their domestic water supply. The law also requires local watershed planning in fifteen WRIAs across the state, including WRIA 14.[5]

1.1.2 Domestic Permit-Exempt Wells

This watershed restoration and enhancement plan, RCW 90.94, and the Hirst decision are all concerned with the effects of new domestic permit-exempt water use on streamflows. Several laws pertain to the management of groundwater permit-exempt wells in WRIA 14 and are summarized in brief here for the purpose of providing context for the WRIA 14 watershed plan.

First and foremost, RCW 90.44.050, commonly referred to as "the Groundwater Permit Exemption," establishes that certain small withdrawals of groundwater are exempt from the state's water right permitting requirements, including small indoor and outdoor water use associated with homes. Although these withdrawals do not require a state water right permit, the water right is still legally established by the beneficial use. [6] Even though a water right

[5] ESSB 6091 includes the following: "*AN ACT Relating to ensuring that water is available to support development; amending RCW 19.27.097, 58.17.110, 90.03.247, and 90.03.290; adding a new section to chapter 36.70A RCW; adding a new section to chapter 36.70 RCW; adding a new chapter to Title 90 RCW; creating a new section; providing an expiration date; and declaring an emergency." (p. 1)*

[6] Washington State follows the doctrine of prior appropriation, which means that the first users have rights "senior" to those issued later. This is called "first in time, first in right." If a water shortage occurs, "senior" rights are satisfied first and the "junior" rights can be curtailed. Seniority is established by priority date — the original date a water right application was filed, or the date that water was first put to beneficial use in the case of claims and the groundwater permit exemption. Although groundwater permit-exempt uses do not require a water right permit, they are always subject to state water law. In some instances, Ecology has had to regulate permit exempt

permit is not required for small domestic uses under RCW 90.44.050, there is still regulatory oversight, including from local jurisdictions. Specifically, in order for an applicant to receive a building permit from their local government for a new home, the applicant must satisfy the provisions of RCW 19.27.097 for what constitutes evidence of an adequate water supply[7].

RCW 90.94.030 adds to the management regime for new homes using domestic permit-exempt well withdrawals in WRIA 14 and elsewhere. For example, local governments must, among other responsibilities relating to new permit-exempt domestic wells, collect a $500 fee for each building permit and record withdrawal restrictions on the title of the affected properties. Additionally, this law restricts new permit-exempt domestic withdrawals in WRIA 14 to a maximum annual average of up to 950 gallons per days per connection, subject to the five thousand gallons per day and ½-acre outdoor irrigation of non-commercial lawn/garden limits established in RCW 90.44.050. Ecology has published its interpretation and implementation of RCW 19.27.097 and RCW 90.94 in Water Resources POL 2094 (Ecology, 2019a). For additional information, readers can review those laws and policy for comprehensive details and agency interpretations.

1.1.3 Planning Requirements Under RCW 90.94.030

While supplementing the local building permit requirements, RCW 90.94.030(3) goes on to establish the planning criteria for WRIA 14. In doing so, it sets the minimum standard of Ecology's collaboration with the WRIA 14 Committee in the preparation of this watershed plan. In practice, the process of plan development was one of broad integration, collectively shared work, and a striving for consensus described in the WRIA 14 Committee's adopted operating principles, which are further discussed below.

In addition to these procedural requirements, the law and consequently this watershed plan, is concerned with the identification of projects and actions intended to offset the anticipated impacts from new permit-exempt domestic groundwater withdrawals over the next 20 years and provide a net ecological benefit[8]. In establishing the primary purpose of this watershed plan, RCW 90.94.030 (3) also details both the required and recommended plan elements. Regarding the WRIA 14 Committee's approach to selecting projects and actions, the law also speaks to "high and lower priority projects." The WRIA 14 Committee understands that, as provided in the Final Guidance on Determining Net Ecological Benefit (Ecology 2019b), "use of

water users when they interfere with older, "senior" water rights, including instream flow rules. More information is available on the Department of Ecology's website: https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability.

[7] RCW 19.27.097 states that "Evidence may be in the form of a water right permit from the department of ecology, a letter from an approved water purveyor stating the ability to provide water, or another form sufficient to verify the existence of an adequate water supply."

[8] The planning horizon for planning to achieve a NEB is the 20 year period beginning with January 19, 2018 and ending on January 18, 2038. The planning horizon only applies to determining which new consumptive water uses the plan must address under the law. The projects and actions required to offset the new uses must continue beyond the 20-year period and for as long as new well pumping continues. (Ecology, 2019b; page 7)

these terms is not the sole critical factor in determining whether a plan achieves a NEB… and that plan development should be focused on developing projects that provide the most benefits… regardless of how they align with [these] labels" (page 12). It is the perspective of the WRIA 14 Committee that this watershed plan satisfies the requirements of RCW 90.94.030.

1.2 Requirements of the Watershed Restoration and Enhancement Plan

RCW 90.94.030 of the Streamflow Restoration law directs Ecology to establish a watershed restoration and enhancement committee in the Kennnedy - Goldsborough watershed and develop a watershed restoration and enhancement plan (watershed plan) in collaboration with the WRIA 14 Committee. Ecology determined that the intent was best served through collective development of the watershed plan, using an open and transparent setting and process that builds on local needs.

At a minimum, the watershed plan must include projects and actions necessary to offset potential consumptive impacts of new permit-exempt domestic groundwater withdrawals on streamflows and provide a net ecological benefit (NEB) to the WRIA.

Ecology issued the Streamflow Restoration Policy and Interpretive Statement (POL-2094) and Final Guidance on Determining Net Ecological Benefit (GUID-2094) in July 2019 to ensure consistency, conformity with state law, and transparency in implementing RCW 90.94. The Final Guidance on Determining Net Ecological Benefit (hereafter referred to as Final NEB Guidance) establishes Ecology's interpretation of the term "net ecological benefit." It also informs planning groups on the standards Ecology will apply when reviewing a watershed plan completed under RCW 90.94.020 or RCW 90.94.030. The minimum planning requirements identified in the Final NEB Guidance including the following (pages 7-8):

1. Clear and Systemic Logic. Watershed plans must be prepared with implementation in mind.

Streamflow Restoration law RCW 90.94.030(3)

(b) At a minimum, the plan must include those actions that the committee determines to be necessary to offset potential impacts to instream flows associated with permit-exempt domestic water use. The highest priority recommendations must include replacing the quantity of consumptive water use during the same time as the impact and in the same basin or tributary. Lower priority projects include projects not in the same basin or tributary and projects that replace consumptive water supply impacts only during critical flow periods. The plan may include projects that protect or improve instream resources without replacing the consumptive quantity of water where such projects are in addition to those actions that the committee determines to be necessary to offset potential consumptive impacts to instream flows associated with permit-exempt domestic water use.

(c) 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.

(d) The watershed restoration and enhancement plan must include an evaluation or estimation of the cost of offsetting new domestic water uses over the subsequent twenty years, including withdrawals exempt from permitting under RCW 90.44.050.

(e) The watershed restoration and enhancement plan must include estimates of the cumulative consumptive water use impacts over the subsequent twenty years, including withdrawals exempt from permitting under RCW 90.44.050.

2. Delineate Subbasins. [The Committee] must divide the WRIA into suitably sized subbasins to allow meaningful analysis of the relationship between new consumptive use and offsets.
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.
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.
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 associated with new consumptive water use.

The WRIA 14 Committee has developed this watershed plan with the intent to ensure full implementation, either through projects and actions, or adaptive management.

The law requires that all members of the WRIA 14 Committee approve the plan prior to submission to Ecology for review. Ecology must then determine that the plan's recommended streamflow restoration projects and actions will result in an NEB to instream resources within the WRIA after accounting for projected use of new permit-exempt domestic wells over the 20 year period of 2018-2038.

RCW 90.94.030 (6). This section [90.94.030] only applies to new domestic groundwater withdrawals exempt from permitting under RCW 90.44.050 in the following water resource inventory areas with instream flow rules adopted under chapters 90.22 and 90.54 RCW that do not explicitly regulate permit-exempt groundwater withdrawals: 7 (Snohomish); 8 (Cedar-Sammamish); 9 (Duwamish-Green); 10 (Puyallup-White); 12 (Chambers-Clover); 13 (Deschutes); 14 (Kennedy Goldsborough); and 15 (Kitsap) and does not restrict the withdrawal of groundwater for other uses that are exempt from permitting under RCW 90.44.050.

1.3 Overview of the WRIA 14 Committee

1.3.1 Formation

The Streamflow Restoration law instructed Ecology to chair the WRIA 14 Committee, and invite representatives from the following entities in the watershed to participate in the development of the watershed plan:

- Each federally recognized tribal government with reservation land or usual and accustomed harvest area within the WRIA.
- Each county government within the WRIA.
- Each city government within the WRIA.

- Washington State Department of Fish and Wildlife.
- The largest publically-owned water purveyor providing water within the WRIA that is not a municipality.
- The largest irrigation district within the WRIA.[9]

Ecology sent invitation letters to each of the entities named in the law in September of 2018.

The law also required Ecology to invite local organizations representing agricultural interests, environmental interests, and the residential construction industry. Businesses, environmental groups, agricultural organizations, conservation districts, and local governments nominated interest group representatives. Local governments on the WRIA 14 Committee voted on the nominees in order to select local organizations to represent agricultural interests, the residential construction industry, and environmental interests. Ecology invited the selected entities to participate on the WRIA 14 Committee.

The WRIA 14 Committee members are included in Table 1. This list includes all of the members identified by the Legislature that agreed to participate on the WRIA 14 Committee.[10]

Table 1: WRIA 14 Entities and Membership

Entity Name	**Representing**
Skokomish Tribe	Tribal government
Squaxin Island Tribe	Tribal government
Mason County	County government
Thurston County	County government
City of Shelton	City government
Mason County Public Utility District 1	Water purveyor
Washington Department of Fish and Wildlife	State agency
Washington Department of Ecology	State agency
Olympia Master Builders Association	Residential construction
Washington State Chapter of the Sierra Club	Environmental interests
Mason-Kitsap Farm Bureau	Agricultural interests
Mason Conservation District (ex officio)	Not applicable
Washington State Department of Health (ex officio)	Not applicable
Green Diamond (ex officio)	Not applicable

The WRIA 14 Committee roster with names and alternates is available in Appendix C.

The WRIA 14 Committee invited the Mason Conservation District, Washington State Department of Health, and Green Diamond (pending) to participate as "ex-officio" members. Although not identified in the law, the ex officio members provide valuable information and

[9] There are no irrigation districts in WRIA 14.

[10] All participating entities committed to participate in the process and designated representatives and alternates.

perspective as subject matter experts. The ex officio members are active, but non-voting participants of the WRIA 14 Committee.

The law does not identify a role for the Committee following development of the watershed plan.

1.3.2 Committee Structure and Decision Making

The WRIA 14 Committee held its first meeting in October 2018. Between October 2018 and January 2021 [UPDATE LAST MEETING DATE, IF NEEDED], the WRIA 14 Committee held 27 Committee meetings open to the public. The WRIA 14 Committee met monthly, and as needed to meet deadlines.

The two and a half years of planning consisted of training, research, and developing plan components. Ecology technical staff, WRIA 14 Committee members, and partners presented on topics to provide context for components of the plan such as hydrogeology, water law, tribal treaty rights, salmon recovery, and planning.

In addition to serving as WRIA 14 Committee chair, Ecology staff provided administrative support and technical assistance, and contracted with consultants to provide facilitation and technical support for the WRIA 14 Committee. The facilitator supported the WRIA 14 Committee's discussions and decision-making, and coordinated recommendations for policy change and adaptive management. The technical consultants developed products that informed WRIA 14 Committee decisions and development of the plan. The technical consultants developed all of the technical memorandums referenced throughout this plan. Examples include working with counties on growth projections, calculating consumptive use based on multiple methods, preparing maps and other tools to support decisions, and researching project ideas. The technical consultants brought a range of expertise to the Committee including hydrogeology, GIS analysis, fish biology, engineering and planning.

During the initial WRIA 14 Committee meetings, members developed and agreed by consensus to operating principles.[11] The operating principles set forward a process for meeting, participation expectations, procedures for decision-making of the WRIA 14 Committee, communication, and other needs in order to support the WRIA 14 Committee in reaching consensus on a final plan.

The WRIA 14 Committee established technical and project workgroups to support planning efforts and to achieve specific tasks throughout plan development. The workgroups were open to all WRIA 14 Committee members as well as non-Committee members that brought capacity or expertise not available on the Committee. The workgroups made no binding decisions, but presented information to the Committee as either recommendations or findings. The WRIA 14 Committee acted on workgroup recommendations, as it deemed appropriate.

[11] Agreed upon operating principles can be found in Appendix D

This planning process, by statutory design, brought diverse perspectives to the table. As the legislation requires that all members of the WRIA 14 Committee approve the final plan prior to Ecology's review,[12] it was important for the WRIA 14 Committee to identify a clear process for making decisions. The WRIA 14 Committee strived for consensus, and when consensus could not be reached, the chair and facilitator documented agreement and dissenting opinions. All consensus and dissenting opinions were documented in meeting summaries that were reviewed and approved by the Committee. The Committee recognized that flexibility was needed in terms of timeline, and if a compromise failed to reach consensus within the identified timeline, the Committee agreed to allow the process for developing the plan to move forward while the work towards consensus continued. The Committee agreed to revisit decisions where consensus was not reached at a later date. Consensus during the foundational decisions during plan development served as the best indicators of the Committee's progress toward an approved plan.

[Language to be included when appropriate]: The WRIA 14 Committee reviewed components of the watershed plan and the draft plan as a whole on an iterative basis. **[Language to be determined]:** Once the WRIA 14 Committee reached initial agreement on the final watershed plan, broader review and approval by the entities represented on the WRIA 14 Committee was sought as needed. The WRIA 14 Committee reached final approval on the Watershed Restoration and Enhancement Plan on XX DATE 2021.

[12] RCW 90.94.030[3] "…all members of a watershed restoration and enhancement Committee must approve the plan prior to adoption"

Chapter Two: Watershed Overview

2.1 Brief Introduction to WRIA 14

Water Resource Inventory Areas (WRIAs) are large watershed areas formalized under Washington Administrative Code (Water Resources Code of 1971) for the purpose of administrative management and planning. WRIAs encompass multiple landscapes, hydrogeological regimes, levels of development, and variable natural resources. WRIA 14, also referred to as Kennedy-Goldsborough, is one of the 62 designated major watersheds in Washington State, formed as a result of the Water Resources Act of 1971 (Figure 1). The 381 square mile Kennedy-Goldsborough Watershed is within Mason and Thurston counties and includes an extensive network of independent streams that issue from springs, wetlands, small lakes, and surface water drainages (Figure 1). These streams originate from the hills located between the inlets of southern Puget Sound and the Olympic Mountains to the north, emptying into shallow bays and inlets. Principal drainages include Cranberry, Goldsborough, Kennedy, Perry, Mill, Sherwood, Johns, Deer, Alderbrook, Shumocher and Skookum Creeks. The Kennedy-Goldsborough Watershed has no major river system.

2.1.1 Land Use in WRIA 14

The upland portion of the watershed generally consists of forested land with large acreages of second and third growth coniferous trees. Land uses shift to rural and urban developments in the lower portions of streams near salt water bays. Rural residential development has primarily occurred in the unincorporated areas of Mason and Thurston counties (Figure 1).

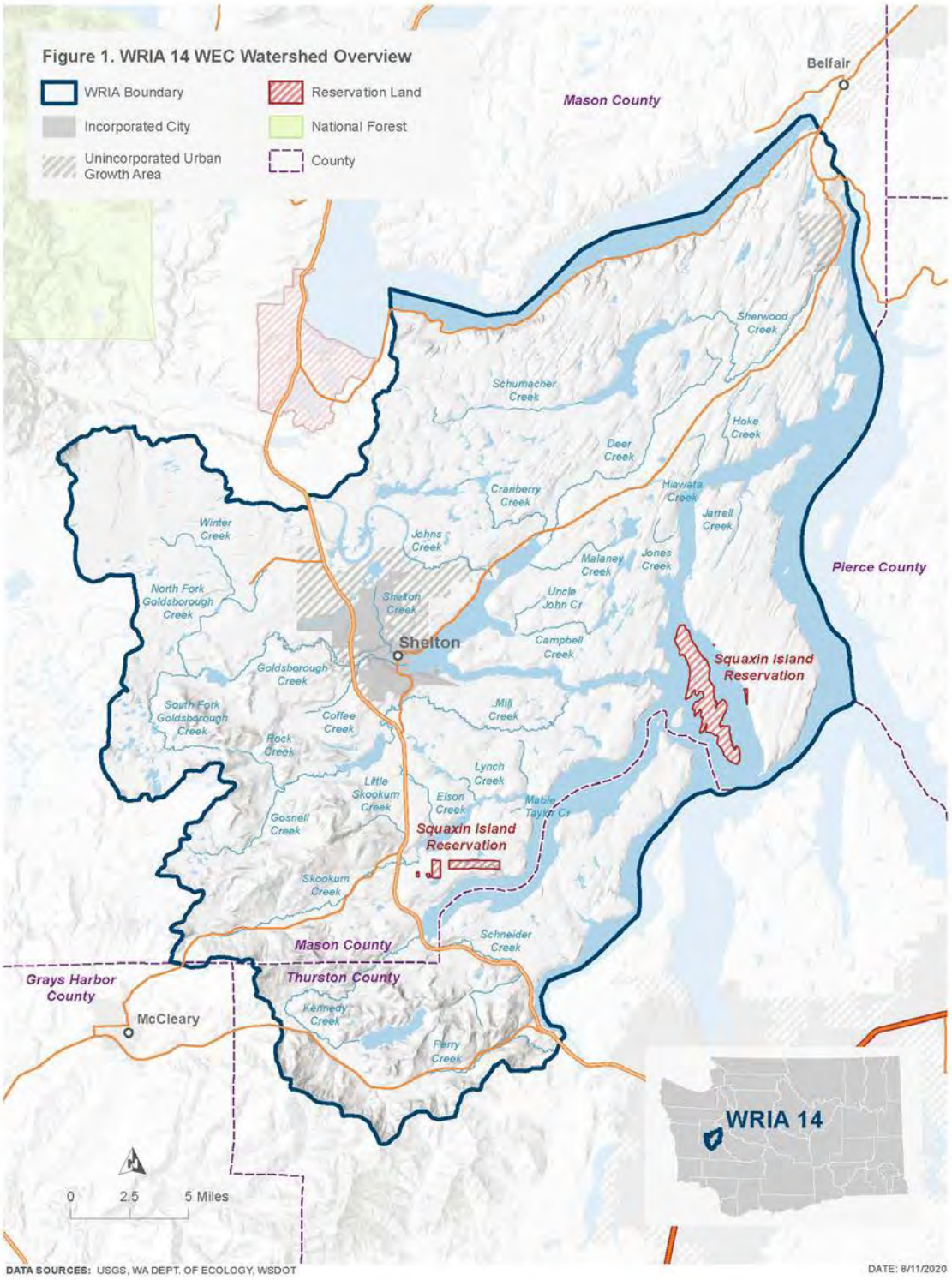

Figure 1: WRIA 14 WRE Watershed Overview

The central portion of the Kennedy-Goldsborough Watershed, near Shelton is predominantly urbanized, characterized by a combination of residential, civic/institutional, commercial, and education land covers. Undeveloped land makes up most of the portion of WRIA 14 that is in Thurston County, while forest land makes up most of the portion of WRIA 14 that is in Mason County. WRIA 14 has both unincorporated urban growth areas and incorporated urban growth areas, totaling approximately 4 percent of the watershed. The Squaxin Island Tribe's Reservation and Off-Reservation trust land occupies approximately 2,162 acres of WRIA 14 (Figure 1*).*

2.1.2 Tribal Reservations and Usual and Accustomed Fishing Areas

Tribes with usual and accustomed fishing areas within WRIA 14 include the Skokomish and Squaxin Island Tribes. These tribes hold reserved fishing rights in WRIA 14 under their treaties with the federal government (Treaty of Point No Point, Treaty of Medicine Creek).

The Tribes also possess Treaty-reserved federal water rights in WRIA 14 in quantities that are necessary to support healthy salmon populations. These water rights are necessary to carry out the purposes of their Treaties, which include the guarantee of a self-sustaining homeland and sufficient water to support the fishing right. These rights operate outside of the state water rights system and have the most senior priority date. While these water rights have not yet been quantified by a court, they likely exceed the amounts that are established by state instream flow rules. Indian water rights are property rights held in trust by the United States for the benefit of Indian tribes.[13]

2.1.3 Salmon Distribution and Limiting Factors

The Kennedy-Goldsborough Watershed is an important and productive system for salmonids. Several tributaries provide spawning and rearing habitat for fall and Summer Chum (*Oncorhynchus keta*), Coho (*Oncorhynchus kisutch*), Winter Steelhead (*Oncorhynchus mykiss*) and Coastal Cutthroat (*Oncorhynchus clarkii clarkia*). Chinook salmon (*Oncorhynchus tshawytscha*) are known to occur, but not spawn and rear in these steams. These streams often experience low streamflows during critical migration and spawning time. In addition, damming of wetlands to create man-made lakes and shoreline modifications, conversion of forestland to agricultural or residential land uses have altered streams in WRIA 14.[14] Similar to climate projections for much of the Western United States, WRIA 14 is projected to experience increasing stream temperatures, earlier streamflow timing, increasing flooding and declining summer minimum flows. These changes are likely to cause additional disruption to salmon as they migrate, spawn and rear (Mauger et al., 2015).

Both incorporated and unincorporated municipalities, various small industrial and commercial facilities, and agriculture in the Kennedy-Goldsborough Watershed compete for a finite water

[13] Language provided by WRIA 14 Tribes
[14] Salmonid Habitat Limiting Factors WRIA 14.

supply, causing a strain on surface water availability, especially during low seasonal flows in productive salmonid streams. Many people depend on the salmon fishery. This includes the Squaxin Island Tribe and the Skokomish Indian Tribe, both with usual and accustomed areas in the Kennedy-Goldsborough Watershed (NWIFC 2014).

The Kennedy-Goldsborough watershed primarily supports coho salmon, chum salmon, winter steelhead, coastal cutthroat trout, and chinook salmon, (Tables 2 and 3).

Table 2: Salmonid Species and Status in WRIA 14

Common Name	Scientific Name	Population[1]	Critical Habitat	Regulatory Agency Status
Puget Sound				
Chinook Salmon	Oncorhynchus tshawytscha	Puget Sound Chinook	No	NMFS/ Threatened/1999
Chum Salmon	Oncoryhnchus keta	Puget Sound Chum	No listing	Not listed
Coho Salmon	Oncorhynchus kisutch	Puget Sound/Strait of Georgia Coho	No	NMFS/Species of Concern/1997
Steelhead Trout	Oncorhynchus mykiss	Puget Sound Steelhead	Yes/2016	NMFS/ Threatened/2007
Rainbow Trout[15]	Oncorhynchus mykiss	No listing	No listing	No listing
Coastal Cutthroat Trout	Oncorhynchus clarki	No listing	No listing	No listing
Hood Canal				
Chinook Salmon	Oncorhynchus tshawytscha	Puget Sound Chinook	No	NMFS/ Threatened/1999
Chum Salmon	Oncoryhnchus keta	Hood Canal Chum	No Listing	No Listing
Coho Salmon	Oncorhynchus kisutch	Puget Sound/Strait of Georgia Coho	No	NMFS/ Threatened/1999
Steelhead Trout	Oncorhynchus mykiss	Puget Sound Steelhead	Yes/2016	NMFS/Species of Concern/1997
Rainbow Trout	Oncorhynchus mykiss	No listing	No listing	No listing
Coastal Cutthroat Trout	Oncorhynchus clarki	No listing	No listing	No Listing

Chinook salmon have been documented to occur in some WRIA 14 streams, but there is no known documentation of spawning and rearing. Chinook presence is likely due to strays from

[15] Note: Resident rainbow trout are the same species as steelhead and have a similar freshwater life history as steelhead. However, they are not anadromous residing in their stream of origin throughout their life.

other river systems. Estuaries such as the Oakland bay provide key habitat for juvenile rearing during smolt saltwater phases of Puget sound stocks from other rivers and streams.

Coho salmon enter WRIA 14 streams from mid-September to mid-November and spawn from late October to mid-December (Table 3). Incubation occurs through the following April. Juvenile rearing occurs for over a year before smolt outmigration the following spring.

Chum salmon enter WRIA 14 streams in the fall and winter (Table 3). Summer Chum typically enter WRIA 14 streams in the late summer to fall and spawn from September to November. Fall Chum Salmon typically enter WRIA 14 streams in the fall and spawn primarily in November and December. Incubation occurs through the late winter. Juvenile rearing and smolt outmigration occurs from that spring to early summer.

Winter steelhead enter WRIA 14 streams in the late fall through the following spring and spawn in the spring (Table 3). Prior to spawning, maturing adults hold in pools or in side channels to avoid high winter flows. Steelhead tend to spawn in moderate to high gradient sections of streams and spawn higher in the watershed compared to other salmonids. Incubation occurs through the following summer. Juvenile rearing occurs for over a year before smolt outmigration the following spring.

Coastal cutthroat trout enter WRIA 14 streams in the late fall and spawn in the winter and early spring (Table 3). Freshwater rearing occurs for a full year with smolt outmigration occurring the following spring.

Table 3 below lists the run timing and life stages of anadromous salmon and trout present throughout the watershed.

Table 3: Salmonid Presence and Life History Timing in Kennedy-Goldsborough

Species	Freshwater Life Phase	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Subbasin
Coho	Upstream migration									■	■	■		All (except Harstine)
	Spawning	■									■	■	■	
	Incubation	■	■	■							■	■	■	
	Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■	
	Smolt outmigration			■	■	■	■							
Chum (summer)	Upstream migration								■	■	■			Oakland
	Spawning									■	■	■		Case
	Incubation	■	■							■	■	■	■	
	Juvenile rearing		■	■	■	■								
	Juvenile outmigration		■	■	■	■	■							
Chum (fall)	Upstream migration										■	■	■	All (except Harstine)
	Spawning	■	■									■	■	
	Incubation	■	■	■	■							■	■	
	Juvenile rearing			■	■	■								
	Juvenile outmigration			■	■	■	■							
Coastal Cutthroat	Upstream migration											■	■	Kennedy
	Spawning	■	■	■	■								■	Skookum
	Incubation	■	■	■	■	■						■	■	Goldsborough
	Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■	Mill
	Smolt outmigration			■	■	■	■							Oakland
Steelhead (winter)	Upstream migration	■	■	■	■								■	All (except Harstine)
	Spawning		■	■	■	■	■							
	Incubation			■	■	■	■	■						
	Juvenile rearing	■	■	■	■	■	■	■	■	■	■	■	■	
	Smolt outmigration			■	■	■								

The Washington State Conservation Commission Limiting Factors Analysis (Kuttel 2002) identified specific limiting factors for specific waterbodies, but also provide the following general themes throughout WRIA 14 streams and rivers on a multi-species basis:

- Fish Passage
- Riparian Canopy Closure
- Streambank Condition
- Floodplain Connectivity

- Substrate Embeddedness
- Large Woody Debris
- Pool Frequency and Quality
- Off-channel Habitat
- Temperature
- Dissolved Oxygen
- Water Quantity/ Dewatering
- Change in Flow Regime
- Biological Processes

Water quantity/ Dewatering was a limiting factor in Skookum Creek, Mill Creek, Goldsborough Creek, Shelton Creek, Johns Creek, and Cranberry Creek. Changes in flow regime were a limiting factor in Skookum Creek, Goldsborough Creek, Shelton Creek, and Cranberry Creek.

2.1.4 Water System Distribution and Impacts in WRIA 14

Pumping from wells can reduce groundwater discharge to springs and streams by capturing water that would otherwise have discharged naturally. Surface water availability for streamflow may be influenced by groundwater pumping such that flows are reduced. Consumptive water use (that portion not returned to the aquifer) reduces streamflow, both seasonally and as average annual recharge. A well pumping from an aquifer connected to a surface water body can either reduce the quantity of water discharging to surface water or increase the quantity of water leaking out of the river.[16]. As required by RCW 90.94, this watershed plan includes projects and actions chosen to offset consumptive use associated with permit-exempt domestic water use, to eliminate future impacts to instream flows, and to restore streamflow.

2.2 Watershed Planning in WRIA 14

Citizens and local, state, federal, and tribal governments have collaborated on watershed and water resource management issues in WRIA 14 for decades. Watershed planning under RCW 90.82 resulted in a draft watershed plan[17], but a final plan was never approved. It should be noted that RCW 90.82 provided that "the portion of the WRIA where surface waters drain into Hood Canal shall be considered WRIA 14b, and the remaining portion shall be considered WRIA

[16] Department of Ecology, 1995

[17] WRIA 14 Watershed Management Plan – Kennedy–Goldsborough Watershed. Final Draft / February 2006. Prepared under Grant G0000107 for the WRIA 14 Planning Unit by Plateau Technical Communication Services. http://www.plateautechcomm.com/docs/WRIA14_Plan_FinalDraft.pdf

14a. Planning for WRIA 14b under this chapter shall be conducted by the WRIA 16 planning unit." Under RCW 90.98, this division did not occur, and the Plan will address all of WRIA 14.

A brief summary of broad watershed planning efforts as they relate to the past, present, and future water availability in the Kennedy-Goldsborough Watershed is provided in Section 2.2.1.

2.2.1 Current Watershed Planning Efforts in WRIA 14

The WRIA 14 watershed plan is building on many of the past efforts to further develop comprehensive plans for the entire watershed. The Kennedy-Goldsborough Watershed is within two Local Integrating Organizations (LIO), the Alliance for a Healthy South Sound (AHSS)[18] and the Hood Canal Coordinating Council (HCCC). The AHSS is developing an ecological recovery plan and the HCCC adopted an Integrated Watershed Plan in 2014. The LIOs have completed ecosystem recovery plans as part of the Action Agenda for Puget Sound Recovery and are actively working to implement holistic approaches to recovery including projects on salmon and orca recovery, stormwater runoff, shellfish protection, and forest conservation.[19] The planning process to develop an ecosystem recovery plan is community based with engagement by local, state and federal agencies. The community is engaged in a collaborative planning process to help understand priorities and support the health and sustainability of the watershed.

The AHSS and salmon recovery lead entity include many of the same organizations and individuals that participate in the WRIA 14 Watershed Restoration and Enhancement Committee (the Committee). This history of collaborative planning and shared priorities has supported the success of the watershed restoration and enhancement plan development in WRIA 14. The Public Water System Coordination Act of 1977[20] created Critical Water Supply Service Areas (CWSSA). This Act requires each water purveyor in a CWSSA to develop a water system plan for their service area, with the boundaries being in compliance with the provision of the Act. The Washington State Department of Health is primarily responsible for the water system plan approval; however local governments ensure consistency with local growth management plans and development policies. This Act and the water system plans are important for the WRIA 14 watershed planning process as water system service areas and related laws and policies can set stipulations regarding timely and reasonable service as to whether new homes connect to water systems or rely on new permit-exempt domestic wells.[21] There are currently no Coordinated Water System Plans in WRIA 14.

[18] More information on the AHSS can be found here: https://www.healthysouthsound.org/

[19] More information on local integrating organizations and their efforts to recovery Puget Sound is available here: https://www.psp.wa.gov/LIO-overview.php.

[20] RCW 70.116.070

[21] County water system planning information is available for each county.
Mason County: https://www.co.mason.wa.us/health/environmental/drinking-water/public-water-systems.php
Thurston County: https://www.thurstoncountywa.gov/planning/Pages/comp-plan.aspx

2.2.2 Coordination with Existing Plans

Throughout the development of the watershed plan, Ecology streamflow restoration staff have engaged with staff from the Salmon Recovery Lead Entity and the Puget Sound Partnership, providing briefings on the streamflow restoration law, scope of the watershed plan, and plan development status updates. The Committee chair conducted outreach to the WRIA 14 Salmon Recovery Lead Entity regarding coordination with the Committee to ensure alignment of salmon recovery priorities and the streamflow planning process. Throughout the planning process, the WRIA 14 Committee has coordinated closely with the lead entity, including inviting the lead entity to participate in meetings and take part as an ex-officio member on the Committee. , The WRIA 14 lead entity participated in the Committee and collaborated by selecting priority streams based on information from the Salmon Recovery Plan, incorporating priority salmon recovery projects in the watershed plan, and reviewing project lists and descriptions.

County comprehensive planning under the Growth Management Act of 1990 identifies where and how future population, housing, and job growth is planned. Development of this plan was also coordinated with the Mason County and Thurston County comprehensive plans. The comprehensive plans set policy for development, housing, public services and facilities, and environmentally sensitive areas, among other topics. The comprehensive plans identify Mason and Thurston County's urban growth areas, set forth standards for urban and rural development, and provide the basis for zoning districts. The Committee used the Mason and Thurston County zoning districts as the basis for determining likely areas of future rural growth.

There are numerous linkages between growth management and water resource management. The GMA addresses water resources through requirements related to water availability as well as ground and surface water protection. Public facilities, which include domestic water systems must be adequate to serve a proposed development at the time the development is available for occupancy. The requirements also call for the protection of the water quality and quantity of groundwater used for public water systems in addition to critical areas including critical aquifer recharge areas. The GMA further addresses water resources through the protection of shorelines (through integration with the Shoreline Management Act) and critical areas, including fish and wildlife habitat conservation areas, riparian habitat, frequently flooded areas, and wetlands, all of which contribute to surface and ground water quality. In the rural area, GMA further requires a land use pattern that protects the natural water flows along with recharge and discharge areas for ground and surface waters. As discussed in Sections 1.1.1 and 1.1.2, ESSB 6091 was enacted in response to the State Supreme Court's "Hirst decision" (primarily codified as RCW 90.94, and other statutes) and amended the GMA. In addition to GMA, there are other connections between land use codes, water planning and water systems.

2.3 Description of the Watershed - Geology, Hydrogeology, Hydrology, and Streamflow

2.3.1 Geologic Setting

Pleistocene glaciation (2.6 million to 11,700 years ago) played an important role in sculpting the landscape of the Puget Sound Lowlands. Reaching a maximum extent during the Vashon stage of the Fraser Glaciation approximately 16,000 years ago, an ice sheet advanced southward into present day Puget Sound (Pringle, 2008). Multiple advances and retreats of the ice sheet formed the Puget Sound Lowlands, depositing a complex sequence of glacial and inter-glacial sediments on top of older sediments and Eocene age (56 to 33.9 million yeaers ago) basalt bedrock.

The surficial geology of WRIA 14 is dominated by a sequence of unconsolidated glacial and interglacial deposits. Depth to bedrock can exceed 1,000 feet in the eastern part of the WRIA (Welch and Savoca, 2011). Basalt bedrock forming the Black Hills outcrops in the southwestern part of the WRIA and the unconsolidated deposits are thin or absent. Shallow bedrock is also present around the majority of Summit Lake, resulting in irregular and unpredictabe groundwater availability (Gray and Osborne 1991; WDNR 2004). Most residential permit-exempt groundwater wells "…utilize seep developments or dug wells which intercept the shallow groundwaters moving towards the lake… (Noble and Wallace 1966).

Understanding the geologic setting allows characterization of surface and groundwater flow through the basin. Defining the relationships between surface water flow and deeper groundwater are important to understanding how to manage surface water resources and can be helpful in identifying strategies to offset the impacts of pumping from permit-exempt wells.

2.3.2 Hydrogeologic setting

U.S. Geological Survey (USGS) described the hydrogeology of the northern and eastern areas of WRIA 14 in a hydrogeologic framework report for the Johns Creek Subbasin (Welch and Savoca 2011). Surficial geologic maps of most of the WRIA have also been developed by the Washington State Department of Natural Resources.[22] The hydrogeologic units of the area are described as being either water-bearing ("aquifer") and non-water-bearing ("aquitard" or "confining layer") sediments, without regard to geologic origin or age. Major groundwater aquifers are found in the unconsolidated glacial and interglacial sediments.

Groundwater in shallow, often discontinuous aquifers generally flows toward local surface water bodies (lakes and streams) while groundwater in deeper, more regional aquifers is expected to flow generally eastward toward inlets of Puget Sound or northward toward Hood Canal. In some areas, groundwater may flow in a different direction from surface water. For

[22] e.g., Derkey, et al., 2009a; Derkey, et al., 2009b; Polenz, et al., 2010

example, in upper Goldsborough Creek basin surface waters flow towards the South Sound, but some aquifers flow towards Hood Canal (Plateau 2006).

The USGS describes the hydrogeology of the watershed as eight hydrogeologic units, typically alternating between aquifer and non-aquifer layers. This information is summarized in Appendix E: Regional Aquifer Units in WRIA 14. Four of the aquifers and two of the confining units defined by USGS are present throughout watershed, except in the southwest portion where bedrock is at or near land surface. These four aquifers are the most likely water sources for new permit-exempt wells. The upper three aquifer units (AA, UA, MA) are also the main source of direct recharge or baseflow to the surface water system. The Lower Aquifer does not have surface expressions except below sea level where it projects into Hood Canal.

2.3.3 Hydrology and Streamflow

Numerous small streams that drain into the marine waters of Puget Sound surrounding the Kennedy-Goldsborough Watershed (WRIA 14) characterize the hydrology of the watershed. There are 139 identified streams totaling over 240 linear miles in the watershed. All of the streams are typical lowland types with their headwaters originating from natural springs, surface water drainages, wetlands, or small lakes in foothills. Despite its abundance of creeks, WRIA 14 has no major river systems. The principal drainages are Schumacher, Sherwood, Cranberry, Deer, Johns, Goldsborough, Mill, Kennedy, Perry, Alderbrook, and Skookum Creeks with many smaller streams discharging directly into Puget Sound (Figure 1) (Plateau, 2006). The topography is relatively flat (ranging from sea level to ~300+ feet elevation) except in the westerly portion of the watershed where elevations rise up to 2,400 feet.

The larger streams consist of Goldsborough (mean annual flow of ~125 cfs), Kennedy (mean annual flow of ~65 cfs), and Skookum (mean annual flow of ~55 cfs) Creeks. Approximately 20 percent of streamflows are supported by a relatively constant year-round discharge of groundwater as baseflow varying from 6 percent in the Upper Kennedy catchment (which is underlain primarily by bedrock) to 24 percent in the Case Inlet drainages (which is underlain by sediments) (Golder 2003).

Because snow and snow pack are not a major factor in the watershed, streamflows reflect seasonal variation in precipitation. Annual precipitation ranges from approximately 55 inches near the Puget Sound to approximately 85 inches on the west side of the watershed (Golder 2003). In addition to directly contributing to streamflow maintenance, precipitation also contributes to storage in lakes and aquifers that serve as natural reservoirs, helping to moderate extreme high and low flows. Much of the precipitation that falls in the Black Hills runs off because of the impermeable rock that dominates the landform. This causes many headwater streams originating in the southwestern portion of WRIA 14 to go dry during the summer months. Precipitation that falls on the unconsolidated sediment of the glacial plain tends to percolate into the groundwater, providing perennial flow to lowland streams. Groundwater provides all late summer baseflow to area streams (Molenaar and Noble 1970). Water recharged to the deeper groundwater system may discharge directly to Puget Sound, an ecologically important function that maintains nearshore marine habitat.

Streamflows in WRIA 14 are typically lowest during the late summer and early fall, when precipitation is low and infrequent. Flows are sustained by groundwater during this period, when rearing juvenile coho and late summer spawning chum are most impacted by low flows. Extreme low flows in these streams can occur during years with relatively low precipitation, because of lower water tables and reduced shallow subsurface flows from summer precipitation.

WRIA 14 streams flow into the southern portion of Hood Canal and multiple south Puget Sound inlets (Figure 1: vicinity map). South Puget Sound inlet receiving waters include Case Inlet, Hammersley Inlet (including Oakland Bay), Little Skookum Inlet, Totten Inlet, and Eld Inlet. The South Hood Canal shoreline is the marine receiving waters of many small creeks including Twanoh Falls Creek, Twanoh Creek, Alderbrook Creek, and Happy Hollow Creek, as well as some intermittent streams and seeps (WRIA 16 Planning Unit, 2006). The primary streams that flow into Case Inlet include Sherwood and Shumocher Creeks. Sherwood and Shumocher Creeks are part of the same drainage basin, separated by Mason Lake. Small streams on Harstine and Squaxin Islands also flow into Case Inlet. The primary streams that flow into Hammersley Inlet include Goldsborough Creek, Johns Creek, Cranberry Creek, Deer Creek, and Mill Creek. In the past the South Shore Hood Canal was included as part of WRIA 16 for watershed planning purpose. However, it is designated as part of WRIA 14 and is being addressed as such in this watershed plan.

The Committee further divided WRIA 14 into subbasins for purposes of this watershed plan, and will be described in Chapter 3. The information in this chapter is not based on the Committee's definition of subbasins.

The University of Washington Climate Impact Group has developed numerous downscaled global climate models to forecast streamflow and precipitation changes in the Puget Sound, including WRIA 14. General trends such as increased stream temperatures, earlier streamflow timing, increased winter flooding, and lower summer minimum flows are expected (Mauger, et al. 2015).[23] Water temperatures impact salmonid survival, growth and fitness. Higher temperatures are exacerbated by low stream flow.

Instream flow rules are established to maintain or safeguard aquatic biota and fish, and to support recreational and other beneficial uses. Stream closures or flow limitations were established on nine streams and lakes under the Fisheries Code (RCW 75.20) and water right actions of Ecology (or the predecessor agencies) between 1953 and 1975. Minimum instream flows were established on an additional 14 streams across the watershed in 1984 under Ecology's Instream Resource Protection Program (WAC 173-514). Twenty-one streams are seasonally closed to further (surface water) consumptive appropriation.

USGS provided the streamflow statistics for for Kennedy and Goldsborough Creeks, both of which have at least ten years of continuous stream gauging data and an established minimum

[23] Climate forecasts for WRIA 14 can be found here: https://climatetoolbox.org/

instream flow regulation. [24] Streamflow statistics from stream gage data provided by the Squaxin Island Tribe were developed by the Department of Ecology, and are included in Appendix K. The analysis indicated that minimum instream flows in these creeks are not met between 50-60% of the time during the period of record, which was considered to be within a wet cycle of the Pacific Decadal Oscillation (PDO) (Golder 2003) (Kuttel 2002). Kennedy creek is regulated by a discharge structure in Summit Lake, and the shallow underlying bedrock ties the lake and stream together creating a unique situation as it relates to meeting instream flows.

WAC173-514 set minimum instream flows for the Kennedy-Goldsborough watershed and its tributaries, closing streams to further appropriation of surface water. WAC173-515 set minimum instream flows for 10 streams and their tributaries, including lakes. Eight of these 10 streams and their tributaries are closed to further appropriation of surface water for part of the year. An additional 11 streams and their tributaries are closed to further appropriation of surface water from May 1 – October 31.Streams subject to minimum instream flows include Shumocher Creek, Sherwood Creek, Deer Creek, Cranberry Creek, Johns Creek, Goldsborough Creek, Mill Creek, Skookum Creek, Kennedy Creek, and Perry Creek. Many of these streams, including Cranberry Creek, Johns Creek, Goldsborough Creek, Skookum Creek, and Mill Creek, have average monthly flows that are less than the minimum instream flows on a seasonal basis (SIT 2020).

The background of how instream flows and closures were set are described in the Instream Resources Protection Program (IRPP) for WRIA 14 (Ecology 1983). Instream flows were set for streams where continuous flow records existed or correlations of flow to other stream gages were possible and where average annual flows exceeded five cfs. Streams closed by the WAC were previously closed pursuant to water right recommendations or had average annual flows less than five cfs and a known high value for fish production, aesthetics, and other environmental values.

The IRPP does not describe the instream flow setting technique; instream flows are believed to have been set using a combination of Physical Habitat Simulation (PHABSIM), which is a suite of hydraulic and habitat models that compute an index to habitat suitability and discharge, and the toe-width method to determine a habitat based instream flow recommendation. The instream flow recommendations tended to use the 40-50 percent exceedance as a hydrologic limit to the habitat-based instream flow recommendation (Pacheco 2020).

In establishing instream flows by regulation, Ecology used regulatory flows that were higher than the flows commonly seen in the stream and as such, were not designed to be met 100 percent of the time, nor was there an intent to try to achieve the instream flow on any given day. Instead, the intent of the regulation was to protect streams from further depletion (e.g., through subsequent appropriations) when flows approach or fall below the recommended discharges (Ecology 1983). When streamflows are below the instream flow, Ecology may

[24] USGS streamflow statistics are available here: (https://waterdata.usgs.gov/wa/nwis/sw)

manage water use by contacting “junior” water users and inform them of the need to curtail water use. Ecology protects instream flows when issuing new water rights, or denies a water right application if mitigation is not provided.

2.3.4 Water Quality

Ecology evaluates surface waters in WRIA 14 every two years with a water quality assessment. Total Maximum Daily Load (TMDL) plans are part of the Federal Clean Water Act that address concerns identifying and tracking surface waters impaired by pollutants, and create programs to restore them. The assessment evaluates existing water quality data and classified waterbodies into the following categories:

- Category 1: Meets tested standards for clean waters.
- Category 2: Waters of concern; Waters in this category have some evidence of a water quality problem, but not enough to show persistent impairment.
- Category 3: Insufficient Data
- Category 4: Impaired waters that do not require a TMDL
    - Category 4a: already has an EPA-approved TMDL plan in place and implemented.
    - Category 4b: has a pollution control program, similar to a TMDL plan, that is expected to solve the pollution problems.
    - Category 4c: is impaired by causes that cannot be addressed through a TMDL plan. Impairments in these water bodies include low water flow, stream channelization, and dams.
- Category 5: Polluted waters that require a water improvement project.

The latest water quality assessment classified many waterbodies in WRIA 14 (Ecology 2020). Category 4 and 5 assessment results are listed in Appendix F. Category 5 listings are based on exceedance of water temperature, dissolved oxygen, pH, and bacteria water quality standards.

Four TMDLs have been prepared in WRIA 14 to address water quality impairments. These studies include the Cranberry, Johns, and Mill Creeks Temperature TMDL (in preparation), the Totten, Eld, and Skookum Inlets Tributaries Bacteria and Temperature TMDL (Ecology 2006), and the Oakland Bay, Hammersley Inlet Tributaries Bacteria TMDL (Ecology 2011).

Reduced stream flow can lead to degraded water quality. Reduced flow leads to increased pollutant concentrations with the same pollutant load (e.g. bacteria). Reduced stream flow also makes the stream flow more slowly, allowing more time for the water to warm up and for periphyton (i.e. algae) to cause dissolved oxygen and pH exceedances. These degraded water quality conditions can impact aquatic life if conditions exceed suitable ranges. Therefore, projects that improve water quality also provide a net ecological benefit.

Chapter Three: Subbasin Delineation

3.1 Introduction

To allow for meaningful analysis of the relationship between new consumptive use and offsets per Ecology's Final NEB Guidance,[25] the Committee divided WRIA 14 into subbasins for the purposes of this watershed plan[26]. This was helpful in describing the location and timing of projected new consumptive water use, the location and timing of impacts to instream resources, and the necessary scope, scale, and anticipated benefits of projects. The Committee used the subbasin delineations to set priorities for developing water offset projects close to the location of anticipated impacts. In some instances, subbasins may not correspond with hydrologic or geologic basin delineations (e.g., watershed divides)[27]. This chapter is based on the Subbasin Delineation Technical Memorandum (Appendix G).

3.2 Approach to Develop Subbasins

The Committee divided WRIA 14 into eight subbasins for the purposes of assessing new PE wells, consumptive use, and project offsets initially using the delineations used in the draft WRIA 14 Watershed Management Plan.[28, 29] The basic considerations of the Committee in delineating subbasin boundaries for this planning process were:

- Existing or concurrent planning efforts may have already delineated subbasins.
- The receiving salt waterbody to which surface waters drain.

Other considerations were:

- Too few subbasins reduce the understanding of relationships between where pumping effects occur and where benefits of offset projects occur.

[25] "Planning groups must divide the WRIA into suitably sized subbasins to allow meaningful analysis of the relationship between new consumptive use and offsets. Subbasins will help the planning groups understand and describe location and timing of projected new consumptive water use, location and timing of impacts to instream resources, and the necessary scope, scale, and anticipated benefits of projects. Planning at the subbasin scale will also allow planning groups to consider specific reaches in terms of documented presence (e.g., spawning and rearing) of salmonid species listed under the federal Endangered Species Act." Final NEB Guidance p. 7.

[26] The term "subbasin" is used by the WRIA 14 Committee for planning purposes only and to meet the requirements of RCW 90.94.030 (3)(b).

[27] Washington State Department of Ecology (Ecology), 2019. Final Guidance for Determining Net Ecological Benefit, GUID-2094 Water Resources Program Guidance. Washington State, Department of Ecology, Publication 19-11-079.

[28] This is consistent with Final NEB Guidance that defines subbasins as a geographic subarea within a WRIA. A subbasin is equivalent to the words "same basin or tributary" as used in RCW 90.94.020(4)(b).

[29] HDR, 2019. WRIA 14 Draft Subbasin Delineation. June 26, 2019.

- Too many subbasins can make it unwieldly to evaluate all of the offset projects needed to achieve a net ecological benefit for the WRIA.
- Stream distribution within each subbasin.
- Fishery resources within each subbasin.
- Streams with closures and minimum flows within each subbasin.

A more detailed description of the subbasin delineation is in the technical memo available in Appendix G.

3.3 Subbasin Map

The WRIA 14 subbasin delineations are shown on Figure 2 and summarized below in Table 4:

Table 4: WRIA 14 Subbasins

Subbasin Name	Primary Rivers and Tributaries	County
Case	Sherwood Creek, Shumocher Creek, Hoke Creek, Hiawata Creek, and Jones Creek	Mason
Goldsborough	Goldsborough Creek, North Fork Goldsborough Creek, South Fork Goldsborough Creek, Winter Creek, and Coffee Creek	Mason
Harstine	Jarrell Creek	Mason
Hood	Alderbrook Creek and multiple small drainages discharging directly to Hood Canal	Mason
Kennedy	Kennedy Creek, Perry Creek, Snodgrass Creek, Schneider Creek and other small drainages	Thurston and Mason
Mill	Mill Creek, Rock Creek, Gosnell Creek and small drainages discharging to the south shore of Hammersley Inlet	Mason
Oakland	Deer Creek, Cranberry Creek, Johns Creek, and other small drainages discharging to Oakland Bay	Mason
Skookum	Deer Creek, Lynch Creek, Elson Creek, Little Skookum Creek, Skookum Creek, and all drainages discharging to Little Skookum Inlet	Mason

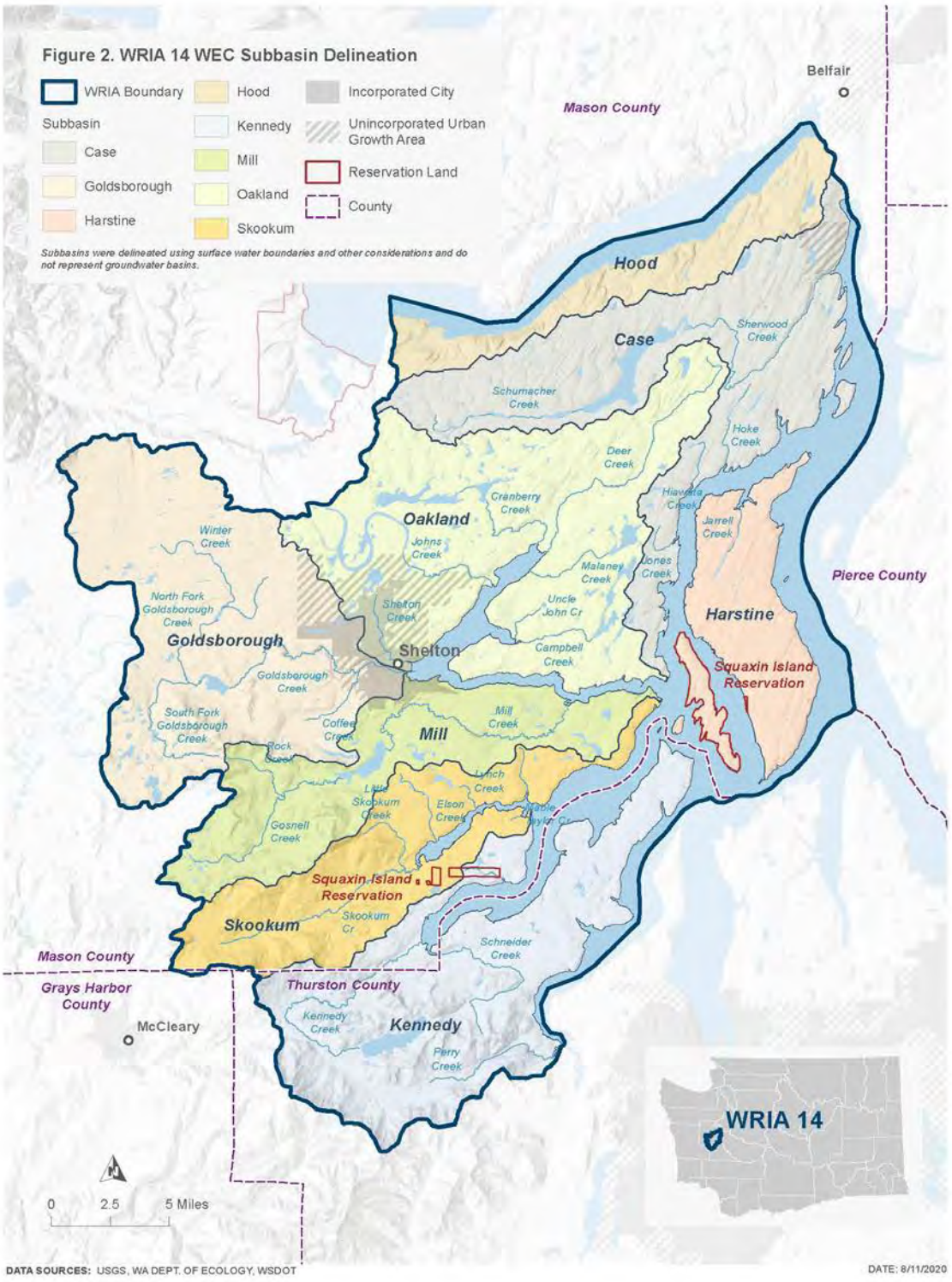

Figure 2: WRIA 14 WRE Subbasin Delineation

Chapter Four: New Consumptive Water Use Impacts

4.1 Introduction to Consumptive Use

The Final NEB Guidance states that, "Watershed plans must include a new consumptive water use estimate for each subbasin, and the technical basis for such estimate" (Ecology 2019b, page 7) [30]. This chapter provides the WRIA 14 Committee's projections of new domestic permit-exempt well connections (referred to as PE wells throughout this plan) and their associated consumptive use (CU) for the 20-year planning horizon. This chapter summarizes information from the technical memos prepared for the Committee.

4.2 Projection of Permit-Exempt Well Connections (2018 - 2038)

This watershed plan addresses new consumptive water use from projected new homes connected to PE wells. Generally, new homes are associated with wells drilled during the planning horizon. However, new uses can occur where new homes are added to existing wells serving group systems under RCW 90.44.0050. The well use discussed in this plan refers to both of these types of new well use. PE wells may be used to supply houses, and in some cases, other Equivalent Residential Units (ERUs) such as small apartments. For the purposes of this document, the terms "house" and "home" refer to any permit-exempt domestic groundwater use, including other ERUs.

The WRIA 14 Committee projects 4,294 PE wells over the planning horizon. The largest number of these wells are likely to be installed in the Oakland Bay subbasin. Projections for Thurston County in this plan are based on Thurston County Comprehensive planning dates through 2040.

The WRIA 14 Committee reached consensus on a methodology to project the most likely number of new PE wells over the planning horizon in WRIA 14, in order to estimate new consumptive water use. The method is based on recommendations from Appendix A of Ecology's Final NEB Guidance. The following sections provide the 20-year projections of new PE wells for each subbasin within WRIA 14, the methods used to develop the projections, and the uncertainties associated with the projections.

[30] Though the statute requires the offset of "consumptive impacts to instream flows associated with permit-exempt domestic water use" (RCW 90.94.020(4)(b)) and 90.94.030(3)(b)), watershed plans should address the consumptive use of new permit exempt domestic withdrawals. Ecology recommends consumptive use as a surrogate for consumptive impact to eliminate the need for detailed hydrogeologic modeling, which is costly and unlikely feasible to complete within the limited planning timeframes provided in chapter 90.94 RCW. RCW 90.94.020 and 90.94.030 have various references to how watershed plans are to project, offset, or account for "water use." Ecology interprets these subsections of the law (RCW 90.94.020(4)(b), 90.94.020(4)(c), 90.94.030(3)(b), 90.94.030(3)(c), 90.94.030(3)(d), and 90.94.030(3)(e)) to relate to the consumptive water use of new permit-exempt domestic withdrawals that come online during the planning horizon. (Ecology, 2019a, page 7)

4.2.1 Permit-Exempt Well Connections Projection by Subbasin

This WRIA 14 watershed plan compiles the counties' growth projection data both at the WRIA scale and by subbasin. Note that two counties are present in WRIA 14: Mason County and Thurston County. The projection for new PE wells in WRIA 14 by subbasin is shown in Table 5 and Figure 3.

Table 5: Number of PE Wells Projected between 2018 and 2038 for the WRIA 14 Subbasins

Subbasin	Projected PE Wells
Case	512
Goldsborough	546
Harstine	143
Hood	117
Kennedy (Mason County)	59
Kennedy (Thurston County)	529
Mill	466
Oakland	1559
Skookum	363
Totals	**4,294**

Mason County projects approximately 3,765 new PE wells for the over the planning horizon. Thurston County projects approximately 529 PE wells within unincorporated areas of WRIA 14 over the planning horizon. The total projection for WRIA 14 is 4,294 new PE wells.

4.2.2 Methodology

The WRIA 14 Committee gave deference to each county for identifying the most appropriate method of projecting PE wells within their jurisdiction. Each county used a different method for calculating the PE well projections within their jurisdiction. Both the Mason County and Thurston County methods are based on Office of Financial Management (OFM) population forecasts, which is simple mortality and migration rate data collection. This method is summarized in the section below for each respective County. The technical consultant developed a WRIA 14 Permit-Exempt Growth and Consumptive Use Summary, provided in Appendix H, which offers a more detailed description of the methods used by the counties.

Mason County Growth Projection Methodology

Mason County developed growth projections based on the Mason County Comprehensive Plan, which is based on OFM medium population growth estimates.

Mason County used the following steps to project growth of permit-exempt connections over the planning horizon:

1. Develop 20-year growth projections based on OFM medium population growth estimates, and conversion to dwelling units based on assumed people per dwelling unit.

2. Determine available land for single family domestic units and determine proportion of build-out capacity by county urban growth areas (UGAs) and rural lands.
3. Apply growth projections to buildable lands.
4. Overlay subbasins to determine new permit-exempt connections in each subbasin.

These methods were used to develop an initial projection of 3,509 new PE wells. A revised projection was developed by assuming that some permit-exempt growth will occur in water system areas, which resulted in 3,765 new PE wells. It was assumed that growth in each respective water system will be proportional to buildable parcels without water system hookups relative to parcels with water system hookups. The following methods were applied on top of the initial methods:

1. Define total buildable parcels in GIS, using Department of Health (DOH) service area polygons and county parcel data.
2. Define total approved water system connections (built out + available) and active water system connections (built out) using the DOH Sentry database (DOH 2019).
3. Buildable parcels with water system hookup = total approved minus active water system connections.
4. Buildable parcels without water system hookup = total buildable parcels minus total approved water system connections.
5. Define proportion of permit-exempt growth within each water system by dividing number of buildable parcels without water system hookups by total number of buildable parcels.
6. Multiply proportion of permit-exempt growth within each respective water system by total growth projected to occur in that water system.
7. Sum additional permit-exempt growth by subbasin and add to initial permit-exempt growth projection.

Thurston County Growth Projection Methodology

The Thurston County growth projection methods and results were provided by the Thurston Regional Planning Council (TRPC) and Thurston County[31].

TRPC used the following steps to project growth of permit-exempt connections over the planning horizon:

1. Develop 20-year growth projections based on OFM medium population growth estimates, and conversion to dwelling units based on assumed people per dwelling unit.
2. Develop residential capacity estimates.

[31] Documentation for TRPC's housing projections is available at https://www.trpc.org/236

3. Allocate growth to parcels based on recent residential development and permit trends, where capacity is available.
4. Once allocated, estimate the amount of development on permit-exempt connections based on the following criteria provided by Thurston County::
    a. Located outside incorporated cities; growth in incorporated cities is assumed to connect to a municipal water system.
    b. Water systems within UGAs; permit-exempt growth is assumed to occur on parcels with no sewer service.
    c. Rural water systems; assumed no permit-exempt growth.

These methods were used to develop an initial projection of 497 new PE wells. A revised projection was developed by assuming that some permit-exempt growth will occur in rural water system areas, which resulted in a projection of 529 new PE wells. It was assumed growth in each respective rural water system will be proportional to buildable parcels without water system hookups relative to parcels with water system hookups.

The Mason and Thurston County PE well growth projections were added together for the initial and revised scenarios, respectively. The WRIA 14 Committee agreed by consensus to use revised projections totaling 4,294 new PE wells in WRIA 14 as the final estimate for the purposes of estimating consumptive use.

4.2.3 Distribution of New PE Wells

The WRIA 14 Committee mapped potential locations of new PE wells in the watershed based on parcels available for residential development dependent on PE wells. These parcels are primarily in rural areas, but also within Urban Growth Areas that are not served by water systems, and in water systems where growth is expected to exceed available water system infrastructure. The resulting map (Figure 3) shows the most likely areas that new residential development dependent on PE wells will occur.

The WRIA 14 Committee projects that most new PE wells will occur in and around the Shelton urban growth area, in the Oakland and Goldsborough subbasins. (Table 5 and Figure 3).

4.2.4 Projected Growth Map

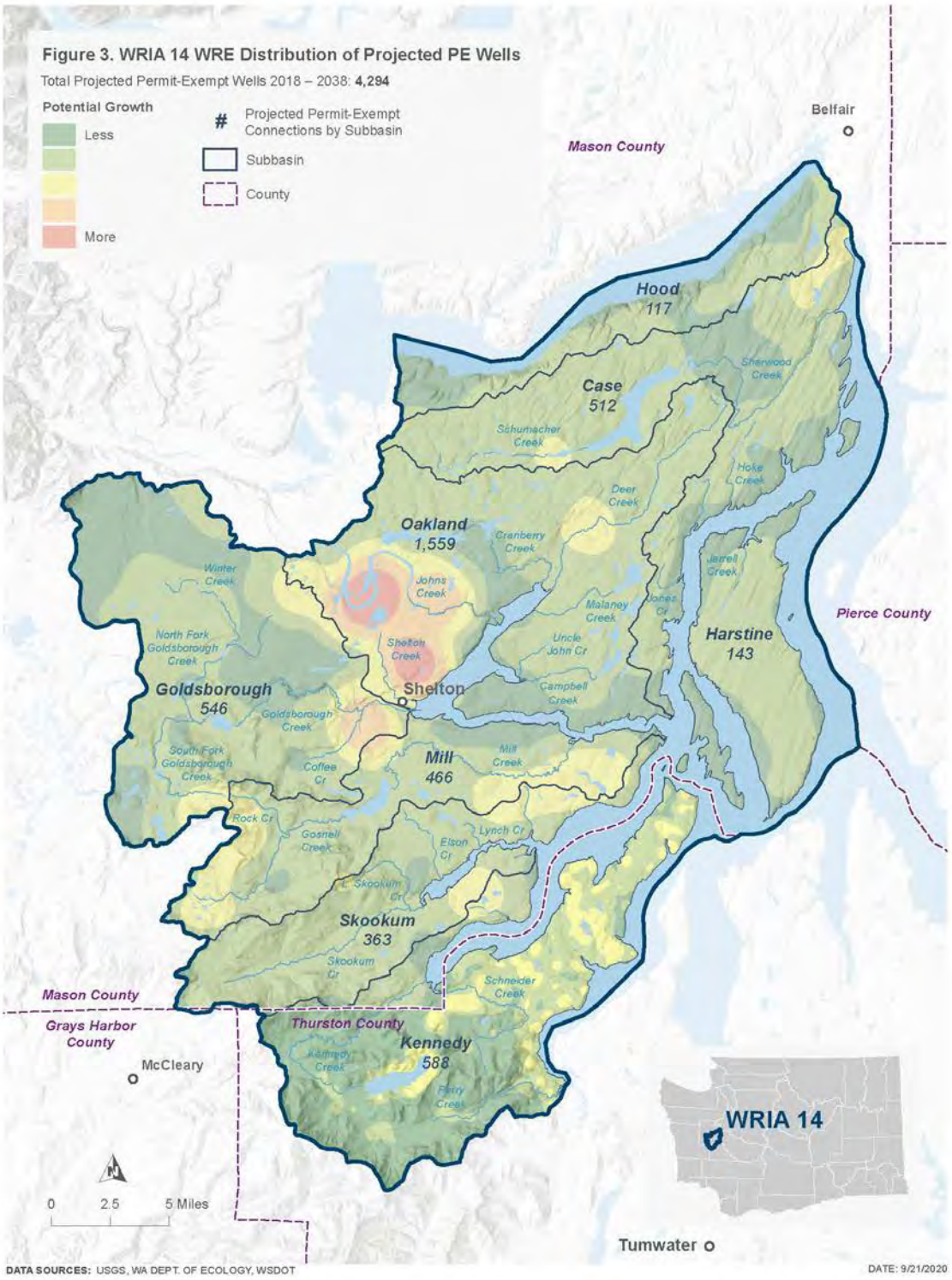

Figure 3: WRIA 14 WRE Distribution of Projected PE Wells for 2018-2038

4.2.5 Summary of Uncertainties and Scenarios

The methods described above for projected new PE wells include a number of uncertainties. These uncertainties were discussed with the WRIA 14 Committee and recognized as inherent to the planning process. The uncertainties are shared here to provide transparency in the planning process and deliberations of the Committee, and to evaluate the range of outcomes that could occur in the future.

One example of uncertainty is that Mason County's method omitted PE wells installed within water system areas. Although most cities require new homes to connect to water systems, they allow exceptions if a connection is not available (for instance, if a home is more than 200 feet from a water line). Additionally, cities and developments may increase the number of available connections through water system expansion, which may result in a lower number of new PE wells, especially in rural areas which have water systems.

Another example of uncertainty is the reliance on historical data. The methods assumed that historical growth trends would continue into the future. However, many factors play into homebuilding trends. Additionally, there is some uncertainty in the methodology that may lead to assumptions of where new PE wells are expected to occur.

An additional example of uncertainty are variations in growth scenarios for each county by OFM. The OFM medium growth scenario was used for this analysis, however OFM also provides a high growth scenario, which is not a formal alternative scenario and is based on the likelihood of the counties experiencing a historically high growth rate. The OFM 20-year high growth projection for 2040 is 18.4% higher than the medium growth projection in Thurston County, and 17.2% higher than the medium growth projection in Mason County.

Because of the uncertainty in the projections, the WRIA 14 Committee evaluated additional PE well scenarios using different assumptions, such as that some permit-exempt growth will occur in rural water system areas. This resulted in the final PE well estimate which the Committee agreed by consensus was the appropriate analysis for WRIA 14.

This methodology is described in detail in Appendix H.

4.3 Impacts of New Consumptive Water Use

The WRIA 14 Committee used a 20-year projection for WRIA 14 of new PE wells to estimate the consumptive water use that this watershed plan must address and offset. The WRIA 14 Committee estimates 759 acre-feet per year (AFY) (1.05 cfs) as the "most likely" new consumptive water use in WRIA 14. This watershed plan also includes a higher consumptive use goal of 1,035 AFY (1.43 cfs) to achieve through adaptive management. This section includes an overview of the method used by the WRIA 14 Committee to estimate new consumptive water use (consumptive use), an overview of the anticipated impacts of new consumptive use in WRIA 14 over the planning horizon, and other considerations by the WRIA 14 Committee, such as assumptions and uncertainties. The WRIA 14 Permit-Exempt Growth and Consumptive Use Summary provides a more detailed description of the analysis and alternative scenarios considered (Appendix H.)

Consistent with the Final NEB guidance (page 8, Appendix B), the Committee assumed impacts from consumptive use on surface water are steady-state, meaning that impacts on the stream from pumping do not change over time. This assumption is based on the wide distribution of future well locations and depths across varying hydrogeological conditions.

4.3.1 Methodology to estimate indoor and outdoor consumptive water use

Appendix A of the Final NEB Guidance describes a method (referred to as the Irrigated Area Method) that assumes average indoor use per person per day, and reviews aerial imagery to provide a basis to estimate irrigated area of outdoor lawn and garden areas. Use patterns for indoor uses versus outdoor uses are different. Indoor use is generally constant throughout the year, while outdoor use occurs primarily in the summer months. Also, the portion of water use that is consumptive varies for indoor and outdoor water use. The Irrigated Area Method accounts for indoor and outdoor consumptive use variances by using separate approaches to estimate indoor and outdoor consumptive use.

To develop the consumptive use estimate, the WRIA 14 Committee used the Irrigated Area Method and relied on assumptions for indoor use and outdoor use from Appendix A of the Final NEB Guidance (Ecology 2019). This chapter provides a summary of the technical memo available in Appendix H.

To develop consumptive use estimates, the WRIA 14 Committee looked at other methodologies for estimating consumptive use, such as the water system data method. The Committee determined that the water system data method would not provide an accurate depiction of water use in the watershed, but the results are provided in the technical memo in Appendix H, and additional water system data from Mason PUD is provided in Appendix L.

New indoor consumptive water use

Indoor water use refers to the water that households use (such as in kitchens, bathrooms, and laundry), and that leaves the house as wastewater, typically to a septic system.[32] The WRIA 14 Committee used the Irrigated Area Method and Ecology's recommended assumptions for indoor daily water use per person and local data to estimate the average number of people per household, and applied Ecology's recommended consumptive use factor to estimate new indoor consumptive water use[33]:

- 60 gallons per day (gpd) per person, as recommended by Ecology.
- 2.5 persons per household assumed for rural portions of WRIA 14[34]

[32] USGS 2012 https://pubs.usgs.gov/sir/2012/5163/sir12_5163.pdf
[33] NEB Guidance 2019 https://fortress.wa.gov/ecy/publications/documents/1911079.pdf
[34] OFM information for each county:
Mason County: https://www.ofm.wa.gov/washington-data-research/county-and-city-data/mason-county

- 10 percent of indoor use is consumptively used (or a consumptive use factor [CUF] of 0.10), based on the assumption that homes on PE wells are served by on-site sewage systems. On-site sewage systems return most wastewater back to the immediate water environment; a fraction of that water is lost to the atmosphere through evaporation in the drainfield.

The equation used to estimate household consumptive indoor water use is:

60 gpd per person x 2.5 people per house x 0.10 CUF

This results in an indoor consumptive water use of 15 gallons per day per well. This equates to 5,475 gallons per year (0.017 AFY[35]) (0.000023 cfs[36]).

New outdoor consumptive water uses

Most outdoor water is used to irrigate lawns, gardens, orchards and landscaping, and may include water for livestock. To a lesser extent, households use outdoor water for car and pet washing, exterior home maintenance, pools, and other water-based activities. Water from outdoor use does not enter onsite sewage systems, but instead infiltrates into the ground or is lost to the atmosphere through evapotranspiration.[37]

The WRIA 14 Committee used aerial imagery to measure the irrigated areas of 80 randomly selected parcels of a stratified sample served by PE wells to develop an average outdoor irrigated area. This analysis returned a large portion of parcels with no visible irrigation, which were given irrigated area values of zero. In order to address uncertainty in the analysis, the WRIA 14 Committee replaced the zero values with a value of 0.05 acres to account for potential outdoor water use other than irrigation. Taking that assumption into account, the average irrigated area for the 80 parcels was 0.10 acres. This analysis was determined to result in the most likely outdoor consumptive use estimate for WRIA 14, and will be used as the target offset to compare to offsets from projects. The WRIA 14 Committee then conducted a statistical confidence level analysis on the results. The 95 percent upper confidence limit yielded an irrigated area of 0.14 acres, representing a conservative estimate of the average irrigation area (i.e., there is a 95 percent probability that the true average irrigated area is less than 0.14 acres). This method is further summarized in Appendix H. A higher consumptive use estimate based on this value is included in the plan as a goal that represents successful achievement of NEB through adaptive management. The Committee considers this analysis as a way to account for other uncertainties such as future growth, and climate change.

Thurston County: https://www.ofm.wa.gov/washington-data-research/county-and-city-data/thurston-county

[35] Acre-foot is a unit of volume for water equal to a sheet of water 1 acre in area and 1 foot in depth. It is equal to 325,851 gallons of water; 1 acre-foot per year is equal to 893 gallons per day.

[36] Cubic feet per second (cfs) is a rate of the flow in streams and rivers. It is equal to a volume of water 1 foot high and 1 foot wide flowing a distance of 1 foot in 1 second; 1 cubic foot per second is equal to 646,317 gallons per day.

[37] NEB Guidance, Page 19, Ecology 2019 https://fortress.wa.gov/ecy/publications/documents/1911079.pdf

The WRIA 14 Committee used the following assumptions, recommended in Appendix A of the NEB Guidance, to estimate outdoor consumptive water use:

- Crop irrigation requirements (IR) for turf grass according to Washington Irrigation Guide (WAIG) (NRCS-USDA 1997): a weighted average of 18 inches of irrigation for the Grapeview (18.8 inches), Shelton (17.8 inches), and Olympia (16.5 inches) WAIG stations. This value was used to estimate the amount of water needed to maintain a lawn.
- An irrigation application efficiency (AE) to account for water that does not reach the turf: 75 percent. This increases the amount of water used to meet the crop's irrigation requirement by 25 percent.
- Consumptive use factor of 0.8, reflecting 80 percent consumption for outdoor use. This means 20 percent of outdoor water is returned to the immediate water environment.
- Outdoor irrigated area based on existing homes using PE wells: 0.10 acres (0.14 acres was used for the higher consumptive use estimate as a goal to achieve through adaptive management)

The equation used to estimate household consumptive outdoor water use is:

$$\frac{1.5\ feet\ per\ year * 0.10\ acres * 0.80\ CUF}{0.75\ AE}$$

First, water loss is accounted for by dividing the irrigation requirement by the application efficiency. Next, the total water volume used to maintain turf is multiplied by the area irrigated. Finally, the volume of water is multiplied by 80 percent to produce the outdoor consumptive water use.

This results in 0.16 AF per year (52,136.15 gallons per year) (0.000221 cfs) average outdoor consumptive water use per PE well for the WRIA based on 0.10 acres used for the most likely consumptive use estimate. Using 0.14 acres used in the higher adaptive management consumptive use estimate, this results in 0.22 AF per year (72,990 gallons per year) (0.00031 cfs). This is an average for the year, however the Committee expects that more water use will occur in the summer. The outdoor consumptive use varies by subbasin due to varying temperature and precipitation across the watershed.

4.3.2 Uncertainties and Limitations

The uncertainties and limitations are discussed here to provide transparency in the planning process and deliberations of the Committee, and to evaluate the range of outcomes that could occur in the future.

To reduce uncertainty, the WRIA 14 Committee relied on existing data to the extent possible, such as the average number of people per household, or information from other studies that estimate average indoor water use per person. However, it was recognized by the Committee that the method is based on historical and current water use, and future indoor water use may

vary based on a variety of factors. For example, water conservation may result in indoor water use becoming more efficient over time.

The outdoor consumptive use calculation contains more uncertainty than indoor consumptive use calculations, because it is based on four different factors and represents close to 90% of water usage. The average outdoor irrigated area analysis was limited to a sample size of 80 parcels distributed by location and property values. Also, the interpretation of irrigated areas from aerial photos is subject to error. Some Committee members voiced concern over these uncertainties in the outdoor irrigated area analysis. To help address the potentially limited sample size, the Committee estimated the error margin achieved with the 80 parcels, and determined that it was approximately 0.03 acres (i.e., the arithmetic average of 0.07 acres, which was the initial averaged irrigated area, has an error margin of 0.03 acres). Applying this error margin increased the irrigated area to 0.11 acres. Also, the Committee calculated the 95 percent upper confidence of the irrigated area average. The 95 percent upper confidence limit was 0.14 acres. The 95 percent upper confidence limit represents an upper estimate of the mean that has a 95 percent probability of being less than that upper limit (i.e. an over estimate of irrigated area that would likely result in a more conservative consumptive use estimate). The Committee generally agreed by consensus that future outdoor irrigation amounts for new permit-exempt connections will most likely fall below the estimate based on the 95 percent confidence limit (0.14 acres).

Potential bias in methodology was investigated in a comparability study with another consultant, GeoEngineers (Appendix H). Methods used by GeoEngineers in WRIAs 9 and 10 were compared to HDR's methods (as used in WRIA 14) for the same parcel images. HDR's method was found to be lower than GeoEngineers by 0.05 to 0.06 acres. The finding of the comparability study was that while the method is subject to error and the results varied between the two analyses, the variation of the results in the two analyses was inconclusive in terms of accuracy and the difference between analysists were not large enough to warrant any revisions to the estimates. However, since the HDR estimate were low, relative to the GeoEngineers estimates, the Committee used the 95% upper confidence limit of the results of this analysis (estimated by HDR) to develop the higher adaptive management CU goal account for uncertainty.

Uncertainty associated with method detection of irrigated areas in aerial photos was addressed by assigning a minimum value of 0.05 acres to the 80 parcels used to calculate the average irrigated area. When this minimum value was applied, the average irrigated area increased to 0.10 acres. This acreage was selected by the Committee for consumptive use calculations. More information on uncertainties on these methods can be found in Appendix H.

Other factors of uncertainty in the outdoor consumptive use calculation are the assumptions about irrigation amounts and irrigation efficiencies. The calculation assumes that homeowners water their lawns and gardens at the rate needed for commercial turf grass (i.e., watering at rates that meet crop irrigation requirements per the Washington Irrigation Guide). The irrigated area analysis demonstrated that many people irrigate their lawns enough to keep the grass alive through the dry summers, not at the levels that commercial turf grass requires. The method also assumes that residential irrigation has an efficiency of 75 percent. This assumes

that an additional 25 percent of the water needed to grow the lawn turf is used, because of watering inefficiency.

Another source of uncertainty is that climate change is expected to create longer, hotter, drier growing seasons, which may raise evapotranspiration and increase dry season water demands.[38]

In order to help reduce uncertainty for the Committee when considering both the USGS Groundwater Model and the Irrigation Area Methods regarding consumptive use, the Skokomish Tribe and Aspect Consulting conducted an assessment of how, or if, precipitation variability across geography and time would affect outdoor irrigation consumptive use estimates in WRIA 14. The study used up to date climatological data from Ag Weather Net and PRISM to compare to values using the Irrigation Area Method. This was undertaken to address concerns that these methodologies may not be conservative enough and whether or not a "safety factor" needed to be factored in to the consumptive use analysis. This assessment can be found in the Plan Compendium. The assessment confirmed for the Skokomish Tribe that the Irrigation Area Method is a conservative estimate, eliminating the need for any safety factor for this method, however it does show that addressing climate change is critical when considering future growth.

The WRIA 14 Committee addressed the uncertainties, assumptions, and limitations in this method by using conservative assumptions, and by developing two estimates for consumptive use: "most likely" and "higher use". This Committee prefers this approach, because it gives assurance that if sufficient projects are implemented to offset these consumptive use estimates, those projects will offset actual water use.

4.3.3 Summary of Consumptive Use Estimates

Of the methodologies presented to address uncertainty in the calculations of consumptive use, the Committee agreed by consensus on two estimates for WRIA 14: a "most likely" estimate and a higher estimate as a goal to achieve through adaptive management. Both are based on the assumption to assign a minimum value of 0.05 aces to the 80 parcels used to calculate the average irrigated area. The most likely estimate is based on an irrigated area of 0.10 acres, while the higher use estimate is based on an irrigated area of 0.14 acres (the 95 percent upper confidence limit of the average irrigated acres). These were applied to the calculations to determine indoor, outdoor, and total consumptive use estimates by subbasin (Table 6). The total consumptive use estimates for WRIA 14 are 759 AF per year (1.05 cfs) for the most likely estimate, and 1,034 AF per year (1.43 cfs) for the higher adaptive management goal. The total consumptive use estimates for WRIA 14 are calculated as the number of PE wells projected (see Section 4.2) multiplied by the total indoor and outdoor consumptive use per PE well. Table 6 summarizes the estimated indoor and outdoor consumptive use by subbasin for WRIA 14. The

[38] See https://climatetoolbox.org/ for more information on climate data.

highest consumptive use is expected to occur in the subbasin with the most anticipated new PE wells, as presented in Figure 3: PE well growth by subbasin.

Table 6: WRIA 14 Estimated PE Well Projects and Indoor and Outdoor "Most Likely" Consumptive Use Estimates by Subbasin, 2018-2038[39], in acre-feet per year[40]

			Assumed Irrigated Acreage of 0.10 Acre (Most Likely Estimate)		**Assumed Irrigated Acreage of 0.14 Acre (Higher Adaptive Management Goal)**	
Subbasin	**Projected PE wells**	**Indoor CU (AF/year)**	**Outdoor CU (AF/year)**	**Total CU/year (AF/year) in 2038**	**Outdoor CU (AF/year)**	**Total CU/year (AF/year) in 2038**
Case	512	8.6	81.9	90.5	114.7	123.3
Goldsborough	546	9.2	87.4	96.5	122.3	131.5
Harstine	143	2.4	22.9	25.3	32.1	34.5
Hood	117	2.0	18.7	20.7	26.2	28.2
Kennedy	588	9.9	94.0	103.9	131.6	141.5
Mill	466	7.8	74.6	82.4	104.4	112.2
Oakland	1,559	26.2	249.4	275.6	349.2	375.4
Skookum	363	6.1	58.1	64.2	81.3	87.4
TOTAL	**4,294**	**72**	**687**	**759.2**	962	**1,034.0**

[39] The WRIA 14 Committee has determined that an area of 0.10 irrigated acres result in the most likely outdoor consumptive use estimate for WRIA 14, and will be used as the target offset to compare to projects. The analysis based on an area of 0.14 irrigated acres is included in the plan as a higher goal to achieve through adaptive management.

[40] 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day

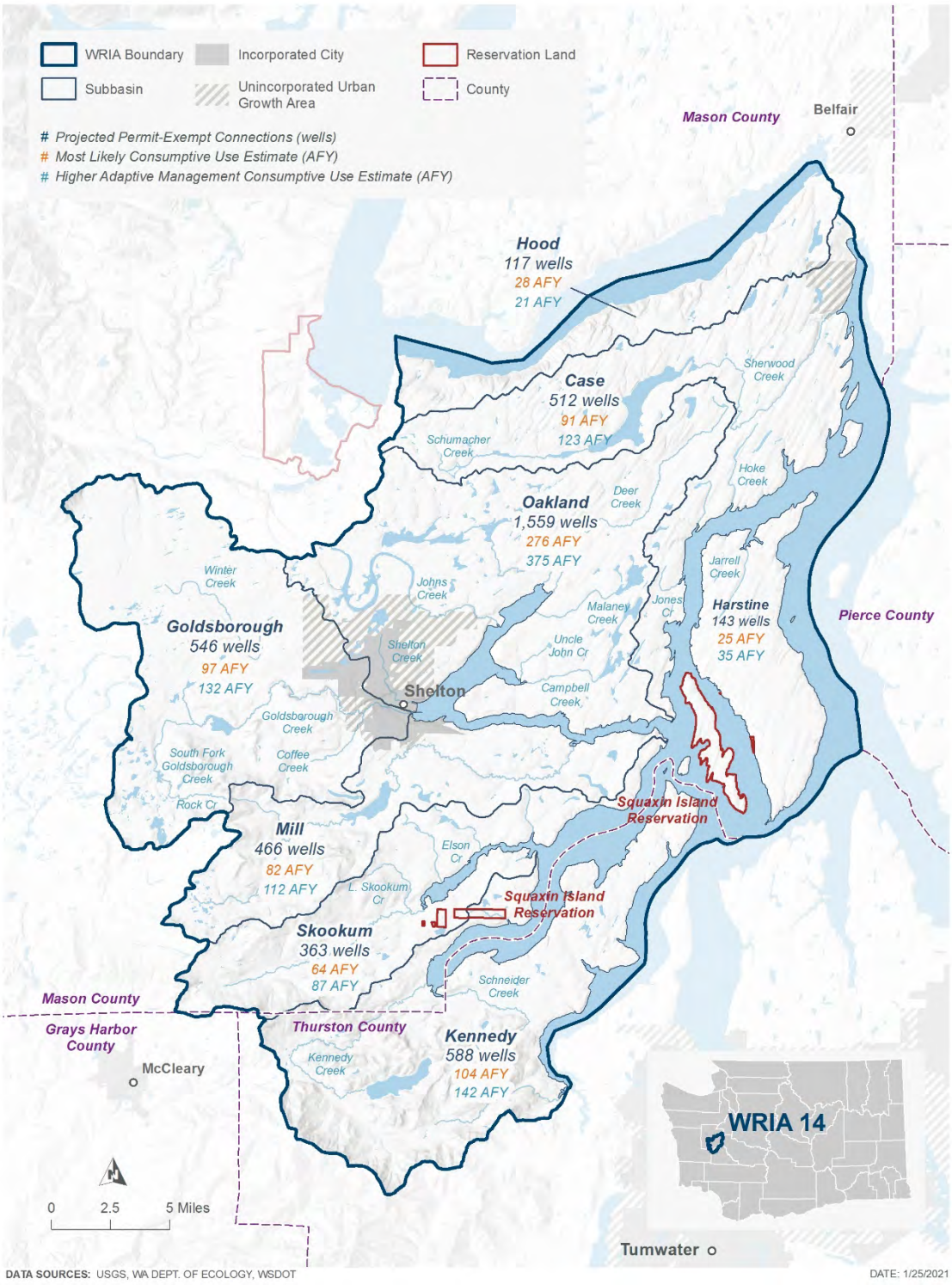

Figure 4: WRIA 14 Estimated Consumptive Use by Subbasin 2018-2038

Chapter Five: Projects and Actions

5.1 Description and Assessment

Watershed plans must identify projects that offset the potential impacts future PE wells will have on streamflows and provide a net ecological benefit (NEB) to the WRIA.[41] This chapter provides recommendations from the WRIA 14 Committee for projects to offset consumptive use and meet NEB[42] and describes 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 improving the ecosystem function and resilience of aquatic systems, supporting the recovery of threatened or endangered salmonids, and protecting instream resources including important native aquatic species. Habitat projects included in this plan were selected for their potential to result in an increase in streamflow, but the water offset benefits for these projects is difficult to quantify. Therefore, this watershed plan does not rely on habitat projects to contribute toward offsetting consumptive use.

To identify the projects summarized in this chapter, as well as the complete project inventory in Appendix J, Committee members and WRIA 14 partners brought project suggestions forward to the workgroup and Committee for discussion. Ecology and the technical consultants also identified projects with potential streamflow benefit from the Puget Sound Action Agenda near term actions, salmon recovery lead entity four-year work plans, streamflow restoration grant applications, and public works programs. The Committee used a project inventory to capture and track all project ideas, no matter their phase of development, throughout the planning process. To receive feedback on projects on alignment with other planning processes and identify any projects of concern for inclusion in the WRE Plan, the WRIA 14 Committee engaged the salmon recovery lead entity in WRIA 14. At any point in the process, Committee members or WRIA 14 partners could identify projects of concern for inclusion in the WRE Plan and recommend removal of the project from the project inventory. Where possible, project sponsors have been identified for projects and were engaged during project development.

[41] The NEB Guidance defines "projects and actions" as "General terms describing any activities in watershed plans to offset impacts from new consumptive water use and/or contribute to NEB." (Ecology, 2019b, page 5) This watershed plan uses the term "projects" for simplicity to encompass both projects and actions as defined by the NEB guidance.

[42] In 2015 the State Supreme Court issued a decision on Foster v. Ecology, City of Yelm, and Washington Pollution Control Hearings Board. The decision, frequently referred to as the "Foster decision," reaffirmed and reinforced that instream flows adopted in a rule must be protected from impairment. The Legislature established the Joint Legislative Task Force on Water Resource Mitigation (Task Force) in RCW 90.94.090 to understand impacts of the 2015 Foster decision. In that law, Ecology is authorized to issue permit decisions for up to five water mitigation pilot projects using a stepwise mitigation approach that can include out of kind mitigation. The City of Port Orchard is one of the entities undertaking a pilot project. As of January 2020, the pilot project work is still ongoing. More information about the Task Force, including their 2019 report to the legislature, can be accessed on their webpage: http://leg.wa.gov/JointCommittees/WRM/Pages/default.aspx. (Ecology, 2020b)

Based on initial information available on projects, the Committee identified a subset of projects that showed promise for quantitative streamflow benefits and prioritized these for further analysis. The technical consultants developed detailed analyses on the subset of projects and the Committee determined the offset value to attribute to each project. This chapter presents summaries of those projects.

Technical consultants provided support to identify water right acquisition opportunities for WRIA 14. In coordination with the Committee, technical consultants narrowed down the list of opportunities. The Committee provided input on the revised list of projects to develop a focused list of water rights for future opportunities such as full or partial acquisition or efficiency projects; however no specific water rights were identified for acquisition. The Committee acknowledged that only the consumptive use portion of the water right that is put to beneficial use could contribute to a water offset in the future. This work shows the annual quantity (Qa) of water rights from the focused list, and acknowledges that only a portion of that would equate to consumptive use. Before these rights are acquired and put into Trust, they will go through a full extent and validity analysis to determine the consumptive use offset component. As these analyses cannot happen until the owners of the rights have agreed to sell, the Committee is relying on the evaluations of the technical consultant to estimate the offset volumes described in section 5.2.

For projects that did not provide a quantifiable streamflow benefit, the WRIA 14 Committee chose not to invest the same level of technical consultant resources to further develop the projects during this planning period as they did for the water offset projects. Information presented on these projects is based on available information from WRIA 14 partners. The Committee focused the technical resources and expertise on finding projects that provide quantifiable offset benefits.

The projects identified in this plan are consistent with the project type examples listed in the Final NEB Guidance: (a) water right acquisition offset projects; (b) non-acquisition water offset projects; and (c) habitat and other related projects (Ecology 2019b). This watershed plan presents projects in the following three categories:

I. Likely to be implemented and provide quantitative streamflow benefits.

II. Likely to be implemented and provide habitat benefit and/or unquantifiable streamflow benefits.

III. Unable to be implemented at this time because the project is highly conceptual or has other constraints.

Projects in Category I and II are presented in this chapter. Prospective projects are also presented in this chapter and may be defined as category I or II projects, once further developed during plan implementation. All other projects are presented in the project inventory in Appendix J. The WRIA 14 Committee recommends implementation of projects in this chapter as well as in Appendix J in order to meet the offset need and NEB for WRIA 14.

As described in Chapter 6, the WRIA 14 Committee supports the development of an implementation group to further develop projects. Priorities of this group may include working

with project sponsors on project implementation, providing guidance for project monitoring, supporting development of feasibility studies, and supporting adaptive management.

5.2 Category I Projects with Quantifiable Streamflow Benefit

The WRIA 14 Committee set the goal of meeting the overall WRIA-scale consumptive use target. The WRIA 14 Committee set a secondary goal of offsetting consumptive use in each subbasin. The projects presented below have quantifiable streamflow benefit and the Committee identified these projects as having the greatest potential for implementation and achieving the required offset need. Detailed descriptions of each of the projects presented in this section are available in Appendix I. A summary of projects and offset benefits by subbasin are presented at the end of this section in Tables 7 - 8.

5.2.1 WRIA-wide Projects

5.2.1.1 Managed Aquifer Recharge Projects in WRIA 14

Managed aquifer recharge (MAR) projects divert, convey, and infiltrate peak seasonal river flows in engineered facilities that are in connection with the local alluvial aquifer that the donor stream or river is also in connection. To ensure that flows would be diverted in quantities that would not reduce habitat suitability for salmonids or reduce habitat forming processes, a couple different methods were used to estimates flow rates. If minimum flows have been designated, then the flow rate was estimated as less than two percent of minimum flows. However, on Kennedy Creek, where minimum flows have not been designated, a diversion of 1 cfs was used, which would be less than 2% of average wet season flows. Seepage back into the river would result in attenuation of these flows, increasing base flows across a broader time period, including the late summer and early fall, when flows are typically the lowest, and water demand for consumptive use is the highest. MAR projects are proposed for the following streams:

- Kennedy Creek
- Mill Creek
- Skookum Creek
- Goldsborough Creek
- Johns Creek
- Cranberry Creek
- Sherwood Creek

MAR projects in WRIA 14 have been identified through analysis by the technical consultants to identify potential suitable locations and are estimated to have a total potential water offset of 910 acre-feet per year (AFY). Due to uncertainties in the likelihood of projects being built and the benefits being realized (including the timing of streamflow benefits), the Committee chose to reduce the initial 910 AFY estimate of benefits from MAR projects. Consequently, the Committee determined that a reasonable offset estimate to claim for the purposes of this plan

is 273 AFY (i.e. thirty percent of the estimated 910 AFY total), accounting for uncertainties such as likelihood of implementation and timing of streamflow benefits (Table 7). The Committee supports future feasibility studies within WRIA 14 for MAR projects to further develop this information. Explanation and potential offset quantities for MAR projects in each stream are described in the following subbasin sections. A detailed project description is available in Appendix I.

The WRIA 14 Committee acknowledges that some diversion methods including in-channel structures may pose an impact to fish habitat, and strongly advocates for the use of diversion methods that do not include in-channel structures. For example, diverted water could be conveyed through a collector well adjacent to the river (e.g. Ranney Collector well). The WRIA 14 Committee suggests that projects should be specifically designed to enhance streamflows and to avoid a negative impact to ecological functions and/or critical habitat needed to sustain threatened or endangered salmonids.

Thurston County and Mason County have indicated that they would be the likely project sponsors of MAR projects within their respective county boundaries, in coordination with project partners and implementation groups, pending feasibility studies and land ownership.

5.2.1.2 Water Right Opportunities

The WRIA 14 Committee supports the full and partial acquisition of water rights to increase streamflows and offset the impacts of PE wells. Water rights should be permanently and legally held by Ecology in the Trust Water Rights Program to ensure that the benefits to instream resources are permanent. The WRIA 14 Committee acknowledges that all water right transactions rely on willing sellers and willing buyers. The WRIA 14 Committee recognizes the importance of water availability for producers and the limited available water supply.

The WRIA 14 Committee has identified a focused list of water rights for potential future investigation by WRIA 14 implementation partners, which can be found in Appendix I.

Water right opportunities are proposed for the following subbasins, and the amount of offset benefit by subbasin is shown based on the assumption of claiming 10% of the total Qa from the focused water rights list:

- Goldsborough: 34 AFY
- Hood: 31 AFY
- Mill: 30 AFY
- Oakland: 16 AFY

Based on the focused list of water rights, the Committee estimates that future feasibility studies or acquisition and efficiency opportunities may lead to a total estimated offset of 111 AFY (Table 7). The Committee supports future investigations of water rights for all water users, including commercial/industrial water right holders, to develop information on extent and validity of water rights for future project opportunities.

5.2.2 Case Subbasin

5.2.2.1 Managed Aquifer Recharge Project in Sherwood Creek

An MAR project (as described in the WRIA-wide Projects section above) is proposed for Sherwood Creek (Appendix I). Sherwood Creek flows from Mason Lake. Average monthly flows for Sherwood Creek at Sherwood Cr Rd. range between 79 - 144 cfs between November and April. Water could be diverted from the downstream end of Mason Lake and conveyed to an MAR site directly downstream of the lake outlet. An MAR diversion of 1 cfs (less than 2% of the lowest minimum instream flows) is proposed over this period. At least 72 days are likely to be above minimum instream flows during this period, while still accommodating a 1 cfs diversion, resulting a potential water offset of 143 AFY. The Committee has conservatively claimed thirty percent of this water offset, or 43 AFY (Table 8).

5.2.3 Goldsborough Subbasin

5.2.3.1 City of Shelton Reclaimed Water

The City of Shelton (City) proposes to increase the quantity and rate of reclaimed water infiltration into the North Fork Goldsborough subbasin by increasing production of Class A reclaimed water (RW) and infiltrating this to groundwater at the City RW spray field, near the Washington Corrections Center (WCC). This project will re-direct an annual average of 560 AFY of the City's wastewater in North Shelton from the City's Wastewater Treatment Plant (WWTP) to the City's Water Reclamation Plant (WRP). The additional flow will be treated to produce 560 AFY of RW for subsequent conveyance to the existing City spray field. The following infrastructure improvements will need to occur to facilitate this project:

- Conveyance of North Shelton wastewater to the WRP.
- A storage tank (0.750 million gallons per day) to store RW at the WRP.

The conveyance of North Shelton wastewater to the WRP is currently in its design phase, and is likely to include a sewage lift station, and 18-inch sewer main that would run from West Birch Street to reclaimed water satellite plant (approximately 9,000 linear feet). The RW storage tank will buffer variable production and use of RW. RW produced from City wastewater may be used for City uses, including a backup for firefighting, and it allows strategic timing of application of reclaimed water to the ground to benefit aquifers and streams and wetlands. Streamflow restoration funds are currently supporting design options for the lift station, sewer main, storage tank, and cost estimates. The additional RW will be conveyed to the City's existing spray field near the WCC with and infiltrated to local groundwater. Assuming an infiltration efficiency of 80%, this would result in about 448 AFY of water being infiltrated into the local aquifer.

The second component of this project is the use of RW at the WCC. The WCC proposes to use RW to irrigate their outdoor lawn, instead of water that they currently pump from their local well. Pumping from their local well has been shown to impact instream flows in the North Fork Goldsborough Creek. Assuming an infiltration efficiency of 80%, this would result in about 38

AFY of additional RW being infiltrated to the local aquifer. Both project components sum to a potential water offset of 486 AFY (Tables 7 – 8).

5.2.3.2 Managed Aquifer Recharge Project in Goldsborough Creek

An MAR project (as described in the WRIA-wide Projects section) is proposed for Goldsborough Creek (Appendix I). Soils and geology are favorable for MAR sites near Goldsborough Creek at multiple locations. Average monthly flows for Goldsborough Creek at S. 7th Street (USGS gage 12076800) range between 196 – 341 cfs between November and April. An MAR diversion of 1 cfs (less than 2% of the lowest minimum instream flows) during period is proposed over this period. At least 166 days are likely to be above minimum instream flows during this period, while still accommodating a 1 cfs diversion, resulting a potential water offset of 329 AFY. The Committee has conservatively claimed thirty percent of this water offset, or 99 AFY (Table 8).

5.2.4 Harstine Subbasin

No water offset projects are identified for the Harstine Subbasin.

5.2.5 Hood Subbasin

5.2.5.1 Managed Aquifer Recharge Project in the Hood Subbasin

MAR projects (as described in the WRIA-wide Projects section) may be proposed for streams in the Hood Subbasin during plan implementation. The Committee supports MAR projects in this subbasin, if there is a suitable stream and MAR infiltration basin that would benefit low seasonal flows.

5.2.6 Kennedy Subbasin

5.2.6.1 Managed Aquifer Recharge Project in Kennedy Creek

An MAR project (as described in the WRIA-wide Projects section) is proposed for Kennedy Creek (Appendix I). Kennedy Creek could have an MAR site(s) at near the outlet of Summit Lake or at approximately River Mile (RM) 5. Both of these areas are forested and have suitable geology and soils for infiltration. Average monthly flows near the mouth of Kennedy Creek range between 92 – 119 cfs between November and March. Since no minimum flows are set for Kennedy Creek, the average flows were used as a basis for setting diversion flow quantities. An MAR diversion of 1 cfs between November and March equates to less than 2% of average wet season flows. A conservative estimate of 40 days (a third of the time) is estimated to be above these average flows, while still accommodating a 1 cfs diversion. This would result in a 79 AFY water offset. The Committee has conservatively claimed thirty percent of this water offset, or 24 AFY (Table 8).

5.2.6.2 Schneider Creek Source Switch

The Schneider Creek Source Switch Project would replace an agricultural surface water diversion on Schneider Creek with a groundwater source. By shifting irrigation withdrawals to a groundwater source, the effect of those irrigation withdrawals on Schneider Creek would be much less. However, by pumping groundwater as opposed to surface water, the pumping effect on Schneider Creek may affect surface flows year round. This lesser but more attenuated

impact on stream flow is not currently consistent with Washington State water law. Chapter 173-514 WAC places a seasonal closure on Schneider Creek May 1 through October 31, but the existing water right specified that all the surface water withdrawals must stop on October 1. If future groundwater pumping was to stop on that date, the effects of groundwater pumping would continue into the month of October and affect streamflow during part of the closed period. Therefore, no water offset credit is currently being claimed for this project. However, if this aspect of Washington State Water law could be modified during plan implementation, the Committee would like to implement this project for water offset credits (Table 7).

5.2.6.4 Steamboat Middle

The Steamboat Middle project consists of expanded water storage in an existing forested/non-forested wetland. The project would expand water storage in a low-lying area between elevation of 114 and 118 ft. Some additional habitat may be created from this project as well as an expansion of wetlands as a result of additional water storage area. Conceptually, this project could provide infiltration of 14 to 61 AFY and would require quantification as part of a feasibility study. The WRIA 14 Committee is conservatively claiming 14 AFY of offset benefit (Table 8).

5.2.7 Mill Subbasin

5.2.7.1 Managed Aquifer Recharge Project in Mill Creek

An MAR project (as described in the WRIA-wide Projects section) is proposed for Mill Creek (Appendix I). Soils and geology are favorable for MAR sites immediately downstream of Isabella Lake. This location would be useful, in terms of providing cool groundwater recharge downstream of the lake. Average monthly flows for Mill creek at Highway 3 range between 81 - 153 cfs between November and April. An MAR diversion of 1 cfs (less than 2% of the lowest minimum instream flows) during period is proposed over this period. There were between 86 - 128 days when flows were above minimum instream flows, while still accommodating a 1 cfs diversion, resulting a potential water offset of 171 – 254 AFY. At least 86 days are likely to be above minimum instream flows during this period, while still accommodating a 1 cfs diversion, resulting a potential water offset of 171 AFY. The Committee has conservatively claimed thirty percent of this water offset, or 51 AFY (Table 8).

5.2.8 Oakland Subbasin

5.2.8.1 Evergreen Mobile Home Estates Water Rights Acquisition

Evergreen Mobile Home Estates (Evergreen Estates) Group A water system (PWSID# 24154) has been issued a compliance order to install CT6 disinfection (i.e. chlorination) to address failing on-site wastewater systems in close proximity to its wells. As an alternative to CT6 treatment, Evergreen Estates is considering connection to the City of Shelton's (City's) water system and abandoning its existing wells. The City has been pursuing consolidating the Evergreen Estates with the City drinking water system and conducted a feasibility study to identify infrastructure improvements necessary for this to occur. The water system consolidation would result in the water rights of the Evergreen Mobile Estates Group A system no longer being unused. A water

offset benefit would occur if that water right was placed into permanent trust, per RCW 90.42. The City conducted a feasibility Study and estimated their likely annual water use to be 7.2 AFY. Therefore, if the City provided water to the Evergreen Estates, and the existing water right were to be placed into permanent trust, the water offset value would be 7.2 AFY (Tables 7 – 9).

The Evergreen Estates installed five new sewer septic systems and a chlorination system at the wells. The property owner has indicated that the State has accepted their plan for onsite septic and chlorination improvements and that no further action on their part is needed. However, water system consolidation could still occur, and may be incentivized if the Evergreen Estates consolidation costs were covered by others or with grant funding.

5.2.8.2 Managed Aquifer Recharge Project in Johns Creek and Cranberry Creek

MAR projects (as described in the WRIA-wide Projects section) are proposed for Johns Creek and Cranberry Creek (Appendix I). Average monthly flows for Johns Creek at Hwy 3 range between 81 – 153 cfs between November and April. An MAR diversion of 0.5 cfs (less than 2% of the lowest minimum instream flows) during period is proposed over this period. At least 36 days are likely to be above minimum instream flows during this period, while still accommodating a 0.5 cfs diversion, resulting a potential water offset of 36 AFY. The Committee has conservatively claimed thirty percent of this water offset, or 11 AFY (Table 8).

Average monthly flows for Cranberry Creek at Highway 3 range between 48 - 99 cfs between November and April. An MAR diversion of 1 cfs (less than 2% of the lowest minimum instream flows) during period is proposed over this period. At least 35 days are likely to be above minimum instream flows during this period, while still accommodating a 1 cfs diversion, resulting a potential water offset of 69 AFY. The Committee has conservatively claimed thirty percent of this water offset, or 21 AFY (Table 8).

5.2.9 Skookum Subbasin

5.2.9.1 Managed Aquifer Recharge Project in Skookum Creek

An MAR project (as described in the WRIA-wide Projects section) is proposed for Skookum Creek (Appendix I). Skookum Creek has unfavorable soils for MAR infiltration along much of its stream alignment. However, there are some small areas of suitable geology and soils in the headwaters and near the confluence with Kamilche Creek. Average monthly flows at Highway 101 range between 57 – 140 cfs between November and April. Assuming that flows are similar downstream of Kamilche Creek, an MAR diversion of 0.5 cfs (less than 2% of the lowest minimum instream flows) during period is proposed over this period. Between 84 - 131 days were above minimum instream flows, while still accommodating a 0.5 cfs diversion, resulting a potential water offset of 83 – 130 AFY. At least 84 days are likely to be above minimum instream flows during this period, while still accommodating a 0.5 cfs diversion, resulting a potential water offset of 83 AFY. The Committee has conservatively claimed thirty percent of this water offset, or 25 AFY (Table 8).

Table 7: Category I and Prospective Projects with Quantifiable Streamflow Benefit.

Project Type	Project Name	Project Description	Subbasin	Estimated Water Offset (AFY)[43]	Offset Claimed by WRIA 14 Committee (AFY)	Timing of Benefits	Project Sponsor	Estimated Project Cost[44]	Readiness to Proceed
Category I	City of Shelton RW/ WCC Source Switch	Re-direct North Shelton wastewater to WRP and infiltrate Class A reclaimed water at existing spray field near the WCC	Goldsborough	486	486	Year-round	City of Shelton	$8.8M	High
Category I	Evergreen Mobile Estates	Water system consolidation and water right acquisition	Oakland Bay	7	7	Year-round	City of Shelton	$474,000	Low
Category I	MAR	Install managed aquifer recharge facilities	Multiple	910	273	Year-round	Mason County/Mason PUD 1/ Thurston County/WRIA 14 Implementation Partners[45]	$3.1 M	Low
Category I	Water Right Opportunities	A focused WRIA-wide analysis on potential WR efficiencies and acquisition for future studies and implementation	Goldsborough, Hood, Mill, Oakland	1,112	111	Year-round	WRIA 14 Implementation Partners	$285,000	Low
Category I	Steamboat Middle	Surface water retention and infiltration	Kennedy	14	14	Year-round	Thurston County	$1 M	Low

[43] 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day
[44] Costs are based on offset claimed by the Committee and are based on order of magnitude estimates.
[45] The WRIA 14 Committee supports the development of an implementation group to further develop projects

Prospective	Schneider Creek Source Switch[46]	Source switch from surface water ground water	Kennedy	64	0	n/a	Thurston County	n/a	Low
Prospective	Summit Lake Water System	Future potential source switch for local domestic water supply	Kennedy	24-133	0	n/a	Thurston County	n/a	Low
Prospective	Mason Co Rooftop Runoff	New county requirement for new rural residential building to install LID BMPs that infiltrate over 95% of rooftop runoff.	All	249	0	Year-round	Mason County	$0[47]	High
	WRIA 14 Total Water Offset for WRIA 14 Projects			**2,866-2,975**	**891**				
	WRIA 14 Consumptive Use Estimate			**759**					
	WRIA 14 Higher Adaptive Management Consumptive Use Goal			**1,034**					

[46] The Schneider Creek Source Switch project currently conflicts with the Foster Supreme Court Decision, and would only be implemented pending legislative changes to allow for such projects to move forward; however, the Committee supports implementation of this project and has estimated the potential future offset quantity should this project be implemented.

[47] At this time, all estimated project costs are expected to be included in costs of construction for new homes, which would range from $3,780-$9.300 per home – a total of ~$17 million for proposed project.

Table 8: Water Offsets claimed by the WRIA 14 Committee, summed by subbasin. All values are in acre-feet per year.[48]

Subbasin	WRIA 14 Most Likely CU Estimate	WRIA 14 Higher Adaptive Mgmt CU Goal	Managed Aquifer Recharge	Water Rights	Shelton RW/WCC	Evergreen Mobile Estates	Steamboat Middle	Total
Case	90.5	123.3	43	0	0	0	0	43
Goldsborough	96.5	131.5	99	34	486	0	0	619
Harstine	25.3	34.5	0	0	0	0	0	0
Hood	20.7	28.2	0	31	0	0	0	31
Kennedy	103.9	141.5	24	0	0	0	14	38
Mill	82.4	112.2	51	30	0	0	0	81
Oakland Bay	275.6	375.4	32	16	0	7	0	55
Skookum	64.2	87.4	25	0	0	0	0	25
Total	**759.2**	**1,034.0**	**273**	**111**	**486**	**7**	**14**	**891**

[48] 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day

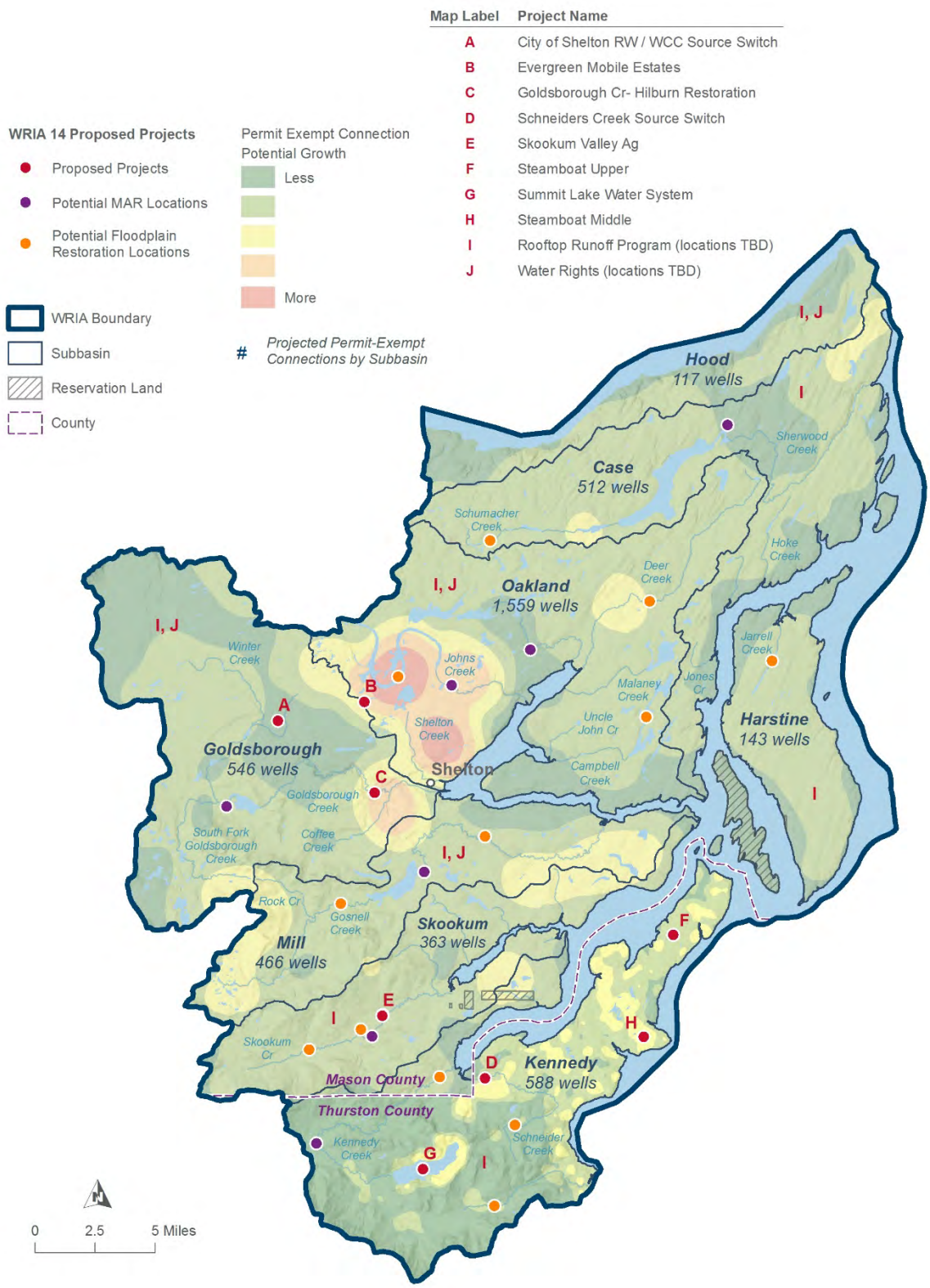

Figure 5: WRIA 14 Projects

5.3 Category II Projects that Primarily Provide Habitat Improvements

A number of habitat restoration projects, or projects with unquantifiable streamflow benefit were identified in WRIA 14. While several of these projects may produce a marginal offset benefit by increasing seasonal storage, the benefits were too small and too complex to estimate. In general, these projects increase stream complexity, reconnect floodplains, fish passage, and enhance natural processes that had been lost to the benefit of salmonids and other aquatic species. Projects are described in Table 9, and detailed project descriptions are included in Appendix I.

Table 9: Category II Projects in WRIA 14 that Primarily Provide Habitat Improvements

Project Name	Project Description	Subbasin	Anticipated Ecological Benefit	Sponsor	Estimated Cost[49]	Readiness to Proceed
Skookum Valley Ag	Channel re-alignment to increase channel length and sinuosity	Skookum	Increase floodplain connectivity; increase usable aquatic habitat area; increase fish cover; increase habitat complexity	Squaxin Island Tribe	<$1M	High
Skookum Valley Railroad Culvert Crossings	Restore fish passage at several existing barriers	Skookum	Fish passage	Squaxin Island Tribe	$1-5M	Medium
Goldsborough Cr-Hilburn Restoration	Remove bank protection and channel fill; Increase density of large woody debris	Goldsborough	Increase floodplain connectivity; increase usable aquatic habitat area; increase fish cover; increase habitat complexity	Squaxin Island Tribe	<$1M	High
Steamboat Upper	Increase ponded storage on north end of the Steamboat peninsula	Kennedy	Increase base flow in unnamed stream flowing from pond.	Thurston County	$1M	Low

[49] Costs are based on order of magnitude estimates

5.4 Categorical Projects and Prospective Projects

In addition to the projects described above, the plan identifies categorical actions that will increase water conservation throughout the WRIA, and in some cases may result in water offset benefits during plan implementation (Table 7). These categorical projects do not have specific locations yet, but would during plan implementation.

5.4.1 Water Right Opportunities

In addition to the projects described in this chapter, the WRIA 14 Committee supports projects and actions that achieve the following goals:

1. Opportunities to address irrigation efficiencies for water right holders. This may be accomplished through education, outreach, or incentive programs.
2. Acquisitions of water rights to increase streamflows and offset the impacts of PE wells. Water rights should be permanently and legally held by Ecology in the Trust Water Rights Program to ensure that the benefits to instream resources are permanent.
3. The WRIA 14 Committee acknowledges that all water rights transactions rely on willing sellers and willing buyers. The WRIA 14 Committee supports acquisition of all types of water rights, including municipal water rights. The WRIA 14 Committee recognizes the importance of water availability for farmers and the limited available water supply. The WRIA 14 Committee supports the acquisition of irrigation water rights if the properties underlying the water rights have access to an alternative water source that can be reliably supplied at rates no greater than that of current irrigation, or is otherwise agreeable to the property owner.
4. The WRIA 14 Committee recommends that opportunities for the above-mentioned projects and actions be addressed through future feasibility studies, water right investigations, etc.
5. Prioritize subbasins where the highest needs for projects exist.

The WRIA 14 Committee acknowledges the need for project sponsors, technical assistance to manage complex studies, and future funding to adequately implement projects.

A detailed summary of the water right analysis performed for the WRIA 14 Committee is included in in Appendix I.

5.4.2 Forest Stand Age

The Committee is interested in voluntary projects that involve forest conservation, forest land acquisition, carbon sequestration that can be demonstrated to have a streamflow benefit. If a project can demonstrate a streamflow benefit, it can be considered for providing an offset and NEB benefit under the plan. Due to uncertainties regarding forest management projects, the Committee chose not to count the potential offset from this project during the plan analysis. More information on this project proposal can be found in the plan Compendium.

5.4.3 Floodplain Restoration

The Committee is interested in restoring stream floodplain function, where appropriate. WRIA 14 floodplain restoration projects would address loss of groundwater storage, low flows and water quality conditions. The specific actions proposed for any given project would be specific to the restoration opportunity and habitat capacity of that location. The goal of any given project would be to rehabilitate natural hydrologic and geomorphic processes that are provided by floodplain connectivity. More detailed objectives pursuant to this goal would be specific to each respective project.

Projects will vary depending on the stream setting, habitat capacity, the impact that has occurred, and the corresponding opportunities for restoration. Potential floodplain restoration actions include the following:

- Channel re-alignment (i.e. re-meander),
- Removing bank protection,
- Installation of large wood to promote hyporheic and floodplain water storage
- Removal of fill or creation of inset floodplain (i.e. excavation of terraces),
- Side channel and off-channel feature reconnections, creation or enhancement.

Potential floodplain restoration locations were identified based on being unconfined, within a flood zone, and being vacant. Secondary considerations were given to locations that were on public land, and near tributary inflow (and therefore potentially prone to flooding).

Due to uncertainties regarding floodplain restoration, the Committee chose not to count the potential offset from this project during the plan analysis.

5.4.4 Summit Lake Water System

This project conceptually involves determining alternative solutions for safe water supply to the Summit Lake community. It involves a substantial portion of the lakefront residents of south shore drive along Summit Lake currently using surface water from the lake itself. An alternative water supply could supply water and reduce the use/demand for 235 homes on south Summit Lake Shore Drive South. Potential alternative sources include new source wells, and piping water from a public water system. A water offset benefit could occur by limiting irrigation for homes newly connected to water supply, and by retiring non-certificated permits and the retirement of certificated water rights into permanent trust. The first steps would be to conduct a feasibility study to determine the best option for a new Summit Lake community source and perform community outreach. Depending on the assumptions made, flow benefits in the Kennedy Creek subbasin may be on the order of 24-133 AFY. The potential offset benefit from this project is shown in table 7 above; however, due to all the uncertainties associated with this project and the need for feasibility and community outreach to occur, the Committee chose not to claim a water offset benefit.

5.4.5 Mason County Rooftop Runoff

Mason County has proposed a modification of the County building code to require low-impact development (LID) best management practices (BMPs) to capture of roof runoff from new rural residential (RR) development (Appendix I). Examples of LID BMPs would include dry wells, infiltration trenches, infiltration galleries, or rain gardens. The requirement would achieve 85% infiltration of runoff from a new rural residential parcel development roof for parcels on hydrologic type A and B soils (Appendix I). Parcels on hydrologic type C soils are anticipated to achieve an average of 69% infiltration of runoff from a new RR parcel development. The maximum infiltration trench size is assumed to be 620 square feet. The infiltrated runoff is assumed to be shallow groundwater recharge as an interflow contribution, with an assumed down-gradient surface water benefit to receiving waters base flow augmentation. Based on 2,766 wells apportioned to assumed full parcel buildout within the WRIA 14 Project area, this project could potentially yield a water recharge offset of 249 AFY or 0.34 cfs (Appendix I; Table 7). The technical approach used to develop these potential water offsets and associated results were reviewed and vetted with the WRIA 14 Committee.

For the purposes of the WRIA 14 watershed plan, the net infiltration recharge of rooftop runoff is equivalent to a water offset per RCW 90.94. The water offset benefits could be credited incrementally with continued RR growth under the current Mason County NPDES program status and implemented Rooftop Runoff Infiltration Program. The Mason County rainfall runoff proposal is available for a quantitative offset because it is not otherwise required by law or regulation. RCW 90.94.030(4)(a)(vi)(C) states the following: “An applicant shall manage stormwater runoff on-site to the extent practicable by maximizing infiltration, including using low-impact development techniques, or pursuant to stormwater management requirements adopted by the local permitting authority, if locally adopted requirements are more stringent.” For Mason County, the “extent practicable” is defined as the extent feasible or capable of being done or carried out with reasonable effort, taking into account the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations. For this reason, the rooftop runoff proposal goes beyond the “extent practicable” and would not already be required on under RCW 90.94. In addition, current locally adopted requirements are not more stringent than this definition. Therefore, the project if implemented as proposed would more stringent than the “extent practicable” for Mason County and would be allowed.

In addition, Mason County is not currently covered by the MS4 Phase 2 NPDES Stormwater permit, which would require the kind of runoff infiltration proposed. Therefore, at this time the proposed project would not be required under the MS4 permit. Based on growth projections and the requirements of the law, Mason County would be required to meet the MS4 permit requirements no sooner than reaching population totals requiring regulation. According to the MS4 Stormwater Permitting Guide, an important distinction from Phase I MS4s is that not all Small MS4s are regulated. Some Small MS4s or portions of Small MS4s are not required to obtain NPDES permit coverage. A Small MS4 must obtain an NPDES permit only in two situations: if it (1) is within a Census-designated urbanized area or (2) has been designated by

the permit authority as requiring a permit. Therefore, this project would likely be in effect for the 20-year horizon required for planning, if implemented.

The Committee is not claiming any offset from this project for the purposes of the NEB evaluation because Mason County is unable to commit to implementation due to regulatory constraints. The project may be considered for implementation if these constraints are lifted, and has Committee support for future consideration. The Committee recommends that a future implementation group (described in Chapter 6) revisit this project during review of adaptive management if offset needs are not being met in WRIA 14. A detailed analysis of this project and calculation of potential offsets in provided in Appendix I for informational purposes should this project be implemented.

5.5 Project Implementation Summary

5.5.1 Summary of Projects and Benefits

As specified in Chapter 4, this plan aims to offset 759 AFY of consumptive use from new PE wells over the planning horizon based on the "most likely" consumptive use estimate. This watershed plan also provides a higher consumptive use estimate of 1,034 AFY as a goal to achieve through adaptive management. The project offset benefits claimed by the Committee and included in Table 7 provide an estimated offset of 891 AFY and exceeds the "most likely" consumptive use estimate at the WRIA scale. The project offset benefits claimed by the Committee and presented in Table 7 do not meet the higher adaptive management goal consumptive use estimate. At the subbasin scale, estimated offsets exceed both the "most likely" and higher adaptive management goal consumptive use estimates in the Goldsborough, and Hood, subbasins. Conversely, estimated offsets fall short of both the "most likely" and higher adaptive management goal consumptive use estimates in all other subbasins.

A total of four habitat projects have been identified by the Committee for their potential to provide streamflow benefits and are included in Table 9. Ecological benefits associated with these projects include floodplain restoration, wetland reconnection, availability of off-channel habitat for juvenile salmonids, increase in groundwater levels and baseflow, and increase in channel complexity. While many of these projects have potential streamflow benefits, this plan does not account for the water offset from habitat projects. The ecological and streamflow benefits from habitat projects are supplemental to the quantified water offsets. A total of five prospective projects have been identified by the Committee for their potential to provide streamflow and ecological benefits. These projects may be part of plan implementation, if they are demonstrated to be feasible.

5.5.2 Cost Estimate for offsetting new domestic water use over 20 Year Planning Horizon

Per RCW 90.94.030(3)(d), this watershed plan must include an evaluation or estimation of the cost of offsetting new domestic water uses over the subsequent twenty years. To satisfy this requirement, this plan includes planning-level cost estimates for each of the water offset

projects listed in Table 7. The plan also includes costs estimates for habitat projects in Table 9 when that information was readily available.

The estimated cost for implementing individual water offset projects range from $285,000 for Water Right Opportunities to $8.8 million for City of Shelton Reclaimed Water. The total estimated cost for implementing the water offset projects listed and described in this chapter is $13.7 million.

The estimated cost for implementing individual habitat projects range from $1-5 million, based on order of magnitude cost estimates. The total estimated cost for implementing the habitat projects listed and described in this chapter is $4-8 million.

5.5.3 Certainty of Implementation

This plan includes adaptive management and policy recommendations (see Chapter 6) to increase reasonable assurance that the projects and actions in the plan will be implemented.

The WRIA 14 Committee selected projects that have a likelihood of implementation and have support from project sponsors. As is further discussed in Chapter 6, the WRIA 14 Committee supports the continuation of an implementation group to further develop projects.

Chapter Six: Policy Recommendations, Adaptive Management, and Implementation

6.1 Policy and Regulatory Recommendations

The Streamflow Restoration law lists optional elements committees may consider including in the plan to manage water resources for the WRIA or a portion of the WRIA (RCW 90.94.030(3)(f)). The WRIA 14 Committee included "policy and regulatory recommendations" in the watershed plan to show support for programs, policies, and regulatory actions that would contribute to the goal of streamflow restoration. When similar concepts arose from multiple Watershed Restoration and Enhancement Committees, the WRIA 14 Committee coordinated with those other committees to put forward common language for inclusion in the watershed plans, when appropriate. Coordination also occurred for jurisdictions that cross multiple watersheds. All projects and actions the WRIA 14 Committee intended to count toward the required consumptive use offset or NEB are included in Chapter 5: Projects and Actions.[50]

As recommended by the NEB Guidance, the WRIA 14 Committee prepared the plan with implementation in mind. However, as articulated in the Streamflow Restoration Policy and Interpretive Statement (POL-2094), "RCW 90.94.020 and 90.94.030 do not create an obligation on any party to ensure that plans, or projects and actions in those plans or associated with rulemaking, are implemented" (Ecology 2019a).

The WRIA 14 Committee initially identified a list of potential recommendations based on proposals brought forward by members of the Committee[51]. After iterative rounds of discussion and feedback during Committee meetings, in one on one conversations, and using a survey tool, the Committee narrowed the recommendations to those presented below. Unless otherwise specified, the proposed implementing entity is not obligated by this plan to implement the recommendation; however, the WRIA 14 Committee requests consideration of each recommendation by the identified implementing entity. Additional information on assurance of implementation has been provided by many entities in section 6.3.2. The identification and listing of these policy and regulatory recommendations is directly from the WRIA 14 Committee members and is not endorsed or opposed by Ecology.

[50] "New regulations or amendments to existing regulations adopted after January 19, 2018, enacted to contribute to the restoration or enhancement of streamflows may count towards the required consumptive use offset and/or providing NEB." Streamflow Restoration Policy and Interpretive Statement, POL-2094

[51] Initial policy proposals are included in the Plan Compendium.

The WRIA 14 Committee provides the following recommendations. Please note that these are not listed in order of priority:

1. Track the number and location of permit-exempt wells

Proposed implementing entity: Department of Ecology

Recommendation: Update Department of Ecology's well tracking system to better track the number and location of permit-exempt wells in use. This update would include the following:

- Collect latitude and longitude of wells on well report forms;
- Identify permit-exempt wells on well log form; and
- Provide electronic Well ID Tag numbers to older wells, and associate well decommissioning, replacement, or other well activities with the Well ID Tag.

Purpose: Accurate tracking of the locations and features of permit-exempt wells will support the WRIA 14 Committee's desire to engage in monitoring and adaptive management after plan adoption.

Funding source: If Ecology does not have capacity do this work with existing staffing and resources, the Committee recommends the legislature provide additional funding.

Additional Resources: The full proposal for this recommendation is included in Appendix M

2. Monitoring and Research

Proposed implementing entity: Multiple agencies would likely be involved in monitoring. Ecology would coordinate the development of the strategy.

Recommendation: Develop and implement a research and monitoring strategy for WRIA 14 that may include the following:

- Streamflow monitoring
- Groundwater monitoring
- Groundwater modeling
- Precipitation and drought conditions
- Land use changes
- Water consumption and water supply data

Purpose: The WRIA 14 Committee desires comprehensive monitoring data on the overall health of the watershed, including status and trends.

Funding source: Funding is needed either through legislative appropriations, grants, pooling of resources by Committee members and other stakeholders, or other means.

3. Revolving Loan and Grant Fund for Community Water Systems

Proposed implementing entity: Thurston and Mason Counties

Recommendation: Investigate the feasibility of establishing and operating a revolving loan/grant fund to offset the costs of connecting to Group A public water systems. Funding would be available when the cost of connecting to a Group A system is higher than creating a new permit-exempt well, creating an economic barrier for applicants. Feasibility would be determined by criteria set for the provider and applicant (such as the availability of a sufficient water right; consistency with the relevant Water System Plan).

Purpose: This would reduce barriers to connecting to Group A systems, thereby reducing the number of projected new permit-exempt wells and reducing groundwater consumptive use.

Funding source: Funding would be needed to develop and manage the program and to provide seed money to the revolving fund. Potential funding sources have not been identified.

4. Mason County-Wide Conservation Outreach Program

Proposed implementing entity: Mason Conservation District and Mason County, with support from the Squaxin Island Tribe

Recommendation: Develop a program for all water users in Mason County to provide water conservation education incentives (mailers, websites, special events, tables at community events, free low flow indoor and outdoor fixtures, rain barrels, xeriscapes, etc.) Measurements of success could be included, such as a certification program, use of signage, the number of conservation items installed, or other methods.

Purpose: This benefits the watershed in creating awareness for water conservation and providing a cumulative reduction in groundwater use. An effective conservation program also supports drought response and climate change resilience. Overall, the program would support NEB and the Plan's goal of streamflow restoration.

Funding source: Funding would be needed to support the program. Potential sources include state or local appropriations, grants, pooling of resources by Committee members and other stakeholders, or other means.

5. Water Supply Data for Comprehensive Water Planning

Proposed implementing entity: Ecology with support from counties, Department of Health, local jurisdictions and potentially consultants.

Recommendation: By September of 2026, collect, estimate, and/or project the following data and include in a report to the WRIA 14 Committee members and the group established in section 6.2 to address Adaptive Management:

- Number of existing permit exempt domestic water wells and their water use.
- All projected water usage for the next 20 years (permit-exempt wells, inchoate rights, and new water rights).
- Number of municipal water supply connections expected in the next 20 years, by subbasin.
- Total number of existing permit-exempt wells by county.
- Total existing (2018 and earlier) connections in service using (1) unmitigated inchoate water rights; (2) mitigated inchoate water rights; or (3) permit-exempt wells.
- Total connections expected to be put into service in the next 20 years using (1) unmitigated inchoate water rights; (2) mitigated inchoate water rights; or (3) permit-exempt wells.
- An evaluation of the costs of offsetting all new domestic water uses over the next 20 years, as described in RCW 90.94.030(3)(d). The initiation of adjudication would be considered an acceptable substitute for this study.

Purpose: This would provide a robust information base for comprehensive water planning and would provide context for the Plan and its goals. This also supports tribal desire for a comprehensive water use estimate.

Funding source: Grant funding or a legislative appropriation will be necessary to hire consultant assistance to Ecology for this effort.

6. Sports Field Irrigation Conservation

Proposed implementing entity: City of Shelton. Other sports field owners, such as Shelton School District, Mason County Parks and Rec, South Mason Youth Soccer Association, YMCA. Support from Squaxin Island Tribe.

Recommendation: Increase conservation at outdoor sports fields by assessing and improving current practices through the following steps:

- Review current irrigation practices of sports ball fields.
- Develop short conservation plans for each entity.
- Develop contingency plans for reclaimed water and use reclaimed water when it becomes available.
- Install water-saving infrastructure at sports fields.
- Use existing metering to demonstrate savings from new infrastructure.
- Consider rainwater capture potential from buildings at outdoor sports fields.

Purpose: This would reduce groundwater use, increase use of reclaimed water, and provides resilience to drought and climate change.

Funding source: Funding would be needed to prepare plans, install water saving infrastructure, and to evaluate program. Funding sources are undetermined.

7. Group A Water System Conservation through Infrastructure Improvements

Proposed implementing entity: City of Shelton and Mason Public Utility District 1

Recommendation: Replace leaking household water distribution pipes to greatly reduce unaccounted for water (distribution system leakage). Start by identifying systems with high distribution system leakage and prioritize them based on quantity of water that can be conserved with infrastructure improvements.

Purpose: Group A water systems are currently required by WA Department of Health to bring distribution system leakage below 10%; the objective of this recommendation is to bring distribution systems below this threshold. By reducing system leakage, group A water systems could expand service territory from the additional connections gained. Expanding service territory decreases the likelihood of nearby installation of permit exempt wells.

Funding source: Grant funding to Group A water system purveyors.

8. Funding for Plan Implementation

Proposed implementing entity: Legislature and/or Committee Members or other stakeholders

Recommendation: The WRIA 14 Committee recommends the Legislature provide funding for plan implementation, monitoring and adaptive management of the plan, including:

- Annual tracking of new PE wells and project implementation by subbasin.
- Staffing for the ongoing Committee.
- Ongoing Committee member participation.
- Developing a process to adaptively manage implementation if NEB is not being met as envisioned by the watershed plan (e.g. identification and development of alternative projects, etc.).
- Ongoing monitoring within the basin (see recommendation 6.1.2).
- Plan implementation.

If necessary, the Committee may also recommend additional funding, including grants, fees, shared contributions from members and other stakeholders, and other sources that may emerge.

Purpose: Plan implementation is key to success and it will take ongoing funding.

Funding source: Legislature or others.

9. **Waterwise Landscaping**

Proposed implementing entity: Mason County, Mason Conservation District, Squaxin Island Tribe, and/or Committee Members or other stakeholders.

Recommendation: The WRIA 14 Committee recommends the Legislature provide funding for a technical and financial support program for voluntarily participating landowners (~100) who are developing their property and installing permit-exempt domestic wells to do the following:

- Around a newly built home site, create waterwise landscaping which includes native plants or retains the existing native vegetation on the site.
- After the completion of home landscaping, monitor daily outdoor water consumption for landscaping purposes only for three years.
- Changes in landscaping water use per household resulting from this program will be summarized and reported by a participating implementing entity.

Purpose: This would generate a new model in waterwise and native landscaping that provides wildlife habitat, and decreases water use which could be quantified and used for planning of future incentive programs.

Funding source: Legislature or others.

6.2 Plan Implementation and Adaptive Management

6.2.1 Project, Policy, and Permit-Exempt Well Tracking

The WRIA 14 Committee recommends tracking the growth of permit-exempt (PE) wells in the watershed as well as the projects and policies that were planned to offset the impacts of these PE wells. This data will allow the Committee to determine whether planning assumptions were accurate and whether adjustments to plan implementation are needed. Recommended funding for plan implementation is described in detail in section 6.1.8.

A. The WRIA 14 Committee recommends tracking the following information on an ongoing basis:

   - New building permits issued that include permit-exempt wells, as well as the number of building permits requiring water connections.
   - Status of implementation for each project included in the plan.
   - Status of policy recommendations included in the plan.
   - An ongoing list of new PE wells in the WRIA since the enactment of RCW 90.94.
     - The lists of building permits and projects will be organized by subbasin, and if feasible represented on a map that includes subbasin delineations. Counties

are encouraged to provide parcel or other geographic information in their reports to Ecology to support mapping by subbasin.

B. To assess the status of project implementation, the Committee recommends using the Salmon Recovery Portal (https://srp.rco.wa.gov/about), managed by the Washington State Recreation and Conservation Office (RCO), to support project tracking.
    - The Washington Department of Fish & Wildlife (WDFW), in collaboration with the Washington Department of Ecology and RCO, will coordinate the implementation of project tracking through the Salmon Recovery Portal.
    - Project sponsors are expected to support project tracking efforts and data sharing.
    - Local salmon recovery Lead Entity Coordinators will not be expected to provide ongoing support for project entry, maintenance, or reporting. To improve harmonization of streamflow restoration with ongoing salmon recovery efforts, local salmon recovery Lead Entity Coordinators will be consulted prior to initial data uploads.
    - University of Washington data stewards, contracted by WDFW, will conduct data entry, quality assurance, and quality control. If this approach changes, WDFW will propose an alternative method for completing this task.
    - Entities with representation in the WRIA 14 Committee (or an implementation group, if created) are encouraged to assist as needed with coordination, data gathering and input, and tracking.

Table 10 summarizes the entities recommended as being responsible for implementing the tracking and monitoring recommendation and associated funding needs.

Table 10: Implementation of Tracking and Monitoring Recommendation

Action	Entity or Entities Responsible	Funding Considerations
Track building permits issued with PE wells (including new connections).	Ecology (via reporting from counties and cities).	The number of building permits and associated fees are transmitted to Ecology annually. No additional funding is needed.
Maintain an ongoing list and map of new PE wells within each sub-basin.	Ecology	Information is included with data on new PE wells, provided by local governments. No additional funding is needed.
Maintain a summary of the status of implementation for each project.	Ecology via the Salmon Recovery Portal, with support from WDFW, RCO, and project sponsors	WDFW may need additional funding to support maintaining the Salmon Recovery Portal.
Maintain a summary of the status of each policy recommendation.	*Implementation group and proposed implementing entities listed in 6.1 Policy and Regulatory Recommendations*	Additional funding may be needed to gather status updates.

6.2.2 Reporting and Adaptation

The Committee recommends that Ecology provides the data collected above to all entities represented on the Committee and other interested parties through annual reporting and a self-assessment as described below. These reports and assessments will help determine whether the plan's recommendations are being implemented and whether they are having the intended impacts. Recommended funding for plan implementation is described in detail in section 6.1.8.

A. The WRIA 14 Committee recommends **annual reporting** as follows:
   - By September of each year, **Ecology** will prepare an annual report that includes:
     - A list of total building permits issued in the prior calendar year along with the total number of associated new domestic PE wells, using the information provided to Ecology by the local jurisdictions.
     - A brief description of the status of WRIA 14 projects and actions included in this plan (descriptions may be drawn from the Salmon Recovery Portal, if available).

        - If the project as implemented differs significantly from the original description and assumptions included in the plan, the annual report will also include an estimate of changes to the offset benefit.
    - Other implementation actions to date, including any changes in approach since the last report and any challenges identified that may require adaptation in plan implementation.
    - The lists of building permits and projects will be organized by subbasin, and if feasible represented on a map that includes subbasin delineations. Counties are encouraged to provide parcel or other geographic information in their reports to Ecology to support mapping by subbasin.
- The first annual report should include an estimate of expenses necessary for plan implementation and associated funding options. Funding options could include:
    - Local or state fees, including PE well fees
    - Grants
    - State funding
    - Other options
- Ecology will share the report with Committee members and other interested parties.

B. The WRIA 14 Committee recommends preparing a **self-assessment every five years** as follows:
    - By September of 2026, and every five years thereafter during the planning horizon period, Ecology will compile and report based on available information from previous reports and partners:
        - All cumulative information required in the annual report.
        - Estimated water offset quantities, consumptive use, and instream flow benefits, realized through implementation of projects and actions identified in this plan.
        - A comparison of each item above to the original assumptions included in the plan and a summation of overall ecological benefit (i.e., greater than expected, less than expected, or about the same as expected).

C. The WRIA 14 Committee recommends that the WRIA 14 Committee members continue to meet to allow continued collaboration on plan implementation.
    - Interested WRIA 14 Committee members, or a new implementation group if established, will meet regularly to:
        - Review and discuss the annual report.
        - Share updates on project and policy implementation.
        - Discuss or develop recommendations for revisions, additions, or deletions to planned projects or actions.

- Every five years interested WRIA 14 Committee members, or a new implementation group if established, will hold a series of meetings to conduct the self-assessment, which includes:
    - Reviewing the five-year assessment report from Ecology.
    - Developing recommendations to adapt projects and actions to meet NEB.
    - Updating data and assumptions.
    - Other items identified by Committee members.
- Additional meetings may be scheduled as needed.
- Mason County has offered to play the role of coordinating an implementation group for WRIA 14. Mason County will use existing capacity as well as seek funding opportunities to support their role. Mason County will convene interested member entities of the WRIA 14 Committee to form the implementation group in the summer of 2021. This group will consider the following activities related to plan implementation:
    - Redefining the WRIA 14 Committee, which could include a new name, charter, and supporting interlocal agreement.
    - Identifying project development lead(s) and supporting project development.
    - Identifying triggers for adaptive management and develop responses to emerging challenges.
    - Coordinating monitoring and research.
    - Coordinating reporting.
    - Identifying funding mechanisms to provide capacity for the Committee members and facilitator.
    - Other tasks as needed.

Table 11 summarizes the entities responsible for carrying out the reporting and adaptation recommendation and associated funding needs.

Table 11: Implementation of Reporting and Adaptation Recommendation

Action	Entity or Entities Responsible	Funding Considerations
Annual Reports	• Local jurisdictions provide building permit information to Ecology. • Ecology compiles information on project status, drawn from the Salmon Recovery Portal.	• Local jurisdictions are already required to provide building permit information to Ecology (no additional funding needed). • Ecology staff would compile reports using existing resources.

Action	Entity or Entities Responsible	Funding Considerations
	• Entities provide monitoring data to Ecology for inclusion in reports. • Ecology combines monitoring data from within the agency with data provided by other entities. • Ecology compiles information into a single report for distribution to the Committee and other interested parties.	• WDFW may need additional funds to manage the Salmon Recovery Portal.
Five-Year Self-Assessment:	• Local jurisdictions provide building permit information to Ecology. • Ecology compiles information on project status, drawn from the Salmon Recovery Portal. • Entities provide monitoring data to Ecology for inclusion in reports. • Ecology combines monitoring data from within the agency with data provided by other entities. • Ecology prepares estimates of the quantity of water, instream flow, and habitat benefits realized through implementation of projects and actions identified in this plan. • Ecology compiles information into a single report for distribution to Committee and other interested parties. • Mason County convenes interested members of the WRIA 14 Committee to review progress and recommend adaptations as needed.	• Local jurisdictions are already required to provide building permit information to Ecology (no additional funding needed). • Ecology may need funding to complete the estimate of realized benefits. • State funding or staff support will be needed to reconvene a group to prepare recommendations. • Committee members who cannot participate in meetings using existing resources will need additional funding. • Mason County may need additional funding to support their role in convening the implementation group.

6.3 Other Issues

6.3.1 Summary of Legislative requests

Legislative funding is requested for recommendations 6.1.1, 6.1.2, 6.1.5, 6.1.8, and 6.1.9

6.3.2 Assurance of Plan implementation

The WRIA 14 Committee prepared the WRIA 14 watershed plan with the intent that the plan is fully implemented Members of the Committee provided the following statements of assurance of their commitment to plan implementation.

- **Department of Ecology**
    - Ecology follows NEB Guidance and RCW 90.94.030 provisions in reviewing the watershed plan and considering plan adoption.
    - Ecology administers the 90.94 Grant Program, giving priority evaluation points to projects included in WRIA plans, and updating grant guidance as needed to better support plan implementation.
    - Ecology considers watershed plan recommendations and investigates the feasibility of actions and recommendations where Ecology is identified as the lead.
    - Ecology reports to the legislature on the status of the watershed plan implementation in 2020 and 2027.
- **Squaxin Island Tribe**
    - The Squaxin Island Tribe supports and participates in implementation activities as staff capacity allows, including:
        - Participating in implementation group meetings.
        - Coordination between meetings, including:
            - Supporting project development and seek project opportunities
            - Seeking and supporting funding opportunities to achieve implementation
            - Tracking implementation and identifying areas for improvement
- **Skokomish Indian Tribe**
    - The Skokomish Tribe supports and participates in implementation activities as staff capacity allows, including:
        - As directed by Skokomish management, participating in implementation group meetings.
        - As directed by Skokomish management, coordination between meetings:
            - Assist in research and identify project opportunities

        - Assist in the identification of funding opportunities to achieve implementation
        - Identify areas for improvement

- **Thurston County**

    - Thurston County will adopt this watershed plan by resolution, formalizing our support of the plan contents once the plan has been approved by Ecology.
    - This watershed plan will become one of the guiding documents for Thurston County community planning work, including implementation of the Comprehensive Plan and related plans.
    - Thurston County will evaluate the relationship of identified projects within the watershed plan with the Thurston County Capital Improvement Program, seeking potential for overlap in funding opportunities.
    - Thurston County supports and participates in implementation activities as staff capacity allows, including:
        - Participating in implementation group meetings.
        - Coordination between meetings, including:
            - Supporting project development and seeking project opportunities
            - Seeking and supporting funding opportunities to achieve implementation
            - Tracking implementation and identifying areas for improvement

- **Mason County**

    - Mason County adopts this watershed plan by resolution, formalizing our support of the plan contents once the plan has been approved by Ecology.
    - Mason County supports and participates in implementation activities as staff capacity and funding allows, including:
        - Participating in implementation group meetings.
        - Coordination between meetings, including:
            - Supporting project development and seeking project opportunities
            - Seeking and supporting funding opportunities to achieve implementation
            - Tracking implementation and identifying areas for improvement

- **City of Shelton**

    - The City of Shelton supports and participates in implementation activities as staff capacity allows, including:
        - Participating in implementation group meetings.
        - Coordination between meetings, including:
            - Supporting project development and seek project opportunities
            - Seeking and supporting funding opportunities to achieve implementation
            - Tracking implementation and identifying areas for improvement

- **Mason County PUD No. 1**

    - Mason County PUD 1 supports collaboration among WRIA 14 members to implement a comprehensive strategy for balancing competing demands for water, while at the same time preserving and enhancing the future integrity of the WRIA 14 watershed basin.
    - Mason County PUD 1 evaluates and prioritizes capital projects included in this plan for placement into the Capital Improvement Program.
    - Mason County PUD 1 supports and participates in implementation activities as staff capacity allows, including:
        - Participating in implementation group meetings.
        - Coordination between meetings, including:
            - Supporting project development and seek project opportunities
            - Seeking and supporting funding opportunities to achieve implementation
            - Tracking implementation and identifying areas for improvement

- **Building Industry Association of Washington (BIAW)**

    - BIAW supports and participates in implementation activities as staff capacity allows, including:
        - Participating in implementation group meetings.
        - Coordination between meetings, including:
            - Supporting project development and seek project opportunities
            - Seeking and supporting funding opportunities to achieve implementation
            - Tracking implementation and identifying areas for improvement

- **Washington State Chapter Sierra Club**

    - The Sierra Club will support and participate in implementation activities as Sierra Club volunteer representative capacity allows, including:
        - Participating in implementation group meetings.
        - Coordination between meetings, including:
            - Supporting project development and seek project opportunities
            - Seeking and supporting funding opportunities to achieve implementation
            - Tracking implementation and identifying areas for improvement

- **Mason Kitsap Farm Bureau**

    - The Mason Kitsap Farm Bureau supports and participates in implementation activities as staff capacity allows, including:
        i. Participating in implementation group meetings.
        ii. Coordination between meetings, including:

1. Supporting project development and seeking project opportunities
2. Tracking implementation and identify areas for improvement
3. Providing information and support from the perspective of agriculture

- **Mason Conservation District - Salmon Recovery Lead Entity (Ex-Officio Member)**
  - Mason Conservation District supports and participates in implementation activities as staff capacity and funding resources allow, including:
    - Participating in implementation group meetings.
    - Coordination between meetings, including:
      - Supporting project development and seek project opportunities
      - Seeking and supporting funding opportunities to achieve implementation
      - Tracking implementation and identifying areas for improvement
- **Washington State Department of Health (Ex-Officio Member)**
  - WA State Department of Health supports and participates in implementation activities as staff capacity allows, including:
    - Participating in implementation group meetings.
    - Prior to approving a Water System Plan for a municipal water supplier (or other planning document with a water right place of use expansion), the Office of Drinking Water will ensure that new water service provided under the water system plan is consistent with relevant provisions of adopted local plans and development regulations. The Office of Drinking Water will ensure consistency through local government review of water system plans against relevant provisions of adopted local plans and development regulations.
    - Office of Drinking Water commits to coordinate with Department of Ecology through the agencies' Joint Memorandum of Understanding. This MOU states that the Department of Ecology will make a determination that the water system's service area and the submitted Water System Plan is not-inconsistent with any county-approved watershed plans.
- **Green Diamond (Ex-Officio Member)**
  - Green Diamond supports and participates in implementation activities as appropriate, including:
    - Partnership in implementations activities with nexus to Green Diamond forest lands, including:
      i. Supporting project development where consistent with Green Diamond's operations
      ii. Supporting funding and in-kind opportunities to achieve implementation
      iii. Tracking implementation and identifying areas for improvement

Chapter Seven: Net Ecological Benefit

The projects identified in this plan are consistent with the project type examples listed in the Final NEB Guidance: (a) water right acquisition offset projects; (b) non-acquisition water offset projects; and (c) habitat and other related projects (Ecology 2019b). Offset projects in WRIA 14 focus on infiltration of reclaimed water, water right acquisition, water system consolidation and source water replacement, and Managed Aquifer Recharge (MAR). Habitat restoration projects focus on increasing stream complexity, floodplain reconnection, fish passage, and enhancement of natural processes to benefit aquatic species. Water offset projects may also provide additional habitat benefits in the watershed as described below and in project descriptions in Appendix I. Similarly, some habitat restoration projects may produce a marginal offset benefit by increasing seasonal storage.

7.1 Consumptive Use and Water Offsets

This plan uses medium population growth forecasts for Mason and Thurston Counties to project a total of 4,294 new PE wells installed within WRIA 14 during the 2018 through 2038 planning horizon. To address uncertainty in the consumptive use estimate, conservative assumptions were made with regards consumptive use from outdoor irrigation. When estimating outdoor irrigated areas (with existing rural parcels with PE wells), all parcels were assumed to irrigate at least 0.05 acres, even when the parcels had no visible irrigated areas. In addition, when calculating outdoor consumptive use, irrigation was assumed to be at rates required for growing commercial turf grass. Applying these assumptions, and accounting for both indoor and outdoor water use, 759 acre-feet per year (AFY) (1.05 cfs) of new consumptive water use is projected to be the "most likely" estimate for new PE wells in WRIA 14 through 2038.

The Committee also defined a higher adaptive management goal of 1,034 AFY, a conservative target of consumptive water use resulting from an assumed average irrigated area of 0.14 acres per well. This larger average irrigated area is based on the 95 percent upper confidence limit of the average irrigated area. This additional factor of safety provides greater certainty that offsets and NEB are met. The Committee recommends that adaptive management measures, as described in Chapter 6, are used to achieve the higher goal.

The Committee's approach to offsetting these consumptive water use estimates was to develop a list of potential offset projects that exceed the anticipated impacts by a margin large enough to give reasonable assurance that this plan will be successful over the planning timeline. This watershed plan demonstrates that the water offset project portfolio (Table 12), if implemented, can succeed in offsetting consumptive use impacts at the WRIA scale from the "most likely"

consumptive use estimate. This plan estimates a total potential water offset of 891 AFY claimed by the WRIA 14 Committee from five water offset projects (Table 12), that produce a WRIA-wide surplus offset of 132 AFY above the "most likely" consumptive use offset target. The total water offset claimed by the Committee results in a WRIA-wide deficit of 143 AFY compared to the "higher adaptive management" goal set by the Committee.

RCW 90.94 allows for an uneven distribution of the offset project amounts relative to anticipated consumptive water use, provided the plan will lead to a NEB at the WRIA-scale. Although the "most likely" consumptive use offset goal is achieved at the WRIA-scale, the distribution among subbasins is uneven (Table 13). In the Goldsborough and Hood subbasins, the surplus offsets exceed the offset target by 523 and 10 AFY, respectively. All other subbasins have water offset deficits, ranging from 1 – 221 AFY.

Water offset benefits from projects fall short of the higher adaptive management consumptive use offset goal at the WRIA-scale. In the Goldsborough and Hood subbasins, the surplus offsets exceed the offset target by 488 and 3 AFY, respectively (Table 13). All other subbasins have water offset deficits, ranging from 31 – 320 AFY.

The Committee recommends using adaptive management measures as described in Chapter 6 to develop sufficient projects to meet the goal of exceeding the "higher adaptive management" consumptive use water offset estimates in all subbasins. The adaptive management and implementation measures include a robust project tracking protocol to ensure that projects are dispersed throughout the watershed to address offset needs across numerous small streams. For example, the five prospective projects not included in the water offset accounting (Section 5.4) have the potential to provide offsets in excess of the higher adaptive management offset goal and distribute offset benefits throughout all subbasins. Water rights acquisitions and efficiencies will be sought in all subbasins. The Mason County Rooftop Runoff Project, if implemented, would provide offset benefits in all subbasins. The Forest Stand Age and Floodplain restoration projects may be implemented in all subbasins and could result in a quantifiable water offset. Finally, the Summit Lake Water System Project could provide a substantial water offset benefit to the Kennedy subbasin.

The water offset projects provide additional benefits to instream resources beyond those necessary to offset the impacts from new consumptive water use within the WRIA. For the project types planned in WRIA 14, additional benefits could include the following:

- Water right acquisition projects: Aquatic habitat improvements during key seasonal periods; reduction in groundwater withdrawals and associated benefit to aquifer resources; and/or beneficial use of reclaimed water. Water right acquisition

opportunities in WRIA 14 can be associated with land acquisitions which provide additional conservation-related habitat benefits.

- MAR and Infiltration of reclaimed water projects: Aquatic habitat improvements during key seasonal periods; increased hydration of wetlands and headwaters; increased groundwater recharge; reduction in summer/fall stream temperature; increased groundwater availability to riparian and near-shore plants; and/or contribution to flood control. Improvements to water quality may also occur as a result of infiltration.

In summary, while this watershed plan demonstrates the water offset portfolio will offset the "most likely" consumptive use impacts at a WRIA scale, it would have to rely on successful adaptive management if it is to meet the goal to achieve offset benefits by subbasin or the higher adaptive management consumptive use estimate.

Table 12: Summary of WRIA 14 Water Offset Projects Included in NEB Evaluation

Project Name	Subbasin(s)	Project Short Description	Estimated Offset Benefits (AFY)[52]	Estimated Offset Benefits Claimed by WRIA 14 Committee (AFY)	Readiness to Proceed
City of Shelton RW/ WCC Source Switch	**Goldsborough**	Re-direct North Shelton wastewater to WRP and infiltrate Class A reclaimed water at existing spray field near the WCC	486	486	High
Evergreen Mobile Estates	**Oakland Bay**	Water system consolidation and water right acquisition	7	7	Medium
Steamboat Middle	**Kennedy**	Expanded water storage in an existing forested/non-forested wetland.	14	14	Low
MAR	**Multiple**	Install managed aquifer recharge facilities: Kennedy, Mill, Skookum, Goldsborough, Johns, Cranberry, Sherwood Creeks	910	273	Low
Water Right Analysis	**All**	WRIA-wide analysis on potential WR acquisition for future studies and implementation.	1,112	111	Low
WRIA 14 Total Water Offset			**2,529**	**891**	
WRIA 14 Consumptive Use Estimate			**759**		
Higher Adaptive Management Consumptive Use Goal			**1,034**		

[52] 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day

Table 13: Subbasin Water Offset Totals Compared to Permit-Exempt Well Consumptive Use Estimate

Subbasin	Offset Project Totals (AFY)	Permit-Exempt Well Most Likely Consumptive Use Estimate (AFY)	Surplus/Deficit[53] from Most Likely Consumptive Use Estimate (AFY)	Higher Adaptive Management Consumptive Use Estimate (AFY)[54]	Surplus/Deficit from Higher Adaptive Management Consumptive Use Estimate (AFY)
Case	43	91	-48	123	-80
Goldsborough	619	97	523	132	488
Harstine	0	25	-25	35	-35
Hood	31	21	10	28	3
Kennedy	38	104	-66	142	-104
Mill	81	82	-1	112	-31
Oakland Bay	55	276	-221	375	-320
Skookum	25	64	-39	87	-62
WRIA 14 Total	**891**	**759**	**132**	**1,034**	**-143**

7.2 Habitat Benefits

The WRIA 14 plan includes an inventory of additional projects to meet the offset needs and NEB for the watershed. Additional projects can be broken down into the following:

- Projects that provide habitat and streamflow benefits, but streamflow benefits are difficult to quantify.

[53] Surplus water offset is associated with a positive value and a deficit in water offset is associated with a negative value. This column represents the difference between the project offset total and the offset target (estimated consumptive use in the subbasin).

[54] 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day

- Projects that primarily benefit habitat and address limiting factors for salmonids.

Many habitat restoration projects were identified in WRIA 14. Table 14 summarizes the benefits of five habitat improvement projects as shown in Figure 5, Chapter 5 and described in further detail in Chapter 5 and Appendix I. While several of these projects may produce a marginal offset benefit by increasing seasonal storage, the benefits were too small and too complex to estimate without further evaluation. In general, these projects increase stream complexity, reconnect floodplains, improve fish passage, and enhance natural processes that had been lost to the benefit of salmonids and other aquatic species. Additional habitat projects that are less developed are listed in the Project Inventory in Appendix J.

The Kennedy-Goldsborough Watershed is an important and productive system for salmonids. The habitat projects in Table 14 address many of the salmonid limiting factors described in Chapter 2.1.3, including:

- Fish Passage
- Riparian Canopy Closure
- Streambank Condition
- Floodplain Connectivity
- Substrate Embeddedness
- Large Woody Debris
- Pool Frequency and Quality
- Off-channel Habitat
- Temperature
- Dissolved Oxygen
- Water Quantity/ Dewatering
- Change in Flow Regime
- Biological Processes

Specifically, water quantity and general dewatering of creeks was identified as a limiting factor in Skookum Creek, Mill Creek, Goldsborough Creek, Shelton Creek, Johns Creek and Cranberry Creek.

Implementation of habitat improvement projects, in coordination with other restoration programs, will contribute to a cumulative net ecological benefit. Providing fish passage improves fish access to existing habitat, and therefore provides immediate benefits. Improvements to riparian condition will increase shade, bank stability, large woody debris loading, and fish cover. Increasing shade will maintain or lower water temperature on a

cumulative basis. Lower water temperatures have a greater saturation potential for dissolved oxygen, which is beneficial for salmonids, in general. Improving bank stability will reduce bank erosion and substrate embeddedness, which increases suitability for salmonid spawning habitat and macroinvertebrate communities (salmonid prey items). Increased bank stability, increased large woody debris loading, and reduced fine sediment inputs will all contribute to increased pool frequency and quality. Increased floodplain connectivity will attenuate flood flows and store water in the floodplain soils for slow release back to the stream over the course of days to months. This local storage will contribute to improving the flow regime and flow quantity.

The watershed plan also includes a number of policy recommendations, described in Chapter 6. Some of these recommendations are expected to result in additional benefits to habitat, fish and wildlife. Benefits include reduced water consumptive, increased water conservation, improved water quality, habitat protection and restoration, and direct streamflow benefits.

Table 14: Summary of WRIA 14 Habitat Improvement Projects included in NEB Evaluation

Project Name	Project Type and Brief Description	Subbasin	Anticipated Ecological Benefit(s)	Readiness to Proceed
Skookum Valley Ag	Channel re-alignment to increase channel length and sinuosity	Skookum	Increase floodplain connectivity; increase usable aquatic habitat area; increase fish cover; increase habitat complexity	High
Goldsborough Cr- Hilburn Restoration	Remove bank protection and channel fill; Increase density of large woody debris	Goldsborough	Increase floodplain connectivity; increase usable aquatic habitat area; increase fish cover; increase habitat complexity	High
Skookum Valley Railroad Culvert Crossings	Restore fish passage at several existing barriers	Skookum	Fish passage	Medium
Floodplain Restoration	Floodplain restoration with variable objectives	Kennedy, Skookum, Mill, Oakland, Harstene, Case	Increased floodplain function and local aquifer storage	Medium
Steamboat Upper	Increase ponded storage on north end of the Steamboat peninsula	Kennedy	Increase base flow in unnamed stream flowing from pond.	Low

7.3 Uncertainty and Adaptive Management

The WRIA 14 Committee identified a number of challenges related to plan implementation, described in Chapter 6. These challenges include uncertainty in growth projections, uncertainty in consumptive use estimates, uncertainty in offset quantities associated with specific project types, uncertainties associated with project implementation, future effects of climate change, and other factors. The Committee has recommended adaptive management measures in Chapter 6 of the plan for the purpose of addressing uncertainty in plan implementation. Adaptive management measures include PE well tracking, offset and habitat project implementation tracking, and periodic watershed plan implementation reporting, with recommended adjustments to the plan.

These measures, in addition to the project portfolio and associated benefits described in Chapter 5, increase the resiliency of the plan and increase the certainty that sufficient additional water from projects is available to achieve NEB. The Committee supports focusing implementation efforts on projects identified in this plan, as well as in subbasins where there is the most need for offsets.

Conservative estimates of PE well growth and consumptive use have been applied at multiple levels in this plan as a precaution, and to add certainty that the project portfolio is adequate to meet offset targets and address factors limiting salmonid survival in the watershed. Furthermore, the Committee has discounted the estimates of calculated offset benefits for projects in the project portfolio. The highly conservative estimates of both consumptive use and estimated project offsets also help ensure that streams will see flow benefits despite uncertainties associated with project implementation.

7.4 NEB Evaluation Findings

The WRIA 14 watershed plan provides projects that, if implemented, can offset an estimated 759 AFY as the “most likely” new consumptive water use in WRIA 14.This watershed plan sets goals of achieving offsets through a total of five water offset projects with an estimated cumulative offset projection of 891 AFY claimed by the WRIA 14 Committee. The projected total water offset yields a surplus offset of 132 AFY above the consumptive use estimate of 759 AFY, but results in a deficit of 143 AFY below the higher adaptive management estimate in WRIA 14. Three additional water offset projects that are not listed in Table 12 (the Schneider Creek Source Exchange, the Summit Lake Water Source, and the Mason County Rooftop Runoff project) would provide additional benefit, but were not included due to uncertainty associated with implementation or other restrictions. The surplus offsets, additional habitat restoration projects, adaptive management measures, and the conservative approach to estimating both

project offsets and consumptive use offset targets increase the certainty that sufficient additional water from projects is available to achieve NEB by protecting, restoring and enhancing streamflows in WRIA 14.

Although the project portfolio will meet offset targets from the "most likely" consumptive use estimate on a WRIA-scale, much of the water offset in WRIA 14 is concentrated in the Goldsborough subbasin. The remainder of the subbasins are near neutral or in deficit as compared to the higher adaptive management consumptive use estimate. The Oakland Bay subbasin has the largest deficit, and any opportunities to increase offset benefits in this subbasin should be prioritized.

Within this plan, water offset projects are complimented by a total of five habitat improvement projects, which provide streamflow habitat benefits. While many of these habitat improvement projects have potential streamflow benefits, the Committee excluded any associated water offset from the plan's water offset accounting.

Additional prospective projects and programmatic actions (described in Chapters 5 and 6) include exploration of water right opportunities, development of a Mason County Rooftop Runoff Program, development of floodplain restoration projects, incentives to increase the average age of forest stands, organization of a Summit Lake community water system, a Water Conservation Education and Incentives Program, a recommendation to update the Ecology Well Log Database, and the potential establishment of a revolving loan and grant fund to offset costs of connecting to Group A public water systems. These prospective projects and programmatic actions could result in water offsets, if they were developed during plan implementation. Improvement of the Ecology Well Log Database may improve the technical capacity for future technical evaluation.

The Committee has additionally recommended adaptive management measures, as described above and in Chapter 6, to provide reasonable assurance that the plan will adequately address new consumptive use impacts anticipated during the planning horizon, despite inevitable challenges that will arise during project implementation, operation, and maintenance.

This WRIA 14 watershed plan describes projects, which if implemented as intended, can offset the anticipated new consumptive use over the planning horizon and achieve NEB. The WRIA 14 Committee developed this Plan to meet NEB, given the limitations of the timeline and resources. As this chapter describes, this watershed plan provides multiple ecological benefits. The WRIA 14 Committee is leaving the final NEB determination to Ecology.

Appendices

WRIA 14 Kennedy - Goldsborough Watershed

Final Draft Plan
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