Watershed Restoration and Enhancement Plan

WRIA 13
Deschutes Watershed

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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 chair local planning Committees to develop Watershed Restoration and Enhancement Plans that identify projects necessary 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 other entities and interests in the Deschutes watershed, also known as Water Resource Inventory Area (WRIA) 13. The WRIA 13 Committee met for over 2 years to develop a watershed plan.

As required by the law, and to allow for meaningful analysis of the relationship between new consumptive use and offsets, the WRIA 13 Committee divided the watershed into nine 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 2,616 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 2,616 PE well connections. The projected new consumptive water use associated with the new PE well connections is 435 acre-feet per year in WRIA 13, which the Committee determined to be the "most likely" estimate. This equates to 0.6 cubic feet per second (cfs) or 388,343 gallons per day (gpd) This watershed plan also presents a higher consumptive use estimate as a goal to achieve through adaptive management and project implementation of 513 acre-feet per year (0.7 cfs or 457,977 gallons per day) in order to support streamflows.

This watershed plan includes projects that provide an anticipated offset of 1,316 acre-feet per year to benefit streamflows and enhance the watershed. Additional projects in the plan include benefits to fish and wildlife habitat, such several thousand feet of streambed improvements, dozens of acres of restoration and protection, and many miles of riparian restoration across WRIA 13.

[2] Some members of the WRIA 13 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.

Out of the 9 subbasins identified by the Committee, 4 subbasins have anticipated project offsets that exceed both the most likely and higher consumptive use estimates; 1 subbasin has anticipated project offsets that do not meet either the most likely or the higher consumptive use estimate; and, 4 subbasins do not have any offset projects identified.

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 fifteen 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 the development of an ongoing implementation group (Deschutes Watershed Council) to support implementation, a tracking and reporting structure to assess progress and make adjustments as needed, and a funding mechanism to adaptively manage implementation.

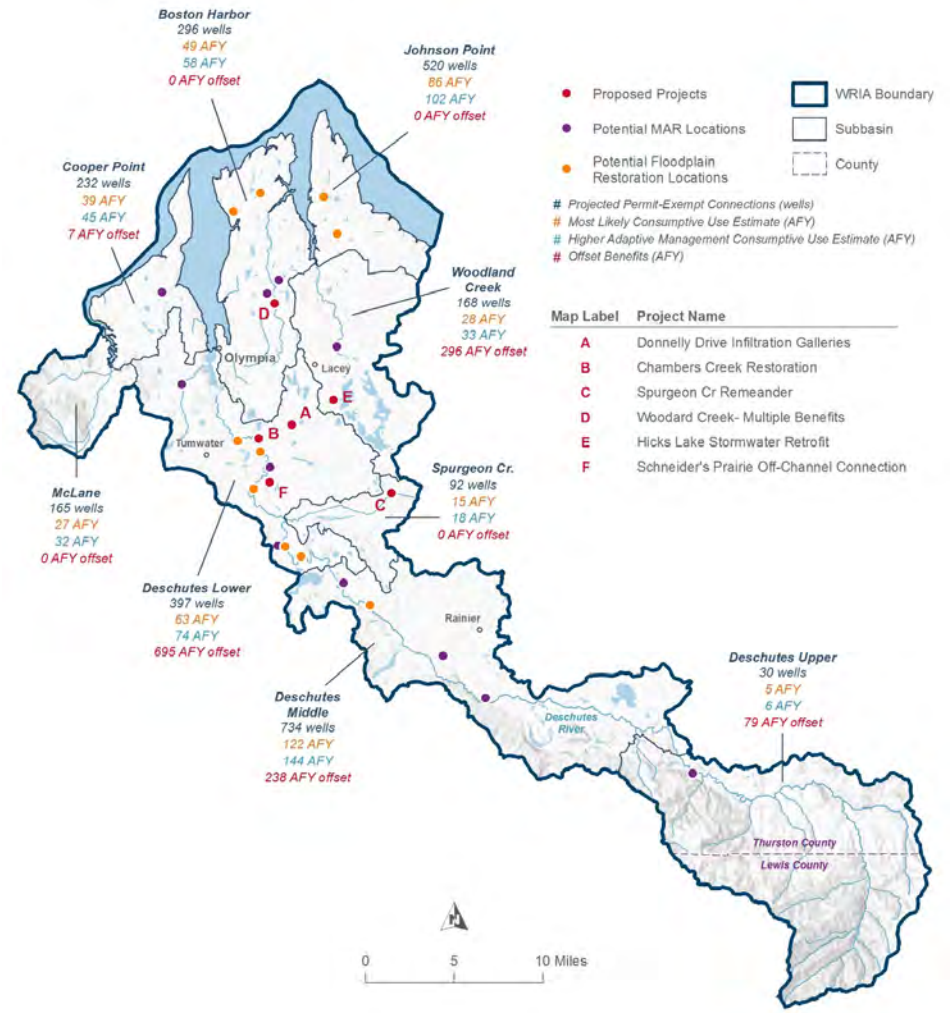

Figure ES 1: Summary of findings of the WRIA 13 Watershed Restoration and Enhancement Plan, including estimates for new domestic permit exempt well growth, consumptive use estimates, and project offset benefits.

Chapter One: Plan Overview

1.1 Plan Purpose and Structure

The purpose of the Water Resource Inventory Area (WRIA) 13 Watershed Restoration and Enhancement Plan is to identify projects and actions necessary to offset the impacts of new domestic permit-exempt wells to streamflows, and provide improved habitat for the recovery of threatened and endangered ~~engendered~~ salmonids. The watershed restoration and enhancement plan is one requirement of RCW 90.94. Watershed restoration and enhancement plans must, at a minimum, 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. WRIA 13 watershed restoration and enhancement plan (watershed plan) considers priorities for salmon recovery and watershed recovery, while ensuring it meets the provisions 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 13 Committee, by completing the watershed plan, has developed, and come to ~~agreement~~ 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 watershed's hydrology, hydrogeology, and streamflow;
3. Summary of the subbasins,
4. Growth projections and consumptive use estimates;

[3] Some members of the WRIA 13 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 13 Committee are described in the Operating Principles in Appendix D.

5. Description of the recommended actions and projects identified to offset the future permit-exempt domestic water use in WRIA 13;

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 13 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 subdivision approvals and building permits for homes intending to use a permit-exempt well for their domestic water supply. The law also requires local watershed planning in fifteen WRIAs, including WRIA 13.[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 13 and are summarized in brief here for the purpose of providing context for the WRIA 13 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 and is subject to state water law.[6] Even though a water right 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

[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] More information on water availability is available on the Department of Ecology's website: https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-availability.

applicant must satisfy the provisions of RCW 19.27.097 for what constitutes evidence of an adequate water supply.

> 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 "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 "junior" permit exempt water users when they interfere with older, "senior" water rights, including instream flow rules.

RCW 90.94.030 adds to the management regime for new homes using domestic permit-exempt well withdrawals in WRIA 13 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 13 to a maximum annual average of up to 950 gallons per day 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. In addition, Ecology may limit these withdrawals to 350 gpd when an emergency drought order is issued. Ecology has published its interpretation and implementation of RCW 19.27.097 and RCW 90.94 in Water Resources POL 2094 (Ecology 2019a). The WRIA 13 Committee directs readers to 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 13. In doing so, it sets the minimum standard of Ecology's collaboration with the WRIA 13 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 13 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[7]. 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 13 Committee's approach to selecting projects and actions, the law also

[7] 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)

speaks to "high and lower priority projects." The WRIA 13 Committee understands that, as provided in the Final Guidance on Determining Net Ecological Benefit (Ecology 2019b), "use of 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 13 Committee that this watershed plan, if fully implemented 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 Deschutes watershed and develop a watershed restoration and enhancement plan (watershed plan) in collaboration with the WRIA 13 Committee. This resulted in a 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

Streamflow Restoration law RCW 90.94.030(3)

(a) The watershed restoration and enhancement plan should include recommendations for projects and actions that will measure, protect, and enhance instream resources and improve watershed functions that support the recovery of threatened and endangered salmonids. Plan recommendations may include, but are not limited to, acquiring senior water rights, water conservation, water reuse, stream gaging, groundwater monitoring, and developing natural and constructed infrastructure, which includes but is not limited to such projects as floodplain restoration, off-channel storage, and aquifer recharge. Qualifying projects must be specifically designed to enhance streamflows and not result in negative impacts to ecological functions or critical habitat.

(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.

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 include the following (pages 7-8):

1. Clear and Systemic Logic. Watershed plans must be prepared with implementation in mind.
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 13 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 13 Committee approve the plan prior to submission to Ecology for review for adoption. 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 13 Committee

1.3.1 Formation

The Streamflow Restoration law instructed Ecology to chair the WRIA 13 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. [8]
- 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 13 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 13 Committee.

The WRIA 13 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 13 Committee.[10]

Table 1: WRIA 13 Entities and Membership

Entity Name	Representing
Squaxin Island Tribe	Tribal government
Lewis County	County government
Thurston County	County government
City of Lacey	City government
City of Olympia	City government

[8] The City of Rainier was not able to participate as an active voting member on the WRIA 13 Committee due to staffing restraints; however, they remained informed of the plan development. The WRIA 13 Committee acknowledges that their participation is welcome for future implementation, and that future opportunities for projects may exist in the area of Rainier.

[9] There are no irrigation districts located in WRIA 13.

[10] All participating entities committed to participate in the process and designated representatives and alternates. The law did not require invited entities to participate, and some chose not to participate on the Committee.

Entity Name	Representing
City of Tumwater	City government
Public Utility District No. 1 of Thurston County	Largest publicly-owned water purveyor within WRIA 13that is not a municipality
Washington Department of Fish and Wildlife	State agency
Washington Department of Ecology	State agency
Thurston Conservation District	Agricultural interests
Building Industry Association of Washington (previous participation from Olympia Maser Builders)	Residential construction industry
Deschutes Estuary Restoration Team	Environmental interests
WRIA 13 Salmon Habitat Recovery Lead Entity (ex officio)	n/a
LOTT Clean Water Alliance (ex officio)	n/a
Nisqually Indian Tribe (ex officio)	n/a
City of Yelm (ex officio)	n/a
City of Tenino (ex officio)	n/a

The WRIA 13 Committee roster with names and alternates is available in Appendix C.

The WRIA 13 Committee invited the WRIA 13 Salmon Habitat Recovery Lead Entity, LOTT Clean Water Alliance, Nisqually Indian Tribe, City of Yelm, and City of Tenino to participate as "ex-officio" members. Although not identified in the law, the ex-officio members provide valuable information and perspective as subject matter experts. The ex-officio members are active but non-voting participants of the WRIA 13 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 13 Committee held its first meeting in October 2018. Between October 2018 and January 2021 [UPDATE LAST MEETING DATE, IF NEEDED], the WRIA 13 Committee held 28 committee meetings open to the public. The WRIA 13 Committee met monthly, and as needed to meet deadlines. In March 2020, the COVID-19 pandemic restricted in-person meetings; from that time on, all Committee and workgroup meetings were held online.

The two and a half years of planning consisted of training, research, and developing plan components. Ecology technical staff, WRIA 13 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 13 Committee chair, Ecology staff provided administrative support and technical assistance, and contracted with consultants to provide facilitation and technical support for the WRIA 13 Committee. The facilitator supported the WRIA 13

Committee's discussions and decision-making, and coordinated recommendations for policy change and adaptive management. The technical consultants developed products that informed WRIA 13 Committee decisions and development of the 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. The technical consultants developed all of the technical memorandums referenced throughout this plan.

During the initial WRIA 13 Committee meetings, members developed and agreed to operating principles.[11] The operating principles set forward a process for meeting, participation expectations, procedures for voting, structure of the WRIA 13 Committee, communication, and other needs in order to support the WRIA 13 Committee in reaching agreement on a final plan.

The WRIA 13 Committee established technical, project, and policy workgroups to support planning efforts and to achieve specific tasks throughout plan development. The workgroups were open to all WRIA 13 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 13 Committee acted on workgroup recommendations, as it deemed appropriate.

This planning process, by statutory design, brought diverse perspectives to the table. As the legislation requires that all members of the WRIA 13 Committee approve the final plan prior to Ecology's review,[12] it was important for the WRIA 13 Committee to identify a clear process for making decisions. The WRIA 13 Committee strived for consensus, and when consensus could not be reached, the chair and facilitator documented agreement and dissenting opinions. All agreements and dissenting opinions were documented in meeting summaries that were reviewed and agreed upon 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 13 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 13 Committee reached initial agreement on the final watershed plan, broader review and approval by the entities represented on the WRIA 13 Committee was

[11] Agreed upon operating principles can be found on the WRIA 13 Committee EZ View webpage.
[12] RCW 90.94.030[3] "…all members of a watershed restoration and enhancement Committee must approve the plan prior to adoption"

sought as needed. The WRIA 13 Committee reached final agreement on the Watershed Restoration and Enhancement Plan on XX DATE 2021.

Chapter Two: Watershed Overview

2.1 Brief Introduction to WRIA 13

Water Resource Inventory Areas (WRIAs) are large watershed areas established in chapter 173-500 WAC for the purpose of administrative management and planning. WRIAs encompass multiple landscapes, hydrogeological regimes, levels of development, and variable natural resources. WRIA 13, also referred to as the Deschutes Watershed, is one of the 62 designated major watersheds in Washington State. The 270 square mile Deschutes Watershed is almost entirely within Thurston County, with only the headwaters of the Deschutes River in Lewis County (see Figure 1). The Deschutes River is the major hydrologic basin in WRIA 13, with a number of smaller independent tributaries that drain into four saltwater inlets: Nisqually Reach, Henderson, Budd, and Eld. Other principal streams include Woodard and Woodland Creeks, which are the largest of the major tributaries to Henderson Inlet (Haring et al. 1999). The Black lake catchment drains to both the Black River (WRIA 23) and Percival Creek (WRIA 13);however, for planning purposes, the Black Lake catchment was included in the Chehalis (WRIAs 22 and 23) Watershed Plan Update and not the WRIA 13 Watershed Plan.

2.1.1 Land Use in WRIA 13

Approximately 26 percent of the watershed is within a city or designated urban growth area. Much of the designated Urban Growth Areas for Olympia, Lacey, Tumwater and Rainier, along with agriculture, rural residential areas and commercial timberlands are within WRIA 13.

Rural residential development has primarily occurred in the unincorporated areas of Thurston County. The portion of the Deschutes Watershed that is in Lewis County is entirely comprised of forest land and is assumed to have no rural growth (Figure 1).

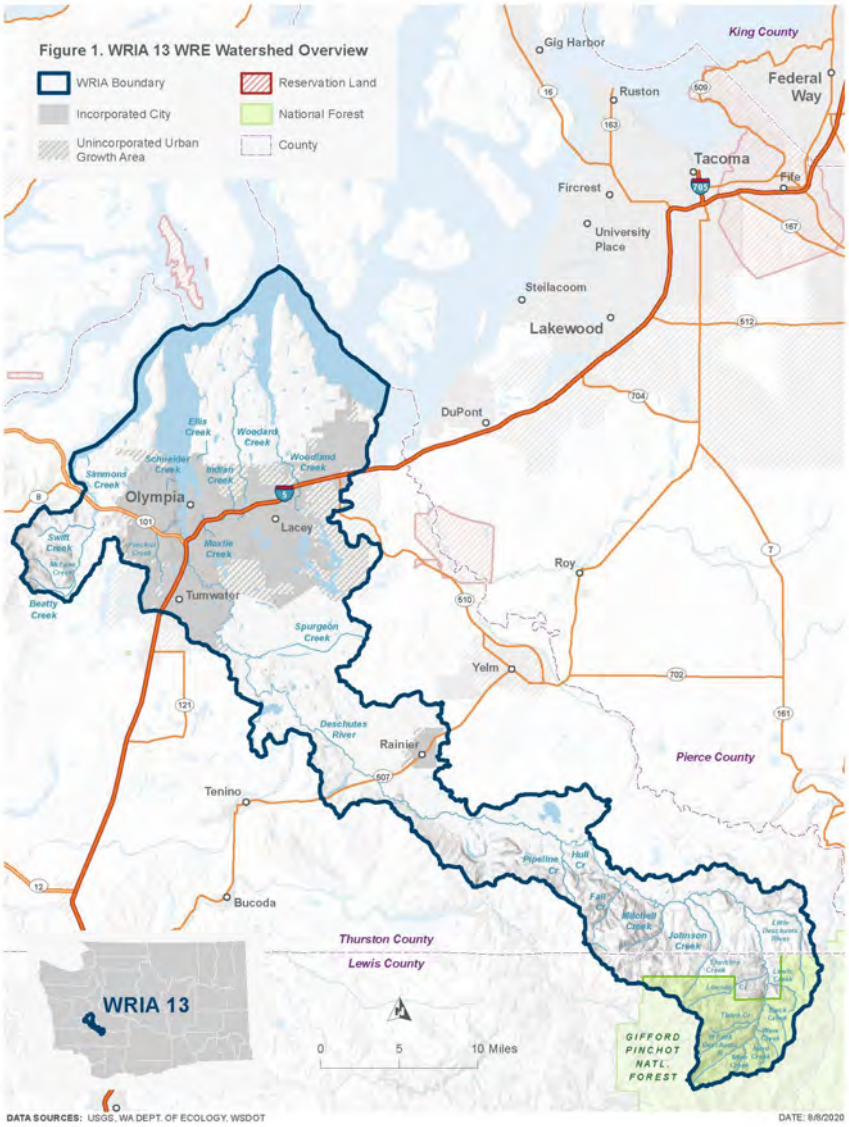

Figure 1: WRIA 13 WRE Watershed Overview

The upper third portion of the Deschutes Watershed is predominantly commercial timber production with some commercial and non-commercial agricultural ventures overlapping in the lower extent. The middle third of the watershed is comprised of commercial and non-commercial agriculture production with rural residences found throughout the mid-watershed and the outer peninsulas. Land use in the lower watershed, near the mouth of the Deschutes River and inner Budd Inlet is mostly urban, with residences along the shoreline of the three inlets (Haring et al. 1999).

2.1.2 Tribal Reservations and Usual and Accustomed Fishing Areas

Commented [JA(1]: The Squaxin Island Tribe has requested that the language in this paragraph be replaced as shown.

The Squaxin Island Tribe holds reserved fishing rights in the Deschutes watershed under the 1854 Treaty of Medicine Creek. ~~The Tribe also possesses Treaty-reserved federal water rights in the Deschutes watershed in quantities that are necessary to support healthy salmon populations. These water rights are necessary to carry out the purposes of the Treaty, 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 the water right has not yet been quantified by a court, it likely exceeds 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.~~The Tribes hold Treaty-reserved water rights in WRIA 13 under federal law that are necessary to support healthy salmon populations; to support and maintain hunting, fishing and cultural resource harvesting right; and to meet all homeland purposes reserved by the Treaties. These reserved water rights are necessary to fulfill the promises and purpose of the Treaties. Federal Indian water rights retain a senior priority date over all other federal and state water rights holders and state instream flow rules. Although federal Indian water rights in WRIA 13 have yet to be adjudicated, these rights are senior to all other rights and have not been accounted for by the State of Washington in the way in which the State determines water availability, over appropriation, and instream flow rules.[13]

2.1.3 Salmon Distribution and Limiting Factors

The Deschutes Watershed is an important and productive system for endangered and threatened salmonids. Anadromous salmonid spawning occurs from Tumwater Falls to Deschutes Falls. The Deschutes River and its tributaries often experience low streamflows during critical migration and spawning time. In addition, culverts, dams, and other flood control measures have further limited habitat along the streams in WRIA 13 (Haring et al. 1999). With changing weather patterns, summer flows are expected to change, causing an additional disruption to the salmon as they migrate, spawn and rear (NWIFC, 2016).

The Deschutes Watershed is one of diverse land uses. Industry, agriculture (including salmon fisheries), commercial facilities, and municipalities compete for a limited water supply, causing a strain on water availability, especially during low seasonal flows in productive salmonid

[13] Language on Tribal Treaty rights has been provided by the Squaxin Island Tribe.

streams. Many people depend on the salmon fishery for commercial, sport, and subsistence harvest. This includes tribes with usual and accustomed fishing areas that overlap with the Deschutes watershed, such as the Squaxin Island Tribe.

The Deschutes WRIA watersheds primarily support Chinook salmon, coho salmon, chum salmon, and winter steelhead (Tables 2 and 3). Chinook salmon, coho salmon, and winter steelhead are all listed as threatened.

Table 2: Anadromous Salmonid Species and Status in WRIA 13

Common Name	Scientific Name	Population[1]	Critical Habitat	Regulatory Agency Status
Puget Sound				
Chinook Salmon	Oncorhynchus tshawytscha	Puget Sound Chinook	Yes/2005	NMFS/Threatened/ 1999
Chum Salmon	*Oncoryhnchus keta*	Puget Sound Chum	No	Not listed
Coho Salmon	*Oncorhynchus kisutch*	Puget Sound/Strait of Georgia Coho	No	NMFS/Species of Concern/1997
Winter Steelhead	*Oncoryhnchus mykiss*	Puget Sound Steelhead	Yes/2016	NMFS/Threatened/ 2007

Chinook salmon enter WRIA 13 streams in the late summer and fall and spawn through the fall (Table 3). Incubation occurs through the following winter. Juvenile rearing occurs throughout the spring and early summer, with smolt outmigration occurring shortly thereafter.

Coho salmon enter WRIA 13 streams in the fall and spawn through the winter and fall (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 13 streams in the late fall to early spring (Table 3). Incubation occurs through the late winter. Juvenile rearing and smolt outmigration occurs from that spring to early summer.

Winter steelhead enter WRIA 13 streams in the late fall through the following spring and spawn in the spring (Table 3). Incubation occurs through the following summer. Juvenile rearing occurs for over a year before smolt outmigration 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 the WRIA 13 Streams and Rivers

Salmonid Life History Timing in WRIA 13																								Subbasin Presence
Species	Freshwater Life Phase	Jan		Feb		Mar		Apr		May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		
Chinook (fall)	Upstream migration																									Woodland Deschutes Lower Deschutes Middle Deschutes Upper McLane Creek
	Spawning																									
	Incubation																									
	Juvenile rearing																									
	Juvenile outmigration																									
Coho	Upstream migration																									All
	Spawning																									
	Incubation																									
	Juvenile rearing																									
	Smolt outmigration																									
Chum	Upstream migration																									Woodland Deschutes Lower McLane Creek Johnson Point Boston Harbor Cooper Point
	Spawning																									
	Incubation																									
	Juvenile rearing																									
	Juvenile outmigration																									
Steelhead Trout (winter)	Upstream migration																									Woodland Deschutes Lower Deschutes Middle Deschutes Upper McLane Creek Boston Harbor Cooper Point
	Spawning																									
	Incubation																									
	Juvenile rearing																									
	Smolt outmigration																									

Salmonid habitat limiting factors have been defined by the Washington State Conservation Commission Limiting Factors Analysis (Haring and Konovsky 1999) and the Deschutes River Coho Salmon Biological Recovery Plan (Confluence 2015). Haring and Konovsky (1999) identified specific limiting factors for specific waterbodies, but also provide the following general themes throughout WRIA 13 streams and rivers on a multi-species basis:

- natural stream ecological processes have been significantly altered due to adjacent land management practices and direct actions within the stream corridor,
- fine sediment (<.85 mm) levels in the stream gravels regularly exceed the <12% level identified as representing suitable spawning habitat,
- lack of adequate large woody debris in streams, particularly larger key pieces that are critical to developing pools, log jams, and other habitat components important to salmonids,
- lack of adequate pool frequency and large, deep pools that are important to rearing juvenile salmonids and adult salmonids on their upstream migration,
- naturally high rates of channel movement in this geologically young basin, but further exacerbated rate of streambank erosion and substrate instability due to loss of streambank and riparian integrity, and alteration of natural hydrology,
- loss of riparian function due to removal/alteration of natural riparian vegetation, which affects water quality, lateral erosion, streambank stability, instream habitat conditions, etc.,
- the presence of a significant number of culverts/screens/dams/etc. that preclude unrestricted upstream or downstream access to juvenile and adult salmonids,
- significant alterations to the natural stream hydrology in streams where the uplands have been heavily developed, and the threat of similar impacts to streams that are experiencing current and future development growth, and
- estuarine/marine function is significantly impacted by physical alteration of the natural estuary, by poor water quality in the estuary, and by significant alteration of nearshore ecological function due to shoreline armoring.

2.1.4 Water System Distribution and Impacts in WRIA 13

Pumping from wells can reduce groundwater discharge to springs and streams by capturing water that would otherwise have discharged naturally. Surface water may be influenced by groundwater pumping such that flows are diminished. Group A and Group B water systems withdraw greater amounts of water and have more impact than PE wells. Group A systems generally have water rights and are regulated by the Department of Health. Group B systems often have permit-exempt wells and are regulated by counties. Within WRIA 13, there are approximately 151 Group A water systems, approximately 205 Group B water systems, and

approximately 16,560 PE wells[14]. 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 (Ecology 1995). As required by RCW 90.94, this Plan includes projects and actions chosen by the Committee that are necessary 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 13

Citizens and local, state, federal, and tribal governments have collaborated on watershed and water resource management issues in WRIA 13 for decades. The Deschutes Planning Unit completed a draft watershed plan in October 2004, but were unable to reach consensus on the document. A brief summary of broad watershed planning efforts as they relate to the past, present, and future water availability in the Deschutes Watershed is provided in Section 2.2.1.

2.2.1 Current Watershed Planning Efforts in WRIA 13

The WRIA 13 watershed plan is building on many of the past and current efforts, including previous watershed planning efforts under RCW 90.82. Other efforts include the Local Integrating Organization (LIO) Alliance for a Healthy South Sound (AHSS)[15] ecological recovery plan[16], and salmon recovery planning by the WRIA 13 Salmon Habitat Recovery Lead Entity. 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.[17] The planning process to develop an ecosystem recovery plan is community-based with engagement by local, state and federal agencies. The AHSS has engaged the community in a collaborative planning process to help understand priorities and support the health and sustainability of the watershed.

The WRIA 13 Salmon Habitat Recovery Lead Entity is a collaboration of local governments, state, federal, and tribal partners, and nonprofit organizations focused on protecting and enhancing wild salmon populations. The Salmon Habitat Protection and Restoration Plan for WRIA 13 identifies and prioritizes projects that protect and restore habitat for salmonids that occur in the marine and freshwater environments of WRIA 13.

The AHSS and Salmon Recovery Lead Entity include many of the same organizations and individuals that participate in the WRIA 13 Watershed Restoration and Enhancement

[14] Estimates at the time of development of the watershed plan based on Ecology's well log database
[15] More information on the AHSS can be found here: https://www.healthysouthsound.org/
[16] The AHSS boundaries include WRIA 13, except a small area in Lewis County which is not within a Local Integrating Organization.
[17] More information on local integrating organizations and their efforts to recovery Puget Sound is available here: https://www.psp.wa.gov/LIO-overview.php.

Committee. This history of collaborative planning and shared priorities has supported the success of the watershed restoration and enhancement plan development in WRIA 13.

The Squaxin Island Tribe has been leading restoration planning for coho in the Deschutes River (NWIFC, 2016). Restoration planning included modeling coho habitat requirements, evaluation of existing habitat conditions, defining salmon habitat limiting factors, and recommendations for habitat restoration.

The Department of Ecology led an effort to develop a total maximum daily load (TMDL) for the Deschutes Basin to address multiple water quality parameters including temperature, fine sediment, and bacteria.[10] Coordinated efforts to reduce water temperatures and restore low flows in the watershed are directed through the establishment of the TMDL as summarized in the *Deschutes River Watershed Recovery Plan* (Schlenger et al. 2015). Actions to restore low flows are encouraged to increase coho production, in part through the improved water temperatures and instream flows, through efforts that focus on reduction in withdrawals and the establishment of total maximum daily loads. More information on TMDLs in WRIA 13 can be found in section 2.3.4 below.

The Public Water System Coordination Act of 1977[18] requires each water purveyor in a Critical Water Supply Service Areas (CWSSA) to update 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 13 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.[19]

Thurston County last updated their Coordinated Water System Plan (CWSP) in 1996, as mandated by the Public Water System Coordination Act of 1977. WAC 246-290-100 requires public water systems with more than 1,000 connections submit a water system plan for review and approval by the Department of Health (DOH) every ten years. Within Thurston County, this includes the water systems of Lacey, Tumwater, Olympia, Tanglewilde-Thompson Place, and Pattison.[20] This ensures that water system service areas are consistent with local growth management plans and development policies. Water system service areas and related policies determine whether new homes connect to water systems or rely on new permit-exempt domestic wells. While the CWSP boundary covers the cities in North Thurston County and some surrounding areas, it does not cover most rural areas.

2.2.2 Coordination with Existing Plans

[18] RCW 70.116.070

[19] Thurston County water system planning information is available at: https://www.thurstoncountywa.gov/planning/Pages/comp-plan.aspx

[20] North Thurston County Coordinated Water System Plan, 1996, WA State DOH Sentry Database

Throughout the development of the watershed plan, Ecology streamflow restoration staff have engaged with staff from the Salmon Habitat 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 WRIA 13 Committee chair conducted outreach to the WRIA 13 Salmon Habitat Recovery Lead Entity regarding coordination with the WRIA 13 Committee to ensure alignment of salmon recovery priorities and the streamflow planning process. Throughout the planning process, the WRIA 13 Committee has coordinated closely with the lead entity, including inviting the lead entity coordinator to take part as an ex-officio member on the WRIA 13 Committee, The WRIA 13 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.

Development of this plan also involved consideration of the Thurston County Comprehensive Plan, which is guided by the Growth Management Act and the Thurston County County-wide Planning Policies, a framework created in collaboration with the seven cities and towns within Thurston County. The Comprehensive Plan contains goals and policies to govern the unincorporated areas of Thurston County, and in turn, the Plan guides other specialized plans like the Joint plans for Urban Growth Areas, subarea plans, and other functional plans. The Comprehensive Plan also guides Development Regulations, Capital Facilities planning, land use permits, inter-local agreements, and other County programs, all with the main goal of effectively managing the county's physical growth. The committee used the Thurston County Comprehensive Plan as the basis for determining likely areas of future rural growth, conceptual projects, and implementation hurdles.

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.

Commented [JA(2]: Thurston County has requested that this language be added to this paragraph.

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 both the Puget Sound Lowlands and the Cascade Mountain Range. Reaching a maximum extent during the Vashon stage of the Fraser Glaciation approximately 13,500 years ago, an ice sheet advanced southward into present day Puget Sound (Drost et al. 1999). Multiple advances and retreats of the ice sheet formed the Puget Sound Lowlands, depositing a complex sequence of glacial and interglacial sediments.

The general geology of WRIA 13 is dominated by a broad drift plain formed from a sequence of unconsolidated glacial and interglacial deposits. These deposits are locally incised by current and former river valleys. The southern terminus of the Pleistocene glacial advance occurs in Thurston County, resulting in thick sediment deposits in the north part of WRIA 13 (over 1,800 feet thick on the Johnson Point peninsula) and progressively thinner sediment deposits to the south and southwest (Drost et al. 1999). WRIA 13 is bounded by the bedrock outcrops of the Bald Hills to the south and the Black Hills west of McLane Creek. Local bedrock knobs (some at land surface and some in the subsurface) also exist, especially in the Tumwater Falls area.

Understanding the geologic setting allows characterization of surface and groundwater flow throughout 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

The USGS described the hydrology of WRIA 13 in a hydrogeologic framework report based on previous studies and published reports for Thurston County (Drost et al. 1999). The hydrogeologic units of the area are described as being either water-bearing ("aquifer") and non-water-bearing ("aquitard" or "confining layer") sediments. Major groundwater aquifers are found in the unconsolidated glacial and interglacial sediments throughout the central and lower regions of the watershed. More recent studies have identified glacial outwash channels that eroded through regional aquitard units, and were then backfilled mostly with sands to form locally distinct aquifer units in the lower Deschutes Valley and along Woodland Creek.[21]

Groundwater in WRIA 13 aquifers generally flow north towards Puget Sound or locally toward the Deschutes River, Woodland Creek, or McLane Creek. Groundwater flow on the northern peninsulas is generally radially outward toward Puget Sound (Drost et al. 1999). Summer base flows in the watershed are sustained by groundwater. Groundwater in the eastern portion of the Deschutes and Woodland Creek watersheds generally move towards the Nisqually flats, in WRIA 11 (See Figure 19 in Drost et al. 1999). Similarly, groundwater in the southestern portion

[21] Walsh and others, 2003; Walsh and Logan, 2005; Golder, 2008; PGG, 2010

of the Deschutes River watershed flows to the Black River, in the Chehalis Basin (See Figure 19 in Drost et al. 1999)

The USGS describes the hydrogeology of the watershed as six sedimentary units, typically alternating between aquifer and non-aquifer layers. Four of the six sedimentary units identified are aquifers and are present throughout much of the watershed . This information is summarized in Appendix E: Regional Aquifer Units in WRIA 13, and in Table 1 of Drost et al. (1999). These aquifers are the most likely sources for new permit-exempt wells. The upper two units will also be the main source of direct recharge or baseflow to the surface water system. Aquifer Qc generally does not have surficial expressions except for immediately adjacent to and below sea level in Puget Sound; surficial expressions of TQu only occur below sea level in Puget Sound.

2.3.3 Hydrology and Streamflow

WRIA 13 can be characterized by its three primary drainages, each draining into a separate saltwater inlet: Henderson Inlet to the east, Budd Inlet, and Eld Inlet to the West (Figure 1). The Deschutes River which drains into Budd Inlet is the major freshwater basin in WRIA 13. A portion of WRIA 13 drains to the Nisqually Reach.

Henderson Inlet, located in the northeast section of WRIA 13 drains approximately 30,000 acres from the Boston Harbor Peninsula, Johnson Point Peninsula and the Woodland Creek Basin. Woodland and Woodard Creeks are the largest of the main tributaries to Henderson Inlet, draining 80% of the Henderson Inlet watershed. The other streams in the watershed, Dobbs Creek (East Henderson), Meyer Creek (Inlet), and Sleepy Creek (West Henderson), drain small areas of the Dickerson Point and Johnson Point peninsulas.[22,23] Because most of the basin lies at an elevation of less than 200 feet above sea level, groundwater is the primary source of streamflow during low flow months. Groundwater-fed springs maintain year round base flow in Woodard Creek and Woodland Creek.[24] Temperature and low flow impacts are not tempered by glacial melt in late summer and fall in WRIA 13.

The approximately 120,000 acre Budd Inlet/Deschutes River Basin is comprised of 143 identified streams providing over 256 miles of drainage, approximately 84% of WRIA 13. The Budd Inlet/Deschutes River Basin includes the 52 mile-long Deschutes River along with other notable streams (Percival/Black Lake Ditch, Ellis, Moxlie, Indian, Adams, Mission and Schneider Creeks) within the Budd Inlet drainage system. The Deschutes River drops from its highest point within the watershed of 3,870 feet near Cougar Mountain to the lowest point near sea level at the mouth of Capitol Lake. The Deschutes River has a mean annual flow of 254 cubic feet per second (cfs).[25,26] Late summer flows average around 50 cfs near Rainier (USGS Station 12079000) and 100 cfs at the E-Street Bridge in Tumwater (USGS Station 12080010).

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[22] Thurston County Department of Water and Waste Management, 1995
[23] WRIA 13 Planning Committee, 2004
[24] WRIA 13 Draft Bill Watershed Plan, 2004
[25] Measured at USGS stream gage 1207900 near Rainier, WA from 1949 through 2019. The 2019 mean annual flow was 149.3 cfs.
[26] USGS. National Water Information System. Water-Year Summary for Site USGS 1207900.

Streamflows are typically lowest during the late summer and early fall, when precipitation is low and infrequent. Flows are sustained by groundwater during this period. 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 a paucity of summer precipitation. Extreme low flows can be characterized in terms of the lowest 7-day running average discharge in a river that occurs on average once every 10 years (7Q10 flows). 7Q10 flows are estimated from 1991 - 2001 to be 21 cfs near Rainier (USGS Station 12079000) and 56 cfs at the E-Street Bridge in Tumwater (USGS Station 12080010) (Ecology, 2012). These extreme low flows have decreased over time at both stations, indicating hydrologic impacts. The Puget Sound Vital Signs program[27] indicates that decreasing low flow trends for the Deschutes River continues to be a concern.

The upper extent of the Deschutes River (river mile (RM) 41 to 52) has a moderately steep gradient and the river drops rapidly over Deschutes Falls at RM 41, forming a complete barrier to fish passage.[28] Much of the upper watershed lies in the transient snow zone of 1100 -3600 feet elevation. This is an area where rain-on-snow precipitation events are relatively common, making estimation of runoff and infiltration more difficult.

The lower 41 miles of drainage is lower gradient along a broad prairie-type valley floor.[29] The mainstem Deschutes River is composed of alternating gaining and losing reaches, ranging from a loss of 1.14 to a gain of 3.61 cfs per river mile, with an overall gain of groundwater of 41.4 cfs, between river miles 42.3 and 0.50, respectively (Ecology 2007a). Groundwater losses occur between RM 42.3 - 28.6, gain between RM 28.6 – 20.5, loss between RM 20.5 – 19.1, gain between RM 19.1 – 9.2, loss between RM 9.2 – 6.8, and gain between RM 6.8 – 0.5.

The Eld Inlet drainage area encompasses approximately 23,220 acres. The primary streams in this drainage area are McLane Creek, its tributaries (including Cedar Flat, Swift and Perkins Creeks) and Green Cove Creek, as well as various unnamed tributaries.[30,31] This drainage area also lies at relatively low elevation. Streamflow is fed primarily from groundwater recharge.

The climate of the region is typical Northwest maritime. Summers are relatively dry and cool while winters are mild, wet and cloudy. Annual precipitation averages about 45 inches[32] in Olympia to over 90 inches in the upper watershed (Miller et al. 1973).

Much of the climate related research in the south sound area has focused on flooding rather than low instream flows (Mauger et al. 2015). Many of the lower elevation drainages to the inlets are characterized by extremely high peak flows that develop quickly during heavy rains and decline rapidly as rain subsides, and prolonged low flow or dry periods in the summer. The

[27] https://vitalsigns.pugetsoundinfo.wa.gov/
[28] River mile delineation is digitized and available from Department of Ecology: https://geo.wa.gov/datasets/fff25ee77f9e43ff9539688ba8ab3af3_0
[29] Methodology to a Watershed Based Approach to Clean Water and Natural Resource Management, 2013
[30] WRIA 13 Draft Bill Watershed Plan, 2004
[31] Methodology to a Watershed Based Approach to Clean Water and Natural Resource Management, 2013
[32] Precipitation data is from the weather station at the Olympia Regional Airport

basic water quantity habitat issue of concern is the alteration of the natural hydrologic regime, including:

- alteration of the frequency and magnitude of high flow events (usually associated with increased stormwater runoff from impervious surfaces), and;
- reduction of summer base flows that affect the salmonid rearing capacity of streams (usually associated with reduced infiltration of groundwater, water withdrawals, or excess coarse sediment that can cause the flow to go subsurface).[33]

The Climate Impacts Group has developed numerous downscaled global climate models to forecast streamflow and precipitation changes in the Puget Sound, including WRIA 13. General trends such as increased stream temperatures, earlier streamflow timing, increased winter flooding, and lower summer minimum flows are expected (Mauger et al. 2015). Comparison of August average stream temperatures between 1992 and 2011 with projections of stream temperature from moderate climate forecasts for 2070 – 2099 indicate a rise of approximately 7.2 degrees F. Water temperatures impact salmonid survival, growth and fitness. Higher temperatures are made worse by low stream flow (Anchor Environmental 2008).

Flows typically are lowest in late summer and impact juvenile salmon (coho) and steelhead rearing in the watershed, adult salmon (most likely chinook) migrating and spawning in the river, and resident trout present in the river. Low flows limit the amount of wetted area available to rearing salmonids, and also limit productivity due to increased water temperatures and decreased dissolved oxygen (Haring et al. 1999).

Summer low flows in Woodland Creek are a habitat limiting factor. The reach of Woodland Creek from Lake Lois to below Martin Way typically goes dry during the summer months and summer flows elsewhere in the system are low. For Woodland and Woodard creeks, the largest threat to salmonids is the change in the natural flow regime resulting from the rapid urbanization of the watershed. Increased impervious surface from urban development typically results in increased peak flow storm runoff in the winter and reduced base flows in the summer. Other stream basins in WRIA 13 are also under intense development pressure. Unless the natural flow regime can be restored and maintained in developing basins, salmonid habitat will also be adversely impacted (Haring et al. 1999).

WAC173-513 set minimum instream flows for The Deschutes River, from the confluence of the Deschutes River with Capitol Lake upstream to the Deschutes Falls at river mile 41. This river is closed to new consumptive appropriates between April 15th – November 1st. Several other streams and their tributaries are closed to further consumptive appropriations, including McLane Creek, Woodland Creek, Woodard Creek, Percival Creek, and unnamed tributaries to Puget Sound.

The background of how instream flows and closures were set are described in the Instream Resources Protection Program (IRPP) for WRIA 13 (Ecology 1980). Instream flows were set for streams where continuous flow records existed or correlations of flow to other stream gages

[33] WRIA 13 Draft Bill Watershed Plan, 2004

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 1981). When streamflows are below the instream flow, Ecology may 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 13 every two years with a water quality assessment. Total Maximum Daily Load (TMDL) plans are part of the Federal Clean Water Act; they address water quality concerns by identifying and tracking surface water 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 13 (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, bacteria, and total phosphorus water quality standards. Fine sediment is also listed as impaired in the Deschutes River.

Four TMDLs have been completed in WRIA 13 to address water quality impairments, including the Deschutes River Multi-Parameter TMDL Implementation Plan (Ecology 2015 and EPA 2020), the Henderson Inlet Watershed Multi-Parameter TMDL Implementation Plan (2008), the Nisqually Watershed Bacteria and DO TMDL Implementation Plan (2007), and the Totten, Eld, and the Skookum Inlets Tributaries Bacteria TMDL Implementation Plan (2007).[34] The 2015 Deschutes River TMDL was only partially approved by EPA, resulting in EPA submitting replacement TMDLs for those that were disapproved. While EPA replaced certain TMDLs within the Deschutes Watershed, they did not revise the implementation plan and the original 2015 report should be consulted for implementation elements. A TMDL for dissolved oxygen impairment in the marine waters of Budd Inlet is currently in development.

The Deschutes River Multi-Parameter TMDL Implementation Plan addressed water temperature, dissolved oxygen, pH, bacteria, and fine sediment in the Deschutes River, its tributaries, and tributaries to Budd Inlet (Ecology 2015). The dissolved oxygen and pH components of the associated TMDL for the Deschutes River were disapproved and updated by the USEPA (USEPA 2020). The Budd Inlet portion of the TMDL is currently in the process of being updated by Ecology.

The Henderson Inlet Watershed Multi-Parameter TMDL Implementation Plan addressed water temperature, dissolved oxygen, pH, and bacteria in Woodland Creek and other tributaries to Henderson Inlet (Ecology 2008). The Nisqually River Basin Fecal Coliform Bacteria and Dissolved Oxygen Total Maximum Daily Load Implementation Plan (Ecology 2007) and the Totten, Eld, and the Skookum Inlets Tributaries Bacteria TMDL Implementation Plan (Ecology 2007) addressed bacterial contamination in marine waters from freshwater tributaries.

Additionally, there is an ongoing environmental review under SEPA being led by WA Department of Enterprise Services (DES) to investigate options to address multiple water quality and habitat issues in the Deschutes Estuary and Capital Lake.[35] The draft EIS is expected to be completed in the summer of 2021, and a final EIS issued in 2022 after a public comment period.

Reduced stream flow can lead to degraded water quality. Reduced flows lead to increased pollutant concentrations with the same pollutant load (e.g. bacteria). Reduced stream flow also

[34] More information on TMDLs in the Deschutes River can be found here: https://www.epa.gov/tmdl/deschutes-river-tmdls

[35] More information on the Capitol Lake - Deschutes Estuary Long-Term Management Project can be found here: https://capitollakedeschutesestuaryeis.org/

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,[36] the WRIA 13 Committee divided WRIA 13 into subbasins for the purposes of this watershed plan[37]. 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).[38] This chapter is based on the Subbasin Delineation Technical Memorandum (Appendix G).

3.2 Approach to Develop Subbasins

The WRIA 13 Committee divided WRIA 13 into nine subbasins for purposes of assessing projections for new PE wells, consumptive use, and project offsets initially using the Salmon and Steelhead Habitat Inventory and Assessment Program (SSHIAP) data as the basis for delineations.[39] [40] The basic considerations of the WRIA 13 Committee in delineating subbasin boundaries for this planning process were:

- Distinguishing areas of anticipated rural growth that would include permit-exempt wells or connections;
- Existing planning efforts that have already delineated subbasins;
- Presence of fish-bearing streams of importance within the watershed;
- Direction of surface drainage to different receiving bodies;
- Current level of residential development; and
- In identifying projects the Committee would strive to provide the highest priority recommendations for offset projects in the same time as the impact and in the same basin or tributary.[41]

Other considerations were:

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[36] "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.

[37] The term "subbasin" is used by the WRIA 13 Committee for planning purposes only and to meet the requirements of RCW 90.94.030 (3)(b).

[38] 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.

[39] 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).

[40] HDR, 2019. WRIA 13 Draft Subbasin Delineation. June 26, 2019.

[41] RCW 90.94.030(b)

- Size of the subbasins;
- Development character within the subbasin;
- Distinguishing areas where little rural growth is expected; and
- The location of streams included in the watershed rule (WAC-173-513) with closures or instream flow rule limits.

A more detailed description of the subbasin delineation is in the technical memo available in Appendix F. The WRIA 13 committee acknowledges that surface water drainages were used as a proxy for groundwater basins. While shallow groundwater oftentimes does correspond with surface water drainages, this correspondence does not always occur. For example, groundwater recharge or loss in a given watershed may affect flows in an adjacent watershed or may affect marine seepage instead of stream flows.

3.3 Subbasin Map

The WRIA 13 subbasin delineations are shown on Figure 2 and summarized below in Table 4:

Table 4: WRIA 13 Subbasins

Subbasin Name	Primary Rivers and Tributaries	County
Boston Harbor	Ellis Creek, Indian Creek, Moxlie Creek, Woodard Creek	Thurston
Cooper Point	Simmons Creek, Schneider Creek	Thurston
Deschutes Lower	Deschutes River, Percival Creek	Thurston
Deschutes Middle	Deschutes River	Thurston
Deschutes Upper	Buck Creek, Lincoln Creek, Lewis Creek, Little Deschutes River, Thurston Creek, Johnson Creek, Mitchell Creek, Fall Creek, Pipeline Creek	Thurston and Lewis
Johnson Point	Unnamed tributaries to Henderson inlet and Nisqually Reach	Thurston
McLane	McLane Creek, Swift Creek, Beatty Creek	Thurston
Spurgeon Creek	Spurgeon Creek	Thurston
Woodland Creek	Woodland Creek	Thurston

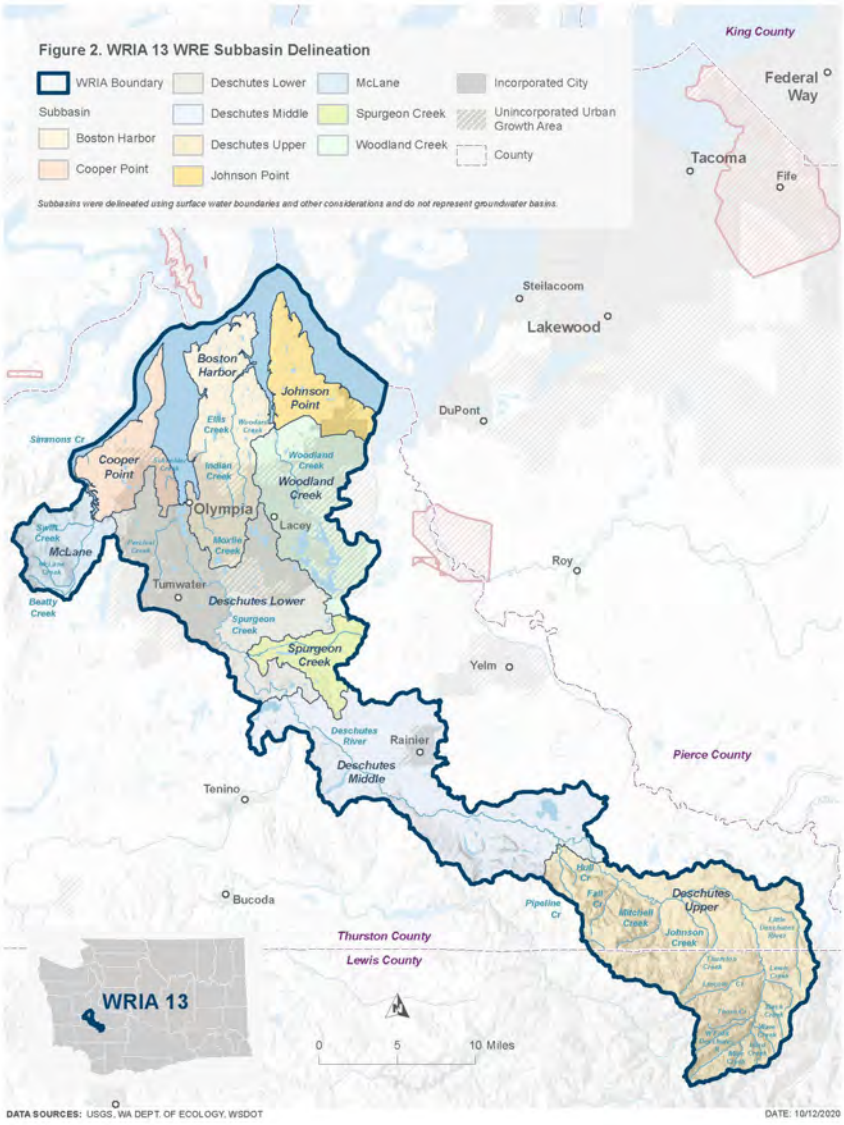

Figure 2: WRIA 13 WRE Subbasin Delineation

Chapter Four: New Consumptive Water Use Impacts

4.1 Introduction to Consumptive Use

The Streamflow Restoration law requires watershed plans to include "estimates of the cumulative consumptive water use impacts over the subsequent twenty years, including withdrawals exempt from permitting under RCW 90.44.050" (RCW 94.030(3)(e)). 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" (pg. 7). This chapter provides the WRIA 13 Committee's projections of new domestic permit-exempt well connections (referred to as new PE wells throughout this plan) and their associated consumptive use (CU) [42] for the 20-year planning horizon.[43] This chapter summarizes information from the technical memo (Appendix H) prepared for the Committee.

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

The WRIA 13 Committee projects 2,616 new PE wells over the planning horizon. Note that Thurston County and Lewis County are both within WRIA 13; however, the Lewis County portion of WRIA 13 is entirely comprised of timberland and thus was not included in the projection for new PE wells. No new PE wells are expected to occur in Lewis County over the 20-year planning horizon. New PE well projections are distributed across the WRIA, with the largest numbers in the Middle and Lower Deschutes subbasins, and the three peninsulas. The fewest new PE wells are projected in the Upper Deschutes and Spurgeon Creek subbasins.

The WRIA 13 Committee developed a methodology that it agreed was appropriate to project the number of new PE wells over the planning horizon in WRIA 13, 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 13, the methods used to develop the projections, and the uncertainties associated with the projections.

4.2.2 Methodology

The WRIA 13 Committee developed a methodology in collaboration with Thurston County and the Thurston Regional Planning Council (TRPC) for identifying the most appropriate method of

[42] New consumptive water use in this document is from projected new homes connected to permit-exempt domestic wells associated with building permits issued during the planning horizon. Generally, new homes will be associated with wells drilled during the planning horizon. However, new uses could occur where new homes are added to existing wells serving group systems under RCW 90.44.050. In this document the well use discussed refers to both 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" or "home" refer to any permit-exempt domestic groundwater use, including other ERUs.

[43] See Chapter 6 policy recommendation #12 which describes a recommendation to collect information on 20 years of consumptive water use in addition to PE wells.

projecting new PE wells within their jurisdiction. Population growth projections for Thurston County are produced by the TRPC every 3 to 5 years. Growth projections represent the expected growth based on currently adopted plans and policies. A detailed description of the TRPC methods is provided in Appendix H[44]. Permit-exempt growth was projected using the following steps to project growth of over the planning horizon:

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

2. Develop residential capacity estimates

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) Incorporated cities: no permit-exempt growth

    b) Urban growth areas (UGAs): permit-exempt growth is assumed to occur on parcels with no sewer service

    c) Rural areas outside of water systems: all permit-exempt growth

WRIA 13 Watershed Restoration and Enhancement (WRE) Committee built upon the TRPC methodology by adding permit-exempt growth in rural water systems, assuming that rural water systems may not be able to serve all growth within their service areas. Permit-exempt growth was assumed to be proportional to buildable parcels without water system hookups relative to parcels with water system hookups.

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4.2.3 Distribution of New PE Wells

This WRIA 13 watershed plan compiles Thurston County's growth projection data at both the WRIA scale and by subbasin. As mentioned above, no new PE wells are expected to occur in Lewis County over the 20-year planning horizon.

The TRPC allocated growth throughout Thurston County and WRIA 13. The WRIA 13 Committee summed PE well growth by subbasin, and mapped potential locations of new PE wells in the watershed. The resulting map (Figure 3) shows the most likely area where new residential development dependent on PE wells will occur.

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

The TRPC and the WRIA 13 Committee project approximately 2,616 new PE wells within WRIA 13 over the planning horizon.

PE well growth is distributed through all subbasins, with the largest numbers in the Middle and Lower Deschutes subbasins, and the three peninsulas (Table 5 and Figure 3).

Table 5: Number of new PE Wells Projected between 2018 and 2038 per WRIA 13 Subbasins

Subbasin	**Projected New PE Wells**
Boston Harbor	296
Cooper Point	232
Deschutes Lower	379
Deschutes Middle	734
Deschutes Upper	30
Johnson Point	520
McLane	165
Spurgeon Creek	92
Woodland Creek	168
Total	**2,616**

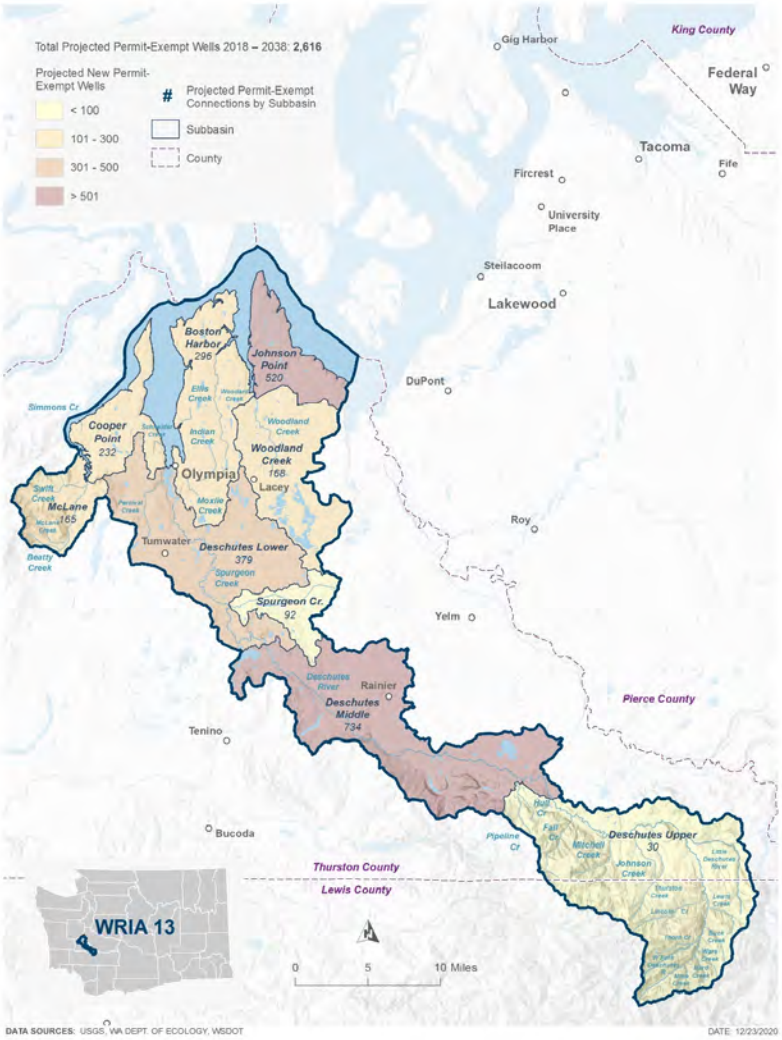

Figure 3: WRIA 13 WRE Distribution of Projected New PE Wells for 2018-2038

4.2.4 Uncertainties and Scenarios

The methods described above for projected new PE wells include several uncertainties. These uncertainties were discussed with the WRIA 13 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.

One limitation is the reliance on historical data. This method 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. To address this uncertainty, the Committee evaluated additional PE well projection scenarios, and agreed to include in the analysis a methodology to account for some growth in rural water systems. This resulted in the PE well estimate which the Committee agreed was the appropriate analysis for WRIA 13.

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, which is simple mortality and migration rate data collection; 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.

This methodology is described in detail in Appendix H

4.3 Impacts of New Consumptive Water Use

The WRIA 13 Committee used a 20-year projection for WRIA 13 of 2,616 new PE wells to estimate the consumptive water use that this watershed plan must address and offset. The WRIA 13 Committee estimates 435 AFY (0.6 cfs) as the “most likely” new consumptive water use in WRIA 13. This watershed plan also includes a higher consumptive use estimate of 513 AFY (0.7 cfs) as a goal to achieve through adaptive management. This section includes an overview of the method used by the WRIA 13 Committee to estimate new consumptive water use (consumptive use), an overview of the anticipated impacts of new consumptive use in WRIA 13 over the planning horizon, and other considerations by the WRIA 13 Committee, such as assumptions and uncertainties. The WRIA 13 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 that annual 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 uses. 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 13 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, which is available in Appendix H.

To develop consumptive use estimates, the WRIA 13 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 Appendix H. Additionally, to provide context for how the regulatory limits of water use in WRIA 13 compare to that of the irrigated area analysis, the Committee agreed that information should be provided regarding the maximum legal limit of 0.5 acres for outdoor watering for non-commercial lawn or garden[45], and the maximum annual average PE well withdrawal limit of 950 gallons per day (gpd)[46]. This information is provided in Appendix H. Information referenced from other methodologies is intended to provide context, and is not intended to be used as a comparison for offsets from projects.

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 into a septic system (Kenny et al., 2012). Based on Ecology's NEB Guidance (Ecology 2019) , the WRIA 13 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 (CUF) to estimate new indoor consumptive water use:

- 60 gallons per day (gpd) per person, as recommended by Ecology.
- 2.5 persons per household assumed for rural portions of WRIA 13[47]
- 10 percent of indoor use is consumptively used (or a CUF of 0.10), based on the assumption that homes on new PE wells are served by onsite sewage systems. Onsite 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.

[45] As defined in RCW 90.44.050
[46] As defined in RCW 90.94.030
[47] Thurston County OFM information can be found here: https://www.ofm.wa.gov/washington-data-research/county-and-city-data/thurston-county

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

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

This results in an indoor consumptive water use of 15 gallons per day per PE well. This equates to an annual average of 5,475 gallons per year (0.017 AFY[48]) (0.00023 cfs[49]) of indoor consumptive water use per PE well.

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 (Ecology 2019).

Average outdoor irrigated area in WRIA 13 was estimated using aerial imagery to measure the irrigated areas of 80 randomly selected parcels of a stratified sample served by new PE wells. The average irrigated area for the 80 parcels was 0.06 acres. This analysis returned a large portion of parcels with no visible irrigation, which were given irrigated area values of zero. To account for undetected irrigation or potential outdoor water use other than irrigation, the WRIA 13 Committee replaced the zero values with 0.05 acres. This value of 0.05 acres was used, because that was the lower end (i.e. <10th percentile) of measurable irrigated areas in WRIA 13. When using 0.05 acres for parcels with no visible irrigation, the average irrigated area was 0.10 acres. This analysis was determined to result in the most likely outdoor consumptive use estimate for WRIA 13, and will be used as the target offset to compare to offsets from projects. Additionally, the WRIA 13 Committee then conducted a statistical confidence level analysis on the results. The 95 percent upper confidence limit (UCL) yielded an irrigated area of 0.12 acre, representing a conservative estimate of the average irrigation area. This method is further summarized in Appendix H, and is included in the plan as a goal to achieve through adaptive management. The Committee considers this analysis as a way to account for uncertainties such as future growth, and climate change.

The WRIA 13 Committee used the following assumptions, recommended in Appendix A of the Final NEB Guidance, to estimate outdoor consumptive water use:

- Crop irrigation requirements (IR) for turf grass according to the Washington Irrigation Guide (WAIG, Appendix B) (NRCS-USDA 1997): 16.8 inches for the Olympia, Packwood, and Centralia WAIG stations, which is a weighted average used to estimate the amount of water needed to maintain a lawn.

[48] 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. One acre-foot per year is equal to 893 gallons per day.
[49] 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. One cubic foot per second is equal to 646,317 gallons per day.

- 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 IR by 25 percent.
- Consumptive use factor (CUF) of 0.8, reflecting 80 percent consumption for outdoor use. This means that 20 percent of outdoor water is returned to the immediate water environment.
- Outdoor irrigated area based on existing homes using PE wells: 0.10 acre (0.12 acres was used for the higher consumptive use estimate as a goal to achieve through adaptive management)

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

$$\frac{1.4\ feet\ per\ year * 0.10\ acres * 0.80\ CUF}{0.75\ AE}$$

First, the crop IR is multiplied by the average irrigated area to yield acre feet. Next, that volume of water was multiplied by 80 percent to produce the outdoor consumptive water use. Finally, that consumptive use is divided by seventy five percent to adjust for irrigation application efficiency (effectively increasing water use or consumptive use).

This results in 0.15 AFY (133 gallons per day) (48,629 gallons per year) (0.00021 cfs) outdoor consumptive water use per PE well for the WRIA based on 0.10 acres used for the most likely consumptive use estimate. Using 0.12 acres used in the higher adaptive management consumptive use estimate, this results in 0.18 AF per year (58,653 gallons per year) (0.00025 cfs). Multiplying the AFY and cfs per PE well by the new PE well projection of 2,616 PE will arrive at AFY and cfs for outdoor consumption by all PE wells. This will provide the contribution of outdoor consumption to the range provided in Section 4.3. This is an average for the year; however, the committee expects that more water will be used in the summer than in other months. The outdoor consumptive use varies by subbasin because of varying temperature and precipitation across the watershed.

4.3.2 Uncertainties and Limitations

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. The WRIA 13 Committee addressed uncertainty in PE well growth projections with a single growth scenario by incorporating TRPC methods and assuming some PE well growth in rural water systems.

Indoor consumptive use estimates 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, the committee recognized that each value in the calculation has uncertainty, and that the method assumes that future indoor water use will not deviate from current water use trends.

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

use. 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. Uncertainty associated with method detection of irrigated areas in aerial photos was ameliorated by assigning a minimum value of 0.05 acre 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. Also, the Committee directed the technical consultant to calculate the 95 percent upper confidence of the irrigated area average. The 95 percent upper confidence limit was 0.12 acre. 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 overestimate of irrigated area that would likely result in a more conservative consumptive use estimate).

Potential bias in methodology was addressed in a comparability study with another consultant, GeoEngineers (Attachment C of Appendix H). Methods used by GeoEngineers in WRIAs 9 and 10 were compared to HDR's methods (as used in WRIA 13) for the same parcel images. HDR's results were found to be lower than that of 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 differences between analysts were not large enough to warrant any revisions to the estimates. However, since the HDR estimates 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 estimate to account for uncertainty.

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, but 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.

An additional source of uncertainty identified by the Committee is that RCW 90.94 allows up to 1/2 acre of land to be irrigated by an exempt well, and in the absence of metering or routine observations of outdoor irrigation, there is no way to accurately calculate how much water is being consumed for outdoor water use.

Another source of uncertainty is that climate change is expected to create longer, hotter, drier growing seasons. This will raise evapotranspiration and increase dry season water demands. A calculation using climate projections by a Committee representative found a 6% increase in

water use over 20 years.[50,51] The WRIA 13 Committee addressed the uncertainties, assumptions, and limitations in this method by using conservative assumptions. This approach means that if the committee implements the projects to offset the consumptive use estimate, the WRIA 13 Committee expects that the plan will also 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 on two estimates for WRIA 13: a "most likely" estimate and a "higher use" 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 0.12 acres (the 95th percentile value of 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 13 are 435 AFY (0.6 cfs) for the most likely estimate, and 513 AFY (0.7 cfs). The total consumptive use estimates for WRIA 13 are calculated as the number of new 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. The highest consumptive use is expected to occur in the subbasin with the most anticipated new PE wells, as presented in Figure 4.

Information on other methodologies including Water System Data, maximum outdoor watering for non-commercial lawn or garden (0.5 acres), and the maximum annual average PE well withdrawal limit (950 gpd) is provided in Table 6 for context.

[50] This analysis is provided in the Compendium
[51] See https://climatetoolbox.org/ for more information on climate data.

Table 6: WRIA 13 Estimated PE Well Projections and Indoor and Outdoor Consumptive Use Estimates[52] by Subbasin[53], 2018-2038

			Assumed Irrigated Acreage of 0.10 Acre ("Most Likely" Estimate)		Assumed Irrigated Acreage of 0.12 Acre (Higher Adaptive Management Estimate)		Water System Data	Maximum Outdoor Watering Limit (0.5 acres)	Maximum Withdrawal Limit (950 gpd)
Subbasin	**Projected new PE Wells**	**Indoor CU (AFY)**	**Outdoor CU (AFY)**	**Total CU/year (AFY)**	**Outdoor CU (AFY)**	**Total CU/year (AFY)**	**Total CU/year (AFY)**	**Total CU/year (AFY)**	**Total CU/year (AFY)**
Boston Harbor	296	5	44	49	53	58	52	226	217
Cooper Point	232	4	35	39	42	45	41	177	170
Deschutes Lower	379	6	57	63	68	74	67	289	278
Deschutes Middle	734	12	110	122	132	144	129	560	539
Deschutes Upper	30	1	4	5	5	6	5	23	22
Johnson Point	520	9	78	86	93	102	92	397	382
McLane	165	3	25	27	30	32	29	126	121
Spurgeon Creek	92	2	14	15	16	18	16	70	68
Woodland Creek	168	3	25	28	30	33	30	128	123
Total	**2,616**	**44**	**391**	**435**	**469**	**513**	**461**	**1,997**	**1,921**

[52] Results are shown in acre feet per year (AFY). 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day

[53] The WRIA 13 Committee has determined that an area of 0.10 irrigated acres result in the most likely outdoor consumptive use estimate for WRIA 13, and will be used as the target offset to compare to offsets from projects. The analysis based on an area of 0.12 irrigated acres is included in the plan as a goal to achieve through adaptive management. Results for consumptive use were rounded to the nearest whole number.

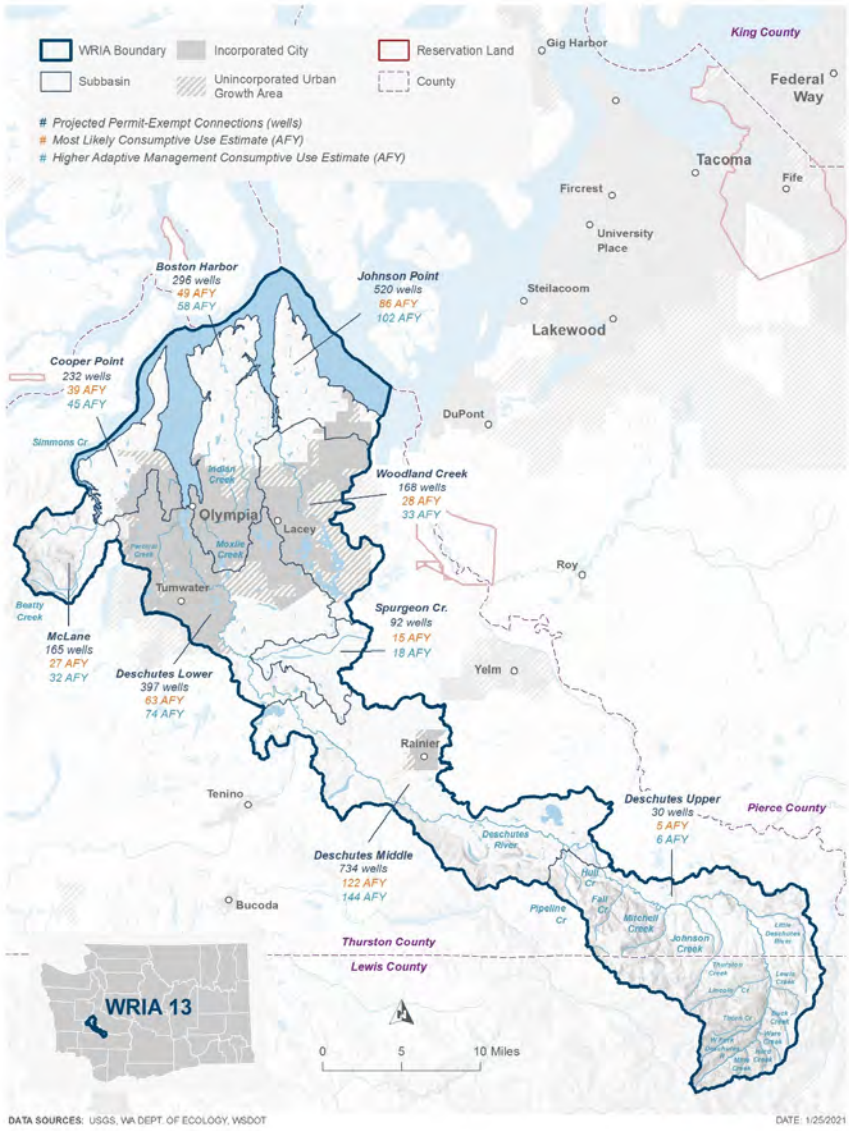

Figure 4: WRIA 13 Estimated Consumptive Use by Subbasin 2018-2038

Chapter Five: Projects and Actions

5.1 Description and Assessment

Watershed plans must identify projects and actions that offset the potential impacts future PE wells will have on streamflows and provide a net ecological benefit to the WRIA.[54] This chapter provides recommendations from the WRIA 13 Committee for projects to offset consumptive use and meet NEB[55]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 are 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 13 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 in alignment with other planning processes and identify any projects of concern for inclusion in the WRE Plan, the WRIA 13 Committee engaged the salmon recovery lead entity in WRIA 13. At any point in the process, Committee members or WRIA 13 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.

[54] 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.

[55] 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 Yelm 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 further developed the analysis on the subset of projects, and the committee determined the offset value to attribute to each project. This chapter presents summaries of those projects.

In a separate effort, Ecology contracted with Pacific Groundwater Group (PGG) to support identification of water right acquisition opportunities for WRIA 13. In coordination with the Committee, PGG narrowed down the list of opportunities. The Committee provided input on the revised list of projects for PGG to develop a focused list of water rights for future project opportunities; however no specific water rights were identified for acquisition and no offset is being claimed by the Committee.

For projects that did not provide a quantifiable streamflow benefit, the WRIA 13 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 13 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 and include detailed project descriptions from the technical consultants in Appendix I. All other projects are presented in the project inventory in Appendix J. The WRIA 13 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 13.

The Committee recognizes the importance of developing projects with climate resiliency in mind, and the need to assess how climate change may affect project effectiveness. Restoring floodplain connectivity and streamflow regimes, and re-aggrading incised channels are most likely to ameliorate streamflow and temperature changes and increase habitat diversity and population resilience (Beechie et al. 2013).

5.2 Category I Projects with Quantifiable Streamflow Benefit

The WRIA 13 Committee set the goal of meeting the offset target for each subbasin. The projects presented below have quantifiable streamflow benefit or habitat improvement. The

committee identified these projects as having the greatest potential for implementation and meeting 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 - 9.

5.2.1 WRIA-wide Projects

5.2.1.1 Managed Aquifer Recharge Projects in WRIA 13

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. MAR potential was estimated in terms of 1) potential locations suitable for MAR projects, 2) flow available for diversion during high flows, and 3) the number of days when diversion is feasible. To ensure that flows would be diverted in quantities that would not reduce habitat suitability for salmonids or reduce habitat forming processes, one of two 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. If minimum flows have not been designated, 2% of the average 75th percentile flows during November –April were used. 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 Deschutes River and Green Cove Creek. MAR projects may be considered for Percival Creek, Woodard Creek, and Woodland Creek, but are not being proposed for offset credits in this plan.

MAR projects in WRIA 13 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 811 AFY. Due to uncertainties in the likelihood of projects being built, project performance over time, and the benefits being realized (including the timing of streamflow benefits), the Committee chose to exclude estimates for projects located in basins with instream flow rule closures, and to reduce the estimates for other MAR projects, Consequently, the Committee determined that a reasonable offset estimate to claim for the purposes of this plan is 325 AFY (i.e. forty percent of the estimated 811 AFY total). The Committee supports future feasibility studies within WRIA 13 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.

The WRIA 13 Committee acknowledges that some diversion methods including in-channel structures may pose an impact to fish habitat, and strongly advocates 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 13 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 has indicated that they will be the project sponsor of MAR projects, in coordination with project partners and implementation groups, pending feasibility studies.

5.2.2 Boston Harbor Subbasin

5.2.2.1 Managed Aquifer Recharge Project in Woodard Creek

An MAR project (as described in the WRIA-wide Projects section) is proposed for Woodard Creek (Appendix I). Woodard Creek is a closed stream (Chapter 173-513 WAC). However, diverting water from the stream for MAR infiltration may be feasible with a rule change to accommodate these flow restoration projects. Measured flows near the potential MAR location are near zero in the summer and range from 10 –17 cfs in the wet season. If an MAR project were to occur at this location, it could be small-scale, approximately 0.2 cfs diversion when flows exceed 10 cfs. The diversion period is likely around 45 days per year, during the wet season. This would result in an offset of around 18 AFY. However, because of the uncertainty associated with being a closed stream, the Committee is not claiming offset credits for this project.

5.2.3 Cooper Point Subbasin

5.2.3.1 Managed Aquifer Recharge Project in Green Cove Creek

An MAR project (as described in the WRIA-wide Projects section) is proposed for Green Cove Creek (Appendix I).Green Cove Creek is a closed stream (Chapter 173-513 WAC). Measured flows near the potential MAR location are near zero in the summer and range from 7 –11 cfs in the wet season. If an MAR project were to occur at this location, it could be small-scale, approximately 0.2 cfs diversion when flows exceed 10 cfs. The diversion period is likely around 45 days per year, during the wet season. This would result in an offset of around 18 AFY. The Committee has conservatively claimed forty percent of this water offset, or 7 AFY (Table 8).

5.2.4 Deschutes Lower Subbasin

5.2.4.1 Schneider's Prairie Off-Channel Storage-and-Release

The Schneider's Prairie Off-Channel Storage-and-Release Project is located on the east bank of the Deschutes River, west of the Keanland Park Lane SE, in north-central Thurston County. This project will restore hydrologic connectivity between the Deschutes River and Schneider's Prairie. Schneider's Prairie is a depressional feature that contains the Ayer Creek drainage (Appendix H). Paleochannels apparent from aerial photos and LiDAR images show that multiple channels historically connected the Deschutes River with Schneider's Prairie. Reconnecting the Deschutes River with Schneider's Prairie and Ayer Creek would provide rearing habitat and flood refugia for juvenile salmonids, stormflow attenuation, and water infiltration for later-season release to augment flow in the lower Deschutes River.

The project concept is to deepen an existing floodplain paleochannel that would hydrologically connect the Deschutes River to Schneider's Prairie (Appendix I). Schneider's Prairie contains Ayers Pond and Ayers Creek. The deepened paleochannel would be connected to the existing Ayers Creek that runs north and back to the Deschutes River. Ayers Creek would be modified near the confluence with the Deschutes River using biotechnical techniques (e.g. buried logs

and log jams) to maintain grade control at an elevation that would inundate a portion of the off-channel area during high flow events (152 ft NAVD88).

Inflows from the Deschutes River to the off-channel area were compared to the maximum infiltration capacity of the off-channel area (i.e. 52 acres). The smaller of the two values were used as an assumed infiltration quantity. River inflows that exceeded the infiltration capacity were assumed to be retained as ponded water in the Schneider's Prairie feature. This retained inflow volume was assumed to infiltrate during the late spring, when river inflows were no longer occurring.

The seasonal inundation would result in infiltration and subsequent seepage back to the river on the time scale of days to months. Seepage back to the Deschutes River increases over time, because of the cumulative effect of infiltrating additional water. This cumulative increase reaches an asymptote (i.e. additional benefits are minimal) after about 50 years of infiltration. Seepage back to river does not change substantially with season, but slightly more seepage occurs during the May –October period, relative to the November –April period. Streamflow benefits during the May –October period are predicted to be 285, 681, 958, and 1,310 acre-feet per year during the first, fifth, tenth, and fiftieth year of infiltration, respectively.

The WRIA 13 Committee identified project uncertainties from the modeling analysis was not able to account for or where assumptions were made, including:

1. Evapotranspiration
2. Amount of infiltration
3. Climate change
4. Dropping flow trends of the Deschutes
5. Sediment issues in the Deschutes
6. Modeling assumptions including transmissivity of aquifer, and streambed conductance
7. Modeling represents average conditions, not dry year conditions

To account for project uncertainties the Committee chose to recognize 681 AFY of seepage back to the river during the May – October dry season from this project, which represents less than half of the total estimated based on preliminary hydrologic and hydrogeologic modeling (Tables 7 and 8).

5.2.4.2 Donnelly Drive Infiltration Galleries

Portions of Donnelly Drive SE, and Normandy Drive SE flood during major rainfalls and impacts public property and reduces public safety. Thurston County Roads Maintenance has routinely responded to calls from residents for assistance. It is proposed to install treatment devices and infiltration systems in the Donnelly Drive vicinity to reduce flooding of public streets and promote infiltration to groundwater (Appendix I). There are five locations in the area which see flood issues, and each of these locations are a low point where an existing drywell is located to infiltrate stormwater. These improved infiltration systems has been modeled to increase stormwater infiltration by approximately 14 AFY (Tables 7 and 8). The Committee is claiming 14 AFY for this project, assuming year-round benefits because the stormwater infiltration basin is

over 2,500 feet from Chambers Ditch, and the travel time is likely attenuated into the summer season (Ecology 2020; USGS Circular 1376).

5.2.4.3 Managed Aquifer Recharge Project in Percival Creek

An MAR project (as described in the WRIA-wide Projects section) is proposed for Percival Creek (Appendix I). Percival Creek is a closed stream (Chapter 173-513 WAC). However, diverting water from the stream for MAR infiltration may be feasible with a rule change to accommodate these flow restoration projects. Measured flows near the potential MAR location are near 3 cfs in the summer and range from 12 –15 cfs in the wet season. If an MAR project were to occur at this location, it could be small-scale, approximately 0.2 cfs diversion when flows exceed 10 cfs. The diversion period is likely around 45 days per year, during the wet season. This would result in an offset of around 18 AFY. However, because of the uncertainty associated with being a closed stream, the committee is not claiming offset credits for this project.

5.2.5 Deschutes Middle Subbasin

5.2.5.1 Managed Aquifer Recharge Project in the Deschutes River

MAR projects (as described in the WRIA-wide Projects section) are proposed for the Middle Deschutes River (Appendix I).). Projects would divert water from the Deschutes River, which then would be infiltrated into the ground for subsequent return flow to the river. To estimate the potential benefits from this project, flow data from measured flows are approximated by the Deschutes River at Rainier gage (USGS Station 12079000) and the Deschutes River at E St Bridge at Tumwater, WA (USGS 12080010). The amount of water available for diversion downstream to the control point (in Tumwater) is approximately 8 cfs during at least 50 days of the year, during the November – April wet season. Potential MAR locations have been identified in both the upper and middle Deschutes River subbasins (Appendix I). If all 8 cfs were diverted for several projects for these days and infiltrated for subsequent return flow to the river, which would equate to approximately 792 AFY of offset benefit. Currently, 6 of the 8 cfs is proposed to be applied to MAR projects in the Deschutes Middle subbasin, equaling 594 AFY. The committee has conservatively claimed forty percent of this water offset, or 238 AFY (Table 8).

5.2.6 Deschutes Upper Subbasin

5.2.6.1 Managed Aquifer Recharge Project in the Deschutes River

MAR projects (as described in the WRIA-wide Projects section) are proposed for the Upper Deschutes River (Appendix I). As described above for the Deschutes Middle subbasin, 2 of the 8 cfs is currently proposed to be applied to MAR projects in the Deschutes Upper subbasin, equaling 198 AFY. The committee has conservatively claimed forty percent of this water offset, or 79 AFY (Table 8).

5.2.7 Woodland Creek Subbasin

5.2.7.1 Hicks Lake Stormwater Retrofit

The Ruddell Road Stormwater Facility was constructed by the City of Lacey in 1999, consisting of a pretreatment settling basin that flows to constructed wetlands; ultimately flowing into Hicks Lake. Although the facility is an improvement to the previous, untreated condition, the limited water quality wet pool volume, relatively high inflows, and flow-through design conditions, limit water quality treatment and provides minimal, if any, infiltration benefit. Therefore, the City is investigating the feasibility of an offset infiltration facility as an upgrade to the current system.

The proposed project would provide water offsets and an ecological benefit (per RCW 90.94.030) to the Woodland Creek sub-basin. The improvements are expected to provide a significant shallow groundwater recharge component, and augment base flow to Hicks, Pattison, and Long Lakes, ultimately benefitting Woodland Creek, which is currently impaired by low instream flow (303d listing 6169). Proposed upgrades to the facility include a flow splitting manhole, filtration treatment BMP, infiltration gallery and an overflow structure to the existing wetland.

A range of diversion flows (1cfs, 2cfs, and 3 cfs) were modeled and resulted in a corresponding range of average annual infiltration of 167, 244, and 296 AFY, respectively. All flows, up to 3.5 cfs are expected to be 100% infiltrated, but infiltrating up to 3 cfs accounts for a reduction in infiltration capacity over time (i.e. from clogging of the infiltration basin from fine materials). Therefore, infiltrating up to 3 cfs for an offset benefit of 296AFY is the estimate of stormwater infiltration (Tables 7 and 8). The Committee is claiming 296 AFY for this project, assuming year-round benefits because the stormwater infiltration basin is over 1,000 feet from Hicks Lake, and the travel time is likely attenuated into the summer season (Ecology 2020; USGS Circular 1376). Also, Hicks Lake is the headwaters of the Woodland Creek watershed. Water seeping into Hicks Lake from this project must travel through a wetland into Pattison Lake, and into another wetland into Long Lake, before that water reaches the beginning of Woodland Creek.

5.2.7.2 Managed Aquifer Recharge Project in Woodland Creek

An MAR project (as described in the WRIA-wide Projects section) is proposed for Woodland Creek (Appendix H). Woodland Creek is a closed stream (Chapter 173-513 WAC). However, diverting water from the stream for MAR infiltration may be feasible with a rule change to accommodate these flow restoration projects. Measured flows near the potential MAR location average 14 cfs in the late summer and range from 24 – 51 cfs in the wet season. If an MAR project were to occur at this location, it could be small-scale, approximately 0.7 cfs diversion when flows exceed 36 cfs. The diversion period is likely around 45 days per year, during the wet season. This would result in an offset of around 62 AFY. However, because of the uncertainty associated with being a closed stream, the committee is not claiming offset credits for this project.

Table 7: Category I Projects in WRIA 13 with Quantifiable Streamflow Benefit

Project Name	Project Type and Description	Subbasin	Estimated Water Offset (AFY)[56]	Estimated Water Offset (AFY) During Critical Flow Period[57]	Offset Claimed by WRIA 13 Committee (AFY)[58]	Timing of Benefits	Project Sponsor	Estimated Project Cost[59]	Readiness to Proceed
Schneider's Prairie Off-Channel Connection	Off-channel reconnection and infiltration	Lower Deschutes	681	681	681	May-Oct	Thurston county	$4.93 M	High
Hicks Lake Stormwater Retrofit	Stormwater infiltration in series with existing stormwater treatment	Woodland	296	148	296	Year-round	City of Lacey	$3.3 M	High
Donnelly Drive Infiltration	Improve neighborhood stormwater infiltration, avoiding surcharge and runoff to Chambers ditch.	Lower Deschutes	14	7	14	Year-round	Thurston County	$6.31 M	High

[56] 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day
[57] The WRIA 13 Committee agreed that for the purposes of this watershed plan, the critical flow period will be defined as May-October.
[58] The WRIA 13 Committee agreed to indicate offset claimed for the purposes of the NEB evaluation.

[59] Costs are based on order of magnitude estimates.

Project Name	Project Type and Description	Subbasin	Estimated Water Offset (AFY)[56]	Estimated Water Offset (AFY) During Critical Flow Period[57]	Offset Claimed by WRIA 13 Committee (AFY)[58]	Timing of Benefits	Project Sponsor	Estimated Project Cost[59]	Readiness to Proceed
Deschutes/ Chambers MAR	Several candidate locations for MAR of diverted Deschutes River water from high flow periods, exceeding instream minimum flows or ecological flows.	Upper Deschutes Middle Deschutes Lower Deschutes Woodland Boston Harbor Cooper Point	811	Not calculated	325	Year-round	Thurston County and WRIA 13 Implementation Partners[60]	$2.8 M	High
WRIA 13 Total Water Offset			**1,802**	**836**	**1,316**				
WRIA 13 Consumptive Use Estimate			**435**						
WRIA 13 Higher Adaptive Management Consumptive Use Estimate			**513**						

[60] The WRIA 13 Committee supports the development of an implementation group to further develop projects

Table 8: Water Offsets claimed by the WRIA 13 committee, summed by subbasin. All values are in acre-feet/year.[61]

Subbasin	WRIA 13 Most Likely CU Estimate	WRIA 13 Higher Adaptive Mgmt CU Estimate	MAR	Schneider's Prairie	Hicks Lake SW Retrofit	Donnelly Drive Infiltration	Total
Boston Harbor	49	58	0	0	0	0	0
Cooper Point	39	45	7	0	0	0	7
Deschutes Lower	63	74	0	681	0	14	695
Deschutes Middle	122	144	238	0	0	0	238
Deschutes Upper	5	6	79	0	0	0	79
Johnson Point	86	102	0	0	0	0	0
McLane	27	32	0	0	0	0	0
Spurgeon Creek	15	18	0	0	0	0	0
Woodland Creek	28	33	0	0	296	0	296
Total	**435**	**513**	**325**	**681**	**296**	**14**	**1,316**

[61] 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day

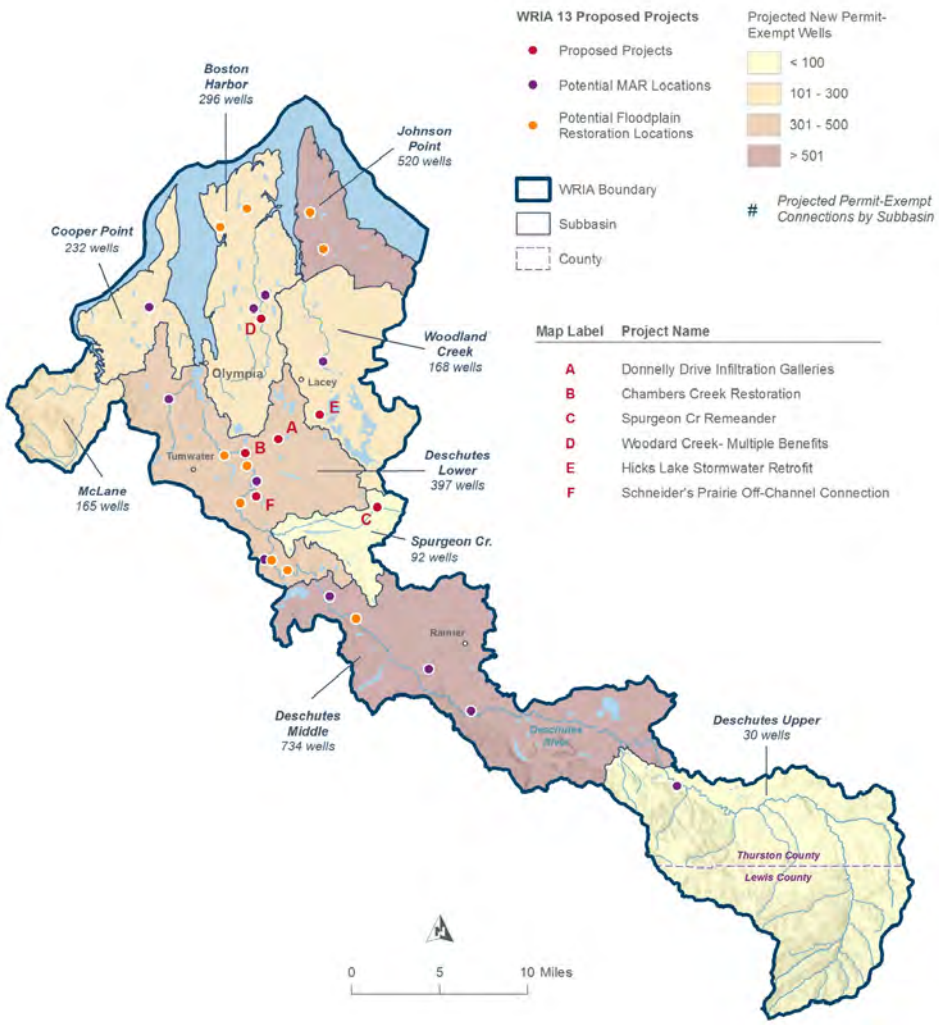

Figure 5: WRIA 13 Projects by Subbasin

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 13. While several of these projects may produce a marginal offset benefit by increasing seasonal storage, the benefits were too small or too complex to estimate. In general, these projects increase stream complexity, reconnect floodplains, promote fish passage, and enhance natural processes that had been lost to the benefit of salmonids and other aquatic species. Projects defined in Table ~~8~~ 9 have been developed to the concept or design level. Additional projects identified by the WRIA 13 committee are defined in Appendix ~~H~~ J and could be completed during plan implementation. Projects are described in Table 9, and detailed project descriptions are included in Appendix I.

Table 9: Category II Projects in WRIA 13 that Primarily Provide Habitat Improvements

Project Name	Description	Subbasin	Anticipated Ecological Benefit	Sponsor	Estimated Cost[62]	Readiness to Proceed
Spurgeon Creek Re-meander	Channel re-alignment to increase channel length and sinuosity	Spurgeon	Floodplain connectivity; Instream habitat complexity	Thurston County	$<1M	High
Chambers Creek	Channel re-alignment to increase channel length and sinuosity at the confluence with Chambers Ditch.	Lower Deschutes	Floodplain connectivity; Instream habitat complexity	Thurston County	$<1M	Medium
Woodard Creek	Add LWD and riparian vegetation	Boston Harbor	Floodplain connectivity; Instream habitat complexity	Thurston County	$<1M	Low

[62] 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 projects and prospective projects that provide additional streamflow or habitat throughout the WRIA. These categorical projects do not have specific locations, but are supported by the Committee for future development.

5.4.1 Water Right Opportunities

In addition to the projects described in this chapter, the WRIA 13 Committee supports projects and actions that achieve the following goals:

1. Opportunities to address irrigation efficiencies and other conservation measures 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 13 Committee acknowledges that all water rights transactions rely on willing sellers and willing buyers. The WRIA 13 Committee supports acquisition of all types of water rights, including municipal water rights. The WRIA 13 Committee recognizes the importance of water availability for farmers and the limited available water supply. The WRIA 13 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 to the properties at rates no greater than that for the current irrigation occurring, or are otherwise agreeable to the property owner.
4. The WRIA 13 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 13 Committee acknowledges the need for project sponsors, technical assistance to manage complex studies, and future funding to adequately implement projects. Due to the uncertainties regarding the acquisition of water rights, the committee chose not to count the potential offsets from acquisitions during the plan analysis.

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.[63] Due to uncertainties regarding forest management projects, the committee chose not to count the potential offset from this project during the plan analysis.

5.4.3 Floodplain Restoration

The Committee is interested in restoring stream floodplain function, where appropriate. WRIA 13 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).

A detailed project description is included in Appendix I. Due to uncertainties regarding floodplain restoration projects, the Committee chose not to count the potential offset from this project during the plan analysis.

5.4.4 Small-scale LID Project Development

The Committee is interested in a programmatic project to strategically concentrate small-scale LID retrofit work in urbanized settings, partnering with residential and commercial community members to redirect runoff away from stormwater conveyance systems and into green stormwater infiltration facilities. In rural settings, efforts can explore additional opportunities to slow and infiltrate stormwater runoff that would otherwise rapidly discharge into nearby streams.

Thurston Conservation District has taken a leadership role on this project, and is committed to working with partners to identify and implement retrofit projects to benefit groundwater recharge. Project locations will be determined during implementation.

Potential benefits include recharge of shallow groundwater areas where other large-scale projects are not feasible, and water quality benefits to nearby streams which would otherwise receive untreated runoff. Additionally, these projects would directly engage residential and commercial partners to contribute to streamflow preservation. Due to uncertainties regarding these types of projects, the Committee chose not to count the potential offset from this project during the plan analysis.

5.5 Project Implementation Summary

5.5.1 Summary of Projects and Benefits

As specified in Chapter 4, this plan aims to offset 435 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 513 AFY as a goal to achieve through adaptive management. The projects included in Table 7 provide an estimated offset of at least 1,346 acre-feet per year and exceed the consumptive use estimate. The projects included in Table 7 provide an estimated offset of 1,316 AFY and exceed both the "most likely" and higher adaptive management consumptive use estimates.

Out of the 9 subbasins identified by the Committee, 4 subbasins have anticipated project offsets that exceed both the most likely and higher consumptive use estimates; 1 subbasin has anticipated project offsets that do not meet either the most likely or the higher consumptive use estimate; and, 4 subbasins do not have any offset projects identified. However, to address a lack of projects in some subbasins, and to increase the likelihood of plan implementation and tracking progress, this watershed plan includes policy and regulatory recommendations and an adaptive management process (see Chapter 6).

Many habitat projects have been identified by the Committee for habitat benefits (Appendix H). Four of these projects have been described 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 were selected by the Committee for their likelihood to provide 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.

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 consumptive use from new domestic PE wells 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 8.

The total estimated cost for implementing the water offset projects listed and described in this chapter range is $17.34 million, with projects ranging from $2.8 million to $6.31 million.

The total estimated cost for implementing the habitat projects listed and described in this chapter is $3 million.

5.5.3 Certainty of Implementation

The WRIA 13 Committee selected projects a likelihood of implementation and have support from project sponsors. As described in Chapter 6, the WRIA 13 Committee supports the development of an implementation group (see the Deschutes Watershed Council in section 6.1.10) to further develop projects. Additionally, Chapter 6 includes "assurance of implementation" language provided by many entities on the Committee. 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. Additionally, this plan includes other adaptive management and policy recommendations to increase reasonable assurance that the projects and actions in the plan will be implemented.

Chapter Six: Policy Recommendations, Adaptive Management, and Implementation

6.1 Policy and Regulatory Recommendations

RCW 90.94 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 13 Committee included what they have termed "policy and regulatory recommendations" in the plan to show support for projects, 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 13 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 13 Committee intended to count toward the required consumptive use offset or Net Ecological Benefit are included in Chapter 5: Projects and Actions.[64] As recommended by the NEB Guidance, the WRIA 13 Committee prepared this watershed plan with the intention that it be implemented.[65]

The WRIA 13 Committee initially identified a list of potential policy and regulatory recommendations[66]. After iterative rounds of discussion, the Committee narrowed the recommendations in this section to those that both supported the goal of streamflow restoration and had the support of the full Committee. Unless otherwise specified, the proposed implementing entity is not obligated by this plan to implement the recommendation; however, the WRIA 13 Committee supports the recommendations and their implementation by the appropriate entity. Committee members identified as the implementing entity for each recommendation have indicated that they are committed to investigating the feasibility of the recommendation.[67] Additional information on assurance of implementation has been provided by many entities in section 6.3.2.

The Committee recommends that Lewis County be exempt from policy recommendations at this time because of the lack of PE well growth in the Lewis County portion of WRIA 13.

The WRIA 13 Committee supports the following recommendations, which are not listed in order of priority:

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[64] "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

[65] Ecology's interpretation, as articulated in the Streamflow Restoration Policy and Interpretive Statement (POL-2094), is that "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)

[66] Policy and adaptive management proposals provided by Committee members are included in the plan compendium. This chapter represents the recommendations that were agreed to by consensus.

[67] The identification and listing of these policy and regulatory recommendations is directly from the WRIA 13 Committee members and is not endorsed or opposed by the Washington State Department of Ecology.

1. Water Conservation and Drought Adaptation Education and Outreach

Proposed implementing entity:

Thurston Conservation District, potentially with support from WSU Extension and Thurston County.

Recommendations:

- Develop educational materials and workshops for new or existing homeowners.
- Work with local nurseries to stock and label low water use native species for xeriscaping.
- Develop Irrigation Water Management Plans for agricultural producers and gardeners.
- Support development of a program to compensate agriculture producers for not using their full water rights, with conserved water to be temporarily placed into Trust Water Rights program.
- Support development of incentive program to upgrade outdated or inefficient irrigation systems.
- Include drought tolerance/water use efficiency as a factor in recommended tree lists.

Purpose:

Promote water conservation in residential and agricultural sectors. Reduced leaching of nutrients into streams and water bodies due to over watering.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2

2. Drought Response Limits

Proposed implementing entity:

Ecology, Thurston County, and other organizations. Recommendations:

Research the use of water from permit exempt wells during drought periods, and whether upon the issuance of a drought emergency order under RCW 43.83B.405, consider a language change to state that the withdrawal of groundwater exempt from permitting under RCW 90.44.050 “will” be limited to no more than 350 gallons per day per connection for indoor use only, instead of “may”. Consider including new exemptions for growing food, maintaining a fire control buffer, or supporting an environmental restoration project. Engage local stakeholders in considering this change. Consider developing or enhancing a County-wide drought response plan.

Purpose:

Build resilience against climate change impacts (e.g., extreme heat, low precipitation, low flows). Protect Tribal Treaty rights and senior water rights. Support NEB goals for streamflow restoration.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2 Other possible sources of funding include funding allotted to Ecology under RCW 90.94 and potential reassignment of existing or future staff.

3. County Policies to Promote Connections to Group A Systems

Proposed implementing entity:

Thurston County

Recommendations:

Research and review existing plans, policies, and ordinances to determine if there are opportunities to limit PE wells when Group A service is available.

Purpose:

Reduce the number of projected new PE wells, thereby reducing groundwater consumptive use and providing an offset safety factor.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2

4. Revolving Loan & Grant Fund for Small Public Water Systems

Proposed implementing entity:

Ecology and Thurston County

Recommendations:

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 increased cost of connecting to a Group A system (instead of constructing a PE well) creates 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:

Reduce barriers to connecting to Group A systems, thereby reducing the number of projected new PE wells, reducing groundwater consumptive use, and providing an offset safety factor.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2.

5. South Sound Water Steward

Proposed implementing entity:

Ecology, local governments, and other entities as appropriate.

Recommendations:

Ecology creates a new position of "South Sound Water Steward," whose duties include:

- Monitoring instream flows, wells, and other relevant water bodies to support implementation of the watershed plans and compliance with state rules.
- Conducting ongoing education, outreach, and technical support for permit-exempt wells owners and water rights holders (especially as part of drought response).
- Providing technical advisement to Ecology during water rights decisions in the South Sound.
- Investigating and enforcing illegal water use issues, in accordance with current regulations for enforcement, in accordance with current regulations for enforcement.

As appropriate, the position would include legal authorities consistent with both a Water Master and a Ground Water Supervisor (RCW 90.03.060; 90.03.070; RCW 90.44.200; WAC Chapter 508-12). Duties would not conflict with existing Water Master staff at Department of Ecology Southwest Regional Office, but may build upon them for specific duties at the discretion of the Water Resources Southwest Regional Manager.

Purpose:

Supports compliance with water resources laws/regulations and Tribal Treaty rights. Consistent and effective implementation of watershed plans. Gives Ecology a visible and clear role for supporting plan implementation and compliance with state laws and regulations.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, reassignment of existing or future staff or other means. More funding information is available in Section 6.2.

6. Upgrade Well Reporting

Proposed implementing entity:

Ecology

Recommendations:

- Develop interactive web-based well mapping and reporting tool for drillers.
- Require well coordinates on reports.
- Increase capacity for the Well Construction and Licensing Office at Ecology to vet well reports.

Purpose:

Improve well location data and access to it. Accurate well data is critical for monitoring and management of shared water resources throughout Washington. Streamline data collection process.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2.

Additional information or resources:

The full policy proposal is included in Appendix K.

7. Instream Flow Rules

Proposed implementing entities:

Ecology; Washington State Legislature; local governments.

Recommendations:

- Investigate the WRIA 13 salmon streams and determine needed revisions to the WRIA 13 Instream Flow (ISF) Rule (WAC 173-513). Streams under review for instream flow revisions will be clearly represented to the public through maps in an accessible manner. Consider need to close streams in WRIA 13 with summer salmonid habitat (which could include: Upper Deschutes River, Middle Deschutes River, Lower Deschutes River, McLane Creek, Green Cove, Woodland Creek, Woodard Creek, Percival Creek, Adams Creek, and other associated tributaries and small coastal streams with salmonid habitat) annually in the low flow season (typically from June through October) and what effect it would have on growth in the watershed. This would apply to water rights that have a priority date after any changes made to the instream flow rule.
- Review other salmon streams without existing ISF between November and May and consider setting ISF levels using current methodology.
- Use the latest ISF assessment methodology to reassess ISF values for the Deschutes River below Deschutes Falls.
- Revise and add any other conditions consistent with the final watershed plan to the ISF rule.

- Ecology to initiate rulemaking to update the 40-year old WRIA 13 rule to reflect changed conditions and new information, and make the rule effective, legally consistent, and enforceable.[68]

Commented [JA(3]: New language proposed jointly by Squaxin Island Tribe and Thurston County. Ecology has added the footnote on rulemaking.

Purpose:

Greater protection of aquatic resources, streamflows, Tribal Treaty water rights, and senior water rights from future water demands.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2.

8. Permit Exempt Well Withdrawal Limits

Proposed implementing entity:

Ecology

Recommendations:

Research water use in WRIA 13 and PE well limits.

- Investigate actual indoor and outdoor domestic water use and compare to current legal limits and determine if a lower limit is appropriate. Consider allowing exceedance of limits if the outdoor water use is for food production, fire protection, or an environmental restoration project.

Purpose:

Benefits: reduces potential impact of new permit-exempt domestic wells. Limitations provide a "safety factor" by setting limits on PE well use based on good water conservation practices. This improves the net benefits of offset projects as they are completed to restore streamflows and protect senior water rights.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2.

9. Salmon Recovery Portal Project Tracking

Proposed implementing entity:

[68] Rulemaking is a public process guided by the Administrative Procedures Act (APA), and is initiated at the discretion of the director of Ecology.

WDFW in collaboration with Ecology, RCO, University of Washington data stewards, and WRIA 13 Committee.

Recommendations:

Pilot the Salmon Recovery Portal, currently managed by Washington State Recreation and Conservation Office (RCO), for tracking streamflow restoration projects and new PE wells. WDFW would coordinate this effort—in collaboration with Ecology and the WRIA 13 Committee—and consult Lead Entity Coordinators prior to initial data uploads. University of Washington data stewards would perform data entry, quality assurance, and quality control.

Purpose:

- Coordinate streamflow restoration with ongoing salmon recovery efforts.
- Improve capacity to monitor implementation of streamflow restoration projects and actions.
- Build grant funding opportunities and track costs associated with streamflow restoration.
- Provide a template for adaptively managing emergent restoration needs.

Funding source:

WDFW, additional funding may be required.

Additional information or resources:
https://srp.rco.wa.gov/

10. Deschutes Watershed Council (DWC)

Proposed implementing entities:

Deschutes Estuary Restoration Team (DERT); Tribes; local governments; other stakeholders (i.e. agricultural, residential construction, environmental interest representatives).

Interested members of the WRIA 13 Watershed Restoration and Enhancement Committee would reconvene to initiate the DWC, such as DERT, City of Tumwater, City of Olympia, City of Lacey, Thurston County, Thurston Conservation District, and the WRIA 13 Salmon Habitat Recovery Lead Entity Coordinator, and others.

Recommendations:

Convene a collaborative partnership that builds on successful models in other watersheds, uses science-based tools with demonstrated effectiveness, and stresses collaborative solutions that reduce conflict and avoid litigation Responsibilities could include:

- Formally implementing Plan recommendations.
- Identifying and implementing water quantity and quality management solutions on a regional scale that increase regional self-reliance, reduce conflict, and manage water to concurrently achieve social, environmental, and economic objectives.

- Incorporating adaptive management techniques to address climate change and other impacts.

Purpose:

The WRIA 13 Committee recommends creating a Deschutes Watershed Council (DWC) to (1) implement the plan; (2) provide a structure for collaboration on projects; (3) identify, recommend, and implement actions to offset impacts from new water right applications, transfers, and changes, and other water use that impact streamflows; and (4) address water quality issues.

Funding sources:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2.

Additional information or resources:

Ecology – Deschutes River, Percival Creek, & Budd Inlet Tributaries TMDL Improvement Projects

11. County Planning Study – Streamflow Restoration Effectiveness

Proposed implementing entity:

Ecology or other department would contract a consultant to perform work.

Recommendations:

Conduct a study to compare planning and permitting policies/programs among Kitsap County, Pierce County, Thurston County, Mason County, and King County. Determine how effectively these policies/programs support protection and enhancement of streamflow restoration (e.g., through protection and enhancement of groundwater recharge). Evaluate (1) how and why county programs have been effective, and (2) gaps or areas where planning has been less effective. Propose strategies for improving rules to promote recharge enhancement and streamflow restoration.

Purpose:

Inform decision-making and improve planning/permitting to promote streamflow restoration.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2.

12. Water Supply Data for Comprehensive Water Planning

Proposed implementing entity:

Ecology with support from counties, Department of Health, and potentially consultants.

Recommendations:

Collect, estimate, and/or project the following data and include in a future update of WRIA 13's Watershed Plan:

- Number of existing permit exempt domestic water wells and their water use
- All projected water usage for the next 20 years (i.e., PE wells, inchoate rights, new water rights).
- Number of municipal water supply connections expected in the next 20 years, by subbasin.
- Total number of existing PE wells by county.

Within the first five years of WRIA 13's Watershed Plan implementation, collect, estimate, and/or project the following for each subbasin:

- Total existing (2018 and earlier) connections in service using (1) unmitigated inchoate water rights; (2) mitigated inchoate water rights; or (3) PE 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) PE wells.

Purpose:

Provide robust information base for comprehensive water planning. Provide context for the Watershed Plan and its goals.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2.

13. Rainwater Collection - Education & Incentives

Proposed implementing entity:

Thurston Conservation District

Recommendations:

- Assurance from regulatory entities at all levels that rainwater collection is allowed under current DOE policy (Policy #1017).
- Rainwater collection design support at multiple scales of capacity, but only at scales allowed under current DOE policy. Design support through this policy is intended for PE well users only.*
- Financial assistance for rainwater harvesting infrastructure, intended for PE well users only.*

** The proposed limitations regarding eligible assisted community members would only apply to work performed as part of this policy and would not restrict the work of individual partners to provide support for rainwater collection across WRIA 13.*

Purpose:

Education and support around allowed uses of rainwater collection. Could help minimize flashy flows in some locations. Could reduce PE well usage, although reduction volumes are likely minimal. Encourages a shift towards viewing water as a finite resource. Provides community members with a tangible—and practical—action to support water conservation efforts in their communities.

Funding source:

Funding is needed either through legislative appropriations, grants, pooling of resources by committee members and other stakeholders, or other means. More funding information is available in Section 6.2.

Additional information or resources:

Ecology's clarification of rainwater collection with basic planning resources:

https://ecology.wa.gov/Water-Shorelines/Water-supply/Water-recovery-solutions/Rainwater-collection

14. Water Conservation Statewide Policy

Proposed implementing entities:

Ecology, Conservation Commission, Conservation Districts, and counties, with direction from legislature.

Recommendations:

The legislature consider authorizing and funding a statewide program of WRIA-based water conservation measures for domestic PE wells in unincorporated areas of the state during drought events. Measures would focus on Voluntary methods for efficient outdoor water use.

Purpose:

Reduce domestic PE well water usage across the state, and especially during drought declarations in affected WRIAs. Reduce impacts on stream flows. Increase climate change resilience. Provide offset safety factor. Support NEB goals.

Funding source:

Potential funding sources could include: legislative budget line item providing additional allocations to Ecology and the Conservation Commission, to pass through to Conservation Districts and Counties.

15. Revise Thurston County Critical Areas Code Regarding Reclaimed Water Use

Proposed implementing entity:

Thurston County

Recommendations:

- Consider changes to the Thurston County Critical Areas Ordinance, specifically the Critical Aquifer Recharge Areas regulations under TCC 24.10.190, 24.30.085, and 24.25.080, to allow for additional uses of reclaimed water. Thurston County's Critical Areas Ordinance currently does not permit large-scale infiltration of reclaimed water (defined as "application to the land's surface above agronomic rates").
- Review additional information from the Regional Groundwater Recharge Scientific Study (now known as LOTT's Reclaimed Water Infiltration Study) and other sources. Thurston County could reconsider this limitation in light of new state-level guidance and information from LOTT's pending study, which will be completed in 2021.

Purpose:

Allowing additional uses of reclaimed water would increase options for mitigating streamflows in unincorporated Thurston County, along with other potential benefits, by replenishing groundwater, augmenting streamflows, enhancing wetlands and other habitat, and offsetting the quantity of water that is withdrawn for other purposes.

Funding:

Funding is undetermined and needed through either grants, committee resources, Thurston County general funds, or other potential funding methods.

6.2 Plan Implementation and Adaptive Management

The WRIA 13 Committee supports an adaptive management process for implementation of the WRIA 13 Watershed Plan. Adaptive management will help address uncertainty and provide more reasonable assurance for plan implementation.

The WRIA 13 Committee recommends tracking the growth of new PE wells and the total number of new building permits requiring a water connection 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.

The WRIA 13 Committee makes the following recommendations:

6.2.1 Oversight

The WRIA 13 Committee recommends creating a **Deschutes Watershed Council (DWC)** to (1) implement the watershed plan; (2) provide a structure for collaboration on projects; and (3)

identify, recommend, and implement actions to offset impacts from new water right applications, transfers, and changes, and other water use that impact streamflows. The DWC would comprise of representatives interested in protecting, conserving, and restoring the Deschutes Watershed. For example, this would include the Squaxin Island Tribe; local governments; special purpose districts (taxing authority); businesses; non-profit conservation, land trust organizations, agricultural representatives, environmental interests, residential construction industry; and other entities that participated in the WRIA 13]Committee; and key involvement from a diverse range of community members from across WRIA 13.".

The DWC could address water quality and quantity issues by:

- Providing a **structure for collaboration** on projects to offset impacts to streamflow and changes in water quality.
- **Inventorying** existing (1) water quantity and quality regulations and (2) incentive-based and/or voluntary water protection and conservation programs.
- Identifying and implementing **regional water management solutions** that increase self-reliance, reduce conflict, and manage water to concurrently achieve social, environmental, and economic objectives.
- Evaluating and pursuing legislation for the development of **mitigation banks** to be used to offset impacts of future development of either permit-exempt wells or permit-required wells.
- Partner with Stream Team, or engage **community-based volunteer and education programs** to initiate a sense of place, ownership, and responsibility for the future of the Deschutes watershed.

- Specific tasks for DWC could include:

    - Support for review, revision, and prioritization for grant applications, to ensure consistency with the overall approach of the Plan

    - Tracking of offsets and the number of exempt well developments authorized by the counties, both by WRIA and by subbasin.

    - Reporting of Plan progress to Ecology, Committee members and the public.

    - Identification and development of long-term stable funding. The Plan proposes funding to provide capacity to the Lead Organization or Committee. The funding strategy is described in a separate proposal.

    - Development of a multi-party agreement that establishes membership, operating principles, and administration of the DWC.

    - Developing and maintaining the institutional knowledge needed to provide a continuing approach to implement over the long-term.

- The long-term responsibility for Plan implementation.

6.2.2 Project Tracking

Counties should continue to track permit-exempt well construction. The WRIA 13 Committee also recommends tracking streamflow restoration projects to: (1) track status of implementation, including projects and other recommendations; (2) build grant funding opportunities; (3) track project costs; and () provide a template for adaptively managing emergent restoration needs.

The WRIA 13 Committee recommends piloting the Washington State Recreation and Conservation Office's (RCO) **Salmon Recovery Portal** **(SRP)** to track Watershed Plan projects through planning and implementation phases. As a statewide tool administered by RCO in partnership with salmon recovery Lead Entities, the SRP provides a dynamic platform to track project offsets. SRP can set goals, create project hierarchy tiers, include supplemental information, and generate automated reports.

To support the implementation of the above pilot program for tracking projects under 90.94.030 RCW, the Washington Department of Fish & Wildlife (WDFW) has initiated pilot projects in two 90.94.020 RCW basins: the Nisqually River Basin (WRIA 11) and the Chehalis River Basin (WRIAs 22/23). These pilots are coordinated by WDFW in conjunction with RCO, Ecology, local Lead Entity Coordinators, and the Planning Units for WRIA 11 and WRIA 22/23. Intended as a proof of concept, these pilots are planned to explore the capacity and effectiveness of the SRP to track streamflow restoration projects.

Tracking of projects will begin with **two primary data entry phases**, shown in Table 9 below.

Table 10: Phases of Project Tracking Data Entry

Tasks:	**Phase 1**: Upload required project information for each project in Watershed Plan.	**Phase 2**: Upload/update all funded projects, project reports, and completed projects annually.
Coordinator	WDFW	WDFW
Funding	WDFW, and other entities TBD.	WDFW, and other entities TBD.
Data entry	University of Washington data stewards in collaboration with RCO and Ecology	University of Washington data stewards in consultation with RCO, Ecology Grant Management staff, and WDFW.
Quality control	University of Washington data stewards	University of Washington data stewards

Local salmon recovery Lead Entity Coordinators will be consulted prior to initial data uploads. At a minimum, the Committee recommends tracking the following **data points for each project**:

- WRIA
- Sub-basin
- Estimated cost
- Funding source

- Project description
- Target implementation date
- Project status (e.g., not started; in progress; completed)
- Project proponent (if applicable)
- Project spatial boundaries or coordinates
- Estimated water offset and/or habitat benefits

6.2.3 Monitoring and Research

In addition to monitoring project implementation as described above, the WRIA 13 Committee proposes the DWC plans and coordinates additional monitoring and research to improve water planning data, reduce uncertainty, and inform decision-making as the Plan is implemented. This additional information will support adjustments to the Watershed Plan to focus limited resources on the most significant problems and best solutions. Additional monitoring and research initiatives could include:

- Developing an overarching **Monitoring and Research Plan** as part of implementation.
- Monitoring all streams with Instream Flow Rule provisions.
- Improving regional groundwater data, maps, and models.
- Developing a program to monitor habitat and net ecological benefit (NEB).
- Monitoring of project implementation and effectiveness.

Existing Monitoring Data

Multiple jurisdictions have operated, and continue to operate, monitoring and data collection programs throughout WRIA 13. The USGS operates gages on the Deschutes River at Rainier (since 1949) and at Tumwater (since 1938). Thurston County operates a weather network (11 stations), groundwater network (10 wells) and stream gaging network (7 gages) in the WRIA, some with continuous data extending back to the 1980s. The County also managed a volunteer lake level monitoring program that was active from 1990 through 2012 on Ward, Hewitt, Chambers, Hicks, Pattison, Long, Offut, Lawrence, and Summit lakes. The Stream Team (a cross-jurisdictional effort between Lacey, Olympia, Tumwater, and Thurston County) has collected volunteer Benthic Index of Biotic Integrity data on streams throughout the region since 1990.

A monitoring and research plan can include these sources of data, as well as any other credible sources of data. Surface water monitoring data in WRIA 13 is available from Thurston County, Ecology, and other entities.

Annual Reporting & Adaptive Management

Using annual reports to identify trends and indicators, the Committee recommends that DWC take an adaptive management approach to implementing the WRIA 13 Watershed Plan.[69] The

[69] Adaptive Management is defined in the Net Ecological Benefit (NEB) Guidance as 'an interactive and systematic decision-making process that aims to reduce uncertainty over time and help meet project, action, and plan performance goals by learning from the implementation and outcomes of projects and actions."

adaptive management provisions outlined below will also help determine whether projects are functioning as designed under climate change conditions and allow for course corrections as needed.

The Committee recommends requiring the following annual reports:

- Counties provide reports to Ecology and DWC on PE well construction and connections, as well as the total number of new water connections.
- Project sponsors provide report to DWC on project status and estimated project offset amounts of completed projects.

The WRIA 13 Committee also recommends that Ecology's Streamflow Restoration grant guidance be revised to include a requirement that funded projects provide annual reports to Ecology.

Beginning the fifth year of implementation, DWC will compare the following by subbasin and summarize in a report to Ecology:

- Estimated consumptive use for permit exempt wells constructed during year (using the methodology designated in the WRIA 13 Watershed Plan).
- Estimated annual project offset amounts by subbasin.
- If sufficient project information is not available within the fifth year of implementation, reporting will be adjusted to accommodate project needs.**Error! Reference source not found.**

If the comparison report indicates that total project offset amounts are less than the cumulative total of new permit exempt well consumptive use amounts described in Chapter 4, the Committee recommends:

- DWC identifies opportunities to accelerate completion of offset projects in progress and includes an associated timeline for completion in report to Ecology.
- DWC works with local jurisdictions to consider additional strategies and actions.
- Ecology considers appropriate actions to protect senior water rights and support implementation of the plan

If the comparison report indicates that project offset amounts are exceeding the consumptive use offset targets identified in Chapter 4 as a higher estimate(513 AFY) to achieve through adaptive management (on an annual prorated basis), or if PE well growth is lower than predicted, Ecology could relax restrictions and make reporting cycles less frequent (e.g., every other year).

6.2.4 Funding

Funding is critical to implementing the WRIA 13 Watershed Plan and achieving its goals. Based on funding estimates from other watershed groups, the Committee recommends that an amount not exceeding $200,000 annually could be needed to establish and maintain the Deschutes Watershed Council (which will implement tasks described in sections 1-4 above). Funding described in this section is for oversight, monitoring, and tracking of implementation and does not reflect funding needs for implementation of projects discussed in Chapter 5. Recommended investigation of funding strategies include:

- **Increase permit exempt well fees**. Consider an equitable approach to increasing the existing well fee based on impact to groundwater and needs of plan.
- **Request sustainable funding from the Washington State Legislature**. Funding would be available statewide to WRIAs with a plan or Rule under RCW 90.94. Activities prioritized for funding could include oversight; monitoring and research; education, outreach, and technical assistance; and reporting. The Committee recommends a dedicated fee (e.g., an annual fee on permit exempt wells as part of annual property tax assessments) rather than reliance on the general fund.
- **Other funding methods**. Research additional options for funding to implement the WRIA 13 plan that could include programs, optional mitigation, or other funding methods.

Additional sources of funding could include grants, DWC member cost-sharing or fees, and/or DWC service revenues.

6.3 Other Issues

6.3.1 Summary of Legislative Requests

Legislative funding is requested for all recommendations except 6.1.9.

6.3.2 Assurance of Plan Implementation

WRIA 13 Committee members and participating entities strongly advocate for implementation of the watershed plan. 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 seeking project opportunities
      - Seeking and supporting funding opportunities to achieve implementation
      - Tracking implementation and identifying areas for improvement

- **Lewis County**

  - Lewis County adopts this watershed plan by resolution, formalizing our support of the plan contents.
  - This watershed plan becomes one of the guiding project implementation plans.
  - Lewis 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

- **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

- **Thurston PUD**
    - Thurston PUD supports and participates in implementation activities as staff capacity allows, including:
        - Participating in Implementation meetings
        - Communications with internal and external stakeholders
        - Support project development and management

- **Thurston Conservation District**

    - The Thurston Conservation District 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

- **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 seeking project opportunities
            - Seeking and supporting funding opportunities to achieve implementation
            - Tracking implementation and identifying areas for improvement

- **City of Lacey**

    - The City of Lacey 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
    - The City of Lacey adopts this watershed plan by resolution, formalizing our support of the plan contents.

- **City of Olympia**
    - The City of Olympia 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
- The City of Olympia participates on the Nisqually Watershed Council and intends to participate on the Deschutes Watershed Council when formally established.
- The City of Olympia engages in regional water resource management activities when consistent with the City's authority and regulations, and jurisdictional interests, thereby providing support to other entities' efforts when appropriate.

- **City of Tumwater**

    - The City of Tumwater 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
    - The City of Tumwater intends to participate on the Deschutes Watershed Council when formally established.
    - The City of Tumwater engages in regional water resource management activities when consistent with the City's authority and regulations, and jurisdictional interests, thereby providing support to other entities' efforts when appropriate.

- **Deschutes Estuary Restoration Team (DERT)**

    - DERT supports and participates in implementation activities as staff capacity allows, including:

    - Inform other interested and affected environmental organizations in WRIA 13 of its provisions, and the extent to which the plan conforms to the letter and spirit of the legislation;
    - Advocate at the Legislature for authorization and funding for the Deschutes Watershed Council;
    - Participate in the activities of the Deschutes Watershed Council, including implementation of projects and policies contained in the Plan;
    - Advocate with Ecology for adoption of rule revisions for WRIA 13 if recommended in the Plan;
    - Advocate with Ecology and the Legislature for greater prioritization in Ecology's grant program for priority projects identified in the Plan;

- Work with the Squaxin Tribe and other representatives to the WREC, to ensure better information and collaborative efforts for restoration of the watershed; and
- Consistent with DERT's mission for the past ten years, and as a Puget Soundkeeper Affiliate, work for restoration of the Deschutes Estuary, and for improvement of both water quantity and water quality conditions in the Deschutes Watershed.

Chapter Seven: Net Ecological Benefit

7.1 Introduction to NEB

Watershed Restoration and Enhancement Plans must identify projects and actions to offset the potential consumptive impacts of new permit-exempt (PE) domestic groundwater withdrawals on instream flows over 20 years (2018-2038), and provide a net ecological benefit (NEB) to the WRIA. The WRIA 13 Committee chose to include an NEB evaluation to reflect the local expertise of the partners who contributed to developing this watershed plan. Upon approval of a watershed plan, 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.[70]

The Final NEB Guidance establishes Ecology's interpretation of the term "net ecological benefit" as "the outcome that is anticipated to occur through implementation of projects and actions in a [watershed] plan to yield offsets that exceed impacts within: a) the planning horizon; and, b) the relevant WRIA boundary" (Ecology 2019).

The Final NEB Guidance sets Ecology's expectation for the NEB evaluation:

- "Planning groups are expected to include a clearly and systematically articulated NEB evaluation in the watershed plan" (Ecology 2019).
- "A watershed plan that includes a NEB evaluation based on this [Final NEB] guidance significantly contributes to the reasonable assurances that the offsets and NEB within the plan will occur. Ecology will review any such [watershed] plan with considerable deference in light of the knowledge, insights, and expertise of the partners and stakeholders who influenced the preparation of their [watershed] plan. Ecology will make the NEB determination as part of this review" (Ecology 2019).

The WRIA 13 Committee completed a NEB evaluation for this watershed plan; the results of that evaluation are included in this chapter.

7.2 Consumptive Use and Water Offsets

This plan uses medium population growth forecasts for Thurston County to project a total of 2,616 new PE wells installed within WRIA 13 during the planning horizon.

[70] RCW 90.94.030(3)(c) states that "prior to adoption of the watershed restoration and enhancement plan, the department must determine that actions identified in the plan, after accounting for new projected uses of water over the subsequent twenty years, will result in a net ecological benefit to instream resources within the water resource inventory area".

The WRIA 13 Committee has determined that an area of 0.10 irrigated acres result in the most likely outdoor consumptive use estimate of 435 AFY (0.6 cfs) for WRIA 13, and will be used as the target offset to compare to offsets from projects. A higher consumptive use estimate to achieve through adaptive management of 513 AFY (0.7 cfs) was also established by the Committee and was developed assuming an average irrigated area of 0.12 acres per well. More information on methods to estimate the number of new PE wells and consumptive use can be found in Chapter 4 and Appendix H.

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 focus on stormwater infrastructure and infiltration, off-channel reconnection, water right acquisition, and Managed Aquifer Recharge (MAR).

This plan estimates a total potential water offset of 1,900 AFY from ~~five~~ four water offset projects or project types (described in Chapter 5 and listed in Table 11). However, to account for uncertainty in the likelihood of projects being built and the estimated benefits being realized (including the timing of streamflow benefits), the Committee chose to exclude estimates of water offsets for some projects, and to reduce the estimates for other projects., resulting in a more conservative potential water offset of 1,316 AFY. This more conservative estimate suggests a WRIA-wide surplus offset of 881 AFY above the consumptive use offset target and a surplus of 803 AFY above the adaptive management goal set by the Committee.

Table 11: Summary of WRIA 13 Water Offset Projects included in NEB analysis

Project Name	Subbasin(s)	Project Short Description	Estimated Offset Benefits (AFY)	Offset Claimed by WRIA 13 Committee (AFY)	Timing of Benefits[71]	Project Stage
Schneiders Prairie Off-Channel Connection	**Deschutes Lower**	Off-channel reconnection and infiltration	681	681	May-October	Conceptual
Donnelly Drive Infiltration Galleries	**Deschutes Lower**	Improve neighborhood stormwater infiltration, avoiding surcharge and runoff to Chambers Ditch.	14	14	Year-round	Conceptual
Deschutes/ Chambers MAR Projects	**Deschutes Lower, Deschutes Middle, Deschutes Upper, Cooper Point, Boston Harbor**	Several candidate locations for MAR by diverting Deschutes River water during high flow periods when minimum instream flows and ecological flows are exceeded.	909	325	Year-round	Conceptual
Hicks Lk Water Stormwater Retrofit	**Woodland Creek**	Retrofit surface water facility for infiltration and additional stormwater treatment - flow attenuation	296	296	Year-round	Conceptual
WRIA 13 Total Water Offset			**1,900**	**1,316**		
WRIA 13 "Most Likely" Consumptive Use Estimate			**435**			
WRIA 13 Higher Adaptive Management Consumptive Use Estimate			**513**			

[71] The WRIA 13 Committee agreed that for the purposes of this watershed plan, the critical flow period will be defined as May-October.

Projected future consumptive water use and the estimated project water offset quantities that the Committee agreed to use during the NEB evaluation are compared at the subbasin scale in Table 12. When compared to both the most likely and higher adaptive management consumptive use estimates, a surplus water offset is achieved in four subbasins (Lower, Middle and Upper Deschutes; and Woodland Creek) and a deficit in water offset in the other five subbasins (Boston Harbor, Cooper Point, Johnson Point, McLane, and Spurgeon Creek).

Chapter 90.94 RCW allows for an uneven distribution of the offset project amounts relative to anticipated consumptive water use, provided the plan overall will lead to a NEB. As is evident in Table 12, the benefits associated with offset projects far exceeds the most likely consumptive use in the Deschutes (Upper, Middle, Lower) and Woodland subbasins, and the surplus water offsets are large (between 74 – 632 AFY). Among the subbasins with water offset deficits, Johnson point had the largest predicted water deficit of -86 AFY and no water offset projects have been identified. The remaining subbasins had much smaller deficits than the surpluses in all surplus subbasins.

The subbasins in surplus and deficits are the same when compared to the higher consumptive use estimate described in this watershed plan as a goal to achieve through adaptive management at the WRIA-scale, shown in Table 12. The benefits associated with offset projects far exceeds the anticipated consumptive use in the Deschutes (Upper, Middle, Lower) and Woodland subbasins, and the surplus water offsets are large (between 73 – 621 AFY). Among the subbasins with water offset deficits, Johnson point had the largest predicted water deficit of -102 AFY and no water offset projects have been identified. The remaining subbasins had much smaller deficits than the surpluses in all surplus subbasins

The water offset projects listed in Table 12 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 13, additional benefits could include the following:

- Schneiders Prairie Off-Channel Connection: Off-channel habitat for juvenile salmonids and other aquatic life will be restored and made accessible, with fish ingress and egress. Off-channel habitat will be particularly beneficial to coho salmon. Increased groundwater seepage into the Deschutes River from this project will increase flow and provide cool water during the critical period (i.e. late summer and early fall), benefitting multiple species.
- 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.

Table 12: Subbasin Water Offset Totals Compared to Permit-Exempt Well Consumptive Use Estimate

Subbasin	Offset Project Totals Claimed by the Committee (AFY)[72]	Permit-Exempt Well Most Likely Consumptive Use (AFY)	Surplus/Deficit from Most Likely CU Estimate (AFY)[73]	Higher Adaptive Management Consumptive Use Estimate (AFY)	Surplus/Deficit from Higher Adaptive Management CU Estimate (AFY)
Boston Harbor	0	49	-49	58	-58
Cooper Point	7	39	-32	45	-38
Deschutes Lower	695	63	+632	74	+621
Deschutes Middle	238	122	+116	144	+94
Deschutes Upper	79	5	+74	6	+73
Johnson Point	0	86	-86	102	-102
McLane	0	27	-27	32	-32
Spurgeon Creek	0	15	-15	18	-18
Woodland Creek	296	28	+268	33	+263
WRIA 13 Total	**1,316**	**435**	**+881**	**513**	**+803**

[72] 1 acre foot per year is equivalent to 0.0014 cfs, or 892.74 gallons per day

[73] 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).

7.3 Habitat Benefits

The WRIA 13 plan includes an inventory of additional projects to meet the offset needs and NEB for the watershed. Table 13 summarizes the benefits of ~~five~~ four 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. 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.

WRIA 13 provides an important and productive system for endangered and threatened Puget Sound salmonids. All of the subbasins in the WRIA support some life phase of one or more species. Anadromous salmonid spawning occurs from Tumwater Falls to Deschutes Falls. The habitat projects in Table 13 address many of the salmonid limiting factors described in Chapter 2.1.3, including:

- natural stream ecological processes have been significantly altered due to adjacent land management practices and direct actions within the stream corridor,
- fine sediment (<.85 mm) levels in the stream gravels regularly exceed the <12% level identified as representing suitable spawning habitat,
- lack of adequate large woody debris in streams, particularly larger key pieces that are critical to developing pools, log jams, and other habitat components important to salmonids,
- lack of adequate pool frequency and large, deep pools that are important to rearing juvenile salmonids and adult salmonids on their upstream migration,
- naturally high rates of channel movement in this geologically young basin, but further exacerbated rate of streambank erosion and substrate instability due to loss of streambank and riparian integrity, and alteration of natural hydrology,
- loss of riparian function due to removal/alteration of natural riparian vegetation, which affects water quality, lateral erosion, streambank stability, instream habitat conditions, etc.,
- significant alterations to the natural stream hydrology in streams where the uplands have been heavily developed, and the threat of similar impacts to streams that are experiencing current and future development growth.

The Schneider's Prairie project would provide off-channel rearing habitat during the winter period, when the inlet channel and wetland area is inundated. This habitat would primarily

benefit coho salmon. Seepage back to the Deschutes River during the summer and early fall would benefit all fish species by providing cool water and increasing flows.

The Woodard Creek, Chambers Creek, and Spurgeon Creek projects will provide similar ecological benefits. Improvements to riparian condition will increase shade, bank stability, large woody debris loading, and fish cover. Increasing shade will lessen warming of stream water temperatures. 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.

Table 13: Summary of WRIA 13 Habitat Improvement Projects included in NEB Analysis

Project Name and Brief Description	Subbasin	Anticipated Ecological Benefit(s)	Project Stage
Woodard Creek – Additional of large woody debris and riparian vegetation, and floodplain reconnection along middle Woodard Creek.	Boston Harbor	Floodplain connectivity, instream habitat complexity	Conceptual
Spurgeon Creek Remeander Project - Restore wetland conditions to upper Spurgeon Creek by filling ditch, creating microtopography, installing large wood and planting area with native species. Spurgeon Creek is a priority tributary to the Deschutes. Funded by PSAR 2016.	Spurgeon Creek	Floodplain connectivity, instream habitat complexity	Design
Chambers Creek Channel realignment to increase channel length and sinuosity at confluence with Chambers Ditch	Lower Deschutes	Floodplain connectivity, instream habitat complexity	Conceptual
General floodplain reconnection/restoration projects – Identify project opportunities in WRIA 13	All	Increase floodplain function and connectivity and local aquifer storage; increase usable aquatic habitat area; increase fish cover; increase habitat complexity	Conceptual

7.4 Uncertainty and Adaptive Management

The 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 where there is the most need for offsets by subbasin.

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 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.

7.5 NEB Evaluation Findings

This watershed plan provides projects that, if implemented, can offset 435 AFY as the “most likely” estimate of new consumptive water use in WRIA 13, and can offset a higher consumptive use estimate as a goal to achieve through adaptive management of 513 AFY. This watershed plan sets goals of achieving offsets through a total of four projects or project types with estimated offset quantities (one project includes eight quantified MAR offsets) with a cumulative offset projection of 1,316 AFY, WRIA-wide. This projected total water offset yields a surplus offset of 881 AFY above the most likely consumptive use estimate of 435 AFY in WRIA 13, and a surplus of 803 AFY above the higher consumptive use estimate as a goal to achieve through adaptive management.

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 13.

Although the project portfolio will meet offset targets on a WRIA-scale, much of the water offset projects in WRIA 13 will benefit the Deschutes Lower, Deschutes Middle, Deschutes Upper, and Woodland Creek subbasins. Water offsets in the upper and middle subbasins will also benefit the lower subbasin. The Hicks Lake stormwater retrofit project will provide water offsets to Hicks Lake, which is the headwaters to Woodland Creek. This project will benefit the entire tri-lakes and Woodland Creek system. The Johnson Point subbasin has the largest offset deficit of 86 AFY and does not have any offset projects identified for the subbasin. However, there are a very limited number of salmon-bearing streams in the Johnson Point subbasin, and the significant benefits in several of the other subbasins and at the WRIA-scale outweigh the deficit.

At the WRIA-scale, the consumptive use impact has been met with water offsets, with a large surplus. However, additional water offsets are desirable in the Boston Harbor, Cooper Point, Johnson Point, McLane, and Spurgeon Creek subbasins, because there are water offset deficits in these subbasins. These water offsets may be met by projects defined during plan implementation. For example, suitable water right acquisition, MAR, stormwater retrofit, or floodplain restoration projects may be identified and developed to meet these deficits that are currently defined.

Within this plan, water offset projects are complimented by a total of four habitat improvement projects, which provide numerous additional benefits to aquatic habitat. While many of these habitat improvement projects have potential streamflow benefits, the Committee excluded any associated water offset from the plan's accounting. Additional programmatic actions as described in Chapters 5 and 6 are dependent on funding and include exploration of water right opportunities, a Water Conservation and Drought Education and Outreach Program, drought response limits, Thurston County policies to promote connections to Group A Systems, a recommendation to update the Ecology Well Log Database, a new Ecology staff position serving as South Sound Water Steward, instream flow rule revisions, permit-exempt well withdrawal limits, Salmon Recovery Portal project tracking, a collaborative Deschutes Watershed Council, and the potential establishment of a revolving loan and grant fund to offset costs of connecting to Group A public water systems. These programmatic actions could result in some water offsets, if they were developed during plan implementation.

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 13 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 13 Committee developed the WRIA 13 watershed plan to the best of the Committee's ability given the

limitations of the timeline and resources. The Committee developed the watershed plan to meet NEB, and as this chapter describes, the watershed plan provides ecological benefits in many ways. The WRIA 13 Committee is leaving the final NEB determination to Ecology.

Appendices

WRIA 13 Deschutes Watershed

Final Draft Plan
January 2021