



2020 Columbia River Basin Water Supply Inventory Report

By

Office of Columbia River

Washington State Department of Ecology
Central Regional Office
Union Gap, Washington

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- Kansas Prairie 2 project site, East Low Canal, Odessa Groundwater Replacement Program, Photo credit: Melissa Downes (OCR), 2020

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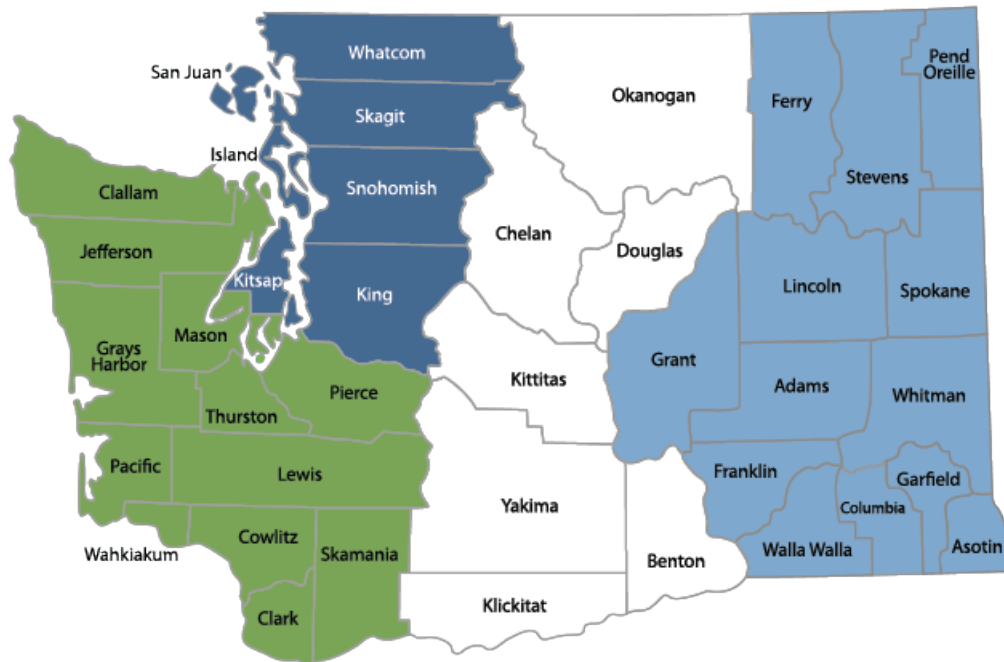
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Northwest Region
425-649-7000

Central Region
509-575-2490

Eastern Region
509-329-3400

Region	Counties Served	Mailing Address	Phone
Southwest	Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, Wahkiakum	PO Box 47775 Olympia, WA 98504	360-407-6300
Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	3190 160th Ave SE Bellevue, WA 98008	425-649-7000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
Eastern	Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman	4601 N Monroe Spokane, WA 99205	509-329-3400
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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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January 25, 2021

The Honorable Jay Inslee, Governor
Honorable Members of the Washington State Legislature
Olympia, Washington

RE: Columbia River Basin Water Supply Inventory Report

The Department of Ecology's Office of Columbia River is pleased to present the 2020 *Columbia River Basin Water Supply Inventory Report* to the Legislature, meeting the requirements under RCW 90.90.040. This report is now available at the following website:

<https://apps.ecology.wa.gov/publications/SummaryPages/2012001.html>

This annual Columbia River Basin Water Supply Inventory Report provides an updated summary of water supply development project progress, project milestones met over the past year, and an inventory list of water supplies developed since 2006.

As we continue to develop and deliver water both instream and out-of-stream across Eastern Washington, we are excited to announce that after more than 16 years of dedicated work, the first pumping plant and delivery system in the Odessa Groundwater Replacement Program finished construction this year. The EL 47.5 system will deliver Columbia Basin Project surface water to 8,600 acres in the Odessa Subarea starting in March 2021.

If you have any questions regarding this report or would like more information, please contact me by phone at (509) 952-5080 or by email at thomas.tebb@ecy.wa.gov. If you would like hard copies of the report, contact Colleen Smith by phone at (509) 571-0921 or by email at colleen.smith@ecy.wa.gov.

Sincerely,

G. Thomas Tebb, L.H.g., L.E.G.
Director
Office of Columbia River

RCW 90.90.040

Columbia river water supply inventory—Long-term water supply and demand forecast.

(1) To support the development of new water supplies in the Columbia river and to protect instream flow, the department of ecology shall work with all interested parties, including interested county legislative authorities and watershed planning groups in the Columbia River Basin, and affected tribal governments, to develop a Columbia river water supply inventory and a long-term water supply and demand forecast.

The inventory must include:

- (a) A list of conservation projects that have been implemented under this chapter and the amount of water conservation they have achieved; and
- (b) A list of potential water supply and storage projects in the Columbia River Basin, including estimates of:
 - (i) Cost per acre-foot;
 - (ii) Benefit to fish and other instream needs;
 - (iii) Benefit to out-of-stream needs; and
 - (iv) Environmental and cultural impacts.

(2) The department of ecology shall complete the first Columbia river water supply inventory by November 15, 2006, and shall update the inventory annually thereafter.

(3) The department of ecology shall complete the first Columbia river long-term water supply and demand forecast by November 15, 2006, and shall update the report every five years thereafter.

[2011 c 83 § 6; 2006 c 6 § 5.]

RCW 90.90.020

Allocation and development of water supplies.

(1) (a) Water supplies secured through the development of new storage facilities made possible with funding from the Columbia River Basin water supply development account, the Columbia River Basin taxable bond water supply development account, and the Columbia River Basin water supply revenue recovery account shall be allocated as follows:

(i) Two-thirds of active storage shall be available for appropriation for out-of-stream uses; and

(ii) One-third of active storage shall be available to augment instream flows and shall be managed by the department of ecology. The timing of releases of this water shall be determined by the department of ecology, in cooperation with the department of fish and wildlife and fisheries co-managers, to maximize benefits to salmon and steelhead populations.

(b) Water available for appropriation under (a)(i) of this subsection but not yet appropriated shall be temporarily available to augment instream flows to the extent that it does not impair existing water rights.

(2) Water developed under the provisions of this section to offset out-of-stream uses and for instream flows is deemed adequate mitigation for the issuance of new water rights provided for in subsection (1)(a) of this section and satisfies all consultation requirements under state law related to the issuance of new water rights.

(3) The department of ecology shall focus its efforts to develop water supplies for the Columbia River Basin on the following needs:

(a) Alternatives to groundwater for agricultural users in the Odessa Subarea aquifer;

(b) Sources of water supply for pending water right applications;

(c) A new uninterruptible supply of water for the holders of interruptible water rights on the Columbia river mainstem that are subject to instream flows or other mitigation conditions to protect streamflows; and

(d) New municipal, domestic, industrial, and irrigation water needs within the Columbia River Basin.

(4) The one-third/two-thirds allocation of water resources between instream and out-of-stream uses established in this section does not apply to applications for changes or transfers of existing water rights in the Columbia River Basin.

[2011 c 83 § 4; 2006 c 6 § 3.

Introduction

The Office of Columbia River

The Department of Ecology (Ecology) formed the Office of Columbia River (OCR) to implement Chapter 90.90 of the Revised Code of Washington (RCW). The Washington State Legislature determined a Columbia River Basin water supply program was necessary in order to meet the current and future water needs of the basin for families, farms, and fish. In accordance with RCW 90.90.040, the Office of Columbia River submits this 2020 Columbia River Basin Annual Water Supply Inventory Report summarizing the accomplishments and ongoing efforts to meet the legislative mandate as defined in RCW 90.90.

Over the past year, OCR has secured an additional 52,844 acre-feet (ac-ft.) through trust water donations, aquifer storage and recovery (ASR) projects, and water conservation efforts. This brings OCR's total amount of developed water supplies for instream and out-of-stream uses to 475,689 ac-ft. These water supplies hydrate pending water right applications, maintain adequate instream flows during the drier times of the year, reduce drought related impacts on interruptible water right holders, mitigation for the issuance of new water right permits, and will remove groundwater dependence in the Odessa Subarea. Throughout this report, each project and/or program will have one or more of the icons shown in Figure 1 associated with it. These icons represent OCR's legislative mandate that each project or program meets.

We anticipate that within the next five years the projects and programs currently in progress will develop an additional 285,878 ac-ft. of water. In total, OCR's goal is to develop over 1 million ac-ft. over the next 10 years to meet water supply demands. With 475,689 ac-ft. permittable water supply coupled with the proposed 285,878 ac-ft., OCR is equipped to reach over 50 percent of our goal by 2025 based on the current path. Continued and consistent efforts to aggressively pursue the development of water supplies for farms, fish, and families set a sustainable path forward. The complete list of OCR water development projects is located on page 12 (Figure 2).

COVID-19 Impacts

The COVID-19 pandemic has temporally changed how OCR conducts business. In response to Governor Inslee's "Stay Home, Stay Healthy" order, Ecology closed their offices statewide beginning mid-March. OCR's work procedures have changed from in-person communication to virtual meetings, remote communication and document processing. While the full impacts of COVID-19 on

Throughout the report, these symbols are used to identify the legislative directive that the project addresses:

 : Alternatives to groundwater for Odessa Subarea

 : Pending water right applications

 : Future water supplies for interruptible water right holders

 : Future water supplies for municipal, domestic, industrial and irrigation

 : Instream benefits

Figure 1 Icon Legend

OCR projects are unknown at this time, work will continue to adapt and change to meet project needs and safety and health requirements.

2020 Accomplishments

- Refined water supplies calculations, bringing OCR's total amount of developed water supplies to 475,689 ac-ft.
- Achieved 91% on metering report compliance.
- Issued 15 water right permits.
- Completed construction of the last two siphons (Kansas Prairie 1 & 2) needed along East Low Canal for delivering surface water to the Odessa Subarea.
- Completed work on the East Low (EL) 47.5 pumping plant and delivery system that will deliver enough water to convert up to 10,500 acres of groundwater irrigated farmland to surface water irrigation in 2021, relieving an overstressed Odessa Subarea aquifer.
- Embarked on the Walla Walla Water 2050 strategic planning process in partnership with Ecology's Water Resources Program, the state of Oregon, the Confederated Tribes of the Umatilla Indian Reservation and many local stakeholders.

Preparing for future water needs and improving drought resiliency

In addition to securing water supplies for today's instream flow needs and current out-of-stream water users, OCR continues to make progress to secure enough water to meet future needs of eastern Washington. OCR's water supply development and delivery projects and programs provide secure and reliable water benefitting instream flows for fish, and supports an over \$8 billion agricultural economy² and growing communities.

OCR publishes a long-term water supply and demand forecast report every five years, the next report is due to the legislature in November 2021. We are working with several universities, consulting professionals, and the State of Washington Water Research Center, to update the 2016 report and examine potential impacts to water supplies beyond 2040, including climate change, population growth, and diminishing groundwater storage. This analysis provides water managers with the information needed to assess current and future water demands and where to make investments in water supply development projects that will optimize when and where water is available to meet demands. This level of detail supports careful calculations of water supply and demand, in the hopes of minimizing water use curtailments caused by climate change and amplified low flow and drought conditions.

² Data acquired from Washington State Department of Agriculture 2019 export statistics, website link: [https://agr.wa.gov/departments/business-and-marketing-support/international/statistics#:~:text=For%20more%20information%20call%20\(360.agriculture%20exports%20total%20%247.1%20billion](https://agr.wa.gov/departments/business-and-marketing-support/international/statistics#:~:text=For%20more%20information%20call%20(360.agriculture%20exports%20total%20%247.1%20billion)

Ecology's strategic plan 2021-2023

Ecology's updated Strategic Plan³ summarizes how the agency is addressing ongoing environmental challenges for the 2021-2023 biennium and beyond. Efforts and actions discussed in this plan build on existing and past work.

Goals of Ecology's Strategic Plan 2021-2023:

1. Support and engage our communities, customers, and employees
2. Reduce and prepare for climate impacts
3. Prevent and reduce toxic threats and pollution
4. Protect and manage our state's waters
5. Protect and restore Puget Sound

As a leader in developing water supplies and basin-wide integrated water resource management solutions, OCR's objectives directly support goals 2 and 4 of Ecology's Strategic Plan. The Office of Columbia River, along with other Ecology programs collaborate to achieve Ecology's goals to deliver integrated water solutions while protecting and managing Washington's vital water resources. The involvement of communities, customers, and employees meets goal 1 through public notices, requests for comments, and collaborative workgroup and committee participation.



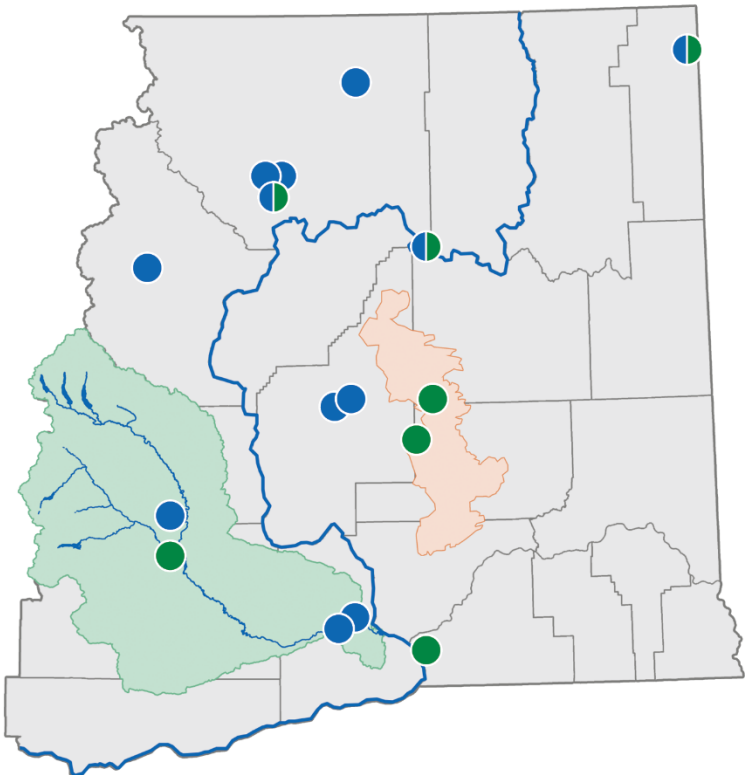
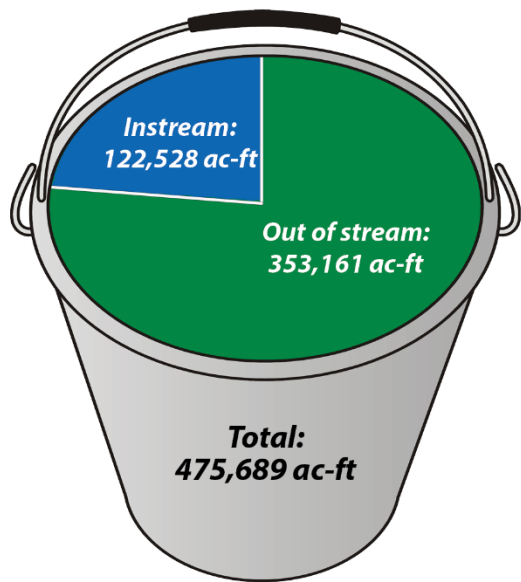
Cle Elum Dam Pool Raise Radial Gates

Photo credit: Tim Poppleton, 2017

³ More information regarding Ecology's Strategic Plan 2021-2023 can be found online at: <https://ecology.wa.gov/About-us/How-we-operate/Strategic-plan> <https://ecology.wa.gov/About-us/How-we-operate/Strategic-plan>

Water Supply Development by the Office of Columbia River

Developed 2006-2020



Key

- Instream
- Out of Stream
- Both
- Odessa Subarea
- Yakima Basin

Near Term 2020-2025

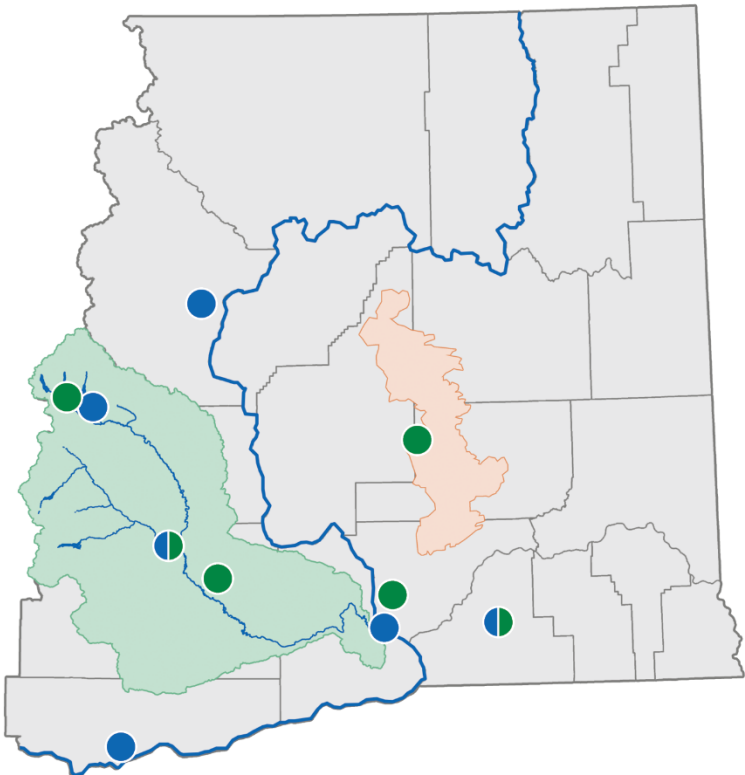
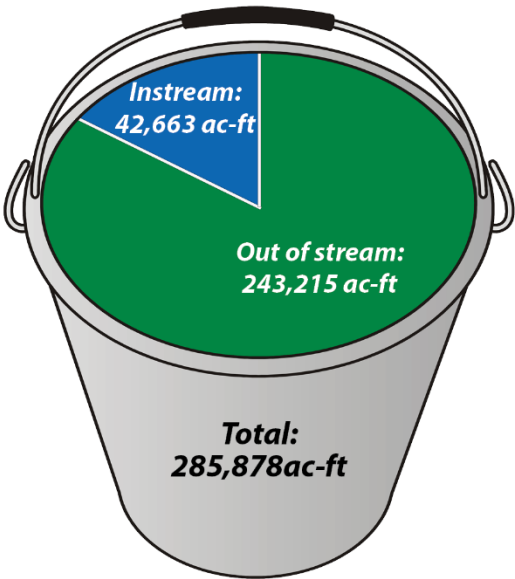
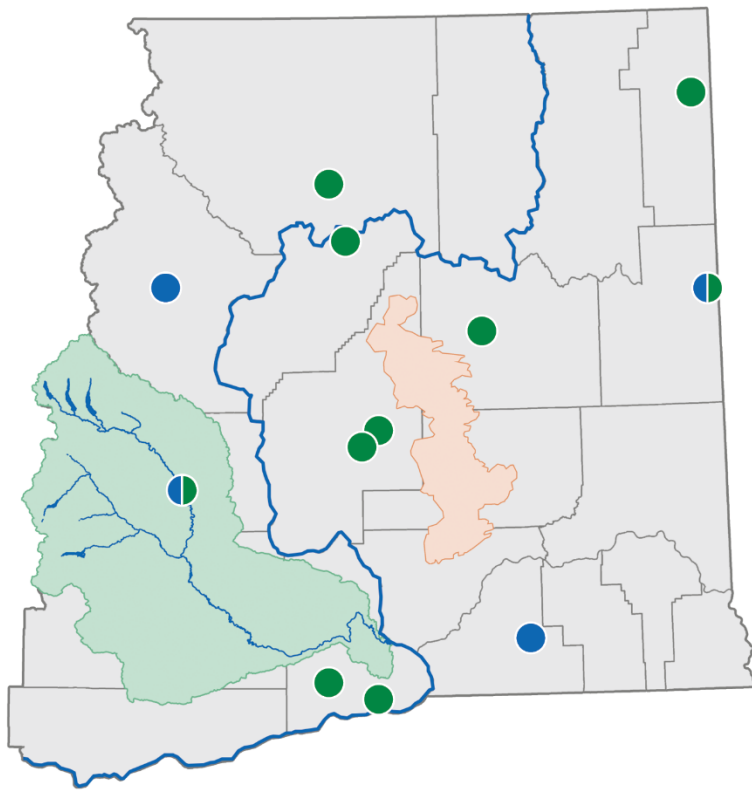
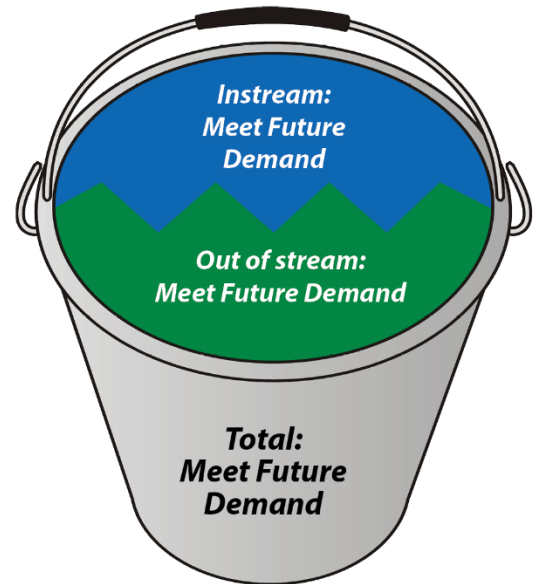


Figure 2 Water Supply Development by the Office of Columbia River



Long-term 2025+



Projects

Developed

- Barker Ranch: 6,436 ac-ft
- Columbia Basin ID Piping: 35,000 ac-ft
- Conservation Commission Irrigation Efficiency: 3,476 ac-ft
- Donations: 28,854 ac-ft
- Kennewick ASR: 1,341 ac-ft
- KID/Red Mountain: 11,005 ac-ft
- Kennewick General Hospital 4,000 ac-ft
- Lake Roosevelt: 132,500 ac-ft
- Lower Wenatchee Piping: 7,823 ac-ft
- Manastash: 1,300 ac-ft
- Methow Trust Water Acquisition: 79 ac-ft
- Methow Projects: 2854 ac-ft
- Odessa Subarea: 164,000 ac-ft
- Peshastin ID Piping: 360 ac-ft
- Potholes Feed Route (conveyance)
- Pine Creek Acquisition: 900 ac-ft
- Sullivan Lake: 14,000 ac-ft
- Port of Walla Walla Leases: 4,761 ac-ft
- Upper Kittitas Tributary Enhancement (conveyance)
- Weber Siphon (conveyance)
- Yakima Basin Ag Conservation: 47,000
- Yakima City ASR: 10,000 ac-ft

Near Term

- Cle Elum Pool Raise: 14,600 ac-ft
- Columbia Basin ID Piping: TBD
- Kachess Drought Relief Pumping Plant: 200,000 ac-ft
- East Low Canal Widening: (conveyance)
- Icicle Creek Water Management Strategy Projects: 20,000+ ac-ft
- Kennewick ASR: 318+ ac-ft
- Pasco Basin Water Supply: TBD
- Pasco Municipal Supply Improvements: 5,000 ac-ft
- SVID: 7,815 ac-ft
- White Salmon ASR: 145 ac-ft
- Yakima Basin Enhanced Conservation: 38,000 ac-ft
- Yakima Basin Shallow Aquifer Recharge: TBD

Long-term

- Regional Aquifer Storage and Recover: TBD
- Conservation Commission Retiming: TBD
- Goose Lake & Nine Mile Flat Storage: TBD
- Horse Heaven Hills: 61,000+ ac-ft
- Kittitas Distributed Off-Channel Small Storage: TBD
- Lincoln CD Passive Rehydration: TBD
- Mill Creek Storage: 2,000 to 11,000 ac-ft
- Peshastin Pump Exchange: TBD
- Rilette Aquifer Storage and Recovery: TBD
- Spokane-Rathdrum ASR: TBD
- Switzler Off-Channel Storage: 44,000 ac-ft
- Walla Walla Flow Enhancement: 25,500 to 58,500 ac-ft
- Yakima Basin Integrated Plan Projects: 150,400+ ac-ft

Odessa Groundwater Replacement Program



Located in the heart of the Columbia River Basin, farmers in the arid Odessa Subarea have relied on groundwater as a primary source of irrigation water for over 50 years. Regional irrigation demand far exceeds the aquifer's recharge capacity, causing groundwater levels to drop significantly. In the areas of most extreme decline, well failure has occurred. This continual drop in aquifer levels forces many farmers to drill deeper and deeper wells that, in turn, require more power to pump water to the surface, increasing the overall cost of crop production. In addition to the costs associated with declining groundwater levels, the water drawn from these depths is typically warmer and higher in sodium content, which are not standards conducive to crop production.

Ready to deliver water

In 2020, the Odessa Groundwater Replacement Program (OGWRP) hit several milestones with completion of the last two remaining siphons within the East Low Canal (Kansas Prairie 1 & 2) and the East Low (EL) 47.5 pumping plant and delivery system.

OCR is excited to announce that after almost two decades of hard work, major water deliveries to the Odessa Subarea will commence via the newly completed EL 47.5 system in the spring of 2021. The EL 47.5 system is the first delivery system of surface water to the Odessa Subarea and is designed to deliver to up to 10,500 acres of irrigated farmland, however, only 8,600 acres have enrolled in water service contracts with East Columbia Basin Irrigation District to replace Odessa groundwater with Columbia Basin Project surface water. At this time, there are 1,900 acres of remaining available capacity in the EL 47.5 system.



Pumps inside the EL 47.5 Pumping Plant

Photo credit: Melissa Downes (OCR), 2020

After nearly 20 years in the making and what started as the Odessa Subarea Special Study, is today in full swing of implementation with major capital investments maximizing and expanding the delivery capacity of existing federal Columbia Basin Project infrastructure. Impressively, the state has invested over \$105 million and the federal government has invested over \$48 million, to expand the East Low Canal and increase its delivery capacity and bring surface water stored behind Grand Coulee Dam to the OGWRP lands. These monies have provided for feasibility, engineering design, hydraulic modeling, cultural resource surveys, habitat evaluations, land reclassifications, environmental impact statements, mitigation measures, water rights, technical support, conservation efforts, rerouting water supplies and massive infrastructure construction (additional siphon barrels, radial gates, canal widening, bridge modifications, check structures). It is exciting to be on the cusp of delivering significant new water supplies to OGWRP lands via the Columbia Basin Project & the EL 47.5 delivery system and to see the many OGWRP pieces come together to provide some much needed relief to the aquifer, the natural resource, and the local communities.



Turnout and tractor at EL 47.5

Photo credit: Melissa Downes (OCR), 2020

Relieving Odessa aquifer demands

Removing groundwater dependence in the Odessa Subarea is no easy feat. As one of OCR's top legislative mandates in RCW 90.90.020, implementation of OGWRP commenced in 2006, building on previous efforts that were started in 2004.

One of the first steps in removing the Odessa Subarea's dependence on groundwater was identifying available surface water supplies. Reclamation, OCR, and the East Columbia Basin Irrigation District worked together to secure water from Banks Lake, Lake Roosevelt, and water conserved through the Columbia Basin Project's irrigation districts Coordinated Conservation Program.

With surface water in hand, work then focused on modifying existing infrastructure to convey this large amount of water to Odessa farmers, widening miles of the East Low Canal (ELC), installing additional siphon barrels, radial gates, upgrading the SCADA (Supervisory Control and Data Acquisition) electronic monitoring systems, and modifying county road bridges. Modifying and/or removing specific county road bridges are necessary along the canal to avoid the back up of water, which slows water delivery and risks flooding uplands adjacent to the bridges. At this time, two of the 10 bridges requiring modifications are complete.

With ELC nearly finished, Ecology and OGWRP partners are now weighing options on pumping plant and delivery system designs. Next steps include installing a power grid substation serving East Low (EL) 22.1, and moving design work on both EL 22.1 and EL 79.2 towards 30 percent completion (Figure 3).

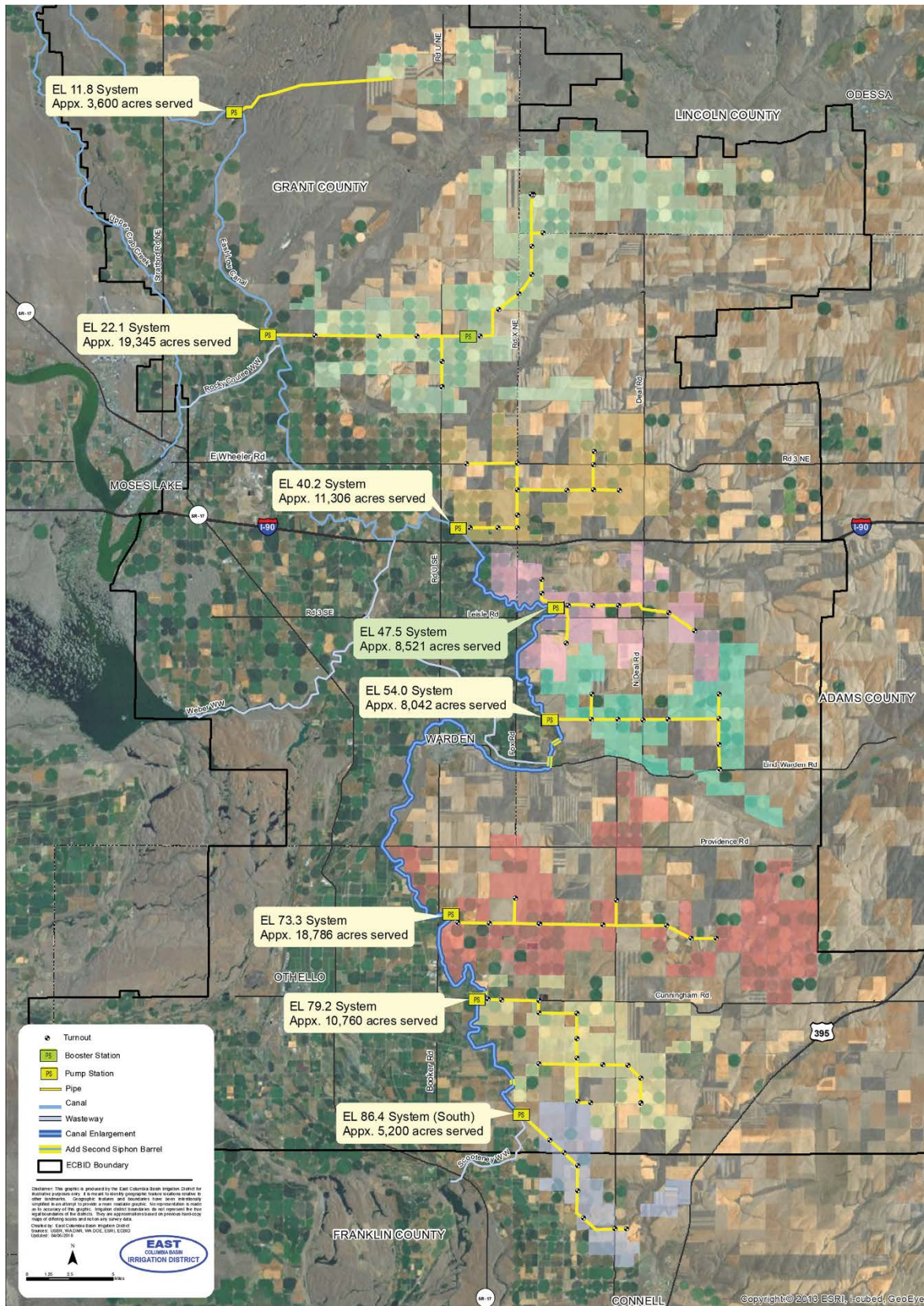


Figure 3 Map of OGWRP Proposed Pumping Plant and Delivery Systems, and Service Area
Source credit: East Columbia River Basin Irrigation District.

Objectives

- Develop and deliver enough surface water to convert 87,700 acres of irrigated cropland from declining groundwater sources to surface water.
- Construct siphons, pumping plants, and other infrastructure required for the delivery of the increased amount of surface water to the Odessa subarea.
- Modify county road bridges crossing ELC once the canal widening is complete.
- Provide an easy transition for landowners to change their existing water rights from groundwater to surface water.



Kansas Prairie 2 siphon construction

Photo credit: Melissa Downes (OCR), 2020

Water at a glance

- Surface water for the irrigation of 87,700 acres of cropland provided from:
 - Banks Lake – 10,000 acres
 - Lake Roosevelt – 70,000 acres
 - Coordinated Conservation Program – 7,700 acres

2020 milestones

- Nine change applications issued.
- Master Water Service contract signed between Reclamation and East Columbia Basin Irrigation District, and backed by a letter of support from the state's Office of the Attorney General.
- Construction complete on the final two final siphon barrels, Kansas Prairie 1 & 2.
- EL 47.5 pumping plant and water delivery system tests complete.

Anticipated 2021 milestones

- EL 47.5 to deliver enough water to irrigate up to 10,500 acres of farmland in March of 2021.
- Reach 30% to 60% design on the EL 22.1, and 79.2 pumping plant and delivery systems.

Integrated Water Resource Solutions

Walla Walla Water 2050



The 1.1 million acre Walla Walla Basin is a complex watershed extending across the Washington/Oregon state line (Figure 4). The basin struggles to meet existing out-of-stream water demands and maintain adequate instream flows vital for fish survival. Since 2009, the Walla Walla Watershed Management Partnership (Walla Walla Partnership) has worked with various stakeholders within the basin to develop and implement an innovative water management concept that enhances flexibility in water use as directed in RCW 90.92. These stakeholders include the Walla Walla Basin Watershed Council in Oregon, the Confederated Tribes of the Umatilla Indian Reservation, Ecology's Water Resources program, OCR, and regional water users.

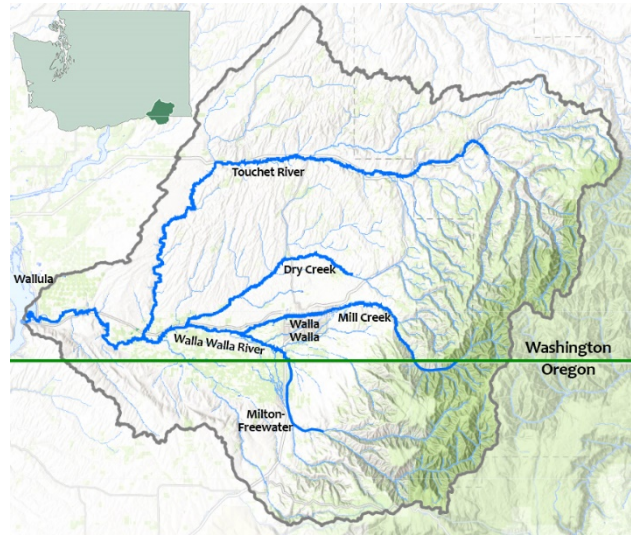


Figure 4 Map of the Walla Walla Basin

Authorized by the Washington Legislature in 2019, the Walla Walla Water 2050 (WWW2050) strategic plan initiative is a consensus-based effort by Ecology, state, federal, local, and tribal governments, and local agricultural and environmental stakeholders to develop a 30-year strategic water resource management plan for the entire Walla Walla Basin. Once complete, this plan will provide a framework to achieve holistic water resource management throughout the entire watershed in both states. These newly forming water management goals may be achieved by advancing a portfolio of potential projects and program solutions, providing sufficient and reliable water supplies to meet current and future instream and out-of-stream demands within the bi-state basin.

In 2020, the state auditor's office and an Ecology contractor conducted performance audit⁴ and financial audit⁵ evaluations, respectively, of the 10-year pilot program. The results from the audits are contained in a 2020 report to the legislature⁶ published by the Walla Walla Partnership, which included recommendations for the WWW2050 strategic plan. The performance audit

⁴ Office of the Washington State Auditor, *Performance Audit Assessing Success of the Walla Walla Watershed Management Partnership Pilot*, May 12, 2020, Report Number 1025998. Website link: https://sao.wa.gov/performance_audit/assessing-success-of-the-walla-walla-watershed-management-partnership-pilot/

⁵ Kraght Snell, *Financial Evaluation Walla Walla Watershed Management Partnership*, Walla Walla Watershed Management May 6, 2020. Website link: https://leg.wa.gov/jlarc/I-900/Documents/6_3_20%20Public%20Testimony%20-%20Walla%20Walla%20Watershed%20Management%20Partnership.pdf

⁶ Walla Walla Watershed Management Partnership and Department of Ecology, *Walla Walla Pilot Local Water Management Program Legislative Report to Implement 2SSB 5352*, October 24, 2020. Website link: https://drive.google.com/file/d/1HTiEf_wCDzsNNjCzhgHUDEIVfR3hli-/view

recommended returning “responsibility for water management in the Walla Walla Basin to the Department of Ecology while maintaining the benefits of the Partnership in the form of an advisory board that includes current membership.” The performance audit also recommended to Governor Inslee to pursue an interstate compact with Oregon to address watershed management in the Walla Walla watershed. The financial audit evaluation recommended that Ecology take the lead and perform project management functions for continued work in the watershed. The 2020 Legislative Report to Implement 2SSB 5352 provided the following recommendations:

- The strategic plan should encompass the entire watershed and involve all affected governments.
- Effects of watershed processes to the headwaters should be included in the strategic planning process.
- The strategic planning process should address the current challenges in managing water use across Washington and Oregon jointly.
- The organizational structure created to advise implementation of the strategic plan will need to include public and private entities and various local, state, and federal agencies and governments.
- For the upcoming biennium, funding is essential to complete the strategic plan, complete an Environmental Impact Statement of potential management options, support the U.S. Geological Survey groundwater study, and begin to fill critical data gaps.

The 2020 Legislative Report to Implement 2SSB 5352 also contained a recommendation for RCW 90.92 to sunset as scheduled in June 2021.

Ongoing bi-State flow study

The 2017 and 2019 Walla Walla River Bi-State Flow Study reports found that a large-scale water supply project is required to meet Walla Walla River instream flow targets for fish. Two large projects have been evaluated to date, a Columbia River pump exchange, and a new surface storage reservoir in tributary headwaters. At this time, Ecology is evaluating the feasibility of these two projects, but more information is needed to inform significant remaining data gaps. Under the current OCR agreement, the flow study steering committee continues to guide a consultant to help fill in these data gaps while simultaneously engaging in the WWW2050 planning process.

Walla Walla Basin next steps

Commence:

- Development of the Programmatic Environmental Impact Statement for the WWW 2050 strategic plan.
- Develop performance metrics for the WWW2050 strategies

Continue:

- US Geological Survey cooperative groundwater study
- Walla Walla River Bi-State flow study
- WWW2050 Strategic Plan Advisory Committee and Sub-Group meetings
- Guiding strategic plan development and implementation
- Secure funding sources for WWW2050 strategies

- Coordination amongst the Three-Sovereign Group⁷ to evaluate options for multi-state water resource management in the Walla Walla Basin
- Fill critical data gaps

Complete:

- WWW2050 strategic plan

Determine:

- Framework for local stakeholder participation and/or organizational structure
- Legislative changes or interstate compact needs to manage water resources in a bi-state basin by the Three-Sovereign Group

Icicle Creek Water Resource Management Strategy



Spanning across a portion of Chelan County from Josephine Lake to the City of Leavenworth, the 212 square mile Icicle Creek subbasin provides clean, cool water vital to the areas' fisheries, instream flows, and out-of-stream water users (Figure 5). Current water management practices are not keeping up with all of the needs in the subbasin.

The Icicle Creek Workgroup embarked on a plan in 2012 to meet the various water supply needs of the subbasin by developing a framework for increasing instream flows and habitat function while also addressing drought resiliency and climate change. As we flipped the calendar from 2019 to 2020, the workgroup moved from plan development into implementation.

To ensure future water supplies meet both instream flow and out-of-stream demands, Icicle Creek Water Resource Management Strategy (Icicle Strategy) co-leads, Ecology and Chelan County, continue moving forward on implementing a wide range of projects and actions identified under the Icicle Strategy's Final Programmatic EIS preferred alternative, Alternative 1. The Icicle Creek Workgroup is considering the actions identified in the preferred alternative through a set of guiding principles.

These principles include improving instream flows, sustainability of the Leavenworth National Fish Hatchery, domestic and agricultural water supply reliability, while enhancing Icicle Creek habitat, protecting tribal and non-tribal fish harvest, and complying with all federal, state, and local laws. In total, the Icicle Strategy goals will provide 31,958 ac-ft. of reliable water supplies to meet out-of-stream demands and to meet short-term (100 cfs) and long-term (250 cfs) instream flow goals.

Icicle Strategy Water Management Solutions

- Alpine Lakes Reservoirs Optimization, Modernization, and Automation
- Icicle-Peshastin Irrigation District Irrigation Efficiencies
- Cascade Orchards Irrigation Company Irrigation Efficiencies and Pump Exchange
- Domestic Conservation Efficiencies

⁷ The Three-sovereign Group consists of the states of Oregon and Washington, and the Confederated Tribes of the Umatilla Indian Reservation.

- Eightmile Lake Dam Reconstruction and Restoration
- Protect Tribal and Non-Tribal Fisheries
- Habitat Protection and Enhancement
- Instream Flow Rule Amendment
- Leavenworth National Fish Hatchery Conservation and Water Quality Improvements
- Fish Passage within Icicle Creek
- Fish Screening
- Water Marketing

Work currently underway

Fish Screen Replacement

The Icicle Peshastin Irrigation District (IPID) plans to modify the Snow Lake Trail Bridge so that it will be able to handle the size and weight of the equipment needed to replace and maintain a new fish screen located on the south side of Icicle Creek. Once complete, IPID will begin work on replacing the existing fish screens. The Leavenworth National Fish Hatchery (LNFH) is kicking off the environmental review process (NEPA⁸) required for the surface water intake and fish screen replacement projects. Finally, the City of Leavenworth fish screen replacement near the Boulder Field is currently underway and expected to be complete by the end of 2020.



City of Leavenworth Fish screen replacement work near Boulder Field

Photo credit: Lisa Pelly (Trout Unlimited), 2020.

⁸ NEPA – National Environmental Policy Act

Snow Lake

A part of the Icicle Strategy is the optimization, modernization, and automation of outlets and gates at seven Alpine Lakes⁹ (Square, Klonaqua, Eightmile, Colchuck, Nada, Upper Snow, and Lower Snow lakes) within the subbasin. Completed in 2019, Snow Lake valve replacement provides improved control of water releases to improve reliability for agriculture and stream flow for fish. Modernizing this aging infrastructure will allow for more precise water releases from these lakes, and provide optimal water storage management resulting in benefits to instream flow, fish, and agriculture needs during low flow periods on Icicle Creek.

Fish Passage

The Boulder Field, aptly named for the large rocks and boulders littering Icicle Creek near river mile 5.6, is a barrier for fish migration. Improving fish passage in this section of Icicle Creek will open over 20 miles of upstream fish habitat along the upper Icicle Creek and its tributaries. Currently, contractors are in the process of removing obstructions at the Boulder Field and constructing a step-pool fishway to allow for fish passage. The Boulder Field fish passage project is set for completion by the end of 2020.

Eightmile Lake Dam

Built during the 1920s, the Eightmile Lake Dam consists of rock, mortar, and dirt. A century of wear and tear from wildfires, storms, freezing waters, and flooding has degraded the dam to the point of compromised integrity. In 2017, the Jack Creek Fire burned over 4,600 acres of forestland abutting the dam. This fire damage altered the Eightmile Lake hydrology, resulting in faster and higher amounts of seasonal runoff putting additional pressure on the already compromised dam. In early 2018, IPID implemented emergency measures at Eightmile Lake Dam in response to the increased risk associated with additional run-off that could lead to a dam failure. This temporary fix requires a more permanent solution to assure the dam's safety well into the 21st Century.



Fish passage at Boulder Field

Photo credit: Lisa Pelly (Trout Unlimited), 2020.

⁹ The Alpine Lakes are managed by multiple agencies including U.S. Fish and Wildlife Services, U.S. Bureau of Reclamation, and the Icicle Peshastin Irrigation District.

On December 18, 2020, Ecology kicked off the project level environmental review process for the reconstruction and restoration of Eightmile Dam. Bringing the compromised and high hazard dam into compliance with current state dam safety standards not only provides security to downstream residents, it also allows for more precise future water releases. In turn, this project improves instream flows for fish and increases the security and reliability of water supplies for out-of-stream water users.

Anticipated work in 2021

Commence:

- Eightmile Dam reconstruction and restoration environmental review
- Snow Creek Trail bridge construction

Continue:

- IPID water conservation measures
- Alpine Lakes automation design
- Leavenworth National Fish Hatchery circular tank construction

Complete:

- Boulder Field Fish Passage
- IPID and Leavenworth Fish Screen replacements
- City of Leavenworth meter installation
- Leavenworth National Fish Hatchery Surface Water Intake Fish Screens and Fish Passage (SWISP) Project environmental review

Icicle Strategy Workgroup Members:

- Department of Ecology
- Chelan County
- Cities of Leavenworth and Cashmere
- Icicle-Peshastin Irrigation District and Cascade Orchard Irrigation Company
- Icicle Creek Watershed Council
- Yakama Nation
- Confederated Tribes of the Colville Reservation
- Cascadia Conservation District
- Washington Department of Fish & Wildlife
- Washington Water Trust
- Trout Unlimited
- NOAA Fisheries
- US Bureau of Reclamation
- US Fish & Wildlife Service
- US Forest Service
- Individual Agriculture Representatives

ICICLE STRATEGY

The purpose of the Icicle Creek Work Group ("Work Group") is to develop a comprehensive Icicle Strategy through a collaborative process that will achieve diverse benefits defined by all of the Guiding Principles below. The Work Group will use best available science to identify and support water management solutions that lead to implementation of high-priority water resource projects within the Icicle Creek drainage.

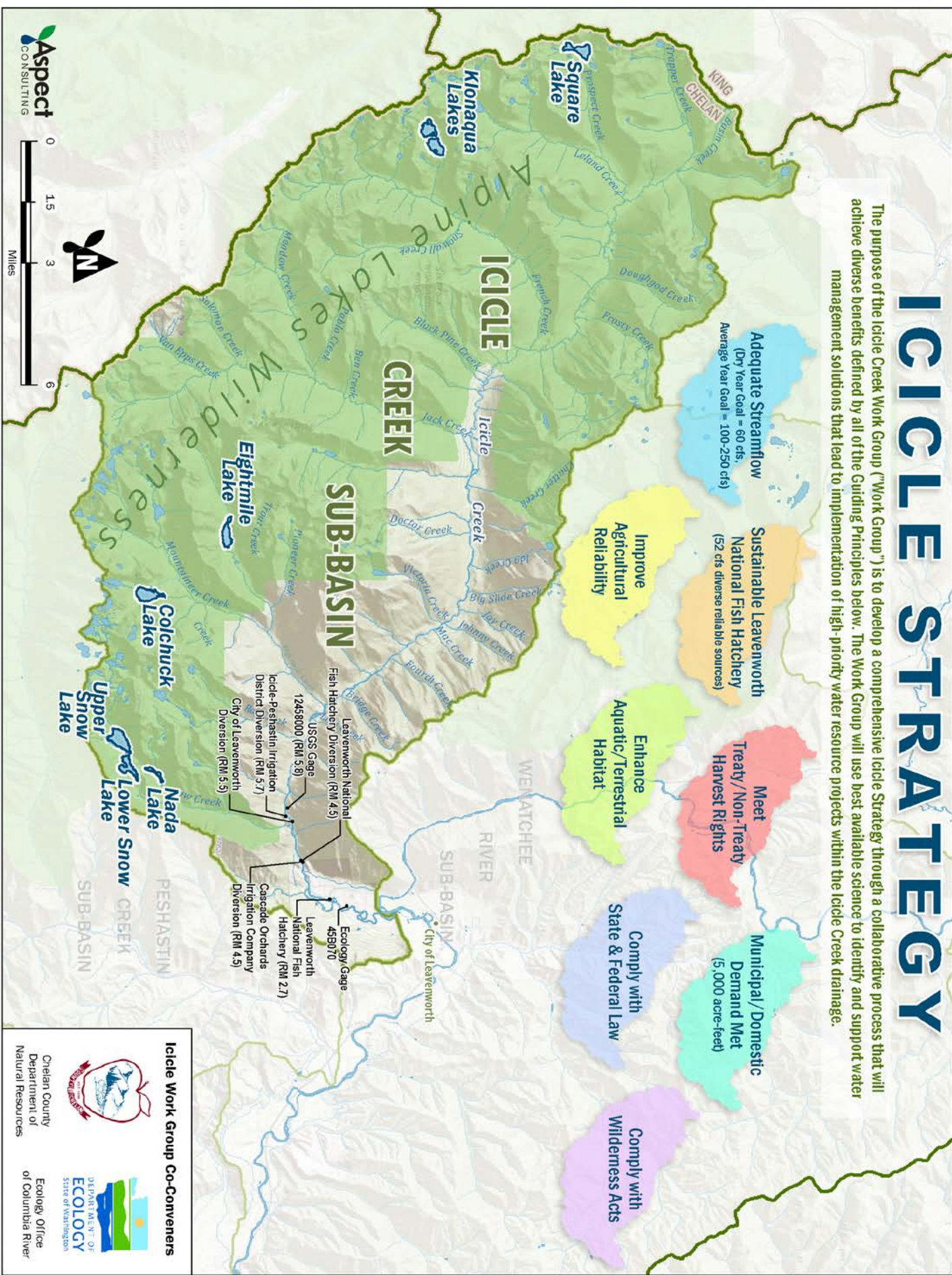


Figure 5 Map of the Icicle Creek Subbasin and the Eight Goals of the Strategy

Yakima River Basin Integrated Water Resource Management Plan



The Yakima River Basin Integrated Water Resource Management Plan (Integrated Plan) is the third phase of the federal Yakima River Basin Water Enhancement Project (YRBWEP). Building on work completed in the previous two YRBWEP phases, the Integrated Plan focuses habitat restoration and conservation, fish passage, enhancing on-farm water conservation efforts, providing additional water storage opportunities, tapping into existing water storage that are currently inaccessible, and improving water market driven reallocations across the Yakima River Basin. Laid out as a 35-year plan, the Integrated Plan consists of three separate phases: the Initial Development Phase, Middle Development Phase, and Final Development Phase. The Integrated Plan is currently in its Initial Development Phase, which focuses on projects that fall within all seven Integrated Plan elements.

Seven elements of the Integrated Plan

- Habitat/Watershed Protection and Enhancement
- Fish Passage
- Enhanced Water Conservation
- Structural and Operational Changes
- Surface Water Storage
- Groundwater Storage
- Market Driven Reallocation

Milestones achieved in 2020

- Achieving 55 percent of the 85,000 ac-ft. water conservation requirement set by the federal 2019 lands package (S.47¹⁰).
- Significant continued progress on Cle Elum Fish Passage Facility construction.
- Construction of shoreline protection commenced at Wish Poosh Campground.
- Release of 230 Bull Trout in Gold Creek and Kachess River, near their natal streams.
- Continuation of groundwater studies taking place throughout the Yakima River Basin.
- Decision, made by the Roza Irrigation District Board of Directors, to move forward the Kachess Drought Relief Pumping Plant floating pumping plant design.
- Completion of the Yakima Basin Managed Aquifer Recharge Assessment Final Report identifying potential MAR sites throughout the Yakima River Basin.
- Launch of the Integrated Plan website¹¹.

¹⁰ S.47 - John D. Dingell, Jr. Conservation, Management, and Recreation Act, 116th Congress (2019-2020)

¹¹ Integrated Plan website: <https://yakimabasinintegratedplan.org/>

Anticipated Work for 2021

- Release of the 2020 Summer Sockeye study report evaluating potential fish passage issues from the mouth of the Yakima River to Roza Dam.
- Provide support to Kittitas County on holding a 2021 Low Water Use and Heritage Garden Workshop that encourages local municipalities and residents to utilize low water use landscaping practices.
- Advance the Kachess Drought Relief Pumping Plan Tier 2 EIS towards completion.

Continue:

- Construction of Cle Elum Fish Passage remaining intakes and gates, secant drainage system installation, and tunnel work.
- Agricultural and municipal enhanced water conservation efforts.
- Shoreline stabilization efforts along the Cle Elum reservoir.
- Floodplain restoration work across the Yakima River Basin.
- Support for Market Driven Reallocation.
- Study groundwater recharge across the Yakima River Basin.
- Clear Lake Dam fish passage design.
- Shoreline stabilization work at two embankment areas along Salmon La Sac Road.



Installation of a juvenile fish intake ramp at Cle Elum Reservoir Fish Passage

Photo credit: Richard Visser (Reclamation), 2020

Water Development Projects

Aquifer storage and recovery projects



Aquifer Storage and Recovery (ASR) is a cost-effective water storage option currently pursued by an increasing number of municipalities across eastern Washington. ASR generally operates by capturing surplus surface water during times of high flows and injecting it into a local aquifer. The aquifer is a natural vessel that holds water with minimal additional infrastructure compared to a new surface water storage project. During times of low flows and droughts, this stored water is pumped back into a municipal system, providing water for out-of-stream end-user distribution, and relieving demands on surface water.

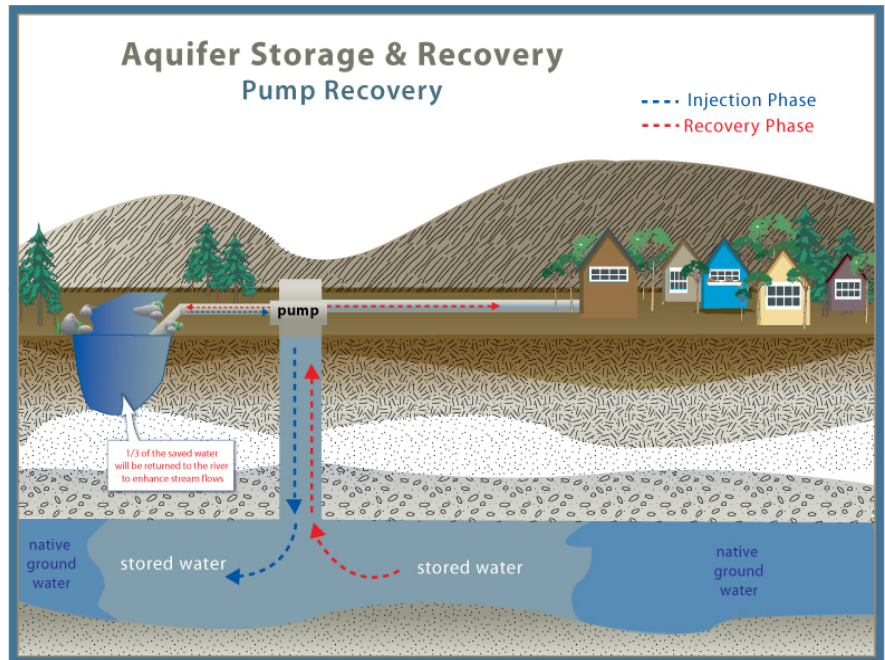


Figure 6 Aquifer Storage and Recovery Schematic

Many smaller municipalities in central Washington are looking into ASR as a secondary source of drinking water. In these areas, the shift of surface water dependence to artificially stored groundwater will take pressure off instream flows during times of low flows.

Objective

Explore and evaluate potential locations throughout the Columbia River Basin where local geologic conditions support ASR operations, provide permitting guidance and technical & financial assistance to develop suitable ASR systems.

Current ASR projects

City of Kennewick

The City of Kennewick (Kennewick) has taken advantage of its surface water and shallow groundwater rights as sources for its ASR project. The city is currently capturing surface water from the Columbia River and injecting it into the Wanapum Basalt aquifer. As with all similar ASR projects, water is only diverted into the aquifer during periods of higher flows on the Columbia River (October-May) and pumped back out to the end-user during lower flows (May - October) when demands are at their highest.

Now that Kennewick's ASR project is permitted and pilot testing is complete, the city is authorized to capture up to 1,458 ac-ft. (October-May) and recover up to 1,341 ac-ft. (May-October)¹². At this time, the city is working on the annual monitoring and reporting requirements as specified in its permit provisions.

Othello

The City of Othello completed its pilot testing of Well 3R as a municipal water source. With positive preliminary results, the city looks to move its ASR testing location to Well 8 which is closer to source water (Columbia Basin Project canal water). The second phase of this study, which is currently under development and review, includes well testing at a new location and water quality testing of Reclamation's canal water.

Quincy

The City of Quincy completed its aquifer characterization analysis and submitted the final report to OCR in March 2020. Results of this characterization analysis found that this site has high potential for use as an ASR project location. Quincy's ASR project is one part of a larger study focused on how the city can remove industrial wastewater discharge from the irrigation canal managed by Reclamation. The city will begin its ASR cycle tests in the future.

West Richland

The City of West Richland is working on the first phases of an ASR feasibility study for use of City well number 10 for storage and recovery. They have completed a well assessment and rehabilitation of well 10 and will be performing an aquifer test in 2021. Next steps for this project are described in Phase 2 of the 2019 Implementation Plan¹³. The city will begin initial ASR pilot testing once the preliminary permitting process is complete.

Pasco

Currently in its feasibility phase, the City of Pasco's proposed ASR project could qualify to meet water supply demands during the dryer months. If the process of characterizing the local hydrogeology and analyzing Pasco's permitting legal framework shows viable results, the city will move to the next project phase of identifying ASR well sites and source water.

Natural Resources Damage Assessment

OCR is supporting the State's Natural Resource Damage Assessment Team as they work towards determining how the State should address Groundwater service losses at the Hanford site. This support includes providing background information and context on OCR's water supply efforts, and demand and cost for water storage and water supply projects in the basin with an emphasis on the Hanford area and downstream. By providing information on water demands and the costs of water supply projects in the basin, OCR anticipates that this work will support funding for future water supply and storage projects included as potential restoration projects.

¹² The amount of water recoverable from an ASR project are evaluated on a site specific case-by-case basis. This is due to potential operation loss or loss due to gradient/groundwater flow, ASR projects are usually not allowed to recover 100% of captured water.

¹³ The full report can be found online at: <https://apps.ecology.wa.gov/publications/SummaryPages/1912005.html>

Proposed Switzler Reservoir Storage Project



Located in Switzler Canyon (Figure 7) in Benton County, the proposed Switzler Reservoir Storage project (Switzler) will require the construction of a 325 ft. high embankment dam, pipeline, and pumping station to divert water from the Columbia River during times of high flows. The reservoir will inundate approximately 415 acres of uplands, creating a surface storage reservoir capable of holding up to 44,000 ac-ft. of water. Additionally, this project will provide new economic opportunities by providing water for new out-of-stream municipal and agricultural uses. At this time, project co-leads Ecology, and Benton and Klickitat counties, continue working on the scoping process for the proposed Switzler Reservoir Storage Project (Switzler) Environmental Impact Statement (EIS). Once scoping is complete, project co-leads will complete the data gap analysis associated the EIS process and begin to evaluate alternatives and potential impacts associated with this project.

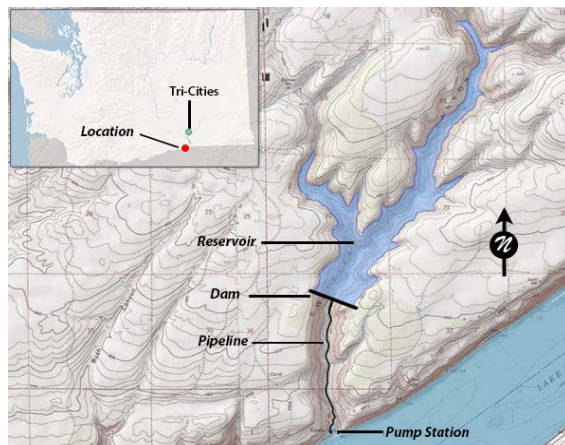


Figure 7 Location Map of the Proposed Switzler Reservoir

Water allocation

- Instream flow augmentation on the Columbia River Mainstem below McNary dam through targeted reservoir releases.
- Mitigation for irrigation of 12,000 to 28,000 acres of new farmland.
- Mitigation for supplying water for up to 1,000 new homes.
- Mitigate potential impacts of interruptible water right curtailments on the Columbia River Mainstem.

Pasco Basin



With the development of the Columbia Basin Irrigation Project by the U.S. Bureau of Reclamation (Reclamation), the groundwater characteristics within the project boundaries have undergone significant change, including commingling of natural and “artificially stored” groundwater. Currently, the aquifers underlying the Pasco Basin¹⁴ are storing large quantities of water as a result of long-term irrigation from the Columbia Basin Project. In 2016, The U.S. Geological Survey quantified the amount and location of commingled groundwater in the Pasco Basin area. One complication in allocating Pasco Basin groundwater is the presence of both naturally occurring (state) and artificially stored (federal) groundwater. Therefore, Ecology and Reclamation have agreed to pursue a framework on how to co-manage this water supply. Reclamation and Ecology (both OCR and Water Resources) are working together to identify quantities of commingled groundwater that may be suitable for future beneficial uses.

¹⁴ WAC 508-14-030

Developed Water

Water right permitting process

Each year, the OCR water right permitting team receives, evaluates, and processes numerous applications for new permanent and temporary water rights, and change of use and transfer applications for existing water rights. OCR permit writers provide clear communication throughout the entire permitting process including pre-application consultation and guidance through the water right permitting application process. In effort to collect detailed and relevant project information, the Water Resources program (WR) and OCR developed a new water right permit application form and guidance document¹⁵. This effort improves the service to customers and water users by gathering additional information at the initial permit application step.

Since 2006, OCR has processed 210 applications (Figure 8), which calculates out to an average of 15 new and/or change applications and issues 10 permits annually. Issuing new permits on tributaries to the Columbia River can have greater impacts to senior water right holders, instream flows, and fish. The majority of the permits issued from OCR are on the Columbia River mainstem or its tributaries.

Water demands continue to grow in eastern Washington, as does the need to develop more supply for current and future demands. More information on projected water supply demands for the next 20 years is available in OCR's Long-term Water Supply and Demands Forecast¹⁶ that details water demands.

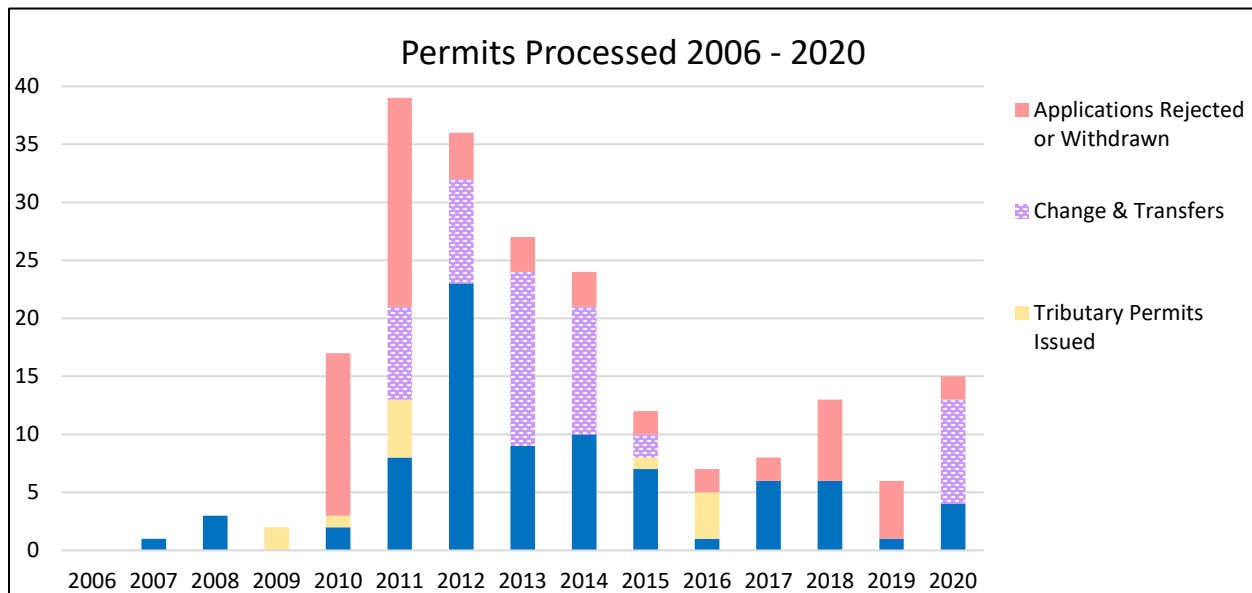


Figure 8 OCR Permits Processed from 2006-2020

¹⁵ Form and guidance document can be found on Ecology's website at <https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Water-right-permits>

¹⁶ OCR's 2011 and 2016 Long-term Water Supply and Demand Forecast Reports can be found on Ecology's website at <https://ecology.wa.gov/About-us/Get-to-know-us/Our-Programs/Office-of-Columbia-River/Office-of-Columbia-River-Legislative-reports>

Lake Roosevelt Incremental Storage Release Program



The Lake Roosevelt Incremental Storage Release Program (Lake Roosevelt Program) provides 132,500 ac-ft. of water by tapping into water already stored behind Grand Coulee Dam. During normal water years, 82,500 ac-ft. of Lake Roosevelt water is made available for augmenting instream flows, removing groundwater dependence in the Odessa Subarea, and providing new municipal and industrial (M&I) uses. To help OCR offset development costs associated with this program, permit holders incur a fee of \$35 per ac-ft. annually.

During drought years, an additional 50,000 ac-ft. is released to minimize drought-related impacts to instream flows and increase water supplies for those Columbia River interruptible water right holders. Interruptible water rights are junior in priority date to the Columbia River instream flow rule (WAC 173-563) and first in line for curtailment in times when the Columbia River falls below minimum instream flow values¹⁷.

In 2020, Ecology has been working with the Confederated Tribes of the Colville Reservation and the Spokane Tribe of Indians, to refresh existing agreements that provide mitigation for lost power generation caused by the water releases for the Lake Roosevelt Program.

Drought planning

The Washington State Drought Contingency Plan¹⁸, approved by Congress in April 2020, provides State agencies tasked with drought response a framework for responding to a declared drought by defining known drought vulnerabilities and identifying specific mitigation and appropriate response actions. This plan also streamlines the State's request for federal drought relief by eliminating the Reclamation and Bonneville Power Administration coordination requirement; streamlining the release of the 50,000 ac-ft. of water provided by the Lake Roosevelt Program during drought years. The next step will be for Reclamation and Ecology to agree on the facets of the Lake Roosevelt drought releases.

Lake Roosevelt water at a glance

Annual Water Releases

- Odessa Subarea - 30,000 ac-ft.
- Instream Flows - 27,500 ac-ft.
- Municipal & Industrial - 25,000 ac-ft.

Drought Year Water Releases

- Instream Flows - 17,000 ac-ft.
- Interruptible Water Right Holders - 33,000 ac-ft.

¹⁷ WAC 173-563

¹⁸ Updated Washington State Drought Contingency Plan can be found online at https://drought.unl.edu/archive/plans/drought/state/WA_2018.pdf

Objectives

- Permit all 25,000 ac-ft. of water for municipal and industrial uses.
- Provide drought-year-water to interruptible water right holders.
- Provide surface water for the Odessa Subarea.
- Provide water for augmenting instream flows.
- Meet our mitigation obligations.

Permits issued to date

As of 2020, 15,284 ac-ft. (61 percent) of the 25,000 ac-ft. available for M&I uses has been permitted, leaving 9,761 ac-ft. available for new M&I uses.

- Quad cities (Pasco, Kennewick, Richland and West Richland) – 4,014 ac-ft.
- Pasco – 5,000 ac-ft.
- All others permits (46 total) – 6,270 ac-ft.

Ongoing work conducted in 2020

- Soliciting interests from new water right applicants.
- Processing new applications as they come in.
- Streamlining the process of providing water to interruptible water right holders during times of drought, as described above.

Sullivan Lake Water Supply Project



Located approximately 11 miles from the Canadian border in Pend Oreille County, Sullivan Lake hosts scenic views and year round fishing. By simply retiming the release of water already held in Sullivan Lake from the wetter months of the year (October through December) to the drier months (June through September), OCR's Sullivan Lake Water Supply Project provides 14,000 ac-ft. of water for out-of-stream uses (9,333 ac-ft.) and instream benefits (4,667 ac-ft.).

As directed by RCW 90.90.110, one-third of this developed water (4,667 ac-ft.) is set aside for augmenting instream flows and is protected from Sullivan Lake to the mouth of the Columbia River. The other two-thirds (9,333 ac-ft.) are available for out of stream uses in northeast Washington, specifically irrigation (4,666 ac-ft.) and municipal, domestic and industrial uses (4,666 ac-ft.). To help OCR offset development costs associated with this program, permit holders incur a one-time fee of \$1,500 per ac-ft. (or a repayment plan of \$60 per ac-ft. for 25 years).

Using a grant from Water Resources Streamflow Restoration Program, Steven's County collaborated with the Avista Corporation to acquire 566.1 ac-ft. of water rights under the Sullivan Lake Water Supply Project. With the Avista Corporation switching their water source from Waitts Lake to Sullivan Lake water, benefitting Waitts Creek, a tributary of the Colville River. This project is one example of how OCR and Water Resources are working together to solve complex water supply needs in eastern Washington.

Sullivan Lake water at a glance

Annual Water Releases

- 4,667 ac-ft. - Instream flows
- 4,666 ac-ft. - M&I
- 4,666 ac-ft. - Irrigation

Objectives

- Allocate the 9,333 ac-ft. of water developed through this project for municipal, industrial, and irrigation uses.

Stipulations

As outlined in the statute, the out-of-stream uses for Sullivan Lake water are limited to Douglas, Ferry, Lincoln, Okanogan, Stevens, and Pend Oreille counties in northeast Washington.

Permits issued to date

- Irrigation - Two permits totaling 993 ac-ft.
- Municipal - One permit for 1,100 ac-ft.

In progress 2020

- One irrigation permit, requesting to fully allocate the remaining 3,473 ac-ft.
- Two M&I permits totaling 631 ac-ft.

Port of Walla Walla Lease Program



The Port of Walla Walla owns 4,170 ac-ft. of water with a designated future use for municipal and industrial service associated with a large proposed business park. During the construction and development phase of this business park, the Port of Walla Walla entered into a lease agreement with OCR to allow the water rights to be temporarily leased until the Port of Walla Walla puts the quantity to beneficial use within the business park.

The Port of Walla Walla Lease Program provides 4,170 ac-ft. of irrigation water on a temporary basis. OCR issues short-term permits backed by the leased water, which allows these permitted water users adequate time to find permanent water sources, and/or brings unauthorized water use into compliance. In an effort to offset OCR's cost to develop this water, permit holders incur a cost-recovery fee of \$120 per ac-ft. per year.

To date, four short-term permits issued by OCR fully allocate the water provided through this program. All four short-term permits issued for this water are currently set to expire on November 30, 2020 or sooner. OCR and the Port of Walla Walla have agreed to extend the contract for this lease program through December 31, 2030 with an extension option of an additional five years.

Port of Walla Walla water at a glance

- 4,170 ac-ft. for out-of-stream uses

Objectives:

- Provide a temporary water supply
 - To allow water users time to find permanent water sources.
 - To bring unauthorized water users into compliance.

Next steps

With the recent extension of the lease between OCR and the Port of Walla Walla, OCR will evaluate the expiring short-term permits and extend these permits as needed.

McNary Pool



In 2019, Ecology clarified the interpretation and intent of the 2020 date noted in WAC 173-531A-040 and -050, which reserves water from the John D. McNary Pool (McNary Pool) for irrigation and municipal uses. Ecology determined it would be beneficial to clarify the date noted within WAC 173-531A-040(1) as a projected date that water under the reservations would be fully allocated and not an expiration date. The clarification of this date allows Ecology to continue permitting McNary Pool water, which is reserved for irrigation of 330,000 acres of farmland and 26,000 ac-ft. for future municipal uses.

Trust Water and Instream Flows

Maintaining healthy instream flow levels is vital to improving and sustaining salmonid populations while providing water for new municipal uses in rural areas. Washington's Streamflow Restoration law (RCW 90.94), authorizes competitive grant funding for streamflow restoration projects. OCR is working with a few counties in need of water banking solutions by identifying potential policy pathways and planning optimization strategies for utilizing existing water supplies needed for mitigation purposes.

Ecology's Trust Water Rights Program allows the donation or transfer of perfected water rights in to the trust program for future uses without risking relinquishment of a water right. While in trust, this water benefits instream flows and/or groundwater mitigation within the area of their point of diversion. Even placing water into temporary trust allows water to remain instream, providing flow benefits for fish. OCR currently has four proposed temporary trust water donations totaling 696 ac-ft. per year.

Water banks provide water right holders the ability to buy, sell, or lease water from one another on a temporary or permanent basis. The ability to move water between water right holders, especially during a drought year, in a streamlined and timely manner ensures water supplies get to where they are needed most. Movement of water rights through this mechanism often provides water for interruptible water holders to minimize drought impacts, and can even allow communities to grow by providing water for new out-of-stream uses. Water banks are becoming more prominent as many water supplies are over appropriated.

A conservation project in the Methow Valley is one example of how modernizing an irrigation system can benefit both water users and instream flows. The Barkley Irrigating Company (BIC) implemented a series of water conservation actions that include moving a point of diversion on the Methow River 3.5 miles downstream and replacing their historic open ditch canal with pressurized pipe. Moving their historic point of diversion downstream 3.5 miles eliminates four-miles of BIC's leaky open ditch canal and increases instream flows within this reach of the Methow River. Ecology and BIC are working on a Trust Water Agreement to place the water savings achieved by the downstream move and canal piping in the Trust Water Rights Program. Additionally, OCR is negotiating with BIC to purchase approximately 90 ac-ft. of the water savings for mitigating future water supply demands locally.

Improving Statewide Drought Resiliency

In 2015, Washington State experienced one of its worst droughts¹⁹ in decades. The state estimated this drought resulted in \$633 to \$773 million in economic losses from agriculture industry alone²⁰. It became apparent the state's existing drought contingency plan, published in 1992, was out of date. In an effort to minimize future economic losses resulting from drought, Ecology, the state's lead agency on drought response, convened a Drought Contingency Planning Task Force charged with updating the State's drought contingency plan to reflect response actions necessary to counter climate change impacts and drought severity.

With the help of a federal WaterSMART grant, Ecology's drought task force published an updated Washington State Drought Contingency Plan (DCP)²¹ in 2018. The DCP provides state agencies responsible for responding to water supply shortages associated with declared droughts with a suite of emergency drought response tools. These tools include the ability to issue emergency water right permits, emergency water right transfers, and provide funds to public entities for emergency infrastructure needs.

To date, OCR has developed over 50,000 ac-ft. in water supplies, through both Lake Roosevelt Incremental Storage Release and Sullivan Lake Water Supply programs that benefit instream flows for fish and hydrating interruptible water right holders during times of drought in eastern Washington. Additionally, improved water management planning and water supplies achieved through the various projects and programs under Integrated Plan aid in improving drought resiliency across the Yakima River Basin.

Budget Sustainability

Ecology's Office of Columbia River's success in developing water supplies is due, in part, to the \$300 million general obligation bonds authorized by the legislature. This stable funding source provided OCR with the means to implement large-scale water delivery in the Odessa subarea, water conservation measures, pump exchanges, and basin-wide integrated water management plans.

¹⁹ As defined in state statute RCW 43.83B

²⁰ Washington State Department of Agriculture, 2015 Drought and Agriculture, 2017, AGR PUB 104-495 (N/2/17)

²¹ Updated Washington State Drought Contingency Plan can be found online at:

https://drought.unl.edu/archive/plans/drought/state/WA_2018.pdf

With these funds fully obligated at the end of the 2017-2019 biennium, OCR now operates under a pay-as-you-go (pay-go) funding model. Table 1 breaks down Columbia River Basin Water Supply Development funding sources include previous biennia expenditures, current appropriations, and requested capital budget funds for the upcoming biennium. While pay-go is historically one of the State's most common methods to fund capital projects, it does not provide the funding security associated with the previously dedicated general obligation bonds. Under pay-go, project funds must be approved for appropriation by the legislature every biennium. Long-term projects spanning multiple biennia funded by this method absorb some level of risk without the entire funding package in place at the beginning of a project.

Table 1 Breakdown of Columbia River Basin Water Supply Development (CRBWSD) Funding Sources

	CRBWSD Account	CRBWSD Recovery Account	Other State Funding Sources	TOTAL
Prior Biennia Expenditures	\$200,000,000	\$4,200,000	\$16,800,000	\$221,000,000
2019-2021 Appropriations		\$2,400,000	\$37,600,000	\$40,000,000
2021-2023 Budget Request		\$2,000,000	\$38,000,000	\$40,000,000
TOTAL	\$200,000,000	\$8,600,000	\$92,400,000	\$301,000,000

As authorized under RCW 90.90.010(6), OCR continues to enter into water service contracts with those benefitting from water developed through one or more of OCR's water supply projects and programs. Being able to recover development costs- associated with water supply projects allows for continued reinvestment into the program. Such agreements make project development more affordable for the end-user who can spread financing costs out over time, providing potential water supply solutions for a wide range of water users including municipalities, the industries, small developers, farmers, and other organizations.

With many of OCR's water supply projects mirroring local and regional water supply goals, OCR is able to tap into smaller funding sources, including other Ecology programs. For instance, water conservation and habitat restoration projects not only meet OCR's mandates; they may also qualify for grants managed by Water Resources (Streamflow Restoration Program), Shorelands and Environmental Assistance Program (Floodplains by Design), Water Quality (Centennial Clean Water Program), and other competitive funding opportunities. Additional long-term funding opportunities, such as public-private partnerships and federal assistance programs, are also explored.

With the success of multiple water supply projects under our belt, there remains unmet water supply demand throughout the Columbia Basin. The governor's budget for the 2021-2023 biennium includes a \$40 million capital budget for OCR and \$42 million for Yakima Basin Integrated Plan implementation. A portion of OCR's budget is set aside to bring on one full time employee who will focus on Integrated Plan contracting and project management as our project portfolio continues to grow.

Public Outreach and Partnerships

Strong partnerships and continuous community engagement are the backbone of successful implementation of innovative water supply solutions across Eastern Washington. The Columbia River Policy Advisory Group (CRPAG), Yakima River Basin Water Enhancement Project Workgroup (Integrated Plan Workgroup), the Icicle Strategy Workgroup meet on a quarterly basis to discuss policy, project development, and budgeting concerns associated with implementing new water supplies for Eastern Washington. Similarly, a new workgroup, the Walla Walla Water 2050 Strategic Plan Advisory group formed over the past year to tackle strategic plan development for the bi-state basin.

These groups are comprised of representatives from a wide range of stakeholders including federal, state, local, and tribal governments, as well as representatives from local municipal, industrial, agricultural interests, and environmental groups, and other interested stakeholders. These meetings provide an opportunity for open and safe dialogue to discuss concerns and highlight successes. In addition, public participation is actively encouraged at these quarterly meetings allowing for greater community input so we can better understand their concerns, needs, and interests. OCR continues to build and nurture these partnerships using public outreach to ensure we are able to provide the best water supply development results possible.

In addition to these quarterly workgroup meetings, OCR sponsored the 2019 Lake Roosevelt Forum Conference. These forums & conferences, much like OCR's own workgroup meetings, bring together Lake Roosevelt stakeholders to discuss how to meet regional environmental, economic, recreation, and cultural water supply needs. We look forward to learning more at future forums and conferences, from hydropower to shoreline management to the Columbia River Treaty.

When COVID-19 began to affect daily operations across the state; OCR moved numerous stakeholder engagement meetings, such as CRPAG, Integrated Plan, Icicle Creek Strategy, and Walla Walla Water 2050 workgroups, to online platforms beginning in March of 2020. This provided a way to maintain strong relationships with various partners, share information, minimize project delays, and kept staff and partners safe during this pandemic. Until conditions are considered safe for in person interactions, meetings will continue to be held on virtual, online platforms.

Columbia River Treaty

The Columbia River Treaty, signed in 1961, is an agreement between Canada and the United States on the development and operation of dams in the upper Columbia River basin. The management of these dams provides adequate water flows for navigation, flood control, hydropower, and irrigation needs in both countries. Current negotiations between Canada and the U.S. highlight the increasing concern over reducing the risks of flood events while maintaining reliable water flows for power generation, instream flows for fish, and other ecological benefits.

Appointed as the lead negotiator by the U.S. State Department in 2017, Jill Smail continues formal negotiations on behalf of the U.S. with the expectation of reaching an agreement within the next several years. As many of OCR's long-term water supply goals hinge on the outcomes of these treaty talks, and the federal Columbia River Power Supply System EIS, OCR will continue to be an active participant in the development of regional recommendations for the updated treaty.

Science Driven Decisions

Monitoring and research drive OCR's science-based decision-making as we create and deliver water supplies. Ecology recognizes that sufficient data collection and analysis are fundamental in making clear and concise decisions regarding water supply project development at local, regional, and watershed-wide scales. This section discusses several examples of how we use the most up-to-date research and data collection technology to guide OCR's water supply project development process.

LIDAR

Light Detection and Ranging (LIDAR) mapping uses a series of pulse lasers, scanners, and GPS receivers that can "see" through vegetation and other surface "interference" to create 3-D high-resolution surface elevation (topographic) and water depth (bathymetric) maps. Washington's Department of Natural Resources' statewide LIDAR mapping project has already shown to be very informative by providing publicly available maps of complex riverbed landscapes, including large portions of the Columbia River, Teanaway River, and Yakima River.

OCR sees great value in DNR's LIDAR project as this tool helps provide a clearer picture of complex riverbed landscapes that overlap where potential water supply development project occur throughout eastern and central Washington. Currently available DNR LIDAR maps can be found at <https://lidarportal.dnr.wa.gov/>

Seismic technologies

OCR has partnered with DNR on the Rilette project, located south of the Columbia River and northwest of Banks Lake in Douglas County. Specifically advancing a seismometer and geophysics pilot program that uses emerging geophysical technologies to interpret local subsurface composition without the need to drill a network of monitoring wells. Data gained from this pilot study will fill in data gaps within the current Rilette well network. Subsurface data gained from this evaluation will help refine aquifer parameters providing valuable insight for aquifer storage and recovery feasibility in the area.

Much like Rilette, the Lincoln County Conservation District (LCCD) is also collecting local groundwater data. This data supplements OCR's long-term baseline data for the region and will refine hydrogeologic models, identify groundwater flow trends, and identify local groundwater availability.

Projecting future water supplies and demands

Every five years OCR updates the Columbia River Basin Long-term Water Supply and Demand Forecast to anticipate water supplies and demands for the next 20 years. OCR's partners, Washington State University (WSU), University of Utah (UU), Aspect Consulting, and the State of Washington Water Research Center, take advantage of the most recent data collection, data analysis, and modeling technology to calculate potential changes in available water supplies and demands as they relate to climate change impacts, improved irrigation efficiencies, and other factors. The next Columbia River Basin Long-term Water Supply and Demand Forecast will be issued November 2021.

Anticipated 2021 Milestones

- Icicle Creek Water Resource Management Strategy
 - Implement initial actions laid out in the Icicle Creek Water Resource Management Strategy Programmatic Environmental Impact Statement.
 - Start Icicle Peshastin Irrigation District's (IPID) bridge modification.
 - Continue working on fish screen replacements for the City of Leavenworth and IPID and the Leavenworth National Fish Hatchery.
 - Move the Eightmile Dam reconstruction Environmental Impact Statement (EIS) forward.
 - Install new water meters for the City of Leavenworth.
- Proposed Switzler Reservoir Storage Project
 - Complete the data gap analysis associated with the proposed Switzler Reservoir Storage Project.
- Odessa Groundwater Replacement Program
 - Deliver water through the EL 47.5 system in March of 2021.
 - Complete 30 percent design work on EL 22.1, and 79.2 systems.
 - Complete radial gate installation on all remaining siphons and wasteways for East Low Canal expansion.
- Walla Walla
 - Continue moving the U.S. Geological Survey groundwater study forward with the State of Oregon.
 - Continue moving the Walla Walla River Bi-State flow study forward.
 - Continue moving the Walla Walla Water 2050 strategic plan forward.
- Aquifer Storage and Recovery
 - Commence the City of West Richland initial ASR aquifer testing.
 - Continue moving the City of Pasco's ASR local hydrogeology & feasibility study analysis forward.
 - Continue to enhance ASR guidance to the regulated community on aquifer storage permitting in partnership with the Water Resources and Water Quality Programs.
- Pasco Basin
 - Reach consensus on a co-management framework with Reclamation on the distribution of naturally occurring and artificially stored groundwater within the Pasco Basin.

Conclusion

The annual Columbia River Basin Water Supply Inventory Report summarizes OCR's success in developing water supplies and milestones during 2020. This year has been unlike any other, primarily due to a global pandemic, which affected all of our work. Still, our ability to move projects forward is testament to the commitment by our partners and staff, who quickly adapted from in person communications to virtual platforms and electronic document processing. As a result, very few meetings, project deadlines, or time commitments were affected by in-person restrictions, despite statewide health and safety restrictions.

We are excited to see how water supplies developed through our projects and programs continue to meet out-of-stream demands while maintaining healthy instream flows on Columbia River mainstem and its tributaries. As directed by RCW 90.90.020, one-third of developed water will remain instream, providing benefits to fish and fish habitat. The remaining two-thirds of developed water is allocated for out-of-stream uses such as irrigation, domestic, municipal industrial storage uses, providing alternate sources for the Odessa groundwater users and minimizing curtailment of interruptible water rights during times of drought.

In our aggressive pursuit to develop water supplies to benefit both instream and out-of-stream uses, our office has developed 475,689 ac-ft. of water supplies, 122,528 ac-ft. for maintaining healthy instream flows for fish, and 353,161 ac-ft. for meeting out-of-stream demands. Over the next 10 years, we anticipate adding over 290,000 ac-ft. of water supplies to meet future demands across eastern Washington. We look forward to accomplishing this through the construction of new surface water storage reservoirs (Switzler), continued ASR pilot studies that identify sites for feasible groundwater storage projects, on-going water conservation measures, and implementation of integrated water supply solutions in the Walla Walla and Yakima River basins, and the Icicle Creek Subbasin.

Much of our success in developing reliable water supplies hinges upon strong partnerships across eastern Washington. These partnerships provide an important foundation of open communication, allowing for the exchange of ideas, building on lessons learned, identifying parallel water supply development efforts and funding sources that can be combined to provide optimal and cost-effective water solutions. The watersheds of eastern Washington are unique in not only landscape, but also in available water development opportunities. To support agricultural needs, recreational demands, and residential growth, continued water supply development must occur. Parallel to the needs of farms and families, the instream flow commitment needs of local rivers and streams support improved fish habitats. Over the years, our office has found that integrated water solutions implemented locally are key to overcoming obstacles. It is this ability to adapt and see the opportunity for change to meet the unique needs of an individual basin that make our office a model for water management for others to follow, nationally and internationally.

Over the next year, we will continue to realize our vision of preserving and enhancing the standard of living for the people of Washington by strengthening economic conditions and restoring and protecting the Columbia Basin's unique natural environment. By developing water supplies for families, farms and fish, we not only meet our mission, but also bring other partners alongside to meet their objectives, and work toward future successes.