Oregon's Integrated Water Resources Strategy

2025-2031

Draft 2

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Office of Governor
TINA KOTEK

A Message from Governor Kotek

Dear Oregonians:

There is no more essential public resource than water.

Access to safe, clean drinking water should be a given for all Oregonians in every part of the state. The reality of growing water scarcity requires increased urgency in addressing water management and policy.

Our most vulnerable communities, our working and natural lands, our fish and wildlife, and our rivers, lakes and streams all face an existential threat, as the relentless march of climate change and other challenges test our resolve to protect that which sustains us.

Our state's Integrated Water Resources Strategy is the roadmap to both increasing our understanding of our water resources and improving the State's capacity to manage water. With water allocation and management policies in particular, there are many challenges - both with resource limitations, and with long-held practices and expectations that are now colliding with very real constraints on our existing water supply.

In the face of these pressing challenges, we must act—decisively, urgently, and in true partnership to protect and sustainably manage our surface- and groundwater reserves for generations to come. This Strategy charts a proactive pathway forward to advance strategic actions that will improve management of Oregon's water resources for the benefit of our communities, environment and the economy.

As stewards of our air, water, and landscapes, we cannot stand idly by and watch our beautiful and productive landscapes deteriorate in front of us. It is incumbent on us to act boldly, embrace creative, new solutions, and take strong action to enhance the resiliency of our natural resources and communities. The actions laid out in this Strategy are critical to achieving our shared goals and advancing water security for all Oregonians.

Governor Tina Kotek

The Integrated Water Resources Strategy

Water is a public resource essential to Oregon's communities, ecosystems, and economy. In 2009, the Oregon Legislature recognized that the protection and management of water and responsible use of public funds requires an integrated strategy, and directed the state to develop an Integrated Water Resources Strategy (Strategy).

The first Strategy, released in 2012, inspired many improvements in water resources data collection, management, planning, and funding for water projects.

The impact of climate change on our water has grown exponentially since 2012. **The 2025 Strategy elevates the role of climate change and identifies actions needed for mitigation, adaptation and resilience.**

The fundamental purpose of the Strategy remains the same: to better understand and meet Oregon's instream and out-of-stream water needs — environmental and consumptive — including water quantity, water quality, and ecosystem needs. The 2025 Strategy updates the wording of some objectives, critical issues, and adds two new actions, identifying areas where incentives or new policies could serve as powerful tools for progress.

This document serves as the introduction of the state's 2025 Integrated Water Resources Strategy.

KEY MILESTONES

2009
State directed to develop Strategy

2012
State releases first Strategy

2017
State releases second Strategy

2025
State releases third Strategy

The Strategy Objectives

Objective 1: Understand Oregon's Water Resources

Chapter 1

*With **more than 100,000 miles of rivers and streams, 360 miles of coastline, and more than 1,400 named lakes,** Oregon is renowned for its water. We have a continued need to understand our water resources: the form and timing of precipitation, the amount and timing of streamflow, the location and volume of groundwater, water quality, the condition of our ecosystems, and the overall accessibility of water to communities and the environment.*

Objective 2: Understand Instream and Out-of-Stream needs

Chapter 2

*A clean and reliable source of water is critical for meeting our basic human needs and for supporting Oregon's economy. Thousands of businesses and industries rely on water in some form, to irrigate a crop, to manufacture a product, or to provide a service or experience. **Without a better characterization of water use today, the state cannot adequately plan to meet these needs sufficiently and sustainably in the future.***

Objective 3: Understand the Pressures that Affect Our Needs and Supplies

Chapter 3

*Oregon must prepare for pressures and unexpected challenges that affect our instream and out-of-stream water needs and supplies. The Strategy offers both climate mitigation and resiliency actions. Oregon Revised Statute 536.220 specifies that the Integrated Water Resources Strategy **must consider climate change, land-use change, and population growth.***

Objective 4: Meet Oregon's Instream and Out-of-Stream Needs

Chapter 4

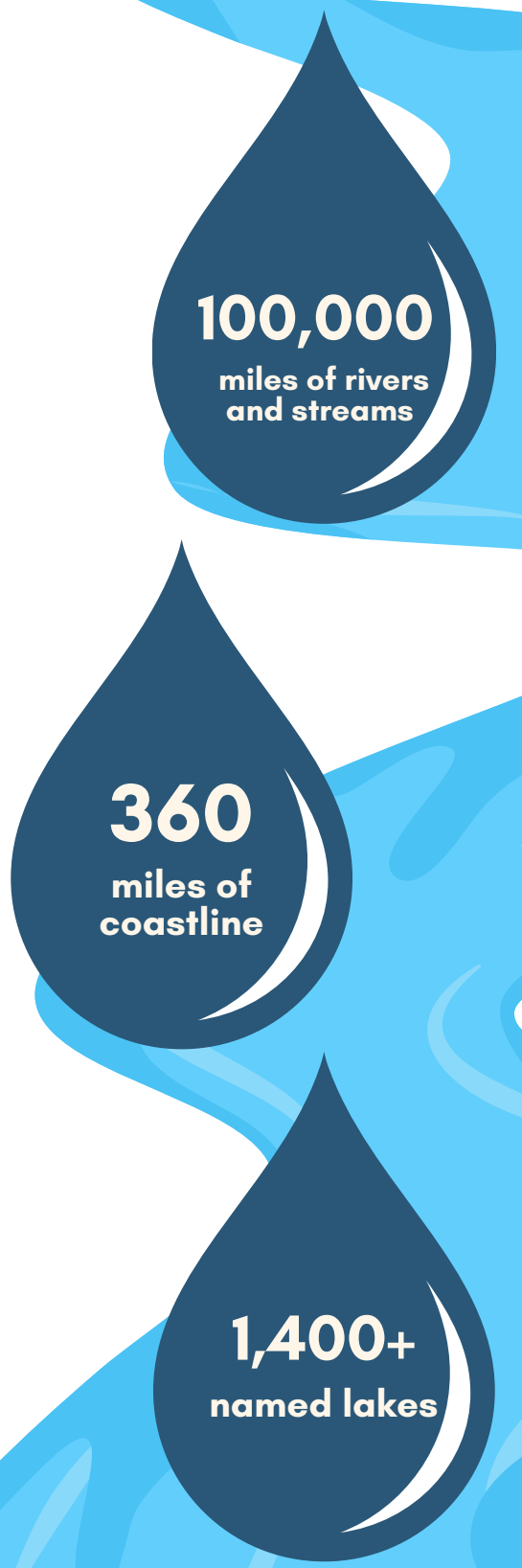
***Our ecosystems need protection, enhancement, and restoration to increase resiliency.** These actions can increase natural storage capacity, improve instream habitat and fish passage, protect and restore wetlands, floodplains and water instream, eradicate invasive species and protect native plant communities, and protect groundwater-dependent ecosystems.*

The Future of Oregon's Water

The state of Oregon faces water shortages, declining water quality, and increasing climate impacts. This threatens our ability to have enough clean water for our people, our economy, and our environment, now and for generations to come.

The choices we make today will determine the legacy we leave for future generations.

For the long-term health and sustainability of Oregon's communities, ecosystems, and economy, we must act in thoughtful coordination on the immediate steps we can take today in preparation for a future of water scarcity.



An Outcomes-Driven Approach

To make progress within a resource-constrained environment, we must focus our attention on a select number of actions.

Governor Kotek directed the 2025 Strategy's structure to articulate more definitive outcomes that will best serve the water needs and interests of all Oregonians.

State agencies identified three priority areas, inspired by recent conversations with federally recognized sovereign tribal nations, communities impacted by groundwater contamination in the Umatilla Basin, dry domestic well issues in several basins, increasing water scarcity issues that impact people, species, and ecosystems, and statewide effects of climate change.

Each priority area includes intended outcomes and proposed actions. The priority actions are described below and graphically summarized in Appendix E.

Priority Actions: *Act, Assist, and Adapt*

Priority 1: Act with Urgency

Prevent things from getting worse: protect water quantity and quality, and ecosystem need.

Priority 2: Assist Community Preparedness Efforts

Help communities and ecosystems prepare and adapt to water and climate changes.

Priority 3: Adapt to Doing More with Less

Increase the pace and scale of multi-benefit solutions for people and ecosystems as our water resources become more scarce.

How We Get There: *Act, Assist, and Adapt*

ACT

- Modernize Oregon's water laws and permitting processes to protect Oregon's water resources, including meeting sovereign tribal governments' treaty rights.
- Increase compliance with existing laws to protect and prevent water quality, water quantity, and habitat degradation and water level declines that negatively impact public and ecosystem health.
- Protect and preserve priority areas using existing agency programs.

ASSIST

- Increase and improve communication between agencies and the public to share critical information about water scarcity, water quality, and ecosystem needs.
- Improve the availability of enterprise water data to support planning and decision-making.
- Increase engagement and technical assistance capacity to support coordinated planning efforts.
- Provide technical assistance to Tribes and local governments to help promote sustainable land use planning and protect water resources.

- **Better incentivize and support water conservation and efficiency practices across rural and urban communities to reduce water scarcity.**
- **Focus multiple agencies' resources to support instream needs, watershed restoration, and ecosystem and species recovery.**
- **Increase investment in source water protection and watershed restoration to secure long-term water quantity and quality protection for drinking water sources.**

Oregon's Integrated Water Resources Strategy

Butte Falls, Jackson County, Oregon. Credit: Laura Tesler Photography

April 2025 – Draft 2

Executive Summary

Water is a public resource, essential to our communities, ecosystems, and economic activities. Protection, conservation, and management of our shared public resource and responsible use of public funds requires an integrated strategy based on rigorous data and analysis. In 2009, the Legislature recognized the need to develop a statewide Integrated Water Resources Strategy (IWRS or from here forward referred to as the "Strategy") to coordinate water management efforts by many agencies and partners. The Strategy is needed to carry out two goals: to **improve our understanding of Oregon's water resources** and to **meet our state's instream and out-of-stream water resource needs**. The first two Strategies (2012 and 2017), inspired many improvements in water resources data collection, management, planning, and funding for water projects.

> ***"Instream"*** *as defined in ORS 537.332 "means within the natural stream channel or lakebed or place where water naturally flows or occurs"*
>
> ***"Out-of-Stream"*** *– water withdrawn or diverted from a groundwater or surface water source for a beneficial use*

The 2025 Strategy places an emphasis on the need for data, collaboration, voluntary, and regulatory efforts. It identifies areas where incentives or new policies could serve as powerful tools for progress. It also identifies where public and private partnerships could stretch our dollars and further instream and out-of-stream efforts. Just as importantly, **the Strategy does not remove or jeopardize existing water rights or other local, state, tribal, and federal authorizations. The Strategy does not itself change any existing authorities. It is the platform for prioritized investments in the coming years.**

In 2019, former Governor Brown initiated the 100-Year Water Vision (Vision), a community engagement process to elevate water concerns of Oregonians and call for strategic investments to address these challenges. Completed in 2020, the Vision called for Oregonians to "invest strategically in infrastructure and ecosystems across all regions to support resilient communities, vibrant local economies, and a healthy environment for all who live here." The 2021 Oregon Legislature made historic investments in Oregon's water resources by passing a $538 million water package distributed among many natural resource agencies. This funding allowed state agencies to make progress toward addressing water issues identified in both the Vision and 2017 Strategy. Vision participants called for the Vision findings to be applied to the next Strategy. The 2025 Strategy highlights where Vision challenges and opportunities align with Strategy actions. **To streamline Oregon's water initiatives, the 2025 Strategy will be the single statewide water planning effort carried forward.**

Document Vocabulary

Since 2012, the Strategy has used specific language to explain and organize goals, objectives, critical issues, and actions. The Strategy's organizational terms are provided below.

- **Framework** – describes the overall structure of the Strategy. The Framework shows how the goals, objectives, critical issues, and actions relate to one another. The Framework is included in Appendix D.
- **Goal** – The Strategy was designed to meet two overarching goals: to improve our understanding of Oregon's water resources, and to meet Oregon's instream and out-of-stream needs. Strategy objectives and actions support meeting these goals.
- **Objective** – Statute (536.220) requires that the Strategy describe objectives of the Strategy and actions designed to achieve those objectives. The Strategy has four objectives, carried forward from the 2012 Strategy.
- **Critical Issue** – Critical issues describe specific water challenges under each objective. Critical issues are the headings for groupings of related actions.
- **Action** – Actions are identified to address a critical issue. Actions are directed to both agencies and others, recognizing many people have a role to play in managing our water. There are 48 actions in the 2025 Strategy.
- **Example Actions –** Each action includes a list of example actions to show how to implement the action. Example actions are distributed throughout the chapters and included on the action summary sheets in Appendix D.

Document Organization

The 2025 Strategy has four objectives. Each objective is separated into its own chapter, Chapters 1 through 4. Within each chapter, the narrative describes critical water issues, actions, and example actions. Several Appendices have been created to provide additional information and support Strategy implementation.

- **Appendix A** - summaries of tribal, state and federal agency roles and responsibilities regarding water
- **Appendix B** - water laws, policies, and regulations guiding management of instream and out-of-stream uses
- **Appendix C** - comparison of wording and numbering updates between the 2017 Strategy and the 2025 Strategy
- **Appendix D** – includes the Framework and action summary sheets for each of the 48 actions. Each action summary sheet provides a quick reference regarding who might take this action, examples of how to implement the action, and current resources including existing workgroups or funding programs, if known.
- **Appendix E** – agency action priorities for the next 6 years, 2025-2031
- **Appendix F** – the key challenges and opportunities identified in the 100-Year Water Vision and the relevant 2025 Strategy actions

Changes from the 2017 Edition

The 2025 Strategy updates the wording of some objectives, critical issues, and adds two new actions. Appendix C provides a crosswalk to review these updates. The 2025 Strategy provides an opportunity to address equity, climate change, and increase agency accountability throughout the document.

- **Equity** – A centerpiece of pursuing water equity requires bringing more voices to the table to meaningfully address the disparities regarding access to clean water across the state. The 2020 Oregon Water Futures Project Report, the 2020 100-Year Water Vision effort, the 2022 State of Water Justice Report, the 2022 Oregon Water Justice Framework, and the 2023 Secretary of State Water Advisory Report 2023-04 all document water insecurities and inequities in Oregon. A new action has been added to identify the need for meaningful community engagement. Equity and environmental justice considerations have been added throughout the Strategy example actions.
- **Climate Change** – Climate change is a pervasive part of life, more so than in 2012 when the first Strategy was published. The 2025 edition provides an opportunity to introduce climate change as the first critical issue in Chapter 3. The 2025 Strategy explains how many actions address climate mitigation, adaptation and resilience. References to climate change have been increased throughout the document.
- **Agency Accountability** –New for the 2025 Strategy, each action is presented in a summary sheet (Appendix D) that identifies the need for the action and detailed information to assist in implementation, including the likely lead and supporting state or federal agencies and partners contributing to the action. Resources, such as funding sources are also provided, if known. Also new for 2025, the Strategy includes agency priority actions for the next 6 years (Appendix E).

Biennial Workplan

In line with previous Strategies, implementation occurs after the Strategy has been adopted by the Water Resources Commission. The statute guiding the development and implementation of the Strategy was updated in 2023 to require a two-year workplan. Following the adoption of the 2025 Strategy by the Water Resources Commission, the Water Resources Department will work with agencies to develop the first biennial workplan that reflects the agency priorities and the legislatively adopted budget for the 2025-27 biennium. Future workplans will include engagement with agencies, water partners, and the public in advance of biennial agency budget processes and legislative concept development to adequately support Strategy implementation. Workplan development provides an opportunity to coordinate work across many agencies and partners and must be done in a way that protects the public interest and balances instream and out-of-stream needs.

Guiding Principles

Development and implementation of the Strategy is guided by a set of principles, including accountability, a balanced approach, collaboration, employing an open and transparent public process, reasonable cost, science-based approaches, streamlining, and other principles memorialized as part of the Strategy's development. The guiding principles developed by the first Policy Advisory Group (2012) still apply today.

Accountable and Enforceable Actions
Ensure that actions comply with existing water laws and policies. Actions should include better measurement and enforcement tools to ensure desired results.

Balance
The Strategy must balance current and future instream and out-of-stream needs supplied by all water systems (above ground and below ground). Actions should consider and balance tradeoffs between ecosystem benefits and traditional management of water supplies.

Collaboration
Support formation of regional, coordinated, and collaborative partnerships that include representatives of all levels of government, private and non-profit sectors, tribes, stakeholders, and the public. Collaborate in ways that help agencies cut across silos.

Conflict Resolution
Be cognizant of and work to address longstanding conflicts.

Facilitation by the State
The State should provide direction and maintain authority for local planning and implementation. Where appropriate, the State sets the framework, provides tools, and defines the direction.

Incentives
Where appropriate, utilize incentive-based approaches. These could be funding, technical assistance, partnerships/shared resources, regulatory flexibility, or other incentives.

Implementation
Actions should empower Oregonians to implement local solutions; recognize regional differences, while supporting the statewide strategy and resources. Take into account the success of existing plans, tools, data, and programs; do not lose commonsense approach; develop actions that are measurable, attainable, and effective.

Interconnection/Integration
Recognize that many actions (e.g., land-use actions) in some way affect water resources (quality and/or quantity); recognize the relationship between water quantity and water quality; integrate participation of agencies and parties.

Public Process
Employ an open, transparent process that fosters public participation and supports social equity, fairness, and environmental justice. Advocate for all Oregonians.

Reasonable Cost
Weigh the cost of an approach with its benefits to determine whether one approach is better than another, or whether an approach is worth pursuing at all. Actions should focus on reducing the costs of delivering services to the state's residents, without neglecting social and environmental costs.

Science-Based, Flexible Approaches
Base decisions on best available science and local input. Employ an iterative process that includes "lessons learned" from the previous round. Establish a policy framework that is flexible. Build in mechanisms that allow for learning, adaptation, and innovative ideas or approaches.

Streamlining
Streamline processes without circumventing the law or cutting corners. Avoid recommendations that are overly complicated, legalistic, or administrative.

Sustainability
Ensure that actions sustain water resources by balancing the needs of Oregon's environment, economy, and communities.

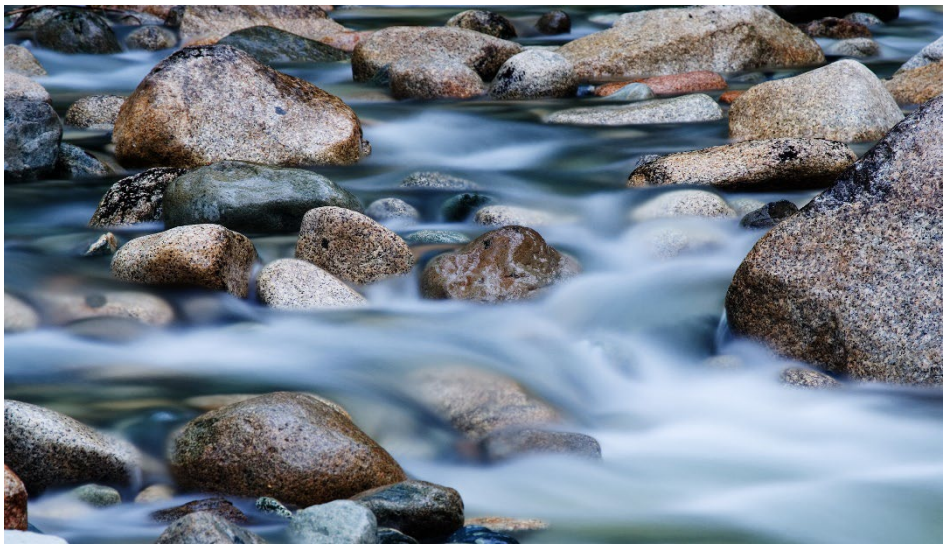
CHAPTER 1

Objective 1: Understand Oregon's Water Resources

Water is one of our most precious natural resources. With more than 100,000 miles of rivers and streams, 360 miles of coastline, and more than 1,400 named lakes, Oregon is renowned for its water.

While progress has been made in recent years, Oregon has a continuing need to understand its water resources. This includes how climate change impacts the form and timing of precipitation, the amount and timing of streamflow, the location and volume of groundwater, water quality, the condition of our ecosystems, and overall accessibility of water to communities and the environment. There is also a need to understand the instream and out-of-stream water needs of these resources to achieve a secure water future for people and the environment.

The 2025 Strategy continues to be a forum for interagency collaboration. This includes a commitment to thoughtful, collaborative, and robust data collection, analysis, and sharing information with the public and those engaged in water management and decision-making.



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Chapter 1 Actions at a Glance

Objective 1: Understand Oregon's Water Resources

Critical Issue - Water Resource/Supply Information

1A Improve Water Resource Data Collection and Monitoring
1B Conduct Additional Groundwater Basin Investigations
1C Enhance Interagency Data Coordination
1D Support Basin-Scale Climate Change Research

Critical Issue | Water Resource/Supply Information

Oregon needs to understand the quantity and quality of available water to meet instream and out-of-stream water needs in a changing climate. Improving our knowledge of water resources requires investments in interagency work, analytical methods and approaches, scientific modeling tools, and platforms to share information with the public and other partners. This section includes Actions 1A-1D which address acquiring and sharing water resource quality, quantity, and ecosystem information. Chapter 2 covers data needs for defining instream water needs (Actions 2A-2C) and out-of-stream water needs (Actions 3A-3B).

Oregon's surface water and groundwater resources, by their very nature, are ever-changing. By day, month, and year, water and natural resource managers need up-to-date information to manage the resource and make sound decisions. This requires measurement of baseline conditions, trends over time, and evaluating the effectiveness of water monitoring programs.

The state needs to maintain and add to its monitoring networks to augment its long-term record, fulfill its day-to-day management responsibilities, and identify trends. Installing and maintaining additional monitoring stations for water supply and water use such as observation wells, streamflow gages, flowmeters, temperature probes, rain gages, snow survey equipment, soil moisture sensors, and AgriMet weather stations will need to be done in strategic locations to answer a growing list of questions.

Action 1A Improve Water Resource Data Collection and Monitoring

The Water Resources Department uses the 2016 Oregon Water Resources Monitoring Strategy1 to identify the Department's monitoring priorities (e.g., climate change, groundwater protection), for both surface and groundwater resources. The Department of Environmental Quality uses the 2020 Water Quality Monitoring Strategy to propose, evaluate, prioritize, and implement monitoring activities.[2] The 2017 Monitoring Strategy for Oregon's Waters, An Interagency Approach helps natural resource agency scientists identify and collect the right information needed to inform policy-makers about emerging water issues, the status and trends of Oregon's waters, and the effectiveness of current agency actions.[3] The Department of Fish and Wildlife has several monitoring programs. The Oregon Conservation Strategy outlines several monitoring strategies for priority species and habitats.

Monitor and Evaluate Surface Water Flows

A gage is a structure installed in a stream that includes equipment to measure water levels. Gages can also measure other parameters such as stream temperature. Scientists use the water level information to calculate streamflow and water quality information to determine the health of waterways. The Water Resources Department operates more than 260 gages on streams, canals, and reservoirs throughout the state, maintaining an extensive long-term record for about 70 of them. About 240 of these gages are operated as near real-time, transmitting data once every hour. As shown in Figure 1-1, the Department also provides access to data from an additional 345 gages, primarily operated by the U.S. Geological Survey.

Approximately 10,000 river miles in Oregon are covered by an instream water right, but the state has limited capacity to monitor whether instream water rights are being met. While the state has taken steps to enhance measurement activities, only 205 instream water rights have an associated stream gage in place to monitor whether the instream flows are being met. Approximately 430 of 2,000 instream water rights were monitored in 2023.

Oregon's network of gages informs water planning, permitting, and management decisions. Because these gages only monitor a fraction of our state's waterways, the state's objective is to continue expanding and maintaining this network.

Operating a gage network requires trained hydrologic technicians to keep the equipment operating properly, to conduct regular measurements and/or observations at gages, and to input the collected information into a central database. Hydrologists review and analyze the data, make corrections based on field conditions, and finalize the records to meet computation standards established by the U.S. Geological Survey.

An expansive network of gages is essential for the management of Oregon's surface water and groundwater resources, and the existing network is not sufficient. The data is used by a variety of agencies, water users, and other entities for making daily decisions, distributing water, protecting and monitoring instream flows, forecasting floods, and designing infrastructure such as bridges and culverts. The data is also useful for planning for recreational activities, better understanding how much water is available for new uses and tracking long-term trends such as climate change and drought. The Department of Environmental Quality for example, uses streamflow data to calculate the loading capacity of certain pollutants during development of Total Maximum Daily Load (TMDL) plans to improve water quality.

Since the early 1990's, the state has lacked sufficient capacity to maintain and process data from its existing network of stream gages in a timely fashion. This has resulted in a backlog of unprocessed records and has hindered the Water Resource Department's ability to share valuable water resources information. The public can access these records in their provisional state, but they are subject to change until they undergo final review and are published. Expanding the network will require additional resources.

Action 1A

Improve Water Resource Data Collection and Monitoring

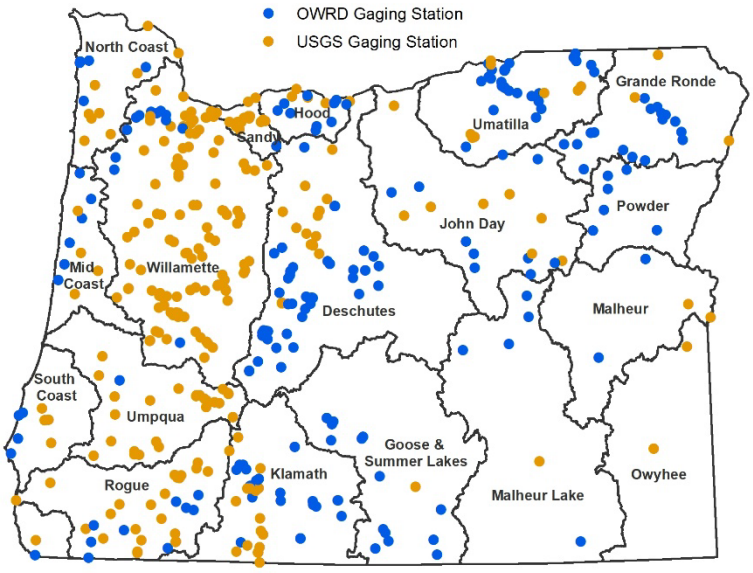
Examples of how to implement this action:

- Use agencies' monitoring strategies, or similar methods, to design, expand, and maintain real-time monitoring networks for surface water and groundwater quality and quantity
- Prioritize basins for data collection and monitoring by centering the needs of people and ecosystems most affected by water quantity or quality challenges
- Expand gage network associated with monitoring instream water rights
- Improve agency capacity to collect, share, analyze, and report data, bringing records to final form and make them available to the public
- Assure that statewide groundwater quality monitoring programs are responsive to community need
- Update water quality standards and develop additional TMDL's (also see Action 12C)
- Increase the number of stream gages with reportable water temperature data to support water quality programs
- Increase resources to help disadvantaged homeowners and renters access water quality testing in private drinking water wells; update real estate transaction database
- Monitor habitat and watershed conditions and evaluate the effectiveness of restoration efforts (e.g., OWEB restoration inventory)
- Establish methods for measuring ecosystem services and incorporate results into planning efforts
- Increase monitoring and evaluate the effectiveness of pollution control plan implementation
- Identify and address gaps in staffing or process that prevent agencies from sharing in the collection of, or already collected, data (e.g., temperature data)
- Work with water distribution partners (BOR, irrigation districts) to develop funding and staffing structures that allow for effective gaging and staffing of storage and irrigation distribution systems
- Work with state, federal, and local monitoring partners (e.g., USGS) to analyze gage network to identify and address gaps

Surface Water Availability

The Water Resources Department maintains the Surface Water Information Management System (SWIMS), a decision tool for determining the amount of water available for new water right applications for most surface waters in the state. Prior to 2025, the database was referred to as the Water Availability Reporting System (WARS). The SWIMS database includes stream flow data, water right information, landscape and climate characteristics, and water use data. The goal of SWIMS is to quantify water availability and limit appropriations such that Oregon's water supplies can sufficiently meet supply demands of water users, including both instream and out-of-stream uses. In the current iteration of SWIMS, water availability was calculated based on streamflow conditions representative of 1958 to 1987. Estimates of water demands were calculated based on information and research developed in the early 1990s.

Figure 1-1: Active Surface Water Gaging Stations
January 2024



With funding provided in 2023, the Water Resources Department has begun planning the first update to SWIMS in nearly 30 years. The update is focused on calculating water availability to better align with today's climate and practices in water resources management. This work includes designing a system that permits more frequent updates to SWIMS, incorporating more recently collected stream flow data, and utilizing technological advances in recent decades (e.g., satellite-based remote sensing data) to better understand water use and demands. The Department is also evaluating existing policies and determining policy needs to support decision making related to water allocation.

Future updates to SWIMS would benefit from improved understanding of surface water-groundwater interactions to better account for the impacts of groundwater pumping on water availability. Additionally, the current coverage of SWIMS is limited in some areas due to lack of stream gages in some areas of the state. This effort could be supported by additional staff to conduct research, perform data analysis, maintain and monitor the Department's monitoring network (including stream gages and groundwater wells), and develop decision-support tools. While SWIMS supports the Department's programs and operations, other agencies (i.e., Department of Fish and Wildlife, Department of Environmental Quality, and Parks and Recreation Department) and planning groups rely and depend upon information the database provides to make recommendations and planning decisions.

> "Good data is the foundation of wise and coordinated decisions. We can work across agencies at all levels, with tribes, and with the private sector to improve access to accurate, relevant, trusted, and current water data and infrastructure condition. We can also use science and information to anticipate future trends. Access to quality information will help communities strategically plan for and invest in their water future."
>
> -100-Year Water Vision (2020)

Rule guides how the Water Resource Department determines whether water is available for monthly natural flow based on water being available 80 percent of the time (80% exceedance), and 50 percent of the time (50% exceedance) for storage. Protections for water quality and habitat for sensitive, threatened, and endangered fish species are also considered when evaluating new water right applications. Figure 3-2 shows (in shades of purple) where water is potentially available for natural flow allocation during the month of August, the month most representative of low summer flows and high out-of-stream demands. With some

exceptions, the mostly tan map indicates that throughout the state, very little surface water is available to allocate for new uses during August. Figure 1-3 illustrates (in shades of purple) modeled water availability for new uses during the month of January. Many water rights authorize storage of surface water during the winter and early spring to supplement summer water supplies.

In addition to water availability, other administrative rules, are used to determine whether a new water right can be approved for a beneficial use. For example, although surface water is available in portions of the Willamette River Basin, many uses of water are not classified or allowable during the summer months for several reasons.

Increasingly, water users are relying on tools such as water conservation, reuse, water right transfers, and water storage to meet their needs during the summer months. Some of these tools are designed to benefit instream flow. See Chapter 4 and Strategy Actions 10A-10C, 11B, and 11E.

Figure 1-2: Available Streamflow in August
(calculated at 80 percent exceedance)
February 2025

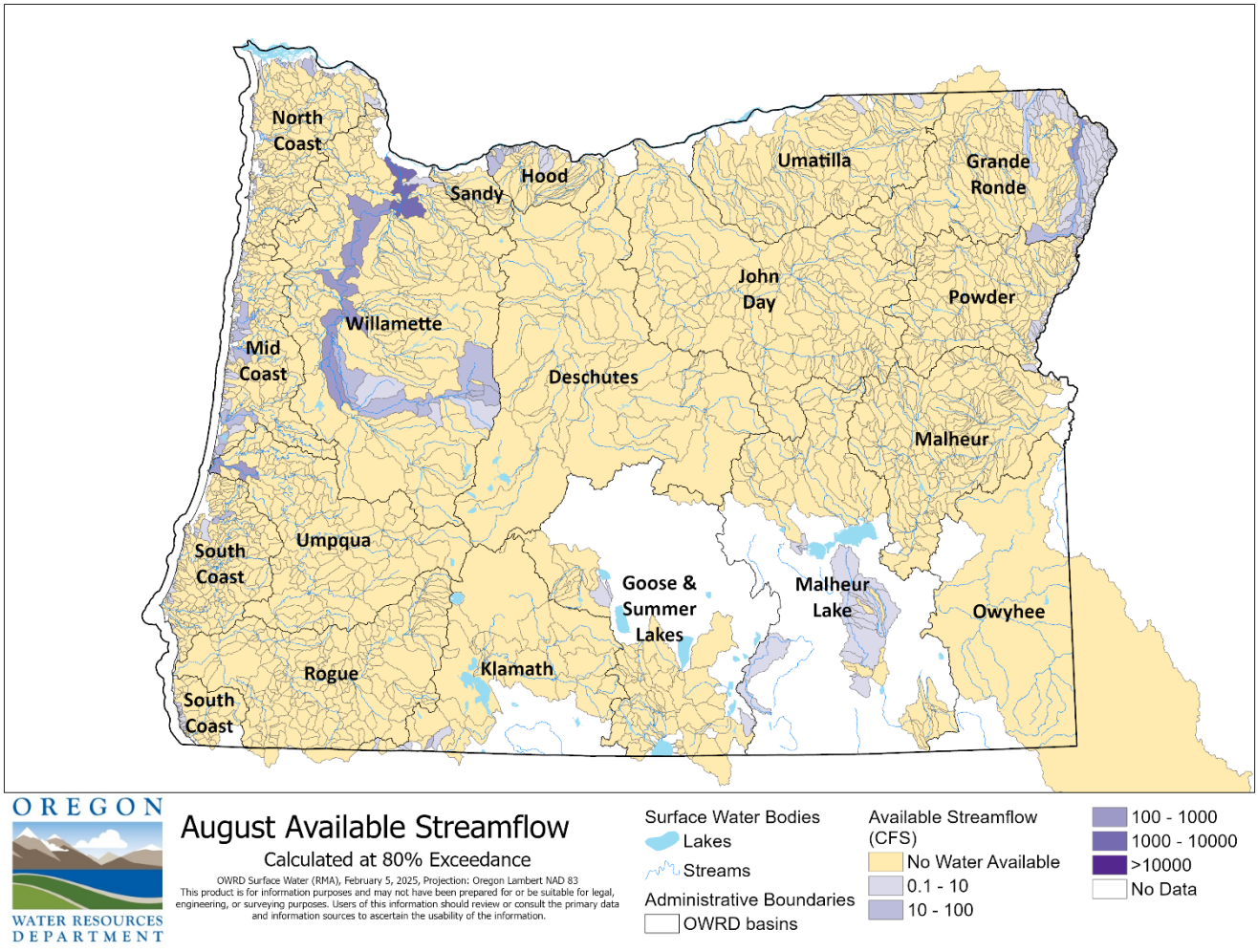
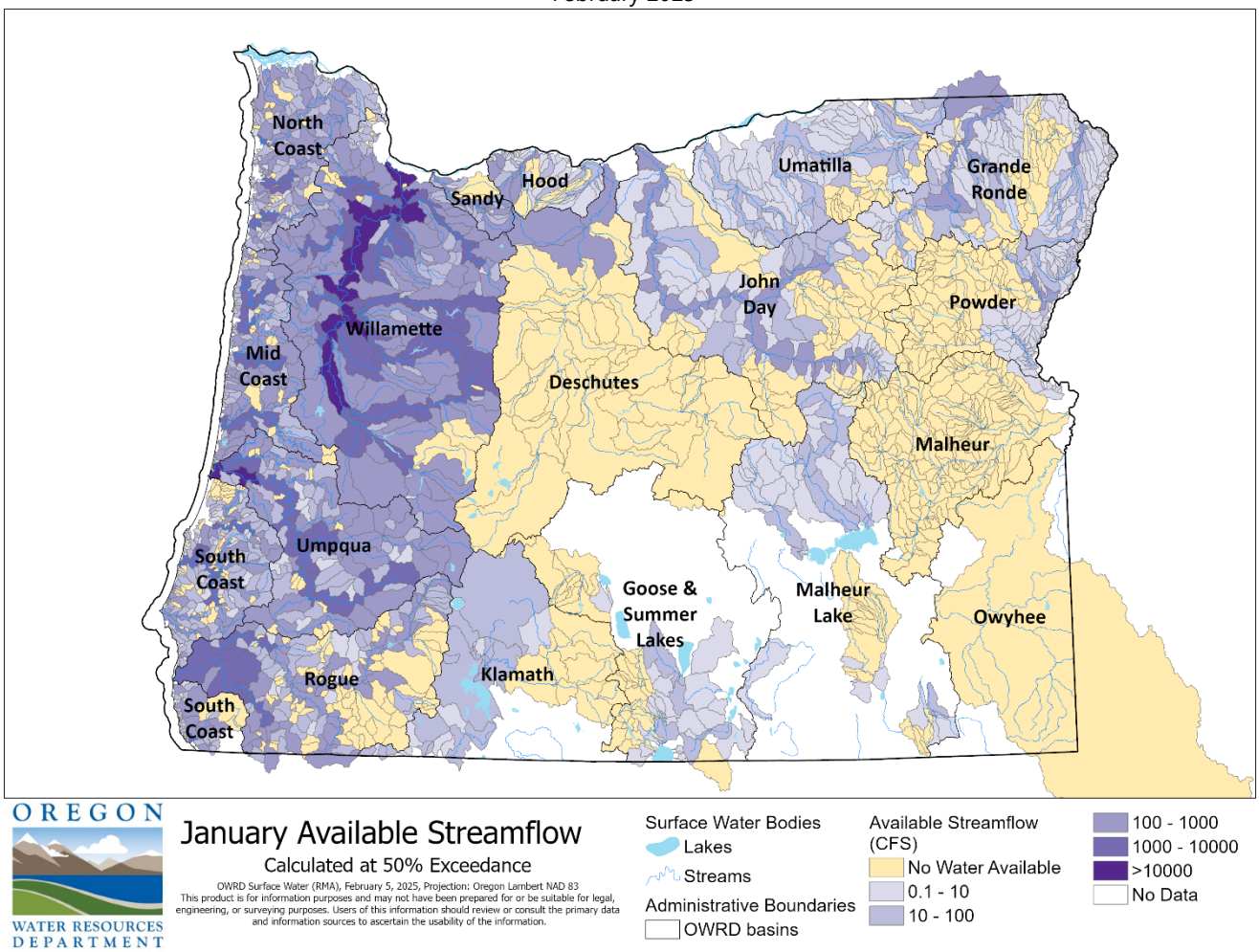


Figure 1-3: Available Streamflow in January
(calculated at 50 percent exceedance)
February 2025



Groundwater – Surface Water Interaction

Groundwater is connected to surface water in various ways. Oregon water law recognizes this important connection, managing these resources as one. This is called conjunctive management.

The hydraulic connection of groundwater to surface water means that groundwater use can deplete streamflow and reduce important cold-water discharge. This depletion is often difficult to measure due to delayed effect and natural variability, making conjunctive management a challenge. Climate change, including multi-year droughts, intensifies this challenge. However, there are some locations where the Water Resources Department and the U.S. Geological Survey have conducted detailed studies and are able to quantify these connections.

Generally, the Water Resources Department denies or limits new groundwater applications in instances where use from an aquifer could substantially interfere with a surface water source that is already fully appropriated. One example of conjunctive management stems from a 2001 study[4] conducted by the Water Resources Department and U.S. Geological Survey that quantified the hydraulic connection between groundwater and surface water within portions of the Deschutes River Basin. Because of this connection, the Water Resources Department established the Deschutes Basin Groundwater Mitigation Program and rules around protecting Scenic Waterway flows and instream rights within the Deschutes Basin. This program allows for the development of new groundwater uses within the Deschutes Basin Groundwater Study Area, that would not otherwise be allowed, by requiring the purchase of mitigation credits or the implementation of a mitigation project to mitigate for their impacts on surface water flows.

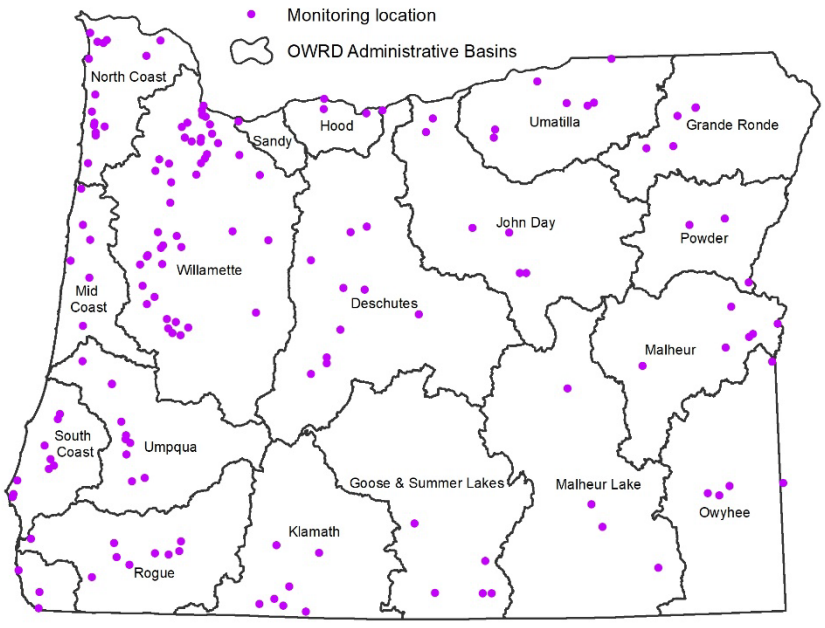
Monitor and Evaluate Surface Water Quality

Water quality standards are established by the state to ensure that our lakes and streams support multiple beneficial uses, including domestic water supplies, recreational activity, and fish and wildlife. Water quality monitoring data and information on status and trends define the priorities and set the direction for programs and activities aimed at protecting and restoring water quality. State agencies and partners utilize water quality monitoring data to update water quality standards, determine causes of impairment, develop water quality improvement plans (Total Maximum Daily Loads), establish permit limits and restrictions to limit further impairment, notify the public of health advisories, measure project and program effectiveness, and modify program strategies as needed to improve water quality outcomes.

The Department of Environmental Quality monitors and evaluates water quality through a variety of programs that provide information on Oregon's waterbodies. Some of these activities are statewide assessments of water quality, whereas others focus on geographically specific assessments of water quality or narrow categories of pollutants and/or beneficial uses. Established monitoring programs and projects include:

- Ambient Water Quality Monitoring System (AWQMS) and Oregon Water Quality Index (OWQI) (See Fig 1-4)
- Oregon beach monitoring (with Oregon Health Authority)
- Cyanotoxin monitoring
- Biomonitoring
- Groundwater monitoring
- Pesticide Stewardship Partnership
- Response monitoring
- Watershed monitoring (TMDLs)
- Toxics monitoring
- Volunteer water quality monitoring
- National aquatic resource surveys
- Drinking water protection
- Other special projects

Figure 1-4: Ambient Water Quality Monitoring Stations
January 2024



Harmful Algal Blooms (HABs) - Historically, Department of Environmental Quality only sampled active HABs in support of Oregon Health Authority's recreational advisory program. During the 2021-23 biennium, the Department of Environmental Quality received legislative direction to start actively monitoring Oregon waterbodies to promote early detection. The summer of 2024 included expanded monitoring efforts to include six routes throughout the state, each with 5-8 waterbodies. Rotating these weekly, the Department sampled each of about 40 waterbodies four times throughout the season. The waterbodies were selected for monitoring based on high recreational use. This active monitoring approach is in addition to ongoing recreational response monitoring which uses satellite imagery to identify HABs and prompt visual inspections. The results of satellite monitoring are published and updated regularly.

Fish and Shellfish Monitoring – Water quality impacts the organisms living and feeding in the water, including fish and shellfish that humans consume, for subsistence, recreation, or commercial purposes. The Oregon Department of Agriculture monitors and reports the status of shellfish for toxin levels, as part of their Food Safety Program.

The Department of Environmental Quality conducts fish and shellfish monitoring as part of their water quality toxics monitoring efforts.

Water Quality Impairments and Oregon's Integrated Report - The Federal Clean Water Act requires the Department of Environmental Quality to report on the quality of Oregon's surface waters every two years. Oregon's surface waters are assessed to determine if they contain pollutants at levels that exceed protective water quality standards. The result of these analyses and conclusions is called the "Integrated Report" because it combines the requirements of Clean Water Act section 305(b) to develop a status report and the section 303(d) requirement to develop a list of impaired waters.

The 2022 Integrated Report identified more than 85-percent of assessed water bodies as impaired and not meeting water quality standards, including more than 150 lakes and reservoirs, and about 2,300 stream and river segments. Additional information regarding the 2022 Integrated Report can be found on the Department of Environmental Quality's website, including a story map, web map, and downloadable database.[5]

Monitor and Evaluate Groundwater Levels

Accurate well location information and water-level data are critical for assessing groundwater resources and the connections to surface water. Prior to conducting detailed groundwater studies in a basin (See Action 1B), it is necessary to establish long-term, water-level data sets suitable to evaluate climatic, seasonal, and groundwater development impacts on the aquifers. Today, there are more than 400 active state observation wells, and in the past five years, the Water Resources Department has measured more than 1,300 other wells. Since 2013, the Oregon Legislature has provided funds to help expand the Water Resources Department's network of dedicated observation wells, providing staff with suitable wells for deployment of automated data recording instruments that provide high-frequency, year-round water level records. The process of siting these wells is spelled out in more detail in the Department's 2016 Monitoring Strategy.

Claire Sturdy measuring Lost Creek in the Klamath Basin. Photo: Garrett Steensland

Groundwater Availability

Groundwater development has occurred primarily in areas where the geologic conditions are favorable or where additional surface water is no longer available for new allocations. In most locations, groundwater aquifers are no longer capable of sustaining additional development without leading to declining supplies for existing water users and reducing streamflows where surface water and groundwater are hydraulically connected. Groundwater quality can also limit use.

A recent increase in complaints from people experiencing dry domestic wells has elevated awareness regarding declining groundwater levels associated with climate change, consecutive years of drought, wildfire damage, and groundwater pumping. The state needs adequate data to better anticipate and respond to groundwater issues and possibly designate additional Groundwater Administrative Areas.

Evaluate Groundwater Administrative Areas - The Water Resources Department oversees 22 Groundwater Administrative Areas (Figure 1-5, below) designated to limit further water level declines or groundwater interference with surface water. Contaminated groundwater is managed under a different program, by the Department of Environmental Quality as "Groundwater Management Areas," described below. As hydrological conditions change with climate change, groundwater data may reveal the need to designate additional Groundwater Administrative Areas and Management Areas.

Specific rules apply to each Groundwater Administrative and Limited Area, but they all fit in the following categories:

- **Withdrawn** – prevents new allocation in specified areas or aquifers. Classified and Limited – limits new allocations for specified uses and areas or aquifers through Basin Program Rules (OAR 690-5XX) to address groundwater supply and quality.
- **Critical** –curtails existing uses, to address groundwater supply, quality, or thermal issues.
- **Mitigation** – requires mitigation for new uses to offset impacts to hydraulically connected surface water.
- **Serious Water Management Problem Areas** – requires measurement and reporting of water use authorized under existing rights.
- **ODEQ Groundwater Management Area** – related to groundwater quality and described in further detail below.

Monitor and Evaluate Groundwater Quality

Groundwater contamination is also a serious issue in some areas of Oregon. Private domestic wells may face contamination issues from nearby failing septic systems, industrial or agricultural sources, or from surface water and groundwater interactions. Naturally occurring elements such as arsenic, uranium, and boron can also make water supplies unsuitable for some uses. Testing the water quality of private domestic wells falls outside of state agency authority in most cases. The Oregon Health Authority requires that private domestic wells are tested for nitrate, bacteria, and arsenic before a home is sold, and the data be provided to the real estate transaction database.

The Department of Environmental Quality implements a Statewide Groundwater Monitoring Program to monitor groundwater for contaminants of concern, including nitrates and pesticides. From 2015 to 2017, the Department was able to monitor two geographic regions per year. Funding and staffing reductions now only allow for monitoring in one region every other year. The monitoring data are used to determine areas of the state that are especially vulnerable to groundwater contamination, long term trends in groundwater quality, status of ambient groundwater quality, emerging groundwater quality problems, and potential risks from contamination. Increased resources for groundwater monitoring can help protect public health.

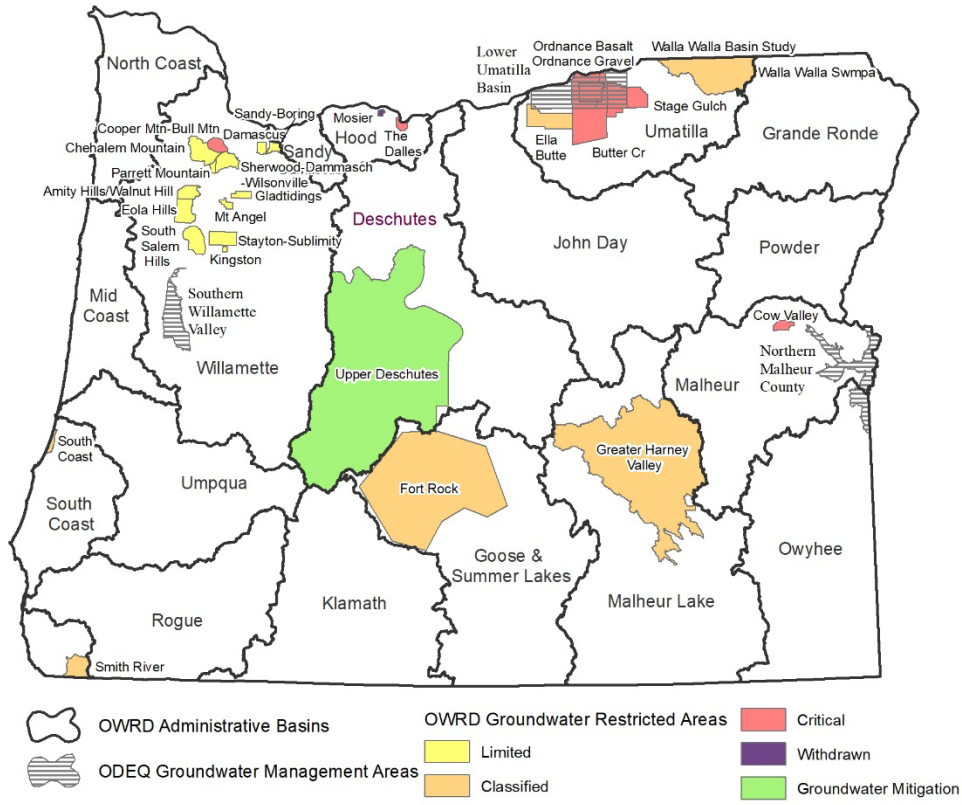
Groundwater Management Areas - The Oregon Department of Environmental Quality designates an area as a "Groundwater Management Area" when groundwater has elevated contaminant concentrations. Commonly analyzed contaminants include nitrates, bacteria, and arsenic. Once a Groundwater Management Area has been

declared, a local groundwater management committee is formed and then works with state agencies to develop an action plan to address the contamination. Three Groundwater Management Areas have been designated in Oregon due to elevated nitrate concentrations in groundwater:

- Lower Umatilla Basin
- Northern Malheur County
- Southern Willamette Valley

The Department may analyze samples from private wells located in a Groundwater Management Area. Outside of these areas, the Department does not have authority to monitor these wells.

Figure 1-5: OWRD Groundwater Administrative Areas and ODEQ Management Areas



Testing Private Drinking Water Wells – Private drinking water supply wells are not routinely tested for water quality issues, although state law requires testing at the time of a real estate transaction. A homeowner selling a property with a drinking water well must test the water for nitrate, total coliform bacteria, and arsenic. Within 90 days after the seller receives the test results, the seller must submit the results to the buyer and to the Oregon Health Authority. The data has potential to provide a broad overview of groundwater quality in the state, however compliance for reporting has been low. This points to a need to amend the Domestic Well Testing Act to require laboratories to electronically report domestic well testing results associated with real estate transactions to the state (see Action 12A Ensure the Safety of Oregon's Drinking Water).

Domestic wells located in an area impacted by wildfire should be tested to ensure water is still safe to drink. Oregon Health Authority recommends testing for arsenic, nitrate, bacteria, lead, and, depending on damage assessment results, benzene, toluene, ethylbenzene, and xylenes, commonly referred to as "BTEX."

Monitor and Evaluate Habitat Conditions and Watershed Functions

The Oregon Department of Fish and Wildlife, Oregon Watershed Enhancement Board, and other agencies have significant responsibilities around habitat and watershed monitoring. Habitat and watershed function monitoring includes evaluating the change in river channels over time, substrate, and fish passage issues, as well as wetland and floodplain conditions. Monitoring is a broad term that encompasses baseline monitoring, compliance monitoring, status and trend monitoring, and effectiveness monitoring. Diversity of monitoring approaches is essential to building an understanding of watershed health, tracking the success of watershed improvement projects, and setting restoration priorities.

The Oregon Watershed Enhancement Board maintains the Oregon Watershed Restoration Inventory of more than 19,000 completed projects since 1995.[6] This database is used to report on the progress of the Oregon Plan for Salmon and Watersheds, to support effectiveness monitoring of restoration activities, and to inform watershed assessments and future restoration project planning and implementation.

Oregon continues to develop guidance for prioritizing watersheds/basins for data collection and monitoring, including recommendations for further investment. The Department of Fish and Wildlife, for example, is identifying and prioritizing areas for aquatic habitat protection and restoration using new species distribution and climate change information. Some watershed-based tools used to prioritize sensitive water bodies and habitat for future restoration efforts include Endangered Species Act Recovery Plans, the Department of Fish and Wildlife's Oregon Conservation Strategy,[7] watershed assessments and action plans, and the Department of State Land's Oregon rapid wetland assessment protocol, the stream functional assessment method, and streamflow duration assessment method.

Indicator Species - One way of tracking the status of both water quality and ecosystem health is with a designated indicator species. The health of an indicator species can offer early warning signs regarding ecosystem impairment.

Such indicator species include native salmonids (salmon, steelhead, and trout) that depend on cold, clean water. Since 1991, the National Oceanic and Atmospheric Administration's Fisheries Office of Protected Resources, which monitors anadromous species that migrate between freshwater and the Ocean, has listed 15 out of 23 Evolutionarily Significant Unites/Distinct Population Segments of salmon and steelhead found in Oregon under the Endangered Species Act. To date, none of them have been delisted.

In addition to these indicator species, the U.S. Fish and Wildlife Service, which has authority for monitoring non-anadromous fish species that reside year-round in Oregon's rivers and streams, has listed five species as either threatened or endangered (Bull trout, Lahontan cutthroat trout, Hutton tui chub, and Shortnose and Lost River suckers). Several other aquatic species are proposed for listing or being assessed for potential listing, including the Northwestern pond turtle and the Western ridged mussel. The high number of aquatic species listed as threatened or endangered are a result of declining water quality and quantity in many areas of the state during critical life history periods and can be an indicator of inadequate ecosystem health. Recovery efforts by local, state, tribal, and federal entities, which include improving habitat connectivity, increasing habitat quantity, and improving habitat quality, are underway for these listed species, as well as other species of significance such as Pacific lamprey.

As a result of such efforts, the U.S. Fish and Wildlife Service announced the removal of the Oregon chub and Modoc sucker and their associated critical habitat from the list of Endangered and Threatened Species in 2015, making them the first to be delisted due to recovery. In addition, the Foskett Spring Speckled Dace and Borax Lake Chub were delisted in 2019 and 2020, respectively.

Oregon chub, Photo: Rick Swart

Modoc sucker, Photo: Doug Markle

Impacts to indicator species can also serve as an early warning sign of broader impacts to the benefits that Oregonians enjoy because of natural processes and biological diversity. Healthy ecosystems provide clean air, clean and abundant water, fish and wildlife habitat and other values that benefit the public. All Oregonians benefit from a healthy aquatic ecosystem as freshwater is vital to human life and economic well-being.

See Strategy Actions 2A-2C for additional data needs related to ecosystems. For Strategy actions that support ecosystem protection and enhancement, see Chapter 4 Strategy Actions 11A-11E.

Measuring Ecosystem Services – Ecosystem services are the benefits that nature provides, including producing clean water, storing water, and cooling. The Oregon Conservation Strategy highlights ecosystem services markets as a way to create economic incentives to protect or restore the environment. More work is needed in Oregon to quantify ecosystem benefits to support conservation, restoration, or mitigation solutions associated with environmental impacts from development. Also See Action 10D for examples of voluntary and market-based approaches for increasing environmental protection and restoration.

Action 1B Conduct Additional Groundwater Basin Investigations

Action 1A outlined the primary data collection and monitoring needs for surface water, groundwater, and ecosystems. This action identifies additional detail needed to understand our groundwater at a finer geographic scale. Place-based water planning and future iterations of the Strategy require groundwater data at the basin or sub-basin scale.

Prioritize Groundwater Basin Studies

Oregon has a need for additional basin studies to further understand the relationship between groundwater and surface water, and the availability of both. Conducting groundwater studies is a priority for the state, which typically evaluates groundwater resources at the basin scale through cooperative, cost-share programs. These studies result in a conceptual model of the basin, including a description of the basin geology, groundwater flow paths, and a water budget quantifying annual volumes of groundwater recharge, discharge, and changes in dynamic storage. A numerical groundwater flow model is also developed and used to better understand the outcome of potential management scenarios.

The Water Resources Department has completed cooperative basin studies in four areas (Harney, Deschutes, Willamette, and Klamath basins) and is currently working with the U.S. Geological Survey and Washington Department of Ecology to study the Umatilla Basin's Walla Walla Sub-basin. The state has prioritized additional basins for subsequent groundwater studies. Priority areas include:

- The Umatilla Basin's Lower Umatilla Sub-Basin, to better understand the hydrogeology to support the evaluation of potential solutions to groundwater contamination and cumulative impacts of alluvial and shallow basalt groundwater development.
- The Hood Basin's Fifteen Mile Creek Sub-Basin, to understand declining groundwater levels and whether groundwater extraction is affecting surface water flows.
- The Powder Basin, to assess groundwater availability and potential over-allocation.
- The Grande Ronde Basin, to assess groundwater availability and potential over-allocation.

Groundwater Budgets for Major Hydrologic Basins

The 2021 Legislature passed House Bill 2018 which directed the Water Resources Department to:

- Enter into a cost-sharing agreement with the U.S. Geological Survey to develop and publish groundwater budgets for all major hydrologic basins in the state,
- Contract with a qualified person to produce a peer-reviewed report on statewide consumptive water use,
- Expand the groundwater level monitoring network, and
- Help communities use the data collected under this bill to inform local water planning efforts.

The water use measurement component of this work is addressed in more detail under Action 3A.

Improve Groundwater-Related Records

The state collects and maintains a variety of groundwater-related records that well owners, consultants, and state agencies need to better understand Oregon's water wells, some examples are described below. Data specific to water users reporting their water use is called for in Action 3A.

Well Location Data Gaps – Wells were not required to be registered with the state until 1955. Since then, most well location information has been reported at a very coarse scale (within a 40-acre area). In 2009, requirements were put in place to obtain more precise location information for newly drilled exempt-use wells, which are most often used for domestic purposes. An estimated 230,000 such wells exist today, with several thousand more drilled each year. In 2014, the state updated its online mapping program to help well drillers and landowners record the location of new, existing, and unused water wells—including both exempt-use wells and permitted wells. On July 1, 2023, statutory changes require all well reports submitted to include the GPS coordinates of the well's location. Despite those efforts, Oregon has inadequate documentation of the number, location, and average water use of water wells.

Water-Level Access – Installation of measuring tubes help to ensure that accurate measurements or samples can be taken in water wells, without measurement equipment getting tangled in pumps or wires. This can be helpful particularly in deep wells. Several locations in Oregon, such as Eola Hills in Polk County, Pete's Mountain in Clackamas County, and Mosier in Wasco County have requirements to install measuring tubes during new well construction.

Scheduled Measurements – Agency scientists collect baseline information at the start of each irrigation season before any significant groundwater pumping begins. This activity is a high priority because it provides an annual snapshot of groundwater conditions that can be compared over time and contributes to Oregon's long-term understanding of the resource.

Action 1B

Conduct Additional Groundwater Basin Investigations

Examples of how to implement this action:

- Install and maintain dedicated state observation wells in priority basins
- Partner with U.S. Geological Survey to conduct and cost-share additional groundwater recharge studies and basin investigations
- Evaluate existing and potential establishment of new groundwater administrative areas; review time-limited permits more efficiently
- Locate and document water wells, including exempt use wells, permitted wells, and unused wells
- Ensure groundwater level measurements are high-quality; install measuring tubes and make scheduled measurements
- Investigate connections between groundwater and surface water, particularly where groundwater sustains summer low flows and/or discharges cold water
- Support and coordinate with ODEQ's Groundwater Monitoring Program (water quality)
- Incorporate groundwater quality and quantity information into Oregon's Environmental Justice Mapping Tool

Action 1C

Enhance Interagency Data Coordination

Data-sharing among agencies supports informed decisions and more efficient management of water resources. As one example, the Department of Environmental Quality and Department of Fish and Wildlife use data to provide information and advice on water allocation decisions made by the Water Resources Department per agency rules and statutes. Their understanding of species and water quality needs helps determine whether a proposed use of water is in the public interest.

As another example, the Department of Forestry uses water right information from the Water Resources Department to determine whether forest streams are sources of drinking water. Streams that serve as a drinking water source trigger more stringent forestry protections. There are many examples among local, state, federal, and tribal agencies where current and accurate water resources information from one agency partner affects whether the other agency can effectively carry out its mission.

Monitoring Oregon's water resources is not limited to just state agencies. There are several federal agencies whose data collection and analysis are critical to the understanding and management of Oregon's surface water and groundwater resources, including the Army Corps of Engineers, Bonneville Power Administration, Natural Resources Conservation Service, the National Weather Service, and the United States Geological Survey. Local partners, including soil and water conservation districts and watershed councils, collect valuable monitoring data too.

The lack of stable resources to maintain or expand the state's monitoring networks, to collect and share data, to conduct studies, and to develop modeling tools presents a significant, ongoing challenge. Several years' worth of water quantity and quality data still needs to be processed, analyzed, and shared with the public and other partners. Methods to enhance data collection, processing and sharing include:

- **Coordination** – Better integration of federal, state, and local data collection efforts, including staffing to coordinate data across agencies, while adhering to quality control standards (e.g., interagency temperature data coordination)
- **Data Management –** Resources need to be allocated for data infrastructure and data stewardship
- **Training** – Improving data collection standards, manuals, training, and technical support
- **Access** – Providing on-line platforms for data submittal, retrieval, and quality control
- **Real-Time** – Adding remote and real-time monitoring to existing stations
- **Backlogs** – Processing the backlog of water quantity and water quality data

Action 1C
Enhance Interagency Data Coordination

Examples of how to implement this action:

- Improve integration of federal, state, and local government data collection efforts while adhering to quality control standards
- Improve data sharing and availability using on-line platforms and emerging technologies, mobile apps, and open standards
- Develop or update modeling and other decision-support tools
- Encourage inter-agency work among a variety of partners
- Provide resources for interagency data management, including data infrastructure and stewardship, as well as participation in the Oregon Water Data Portal
- Support the development, implementation, and ongoing maintenance of the Oregon Water Data Portal Project
- Provide interagency training to improve data collection standards, including manuals and technical support
- Invest in information technology and modernization of databases and applications
- Improve public access to water data and provide a centralized location to access various types of water data

A Strategic Enterprise Approach to Monitoring

Oregon's interagency Strategic Enterprise Approach to Monitoring (STREAM) Team was created in June 2013 and is made up of many of the state's natural resources agencies, all of which monitor Oregon's waters for various public purposes. The STREAM Team facilitates collaborative decision-making to support a healthy environment through coordinated planning, monitoring, and communication of water-related data and information. The work of the STREAM Team directly supports the intent of the Strategy, improving water resources data collection and monitoring by coordinating interagency efforts.

The STREAM Team has developed a collaborative workspace for agency partners and a monitoring calendar and associated map that are updated annually. Members meet regularly, where agencies provide input on statewide water-related monitoring issues, such as new stream gages, harmful algae bloom coordination, environmental data management strategies, and more. They published a statewide monitoring strategy in 2017.

Make Water-Related Information Available Electronically

Water-related program information, contact information, and data are often not available from state agencies, or sometimes difficult to find and use, though agencies do try to keep fact sheets and "how-to" guides accurate and up to date. While agencies have made progress scanning older documents and making newer documents available online in a searchable format, investments in information technology have been insufficient. In a culture that relies on instant access to information, agencies are still in the process of making historic documents available while working to make data more interactive.

A significant milestone in the process to share information among agencies and with the public has been achieved through the initiation of the Oregon Water Data Portal Project in 2022.[8] The project, led by the Department of Environmental Quality, is still in the early phases including developing a beta version of the portal during the 2023-2025 biennium. Eventually, if funded, the portal will be a single location for agencies and the public to access a variety of data that has been collected by many agencies and partners.

Statewide Lidar – Oregon's Lidar Program (Airborne Light Detection and Ranging) uses a remote sensing tool to provide three-dimensional surface terrain data (i.e., topographic information) for the state. In 2007, the Oregon Legislature designated the Department of Geology and Mineral Industries as the lead agency for lidar acquisition in Oregon. The Department established the Oregon Lidar Consortium to build funding for the acquisition of large swaths of lidar across the state. These data help create geologic maps, flood hazard maps, evaluate tidal channel topography, locate infrastructure, model water quality, delineate wetlands, evaluate habitat restoration, assess hazards, and inventory forests. As of 2020, the Oregon Lidar Consortium has acquired high-resolution lidar data for approximately 48 percent of the state. A web-based mapping application shows which parts of Oregon are completed or in-process for lidar coverage.[9]

Action 1D Support Basin-Scale Climate Change Research

Many local, state, federal, and tribal governments are conducting, and must continue, climate change research, identifying and assessing risks and actions specific to the Pacific Northwest. These research efforts will help water managers and natural resources agencies develop placed-based strategies for addressing climate-related impacts on water quality, water quantity, and ecosystems. There are many opportunities to further collaborate between local partners, governments, and research institutions.

Oregon Climate Change Research Institute

The Oregon Climate Change Research Institute (OCCRI) has been tasked by the Oregon Legislature to lead climate change research among faculty of the Oregon University System. In 2025, OCCRI released the Seventh Oregon Climate Assessment, a compendium of research on climate change and its impacts on Oregon.[10]

Researchers at OCCRI are examining climate change impacts on a regional scale, looking specifically at risks to the Pacific Northwest. The National Oceanic and Atmospheric Administration awarded a five-year grant to establish and coordinate a regional consortium of climate variability assessment, research, and outreach in the Pacific Northwest. Funds were used to establish the Climate Impacts Research Consortium, which includes OCCRI and other researchers from universities and extension services within Oregon, Washington, and Idaho. The Consortium provides information and tools for making decisions about landscape and watershed management and has been home of the Regional Integrated Sciences and Assessments (RISA) for the Pacific Northwest since September 2010, one of ten RISAs in the country. In 2022, Congress directed changing the name of the RISA program to "Climate Adaptation Partnerships."

Oregon's Climate Change Adaptation Framework

Oregon's Climate Change Adaptation Framework provides a broad-scale qualitative assessment of risks to people, infrastructure, communities, and natural resources that are expected to result from the effects of variable and changing climate conditions.[11] The Framework calls for additional research in several areas, including social, economic, and climate change impacts related to forest management and other types of management.

Oregon Climate Action Commission (formerly Oregon Global Warming Commission)

In 2007, the Oregon Legislature, through passage of House Bill 3543, established the goal of reducing greenhouse gas emissions by 10 percent below 1990 levels by the year 2020.[12] By 2050, those emissions have to be at least 75 percent below 1990 levels. That legislation also created the Oregon Global Warming Commission, which is tracking progress towards the goal. The Oregon Department of Energy provides support for the Commission.

In 2023, the Oregon Legislature (Senate Bill 522) changed the name of the Oregon Global Warming Commission to the Oregon Climate Action Commission. The Commission developed an Oregon Climate Action Roadmap that provides foundational information on state climate impacts, emission trends, and progress towards achieving Oregon's greenhouse gas emissions goals. The Commission has also authored several other documents including the 2021 Natural and Working Lands Proposal, in collaboration with the Department of Agriculture, Department of Forestry, and the Oregon Watershed Enhancement Board. Through the adoption of HB 3409 in 2023, the Oregon Legislature established the state's Natural and Working Lands Fund to support investments in natural climate solutions on Oregon's natural and working lands. As approved by the Oregon Climate Action Commission in early 2024, the Fund's initial $10 million appropriation was allocated between the Oregon Department of Agriculture, the Oregon Department of Fish & Wildlife, the Oregon Department of Forestry, and the Oregon Watershed Enhancement Board to support a variety of programs and projects to advance nature-based climate solutions.

Next Steps

Oregon should continue collaborating with existing climate change research organizations and institutions to improve climate change projections at a basin scale. Basin-scale data are needed to help Oregonians prepare responses and strategies to address climate change.

These include: identifying basins susceptible to changing flow regimes, establishing gages to quantify the rate of change in the magnitude, frequency, duration, and timing of streamflow; identifying groundwater systems with areas of recharge within the rain-snow transition zone; monitoring groundwater level responses to climatic impacts; and working with the U.S. Geological Survey and other partners to support long-term, natural streamflow monitoring stations that have previously been used to assess climate impacts on water supplies (e.g., U.S. Geological Survey Hydro-Climatic Data Network stations, and Geospatial Attributes of Gages for Evaluating Streamflow stations).

Action 1D

Support Basin-Scale Climate Change Research

Examples of how to implement this action:

- Make improvements in surface water and groundwater monitoring, flood and drought frequency projections, and long-range forecasts
- Improve climate change projections at the basin-scale
- Develop reliable projections of basin-scale hydrology and associated impacts on built and natural systems, including aquatic species and habitat
- Analyze how instream and out-of-stream water rights will be met with hydrologic changes
- Investigate potential shifts in the hydrograph, agriculture and irrigation seasons and impacts to fish distribution/life history timing
- Develop climate change forecasting for use in water availability analyses and permitting decisions (also see Action 10F)
- Investigate new crop types suitable to a changing climate
- Investigate increased risks to ecosystems and water supply and wastewater management infrastructure associated with wildfires, particularly in environmental justice communities
- Finalize and implement ODFW's Aquatic Habitat Prioritization assessment which incorporates climate projections for water quantity and temperature when evaluating future habitat suitability for sensitive aquatic species
- Coordinate data collection into the Oregon Water Data Portal Project
- Include an assessment of vulnerable water supply systems and identify those in environmental justice communities
- Consider the increased risk to water infrastructure by wildfire in environmental justice communities
- Look for equity impacts of climate change (i.e., climate justice) and water management (i.e., water justice)
- Advocate for financial resources to help local basins better understand climate impacts, including partnerships with OCCRI

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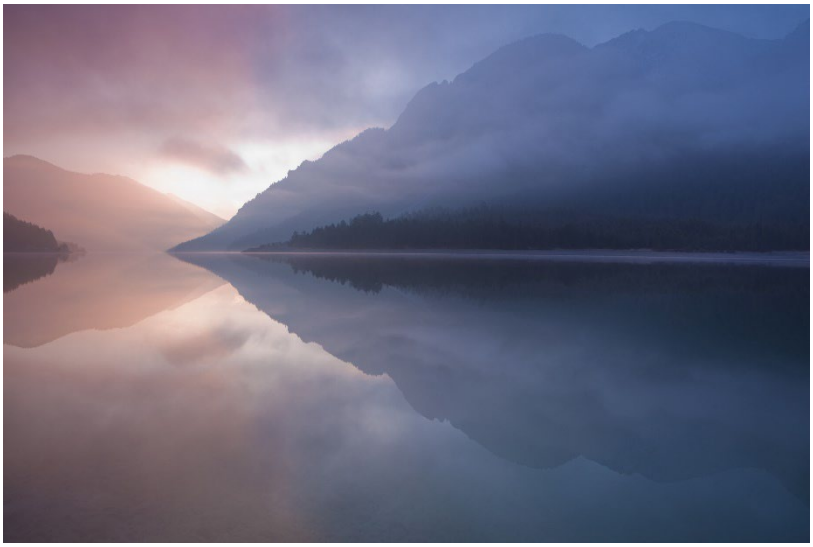
CHAPTER 2

Objective 2: Understand Instream and Out-of-Stream Needs

Oregon's rivers, streams, lakes, estuaries, wetlands, springs, and aquifers support a wide range of benefits for both humans and the environment. They provide sources of water for drinking, agriculture, industry, recreation, and essential habitat for fish and wildlife.

A clean and reliable source of water is critical for meeting our basic human needs and for supporting Oregon's economy. Thousands of businesses and industries rely on water in some form, to irrigate a crop, to manufacture a product, or to provide a service or experience. Oregon's economy is therefore dependent upon a healthy environment where water resources play and essential part. Fish and wildlife need a sufficient quantity and quality of water in rivers, lakes, wetlands, and estuaries to live, reproduce, and thrive. A healthy environment includes fully functioning ecosystems that can support our commercial and recreational needs and a quality of life unique to Oregon and the Pacific Northwest.

Oregon continues to seek better information about water needs and demands, both instream and out-of-stream. Without a better characterization of water use today, the state cannot adequately plan to meet these needs sufficiently and sustainably in the future.



Chapter 2 Actions at a Glance

Objective 2: Understand Instream and Out-of-Stream Needs

Critical Issue - Instream and Ecosystem Water Needs

2A Determine Instream Flow Needs (Quality and Quantity)
2B Determine Needs of Groundwater-Dependent Ecosystems
2C Develop Instream and Ecosystem Water Need Forecasts

Critical Issue - Out-of-Stream Water Needs

3A Improve Water-Use Measurement and Reporting
3B Regularly Update Out-of-Stream Water Demand Forecasts
3C Determine Unadjudicated Water Right Claims
3D Authorize the Update of Water Right Records with Contact Information

Critical Issue | Instream & Ecosystem Water Needs

Enough cold, clean water is needed within the environment to ensure overall ecosystem health. "Instream flows," or those within a stream channel, lakebed, or place where water naturally flows or occurs, support pollution abatement and sustain fish, wildlife, and the habitats they depend on. Instream flows also support society's economic and cultural needs, including energy production, navigation, transportation of goods, recreation, tourism, scenic values, and fishing.

The practice of securing a water right and taking water out of streams and aquifers to use for beneficial uses has resulted in reduced amounts of water instream. Without adequate water in the system and its legal protection, instream uses and associated ecological, economic, cultural, and spiritual benefits are at risk. Oregon must develop a better understanding of instream water quantity and water quality needs. For example, efforts to protect and restore water instream for aquatic life require an understanding of the full range of flows that are needed to not only prevent further species decline but also aid in the recovery of threatened and endangered species.

This section describes the data and studies needed to better understand instream water needs in the context of a changing climate. Chapter 3 describes actions (5A-5C and 6A-6B) to protect water resources during natural hazard mitigation and land use planning. Chapter 4 describes actions (11A-11E) to protect and enhance ecosystems and secure legal instream protections (e.g., Scenic Waterways designations, instream water rights).

Action 2A Determine Instream Flow Needs, Quality and Quantity

Healthy streams are dynamic, each exhibiting different patterns of variability to which native species are adapted. Ecosystems and aquatic species depend upon a range of flow conditions including frequency, magnitude, and timing, and suitable water quality to thrive. Scientists require site-specific data and studies to quantify these variable instream needs throughout the year. Agencies need information about the quantity and quality of flows needed to support public uses including recreation, scenic attraction, and pollution abatement. This section looks at next steps for better understanding instream flow needs to inform adequate instream flow protection and prioritize flow restoration efforts.

Data Needs for Instream Water Rights

The state faces an ongoing challenge to sufficiently fulfill instream needs to protect ecosystem function because instream values were not initially recognized under Oregon's Water Code. Therefore, it is important to conduct studies to quantify specific instream flow needs by stream system and specific reaches and legally protect the identified necessary instream flows (Action 11B). Understanding the full suite of flows needed to support stream ecosystems and functions can better inform future management actions and support instream water right applications.

Instream water rights, a water right held in trust by the Water Resources Department, are one tool that can be used to protect instream needs. Limited state agencies can apply for instream water rights for aquatic life and wildlife, pollution abatement, and recreation and scenic attraction, described in more detail below. The historic and legal basis of instream water rights are described in more detail in Appendix B. Additional discussion about instream water rights, including instream leases and transfers, can be found in Chapter 4, Action 11B.

Aquatic Life and Wildlife - The Department of Fish and Wildlife applies for instream water rights for the conservation, maintenance and enhancement of aquatic and fish life, wildlife, and fish and wildlife habitat. There are certain stream conditions that are necessary to support the life cycle of Oregon's fish species. Adequate amounts of

cool, clean water are a requirement for all life stages of salmonids, and the water quality, water quantity, and habitat needs vary by species. The Department of Fish and Wildlife strives to understand and provide information regarding the ecological flows and water quality components needed to protect and enhance Oregon's fish and wildlife and their habitats. Ecological flows represent the full range of flows (i.e., from low water fall spawning flows to channel forming high flows) and water quality that must be maintained within a stream and its margins to support the natural functions of healthy ecosystems. Without adequate water in the system, instream uses and their associated ecological benefits are threatened. The quantification of ecological flows is lacking across the state, so additional studies are needed. This lack of data makes water and species management challenging.

Data on ecological flows is needed to support public uses and ecosystem needs in future instream water right applications. Such applications require data collection and scientific analysis to determine the flows needed to meet the physical habitat requirements of target species and life stages. Understanding when and where species may be vulnerable can also inform streamflow and habitat restoration efforts and identify areas in need of additional study. There is very little information on the instream needs for wildlife, so more research is needed.

Pollution Abatement - The Department of Environmental Quality is authorized to apply for instream water rights for pollution abatement. Elevated stream temperature is a common water quality impairment in streams across Oregon. Healthy, functioning streams require adequate riparian vegetation, floodplain connection, and adequate streamflow, among other factors, to prevent water quality degradation and maintain high-quality aquatic habitat. Some instream rights in Oregon streams are for "pollution abatement" purposes but the Department currently lacks a program and technical capacity to apply for new instream water rights. The Department recognizes that instream water rights for the purpose of fish and wildlife provide water quality benefits as well.

Recreation and Scenic Attraction - The Parks and Recreation Department is authorized to apply for instream water rights to support recreation and scenic attraction based on studies utilizing the Oregon Recreation Methodology. This methodology is used to determine the recreation flow or water level requirements for scenic attraction and recreational values of a stream, river, lake, or wetland. More studies are needed across the state to determine the amount of water needed to accommodate the main recreational use(s) or scenic attraction occurring during any given month.

Western brook lamprey (Lampetra richardsoni). Credit: Laura Tesler Photography

Action 2A
Determine Instream Flow Needs (Quality and Quantity)

Examples of how to implement this action:

- Prioritize and install gages in additional locations to monitor the status of instream flows and water rights
- Use existing and new data to develop statewide ecological flow criteria for streams
- Prioritize basins and install monitoring equipment to help characterize the full suite of flows through these basins
- Conduct instream needs studies to support future instream water right applications
- Conduct instream needs studies to assess spiritual and cultural needs
- Pursue a consistent, model-based framework for characterizing long-term instream need in the context of climate change to support the development of a long-term instream forecast (Action 2C)
- Review, synthesize, and update models/studies to quantify the ecological, economic, social, and cultural value of instream uses
- Support state agency instream flow efforts and programs (e.g., ODFW, ODEQ, OPRD)
- Support ODFW and ODEQ efforts and collaboration regarding stream temperature monitoring, modeling, and studies
- Support ODFW and OWRD efforts and collaboration regarding monitoring for instream flows and instream water rights
- Fill data gaps regarding fish passage barriers
- Conduct studies to determine if wetland restoration or reconnection to streams could benefit instream flow

Data Needs to Support Spiritual and Cultural Values

Data needs regarding other instream values (e.g., spiritual and cultural values and access to First Foods) need to be studied, as they are not directly quantified in instream water rights. Studies could include environmental flows, which are metrics that consider human uses and other management objectives beyond ecological flow considerations. These are often called "balanced flows." They are set by evaluating trade-offs, but a solid understanding of ecological flow needs is an essential component to define realistic environmental flow targets.

Data Needs for Other Instream Needs

Salmon and steelhead need cold water refugia during their migrations upstream on the way to spawn and for rearing during the heat of summer when stream temperatures are at their highest. Such safe havens play an important role in the survival and migration of adult and juvenile salmon, steelhead, and trout as rivers warm to lethal thresholds during the summer. Identification, protection, and restoration of cold water refugia is critical, as climate change holds the potential for hotter, drier summers.

In 2015, the Oregon Department of Environmental Quality, U.S. Environmental Protection Agency, and the National Oceanic and Atmospheric Administration developed a partnership under the Clean Water Act to locate, protect, and restore zones of cold water habitat for fish in the Columbia and lower Willamette Rivers.[1] The Lower Willamette River Cold-Water Refuge Narrative Criterion Interpretation Study was submitted to the National Oceanic and Atmospheric Administration by the Department of Environmental Quality in March of 2020, and the Columbia River Cold Water Refuges Plan was prepared by the U.S. Environmental Protection Agency in 2021.

Data Needs for Grant Funding

Some water projects receiving funds from Water Projects Grants and Loans from the Water Resources Department under Senate Bill 839 (2013)[2] will need flow prescriptions that describe the duration, timing, frequency, and volume of flows required to maintain the biological, ecological, and physical functions of the watershed.

Action 2B Determine Needs of Groundwater-Dependent Ecosystems

Groundwater is vital to both ecosystems and human communities, as groundwater discharges and supplies water to wetlands, rivers, and lakes. Groundwater provides late-summer flow for many rivers and creates cool-water upwellings critical for aquatic species during the warmer summer months. Groundwater-dependent ecosystems contain species and habitats that rely on groundwater for some or all of their life cycle. These ecosystems form the interface between groundwater and surface water, and due to their unique hydrology, often harbor many rare species native only to these locations. Groundwater-dependent ecosystems still need to be fully identified and characterized across the state, including their groundwater quantity and quality requirements.

Action 2B
Determine Needs of Groundwater-Dependent Ecosystems

Examples of how to implement this action:

- Identify and characterize groundwater-dependent ecosystems and prioritize systems for long-term study
- Perform an in-depth analysis of accessible springs
- Monitor springs and seeps across the state to understand their contribution (quality and quantity) to streamflows
- Identify the water quantity and water quality needs of groundwater-dependent species and ecosystems
- Conduct seepage studies on priority streams to quantify groundwater exchange
- Evaluate impacts to groundwater ecosystems from human activities (e.g., groundwater pumping, lining canals, fish passage and transportation maintenance projects)

Oregon has a wide distribution of groundwater-dependent ecosystems. In 2022, the Nature Conservancy published the Oregon Atlas of Groundwater Dependent Ecosystems, documenting the abundance and distribution of groundwater dependent ecosystems. This report identified nearly 30,000 springs and found that approximately 33-percent of all rivers, 45-percent of all wetland area, and 63-percent of total lake area are groundwater dependent. The report also noted over 3,100 observations of groundwater dependent species. While some continued characterization of these systems is needed, the next important step is to quantify their groundwater quantity and quality requirements. This information can be used to help meet the needs of people, species, and ecosystems. For example, in the Oregon Dunes National Recreation Area, municipal wells pump water from an unconfined sand dune aquifer that also supports two sensitive species of amphibian that breed in the swale wetlands. By quantifying the groundwater needs of amphibians and wetland plants, compatible pumping levels supportive of wetland species were identified.[3]

Action 2C Develop Instream and Ecosystem Instream Need Forecasts

The state has completed two long-term water demand studies (2008 and 2015) that focused on forecasting water demands for agricultural, municipal, domestic, and industrial uses (See Action 3B). A parallel statewide analysis is needed to better understand the quality and quantity of instream and ecosystem needs now and into the future. Climate change will continue to affect water quality, timing, availability and use, and balanced solutions are not achievable without understanding the full suite of instream and out –of-stream needs. An instream need forecast must be produced at the appropriate scale and periodically updated to inform water planning and management.

Action 2C
Develop Instream and Ecosystem Water Need Forecasts

Examples of how to implement this action:

- Develop statewide instream water demand forecasts
- Periodically update demand projections with new climate projections
- Study potential impacts to ecosystems under a changing climate
- Study potential impacts to environmental justice and other frontline communities under a changing climate

Critical Issue | Out-of-Stream Water Needs

Out-of-stream uses are those that divert water from the environment, from a stream, reservoir, or from below ground, to serve a beneficial purpose. The major uses of diverted water in Oregon are to supply the water needed for agriculture, municipal, industrial/manufacturing, and domestic purposes (e.g., drinking water, bathing, laundry). Uses that divert water are often considered a "consumptive" use, or water that is not returned to its source. It is important to consider that freshwater is a finite resource and Oregon water law requires that it be used without waste. With few exceptions, water users must apply for and be granted a water right to use either surface water or groundwater for a beneficial use. Additional information about water rights can be found in Appendix B "Water Laws, Policies, and Regulations."

A changing climate has the potential to reduce water supplies, in the form and timing of snowpack and rain, leaving less water available to meet instream and out-of-stream needs. Oregon has been working to increase its accounting of out-of-stream water use to inform basin strategies for integrated water management. Out-of-stream water use supports many sectors of Oregon's economy – reinforcing the need to better understand these uses to avoid negative economic impacts.

Out-of-Stream Water Uses

Statewide Consumptive Use Estimates

House Bill 2018, passed in 2021, called to produce a report on statewide consumptive water use. The Water Resources Department is leading this work and expects to have consumptive water use estimates for all major hydrologic basins in Oregon in 2028. In absence of this more detailed data, generalizations about out-of-stream water use are summarized below using the 2023 Business Case for Investing in Water report. The report utilized data from the U.S. Geological Survey.

Water Use in Agriculture

The majority of water diverted for out-of-stream use is for irrigation to grow crops. According to the 2023 Business Case for Investing in Water in Oregon[4], almost 80-percent of all water withdrawn from surface or groundwater sources is used for irrigation (Figure 2-1).

Figure 2-1: Water Withdrawals by Source and Use Across Oregon

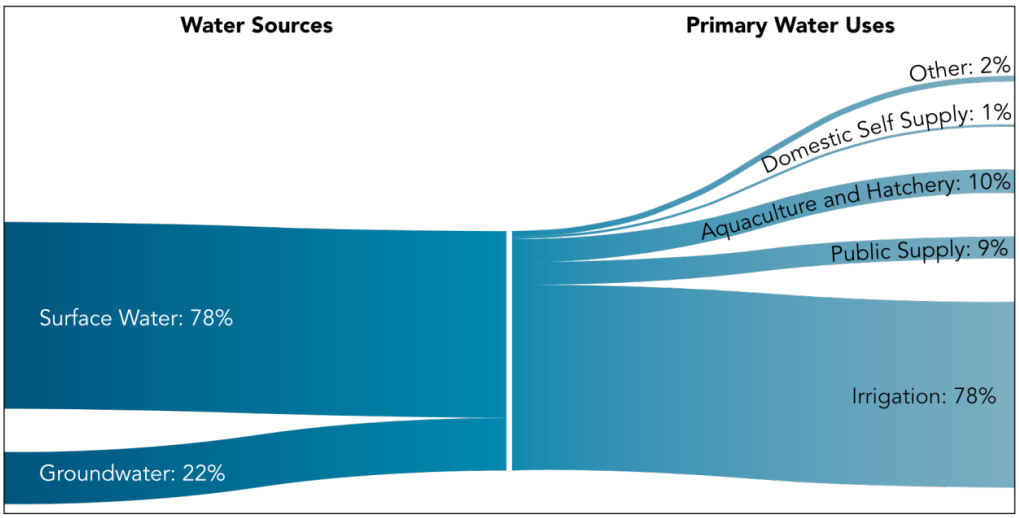


Image Source: AMP Insights, Data Source: USGS Water Use Data for Oregon[5]

Increases in agricultural water demand are expected from a range of possible changes in the climate, including increased temperatures and drier summers, resulting in prolonged agricultural growing seasons and increased evapotranspiration. Many basins are over appropriated, meaning there is not enough water to meet the full water rights held by people. This means that increasing irrigation or shifting irrigation seasons to respond to warmer, drier conditions may simply not be an option. Actions including increasing irrigation efficiency, water conservation, water reuse, storage, and market-based solutions are all potential management approaches outlined in Chapter 4, Actions 10A-10D.

Irrigated agriculture contributes significantly to the economy, food supply, and to local communities. The Department of Agriculture reports that Oregon's 37,200 farms produced more than 220 different products in 2021.[6] According to the 2023 Business Case, the total annual economic contribution of irrigated agriculture to Oregon's economy is $7.3 billion.

Although much of the water is used to irrigate crops, there are many other uses for water within agriculture, such as water for livestock operations, which supports one of Oregon's highest-ranking commodities – cattle and calves – valued at almost $588 million in 2020. [7]

Food Processing – Oregon hosts hundreds of food manufacturing companies that play an essential part in food production by cooking, freezing, and packaging products for consumers. The food processing industry handles crops from cherries to onions and includes bakery and dairy products, fruits and vegetables, meat, poultry, and seafood. Water is needed for washing, processing, and packaging food. Finding a high-quality water supply to meet the needs of this industry is sometimes a challenge.

Public Supply – Municipal, Commercial & Industrial Water Use

Municipal water systems may be shared water systems operated by homeowner associations, larger systems managed by private water companies, or public systems operated by cities, towns, or water districts. Most commercial, industrial, and high-tech facilities receive water from municipal water systems. Public supply to meet municipal, commercial, and industrial demands, account for approximately 9 percent of out-of-stream diversions (Figure 3-6).

Municipal water systems are crucial to the state's economy, serving as a backbone of economic development, public health, and safety in many Oregon communities. These water providers supply clean and reliable water to residences, schools, parks, hospitals, industries, businesses, and other public and private facilities. In the past decade, manufacturing has largely been located in urbanized areas where access to a public water system has played an important role. The ability of municipal water systems to deliver reliable, high quality water supplies is one factor that has attracted industry to Oregon.

Industrial use involves using water within the processing or manufacturing of a product. Water can be used to construct, operate, and maintain industrial sites and facilities. Commercial use is very similar. It includes the use of water for the production or delivery of goods, services, or commodities, along with the use of water to construct, operate, or maintain a facility.

Economic growth in Oregon depends, in part, on the availability of water and wastewater services, and the ability of municipalities to serve these needs. Through their planning efforts, municipalities will continually need to estimate long-range water supply demands and to identify options, including water conservation programs, to meet future needs. Municipal Water Management and Conservation Plans, described in Appendix B, are one such tool to plan for the future.

Self-Supplied Industries – Self-supplied industrial and commercial facilities maintain their own water supplies and water rights independent of public water systems. It is important to recognize that much of the state's industries are supported by municipal systems and not "self-supplied."

Domestic Wells
Domestic self-supply makes up just one percent of the water withdrawals. While this is not a large amount of the total water diverted in the state, this water supply is critical to meeting many people's basic household needs. Nearly 23 percent of Oregonians rely on domestic or private wells as their primary source of potable water.[8]

Action 3A Improve Water-Use Measurement and Reporting

Objective water management decisions are made possible when they are based on reliable information about water use. Availability of water use data is fundamental to ensure efficient water management, effective water distribution, determine the effectiveness of water conservation actions, accurately characterize water budgets, account for water use in basin studies, and to help plan for future water needs. The information is also used to ground-truth demand projections or models. The Water Resources Department has the authority to require users to measure water use; however, there was historically limited authority to require reporting of the resulting data. This has changed with the passing of House Bill 2010 in 2023, now providing the Department with broader authority. Water users who do keep track of their use are better able to demonstrate the validity of their water rights, to develop water management and conservation plans, and to determine the design and funding needs of their water systems in the future.

2022 Legislative Report on Water Use Measurement and Reporting

The 2022 Legislative Report on Water Use Measurement and Reporting, published by the Water Resources Department, outlines recommendations for improving collection and use of water use data.[9] Implementation of these recommendations is expected to provide information needed to facilitate planning, protect existing water right holders, maximize instream and out-of-stream beneficial uses, and minimize costly water conflicts. The report's six key recommendations include:

1. Improve water use reporting database functionality and public access
2. Integrate accurate, transparent statewide water use summaries
3. Invest in evapotranspiration monitoring and programs
4. Invest in water use measurement devices in priority watersheds
5. Install groundwater observation wells
6. Increase understanding of statewide water use through investments in field and technical staff

Integrate Accurate, Transparent Statewide Water Use Summaries – Basin studies, water budgets, and planning efforts would all benefit from accurate data of water use by water right. A robust data set is also needed to develop reports on water use by watershed, including cross-boundary watersheds, and support modeling efforts used in many planning initiatives. The Water Resources Department received funding for this effort and is working to identify staffing and specific activities needed to develop these much-needed statewide summaries.

Invest in Evapotranspiration Monitoring and Programs - Evapotranspiration (ET) is water that transpires from the leaves of plants and evaporates from soil and reservoirs. ET data can be used to quantify how much water is consumed by irrigated agriculture and other lands (e.g., forest, lawn). Understanding how much water crops use can help farmers, water managers, and communities manage current supplies and plan for their future needs. The Water

Action 3A

Improve Water Use Data and Reporting

Examples of how to implement this action:

- Continue to work with Information Technology to improve the software and tools used for water-use measurement and reporting
- Implement new authority that allows OWRD to require reporting of water use, where measurement is required, including aligning the reporting with the Water-Use Reporting program
- Update and implement the Water Resources Commission's Strategic Measurement Plan, measuring significant diversions
- Coordinate the Water-Use Reporting Program and Water Resource Commission's Strategic Measurement Plan
- Improve Water Use Reporting Database functionality and public access, including establishing and maintaining quality assurance procedures to verify the accuracy of water use and other data
- Invest in water use measurement devices in priority watersheds
- Invest in evapotranspiration monitoring and programs
- Develop accurate statewide annual water use summaries for water rights using all available water use data sets
- Produce annual values of consumptive use by water right to allow for analysis of trends in water use over time
- Install and monitor groundwater observation wells
- Provide resources to assist with installation of measurement devices; update cost-share program
- Work with USGS to integrate water use data from OWRD into USGS water use products
- Seek authority to require water use reporting in areas of scientific interest in preparation for Serious Water Management Problem Areas (SWMPAs), basin studies, or planning exercises like updates to basin plan rules
- Increase documentation and data collection of decommissioned wells and well construction history

Resources Department uses estimates of ET for several important programs and projects ranging from studies to water right transfers.

Satellite-based ET data provides more accurate data over a larger area, over a broader period of time, and more affordably than any other approach. The Water Resources Department uses satellite imagery, supported with ET models, and other well-established methods to calculate consumptive water use from irrigated fields and open water bodies. With legislative support from House Bill 2018 in 2021 and House Bill 2010 in 2023, the Department is working to establish a consistent, accurate, and well-vetted ET and water use dataset across Oregon to support water planning and management.

Future applications of satellite-based ET data sets include:

- Compute water use in Walla Walla Basin and future groundwater basin studies
- Develop consumptive use values for statewide water budgets prescribed under House Bill 2018 (2021)
- Support enrollment and validation of historical use; monitoring compliance for the Harney Basin Groundwater Conservation Reserve Enhancement Program (CREP)

Water Measurement Cost Share Revolving Fund – Federal support through the American Rescue Plan Act State Fiscal Recovery Funds provided $1 million in 2021 to the Water Resource Department's Cost Share Measurement Program to assist water users with the installation of measuring devices.

Action 3B Regularly Update Out-of-Stream Water Demand Forecasts

The most recent water demand forecast was developed by the Water Resources Department in 2015. Oregon's 2015 Long-Term Water Demand Forecast[10] describes potential long-term consumptive use demands in Oregon that may not be able to rely on historic patterns to predict future rainfall and snowpack. The 2015 scenarios and assumptions included both a projected increase in population and a longer, warmer growing season, leading to more demand by agricultural, commercial, residential, and industrial water uses in 2050. The forecast was done at a coarse scale, offering projections in increased water demands at the county level.

Strategy Action 3A described improvements needed to statewide water use measurement and reporting. These improvements, outlined in the 2022 Legislative Report on Water Use Measurement and Reporting, are needed to develop the data and modeling tools needed to improve our statewide approach to water demand forecasting. Future out-of-stream water demand forecasts must be produced at the appropriate scale to inform collaborative approaches to water planning and management. Demand forecasts should identify trends in water use, economic development, urban-rural population growth/shift, per capita demands, and changing crop water requirements due to a changing climate.

Out-of-stream water demand forecasting is needed to support future place-based, integrated water resources planning and other planning efforts. For further discussion of place-based integrated water planning, refer to Chapter 4, Action 9A.

Forecasting is also needed for instream flow and ecosystem needs, see Action 2C.

Action 3B
Regularly Update Out-of-Stream Water Demand Forecasts

Examples of how to implement this action:

- Periodically update demand projections with new population, per capita water demand, industrial demand, crop water use, and climate projections
- Develop models/studies to quantify the economic, social, and cultural value of consumptive uses of water and publish outcomes
- Employ remote sensing and crop water demand modeling to improve crop water use estimates
- Provide data in a method consistent with needs of the public, and involve water users in the development of demand products
- Study potential impacts to environmental justice and other frontline communities in demand forecasts

Action 3C Determine Unadjudicated Water Right Claims

Appendix B describes the process for obtaining water rights in Oregon, and the need to resolve claims to the use of surface water that predate Oregon's 1909 Water Code. Adjudication is a formal administrative judicial process where water right claims are quantified, documented, and eventually incorporated into the prior appropriation system. In addition to pre-1909 claims, federal and tribal reserved water rights can be determined through an adjudication. There are similar procedures for conducting adjudications for groundwater uses that pre-date the Water Resource Department's authority to issue groundwater rights.

The ability to manage water resources has been greatly facilitated in Oregon where adjudications have been concluded. Adjudicating water right claims creates an enforceable system that is protective of senior users in times of shortage. Without the adjudication process, these claims cannot make calls for their water or take advantage of water management tools, such as transfers or leases.

The Federal Court ruled in US v Oregon that the US Government along with Indian Tribes must participate in Oregon's General Stream Adjudication and have their rights to water quantified. Following this ruling both the

Federal Government and the Klamath Tribes filed claims in the Klamath Basin Adjudication. In 2013, the Water Resources Department completed the administrative phase of the Klamath Basin Adjudication, submitting the Findings of Fact and Order of Determination (FFOD) to the Klamath County Circuit Court for review. A year later in 2014 the Department issued the Amended and Corrected Findings of Fact and Order of Determination (ACFFOD). The court remanded portions of the ACFFOD back to the Department for further findings. At the conclusion of the judicial phase, the Court will issue a water rights decree, either affirming or modifying the ACFFOD. The Water Resources Department can then issue water right certificates in accordance with the decree.

Action 3C
Determine Unadjudicated Water Right Claims

Examples of how to carry out this action:

- Conduct surface water and groundwater adjudications
- Settle federal reserved claims, including tribal claims

The remaining unadjudicated areas for surface water consist primarily of river basins located west of the Cascades. In some instances, federal reserved rights, including tribal claims, still have not been determined in basins that have been adjudicated. Tribes and federal agencies play an important role in the resolution of water rights claims in basins throughout the West. The need to resolve tribal and federal rights in Oregon is real and significant.

Action 3D Authorize the Update of Water Right Records with Contact Information

There are no statutory provisions allowing the name on a water right certificate to be changed or updated, even if the holder of the certificate has passed away or sold off land with its appurtenant water rights. More than 89,000 certificates are held by water users. The sate needs the ability to respond to holders of water rights who are asking to modify the names on these certificates. State authority will enable the Water Resources Department to update ownership information in its records.

This authority will also help facilitate Water Resources Department processes, such as communicating with water right holders, researching water rights, mapping water rights with geographic information systems (GIS), updating the water rights database, and improving compliance with measurement and reporting permit conditions.

Action 3D
Authorize the Update of Water Right Records with Contact Information

Examples of how to carry out this action:

- Authorize the Water Resources Department to update the names on water rights certificates
- Update related water right records, including databases and geographic information system (GIS) layers

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CHAPTER 3

Objective 3: Understand the Pressures that Affect Our Needs & Supplies

Oregon must plan and prepare for pressures and unexpected challenges that affect our instream and out-of-stream water needs and supplies. Climate change, multi-year droughts, floods, and extreme temperatures will continue to affect water resources, ecosystems, and water needs now, and into the future. Ensuring the state can meet the need for access to clean water is necessary for both people and the environment.

Oregon Revised Statute 536.220 specifies that the Integrated Water Resources Strategy must consider climate change, land-use change, and population growth. This chapter describes how the Strategy offers both climate mitigation and resiliency actions. This chapter also addresses the connection between energy and water, resources to plan and prepare for natural hazards, improvements needed to Oregon's land use planning system, the need to maintain, upgrade, and modernize our water infrastructure, and the need to provide a foundation of education around water.

Chapter 3 Actions at a Glance

Objective 3: Understand the Pressures that Affect Our Needs and Supplies

Critical Issue – Climate Change
Actions to mitigate and adapt to climate change are distributed throughout the Strategy

Critical Issue - Water & Energy
4A Analyze the Effects on Water from Energy Development Projects & Policies
4B Develop Non-Traditional Hydroelectric Power
4C Promote Strategies that Increase/Integrate Energy and Water Savings

Critical Issue - Natural Hazard Mitigation Planning & Extreme Events
5A Plan and Prepare for Drought and Wildfire Resiliency
5B Plan and Prepare for Flood Events
5C Plan and Prepare for a Cascadia Earthquake and Tsunami Event

Critical Issue - Land Use Planning
6A Improve Integration of Water Information and Land Use Planning
6B Encourage Low Impact Development Practices and Green Infrastructure

Critical Issue - Water Infrastructure
7A Maintain, Upgrade, and Decommission Water and Wastewater Infrastructure
7B Encourage Regional (Sub-Basin) Approaches to Water and Wastewater Systems
7C Support Dam and Levee Safety

Critical Issue – Education & Outreach
8A Support Implementation of K-12 Environmental Literacy Plan
8B Provide Career Training for the Next Generation of Water Professionals
8C Promote Community Education and Outreach
8D Identify Water Research Needs and Partnerships

Critical Issue | Climate Change

Oregon is experiencing increased temperatures, extreme weather events, decreased winter snowpack, and frequent and intense drought. These climate conditions place immense pressure on our ecological, social, and economic systems. Oregon's wetlands, estuaries, lakes, rivers, streams, and aquifers are receiving less natural recharge and experiencing more evaporation and increased pressure for human uses. Our water resources are less able to support the many species that rely on them for their survival, contributing to species extinctions and a biodiversity crisis. Oregon's forest ecosystems, essential for storing and filtering water, are suffering from increased disease, competition from invasive species, tree mortality, and wildfire risk. These climate pressures, and more, have implications for our ability to meet Oregon's instream and out-of-stream water needs.

Climate change does not affect all places and communities in Oregon equally. Underserved populations, rural communities, future generations, and sensitive ecosystems are disproportionately affected. Individuals who lack access to power, employment, adequate housing, and financial markets are less able to prepare for and respond to the changes brought about by climate change. Oregon's Climate Equity Blueprint provides tools that state agencies can use to advance equitable climate adaptation planning and action.[1]

This section will describe the latest climate projections, expected impacts to natural and human systems, and the Strategy's role in mitigation and adaptation. While this section does not include standalone actions, it points to the many actions distributed throughout the Strategy that seek to help Oregon mitigate and/or adapt to climate change.

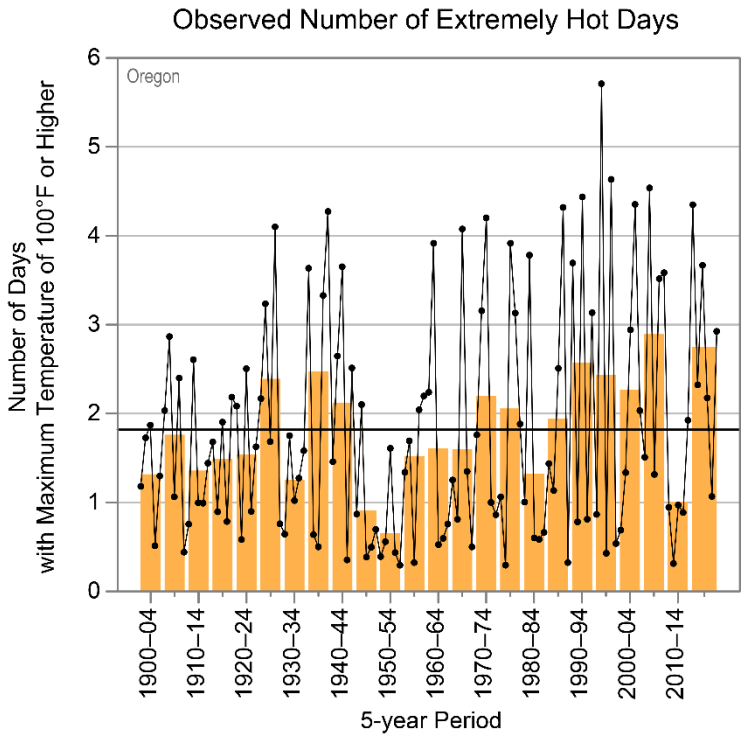
Climate Change Projections for Oregon

The Oregon Climate Change Research Institute (OCCRI) conducts regular biennial assessments of the state of climate change science and the likely effects of climate change on Oregon. The assessment supports the state's natural hazards mitigation planning and implementation of the 2021 Oregon Climate Change Adaptation Framework.[2] The following is a summary of some of the impacts and risks identified in OCCRI's Seventh Climate Assessment and other references.[3]

Increasing Air Temperature

Oregon's annual average temperature has warmed by 2.2 degrees Fahrenheit (°F) per century since 1895. Annual temperatures are projected to increase at least 5°F by 2074 if greenhouse gas emissions continue at current levels. The number of days each year where temperatures exceed 90°F during the day and 65°F at night has continued to increase.[4] Increased air temperatures cause a cascade of other impacts, including changes to snowpack, soil moisture, and water quality.

Figure 3-1: Days Oregon Exceeded 100 Degrees F
(Source: https://statesummaries.ncics.org)



Wetter Winters and Declining Winter Snowpack - As mean annual temperature increases, the percentage of precipitation that falls as rain instead of snow are expected to increase. Precipitation that arrives as rain instead of snow runs off the landscape sooner, reducing groundwater recharge and streamflow in the late spring and summer. Climate predictions also note that the amount of moisture contained in snowfall, called "snow water equivalent" is expected to continue to decline.

The retreat of Oregon glaciers has accelerated since the 1990s.[5][6][7] Shrinking glaciers change the hydrology and ecology of downstream systems. Changes in summer and winter air temperature and winter snowfall are the most important factors affecting changes in the extent of glaciers.[8]

Drier Summers – In addition to summers becoming hotter, they are also expected to be drier. Oregon typically experiences dry summer months, but climate projections indicate the duration between rainy seasons will increase and overall summer precipitation will decrease.

Decreased Soil Moisture – Prolonged high temperatures increase plant uptake and evaporation of water from soil. Dry soils can worsen the human perception of extreme heat events through relative lack of evaporative cooling.

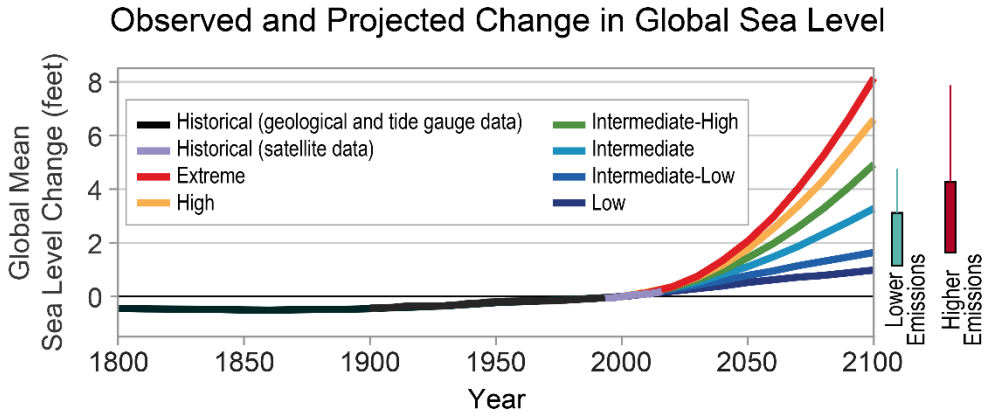
Surface Water Temperatures - High water temperatures are already a major water quality concern in many of Oregon's streams and rivers. Water temperature is projected to rise as air temperature increases in the 21st century, particularly in urban streams lacking natural riparian vegetation. A decline in summer streamflow will exacerbate the increase in water temperature, because low volumes of water can heat up more quickly than larger, faster streamflows. Warmer conditions may contribute to earlier or longer lasting harmful algal blooms.

Sea-Level Rise - Increasing temperatures raise concerns for sea level rise in coastal areas. Global average sea level has risen since 1900 by about 7–8 inches. It is projected to rise another 1–8 feet, with a likely range of 1–4 feet, by 2100 because of both past and future emissions from human activities. Movement of tectonic plates on the ocean floor is causing the Oregon coast to rise, a phenomenon known as "uplift." In some parts of the Oregon coast, the uplift is exceeding the rate of sea level rise; so, sea level has dropped in these locations. However, the rate of sea level rise is projected to exceed the rate of uplift along the entire Oregon coast by 2050, resulting in sea level rise for all locations.[9]

Wind Speeds

Projections indicate extreme winter wind speeds may increase while mean wind speeds across the state are projected to decrease slightly. Increased wind speeds have implications for water and energy infrastructure and public health and safety.

Figure 3-2: Global Sea Level Rise
(Source: https://statesummaries.ncics.org)



Climate Change Impacts

Impacts to Aquatic Species and Habitat

Changes in hydrologic variables, such as the timing and extent of streamflow, alter key habitat conditions for salmon and other anadromous fish that depend on specific conditions for spawning and migration. The impacts of climate change on the region's salmonids will vary across the region and among different species, populations, life-stages, and site characteristics.[10] Increased winter and early-spring streamflows have the potential to scour eggs or wash away newly emerged fry of fall-spawning salmon and trout species. Extreme low summer streamflows can limit the accessibility for some species to move upstream to spawn.

In snowmelt-dominated watersheds, an earlier occurrence of peak streamflow and snowmelt in the spring will result in decreased summer and fall flows, warmer summer water temperatures, and increased sedimentation, all of which have negative consequences for natural systems, salmonids and other estuarine and marine populations. Shrinking glaciers reduce benefits to cold-water adapted aquatic species, including insects and bull trout.[11,12]

For salmon populations to remain viable, adults must migrate to spawning habitat, where survival of eggs and larvae requires cool water, gravel substrates, and sufficient water flow and oxygen. There also must be enough water flow to support migration back to the sea. Climate change is affecting all these elements in ways that threaten the survival of salmon runs, and several of the region's populations may be approaching physical temperature tolerances.[13]

Impacts to Wetlands

Scientific evidence suggests that climate change is causing significant impacts to coastal, estuarine, and freshwater wetlands. Sea level rise and ocean acidification is affecting tidal wetland habitats and the species they support. Wetlands can be sensitive to small changes in precipitation and temperature. These climate-sensitive habitats, including vernal pools, springs, and seeps, support a variety of unique species, including threatened and endangered species.

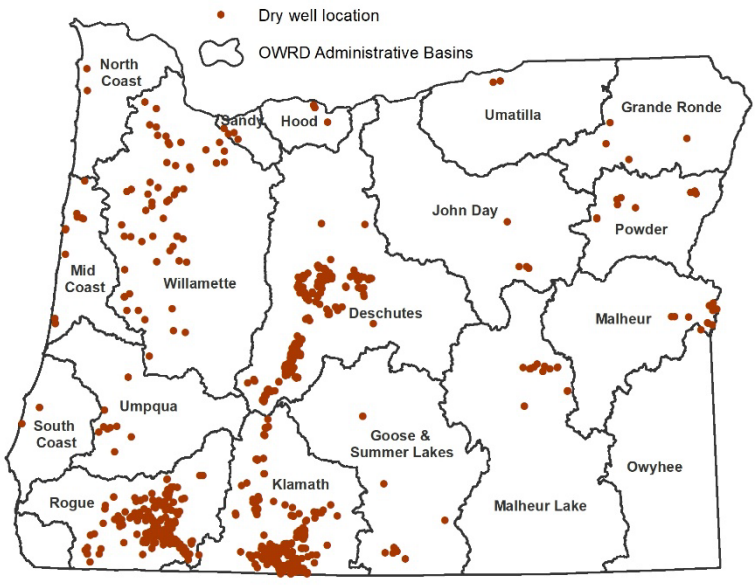
Impacts to Forests

Higher summer temperatures and earlier spring snowmelt are expected to increase the risk of forest fires. Wildfires are expected to increase in both frequency and severity. The average annual area burned in Oregon's forests is expected to increase by at least 50-percent. An increase of wildfires, insect outbreaks, erosion, and changing species composition in forests will pose challenges for ecosystems and significant challenges for water management.

Impacts to Groundwater Systems

Reduced snowpack is expected to result in declines in groundwater recharge, affecting aquifers that are recharged from mountain systems. The timing of groundwater discharge to streams may also shift, possibly reducing baseflows in the late summer months. Much of this change largely depends on the hydrogeological setting and a stream's sensitivity to climate change.

Figure 3-3: Reported Dry Wells Throughout Oregon
January 2024



Impacts to Coastal Systems

The coast is already vulnerable to several hazards, and these will be further exacerbated by climate-related impacts. Winter storms have historically been the primary factor for coastal erosion and flooding. The combination of increasing wave heights and rising sea-levels presents a substantial threat to the Oregon coast, increasing erosion and the loss of some beaches and coastal lands.

Sea level rise will also have impacts beyond the coast, affecting tidally influenced rivers and surrounding inland communities, where rising river levels can pose flooding problems. Other threats include increasingly stressed infrastructure built under older engineering standards. Infrastructure at risk can include water treatment plants, diversion facilities, onsite wastewater treatment systems (septic systems) and wastewater treatment plants. The intrusion of salt water will pose a risk in some communities.

The Oregon Coastal Management Program at the Department of Land Conservation and Development published the Sea Level Rise Exposure Inventory for Oregon's Estuaries in 2017. The project identified vulnerable infrastructure and other assets and will help prioritize areas to focus future resources and further study. Additional sea level rise planning resources can be found on the Oregon Coastal Atlas.

Impacts to Human Health

The Oregon Health Authority published its 2017 Oregon Climate and Health Resilience Plan to alert Oregonians to the risks associated with a warming climate and building climate resilience.[14] The Plan notes that human health could be compromised by both drought and increased water temperatures, leading to conditions that result in harmful algal blooms and waterborne diseases. At the other end of the spectrum, flooding conditions caused by increased precipitation and rapid runoff can overwhelm drinking water intakes and sewer/wastewater systems.

Impacts to Agriculture

Climate change may significantly affect the availability and use of water for irrigation. Longer and drier growing seasons generally result in an increased demand of water for irrigation. With projected rises in temperature, irrigation demands are projected to increase by at least 10 percent in arid and semi-arid regions, translating into higher pumping and energy costs.[15] Regenerative agriculture practices offer a way to restore degraded soils, increasing organic matter and moisture-holding capacity, and manage them sustainably.[16]

The retreat or disappearance of glaciers will also impact agriculture. For example, apple and pear orchards on the north slopes of Mount Hood are watered by the Middle Fork of the Hood River, which drains the Coe and Eliot glaciers. Modeling suggests that September flow along the Middle Fork will decrease by almost 70 percent by 2100 due to the loss of glacier area.[17,18]

Impacts to Water Rights

The shift in timing and availability of water due to climate change may affect whether water users are able to utilize their water rights as authorized. The implications of this could be particularly significant for water right holders who have historically relied on live flow surface water during the summer months. Prime growing conditions are shifting to earlier in the year and have lasted longer, because of gradual changes in temperature. This increased demand for water in the early spring or late summer could happen more frequently in the future under a changing climate.

Similarly, water rights that protect water instream for a certain amount, time of year, and location may no longer be adequate due to precipitation changes, decreased snowpack, and changes in species distribution. An increase in regulation may be needed to meet senior out-of-stream water rights, to protect instream needs, and to meet water quality needs. Policymakers may one day have to revisit the body of rules that define irrigation seasons that were based on historic conditions. Incremental adjustments will be important for maintaining strong legal foundation, while keeping up with a changing climate.

Impacts to Population Growth and Shifts

Climate change is predicted to cause a decline in quality-of-life across much of the country.[19] Areas of Oregon west of the Cascades are anticipated to be an exception, with people in that region benefiting from climate change because of improvements to climate amenities in the future.

People are likely to move to Oregon in response to climate change, and the population and economic production of the Pacific Northwest may increase by 15 percent by 2065 due to climate migration from other areas of the country.[20] Oregon must consider how to prepare for climate migration to avoid economic disruption, housing shortages, and over-burdened infrastructure.

Planning for Climate Mitigation, Adaptation, and Resilience

The wide-ranging impacts of climate change may seem overwhelming and lead us to ask what can or should be done to keep things from getting worse and to adapt to the coming changes. Many state documents and programs are dedicated to addressing both the need to mitigate and adapt to climate change. Climate mitigation and climate adaptation mean very different things, but some actions described in the Strategy can simultaneously accomplish both. Actions to protect and restore our green infrastructure including wetlands, floodplains, and forests, or planting urban areas have potential to accomplish both mitigation and adaptation.

Climate Mitigation	Climate Adaptation	Climate Resilience
Measures to reduce the amount and rate of future climate change by reducing emissions of heat-trapping gases (primarily carbon dioxide) from the atmosphere	The process of adjustment to an actual or expected environmental change and its effects in a way that seeks to moderate harm or exploit beneficial opportunities	The ability to prepare for threats and hazards, adapt to changing conditions, and withstand and recover rapidly from adverse conditions and disruptions

Definitions from the U.S. Global Change Research Program[21]

Climate Mitigation

Greenhouse gases, such as carbon dioxide, nitrous oxide, methane, and ozone cause heat to be trapped near the Earth's surface causing a "greenhouse effect" and many of the conditions we refer to as "climate change." Greenhouse gases can be from human or natural sources. Carbon dioxide is the largest source of greenhouse gas, produced from a wide range of activities including burning fossil fuels and biomass, land-use changes (e.g., de-forestation), and industrial processes (e.g., concrete production). Climate mitigation refers to actions that reduce the production of greenhouse gases or capture carbon dioxide from the atmosphere, to prevent climate change from getting worse. The Climate Protection Program, led by the Department of Environmental Quality, sets an enforceable declining cap on greenhouse gas emissions from fossil fuels used throughout Oregon, including diesel, gasoline, and natural gas. The program is designed to reduce these emissions by 50% by 2035 and 90% by 2050.

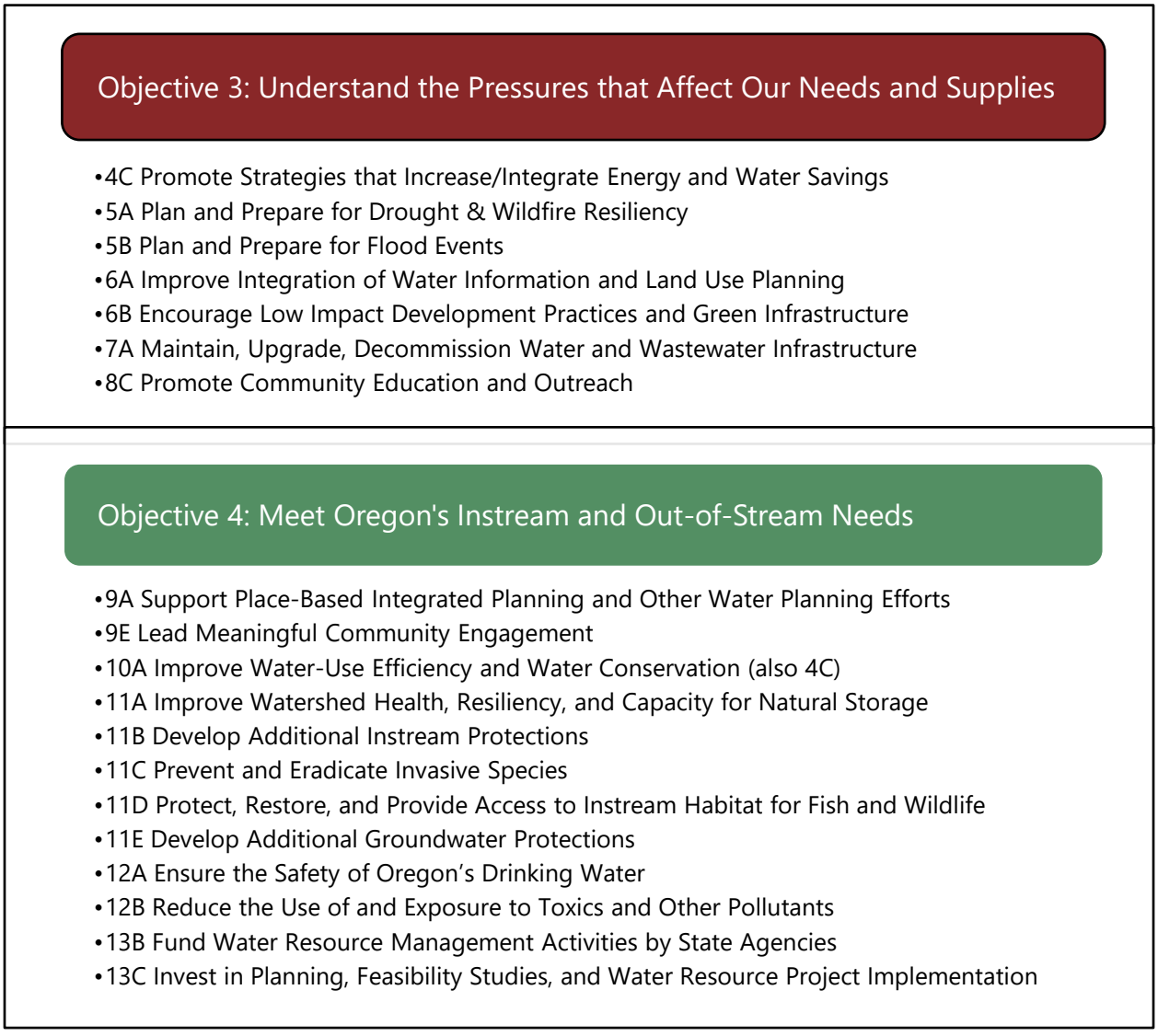
Oregon's Land Use Planning program (see Critical Issue later in this chapter) led the Department of Land Conservation and Development works to address climate mitigation. Oregon's working farms and forests keep carbon pollution sequestered in existing soils, plants and trees. Oregon's Planning Goal 3 (agricultural lands) and Goal 4 (forest lands) help keep these lands in production, rather than converting them to other uses and releasing sequestered carbon. Protection of ecosystems is a best practice, but restoration of degraded ecosystems can yield

climate mitigation benefits. Chapter 4 "Healthy Ecosystems" discusses several actions to improve watershed conditions.

2025 Strategy Actions Supporting Climate Mitigation

Strategy actions that decrease water and energy use may also reduce greenhouse gas emissions. Actions that protect and restore Oregon's green and natural infrastructure may provide the added benefit of carbon capture or storage. See Figure 3-4 for a list of actions that could be implemented in a way to mitigate climate change.

Figure 3-4: 2025 Strategy Actions with Potential to Support Climate Mitigation (not exhaustive)



Climate Adaptation

In addition to climate mitigation, Oregon must moderate the harm to instream and out-of-stream needs from climate change by implementing adaptation measures. Adaptation includes changing how we manage water, protecting and restoring ecosystems to help them accommodate change, and improving infrastructure to protect public safety, water quantity, and water quality. The 2021 Oregon Climate Adaption Framework urges the state to plan for and respond to climate change impacts in a coordinated and efficient manner to increase impact and minimize redundant effort.

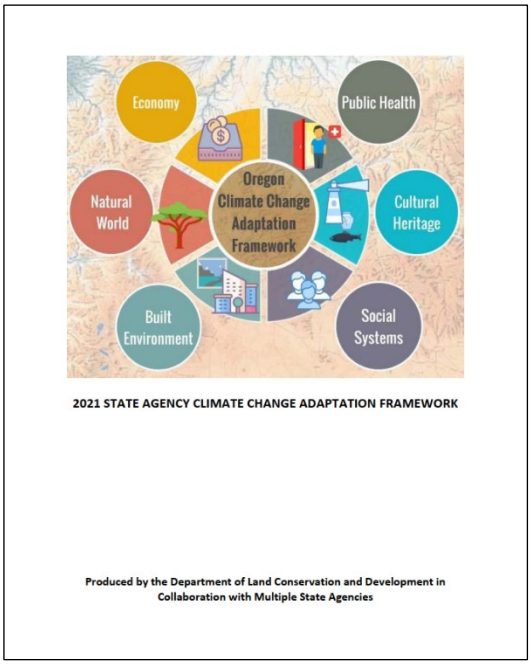
2025 Strategy Actions Supporting Climate Adaptation and Resiliency

The 2017 Strategy included Action 5B "Assist with Climate Change Adaptation & Resiliency Strategies." The 2025 Strategy acknowledges that adaptation and resiliency strategies are distributed throughout many other Strategy actions and therefore eliminates this standalone action. The 2025 Strategy also increases the discussion of climate change within the narrative for many other actions. Figure 3-5 summarizes how the 2025 Strategy actions contribute to climate adaptation and resilience.

Figure 3-5: 2025 Strategy Actions with Potential to Support Climate Adaptation & Resiliency

Objective 1: Understand Oregon's Water Resources	
Water Resource / Supply Information Actions 1A-1D	• Water resource data is necessary to understand current and future water supply to inform adaptation actions.
Objective 2: Understand Instream and Out-of-Stream Needs	
Instream & Ecosystem Water Needs Actions 2A-2C	• Information about instream and ecosystem water needs is critical to informing protection and restoration efforts that will help ecosystems be more resilient to climate change.
Out-of-Stream Water Needs Actions 3A-3D	• Information about out-of-stream water needs is critical to informing management and conservation efforts.
Objective 3: Understand the Pressures that Affect Our Needs and Supplies	
Water & Energy Actions 4B-4C	• Energy and water conservation measures help Oregon adapt to a future with increased drought frequency and intensity.
Natural Hazards Actions 5A – 5B	• Oregon must plan and prepare for an increased frequency and intensity of hazards like drought, wildfire, and flooding.
Land Use Planning Actions 6A – 6B	• Land use planning requires up-to-date water information (6A) to inform resilient zoning and development. Low impact development and green infrastructure (6B) make Oregon more resilient to increased temperatures, drought, and flooding.
Water Infrastructure Actions 7A – 7C	• Water infrastructure must be resilient to extreme weather events to protect public safety and ecosystems. Upgrades can make infrastructure more water and energy efficient, contributing to drought resilience.
Education & Outreach Actions 8A-8D	• Oregon's communities, including youth, can contribute to adaptation and resilience actions if they are informed about climate risks and needed actions.
Objective 4: Meet Oregon's Instream and Out-of-Stream Needs	
Water Planning Actions 9A – 9E	• A variety of water planning efforts get interested parties around a table to chart a new future for communities to prepare and adapt to new climate conditions.
Water Use & Management Actions 10A – 10E	• Water conservation, reuse, storage, and voluntary actions are all needed to adapt to a future with less water (10A-10C). Agency field presence and modernized permitting programs will help water users adapt to climate change (10E-10F).
Healthy Ecosystems Actions 11A – 11E	• Protection and restoration of ecosystems helps species adapt to increased temperatures, drought, and extreme weather.
Clean Water Actions 12A - 12C	• Surface and groundwater protection through source protection and reduced pollution helps ensure that the water that is available is clean and safe.
Funding Actions 13A – 13C	• Funding Strategy implementation and water management by state agencies helps the state be more responsive to changing conditions. The State can choose to fund planning, feasibility studies, and projects that target adaptation and resilience.

Oregon's Climate Change Adaptation Framework - The Oregon Department of Land Conservation and Development partnered with 24 state agencies to update the state's Climate Adaptation Framework, published in 2021. The Framework addresses why we must adapt, provides guidance for implementing comprehensive climate change adaption, and describes vulnerabilities and adaptation strategies. It also includes a Climate Equity Blueprint that presents strategies for addressing climate and environmental justice. The Framework is being implemented by the Department of Land Conservation and Development hosting a weekly virtual meeting aimed at building a cooperative state agency community-of-practice around climate change adaptation.



A Climate Change Vulnerability Assessment, supporting the Framework, began in 2022 and is being completed in 2025. The Assessment will help us understand how climate change may affect existing and future social vulnerabilities across Oregon. The information gathered during the assessment will be used by agencies and policymakers to propose adaptation measures that support community needs, acknowledging that future community engagement will be needed before adaptation measures are implemented.

The use of water and energy are highly interdependent. Water is critical for energy production, and energy is used to pump, treat, and convey water through pipes for residential, commercial, industrial, and irrigation purposes. Approximately 23 percent of Oregonians get their drinking water from a private well and are therefore dependent on power for their drinking water.[22] Water conservation also conserves energy, and energy conservation reduces the amount of water used in energy production. Across various locations and times of the year, climate change presents the challenge of having reduced availability of both water and energy. Actions and policies to reduce greenhouse gas emissions and diversify Oregon's energy portfolio will change the ways in which we use water in energy production. Severe weather events threaten energy and water infrastructure and climbing temperatures also increase the demand for water for many types of cooling processes.

Since 2018, the Oregon Department of Energy has delivered Biennial Energy Reports to inform local, state, regional, and federal energy policy, planning, and investments. The most recent report from 2024 provides information on key energy resources, policies, trends, and forecasts, and what they mean for Oregon. The document serves as a helpful education tool, including a section called 'Energy 101' that provides the reader with foundational knowledge about energy planning and management in Oregon.

In 2023, the Oregon Legislature directed the Oregon Department of Energy (House Bill 3630) to develop a state energy strategy by November 1, 2025. The strategy will help identify pathways to achieving the state's policy objectives while increasing the reliability and resilience of the energy system.

Energy-Water Interdependence

Water is critical for electricity production. The U.S. Department of Energy estimates that nearly half of all fresh surface water withdrawals in the United States are used at thermoelectric power plants.[23] Oregon has relatively minimal water withdrawals for thermoelectric power plant cooling and the largest water withdrawals are for irrigation. In Oregon, the electricity we use comes from energy production plants throughout the West, including hydroelectric, coal, natural gas, wind, solar, and other sources (see Figure 3-6). About 40 percent of the electricity used in Oregon is generated by hydroelectric facilities. The Oregon Department of Energy's website offers interactive features to see how Oregon's electricity mix has changed over time.

Oregon's Renewable Portfolio Standard (RPS)

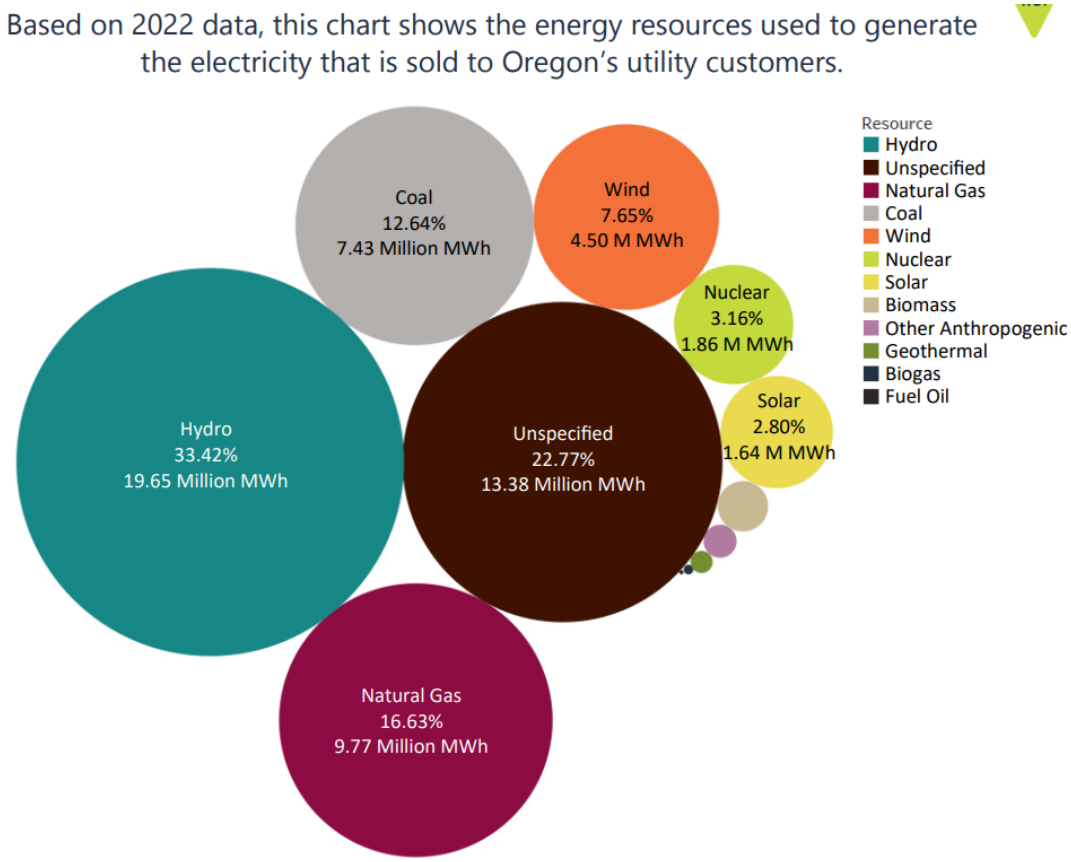
Oregon's 2016 Renewable Portfolio Standard (RPS) update requires that 50 percent of the electricity sold by Oregon's large utilities comes from eligible renewable resources by 2040. Oregon's 100 percent clean energy target established by House Bill 2021 in 2021 also requires the state's large investor-owned electric utilities to achieve a 100 percent reduction in the greenhouse gas emissions associated with their electricity mixes by 2040. House Bill 2021 established an emission-based clean energy requirement and therefore wouldn't necessarily require new renewable energy resources. Existing dams are eligible for the Oregon RPS if they are modified to be more efficient and produce more power, without increasing water flow through the dams. Existing hydropower facilities are also eligible for the Oregon RPS if they are certified as "low-impact hydro" by the Low-Impact Hydropower Institute. Certified low-impact hydropower facilities are facilities that meet science-based criteria for flow, water quality, fish passage, aquatic and riparian habitat, and cultural resource protection.

Conventional and renewable energy projects and infrastructure have the potential to impact both instream water quantity and quality. The state will need a better understanding of how new renewable energy projects affect water resources. Wind and solar generation facilities have minimal water needs, but new thermoelectric generation may be added to supply electricity when wind and solar are not meeting demands. Energy storage advancements could

reduce the need for new thermoelectric generation. Potential low carbon alternative fuels such as hydrogen and biofuels may grow in demand and production to meet decarbonization targets. Production of these fuels requires the use of water and may lead to greater water demand from the energy sector.

Figure 3-6 Resources Used to Generate Oregon's Electricity

Source: Oregon Department of Energy 2024 Biennial Energy Report



Action 4A Analyze the Effects on Water from Energy Development Projects and Policies

Hydropower facilities at dams produce affordable energy, however, dam operations, including procedures for maximizing power production, can alter streamflow amounts and timing and oppose needs for fish and other aquatic wildlife and other instream needs. Statewide goals to reduce greenhouse gas emissions while meeting future energy demand elevates the need for improving efficiency of existing facilities and developing alternative energy projects. Proposed energy projects should undergo a thorough scientific analysis to understand potential impacts to instream and ecosystem needs. This information can then provide the basis for decision-making for often conflicting objectives to produce affordable, low emission power and protect aquatic ecosystems and other instream needs.

In June 2024, the federal government published a report titled Historic and Ongoing Impacts of Federal Dams on the Columbia River Basin Tribes. This report is significant because this is the first time the federal government has described the past and ongoing harm to Tribes in the region from the eleven federal dams on the Columbia River.

This report highlights the conflict between building dams for energy production, water supply, or flood control and the ecological and cultural harm that can have multi-generational impacts.

Oregon has a need to analyze the impact of existing and potential energy development projects and policies on water quality, quantity, and ecosystems to inform an equitable climate future. Oregon's dam safety program, described in Action 7C, provides for periodic reviews of dams only related to safety for humans and property. Periodic reviews for hydrologic or ecological harms would require additional authority and resources for several agencies.

Non-dam energy projects, such as solar, wind, and geothermal, may also have water demands and siting-related hydrologic or ecological impacts. Actions to develop non-traditional hydroelectric power and projects that integrate water and energy savings are discussed in the following actions.

Action 4A
Analyze the Effects on Water from Energy Development Projects and Policies

Examples of how to implement this action:

- Analyze and project the water demand and water quality impacts of current and proposed energy development projects (e.g., hydroelectric, solar, wind, geothermal, bio-energy, nuclear, hydrogen, natural gas) in the context of climate change and greenhouse-gas reduction strategies
- Analyze the siting impacts of proposed energy projects on water quantity, quality, and ecosystems
- Evaluate where impacts to water quantity and quality associated with energy projects have been experienced, including environmental justice communities, and look for opportunities to recognize and avoid or mitigate in future energy projects

Action 4B Develop Non-Traditional Hydroelectric Power

There are several ways that existing infrastructure can support additional power generation. Existing hydroelectric dams can be modified to produce more energy, non-hydroelectric dams can be modified to produce power, and piped water distribution systems can be modified to include in-conduit energy production. Pumped storage systems are less frequently considered for existing infrastructure (e.g., occupying a brownfield site rather than developing a greenfield).

In-Conduit Hydroelectric Development

Irrigation Distribution System - Oregon has an expedited review process for proposed hydroelectric projects at existing artificial delivery systems, such as within an irrigation district distribution system. The amount and timing of water diverted for an existing water use must remain unchanged (Oregon Revised Statutes 543.765). Holders of water right certificates under these provisions can secure approval to install hydroelectric generation inside or at the end of existing transmission pipelines or conduits. The resulting hydroelectric water rights certificate will include requirements for fish screens, by-pass devices, and fish passage, with some exceptions.

In 2013, the Oregon Legislature passed Senate Bill 837, giving in-conduit hydro developers a choice: install fish passage as required by the Oregon Department of Fish and Wildlife or pay into a statewide fish passage restoration account that will fund fish passage at priority locations identified by Fish and Wildlife.[24] The Department of Fish and Wildlife is required to report on the deposits and expenditures from this restoration account. As of December 31, 2021, the account had a balance of $1,900.35. This was the entire revenue generated by the program at that time, an amount far less than originally anticipated. The Department of Fish and Wildlife has not expended any funds from the account and may consider revisions to this program due to the small generation of funds.

Aquifer Storage and Recovery Wells - There are other in-conduit projects generating electricity as water is injected into aquifer storage and recovery wells. Aquifer storage and recovery projects at Madison Farms of Echo and the City of Pendleton also represent a non-traditional use of hydroelectric power.

Modify Existing Hydroelectric Dams

Existing hydroelectric dams can be modified to increase power production without increasing the water flow through the facility. This option takes advantage of existing infrastructure and advances in power generation technology and are eligible for the Oregon RPS.

Certified Low-Impact Hydropower Facilities – Low Impact Certification of a hydropower facility indicates it has met or exceeded eight criteria that address environmental, cultural, and recreational considerations. This voluntary nation-wide program incentivizes hydropower facilities to minimize their impacts. Certified low-impact hydropower facilities are eligible for the Oregon RPS.

Action 4B
Develop Non-Traditional Hydroelectric Power

Examples of how to carry out this action:

- Utilize the state's expedited application process to develop hydroelectric projects at existing infrastructure
- Invest in alternative energy projects
- Promote modifications to increase the efficiency of existing hydropower turbines (I.e., increase the amount of electricity produced by the same amount of flow – eligible per Renewable Portfolio Standard)
- Offer incentives for low-impact hydropower projects that provide local co-benefits, such as in-conduit micro-turbines installed in irrigation pipes
- Add hydroelectric to non- powered dams using newer fish-friendly hydroelectric turbine designs (will require capital intensive fish screening at intake and/or fish passage)

Modify Existing Dams to Add Power Production

The Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program has designated certain river reaches as "protected areas," finding that new hydropower development in those areas would have unacceptable risks of loss to fish and wildlife.[25] Exemptions to this policy include adding hydroelectric facilities to already-existing non-hydroelectric dams or diversion structures. These projects must be designed to avoid and minimize potential impacts to fish, wildlife, and water quantity and quality.

Pumped Storage Systems

A pumped storage system consists of two reservoirs, one at a higher elevation than the other, where water moves from the upper reservoir to the lower reservoir to generate power when demand is high. Water is then pumped back up to the higher reservoir, using electricity, when pricing and demand is low, usually at night. Pumped storage systems can be considered both a power management tool and an energy storage device but notably consume more energy than they produce. These systems require large amounts of land and very specific topographies to provide the needed elevation change between the two reservoirs. Such projects must be designed to avoid and minimize potential impacts to fish, wildlife, cultural resources, and water quantity and quality. Utilizing a brownfield, or previously developed land, may reduce the ecological footprint associated with this power generation technique. Pumped storage projects have the potential for environmental justice impacts and therefore need to include environmental justice communities early in the planning process.[26] The Federal Energy Regulatory Commission has licensed one pumped storage project in Oregon, and a number of pumped storage projects are currently being proposed.

Action 4C Promote Water and Energy Savings

There are many options when selecting energy-efficiency and water efficiency techniques. Significant efficiencies could be realized from coordinating energy conservation and water conservation efforts. Also see Action 12B for water efficiency and conservation resources.

Saving Water and Energy in Agriculture

Pumping and moving water, especially groundwater, can require significant energy for agriculture and businesses.

Many of Oregon's farmers and ranchers have implemented energy efficiency projects, and a few have implemented renewable energy projects. Some of the most attractive projects are those that provide significant co-benefits, such as labor savings, water savings, and improved soil productivity. Irrigation efficiency and reduced or no-till cropping systems are some of the most popular types of multi-benefit projects. Farms often employ the use of efficient water application equipment, energy-saving pumps and motors, soil moisture monitoring programs, and precision fertilizer applications. Reducing the amount of groundwater used for irrigation can save significant energy – the deeper the well, the more power and energy is required.

Achieving greater efficiencies in water application—for example, moving from gravity-powered systems to pumped systems— increases the demand for energy, driving up energy costs though this can be mitigated by using efficient water and energy efficient delivery, e.g., LEPA, LESA and using VFDs to control pumps. This increased energy cost may outweigh the water-use efficiency benefits, and should be considered during the design of a project. Grants and incentives are offered by the U.S. Department of Agriculture and Energy Trust of Oregon to encourage installation of more energy efficient irrigation and renewables. A variety of measures are supported by public utilities, including the installation of freeze-resistant stock watering tanks and low-energy precision irrigation equipment.

Agrivoltaics – Agrivoltaic projects combine growing crops and energy production using solar voltaic panels. The Oregon State Extension Service has constructed a research study area at the North Willamette Research and Extension Center in Aurora, Oregon. According to Oregon State University's Sustainable Farm Agrivoltaic website, this approach may reduce the water demand by plants, providing solar panels shading them enough to limit evapotranspiration. The plants also provide a benefit to the solar panel efficiency by keeping them cooler, and thus more productive.

Saving Water and Energy at Municipal Utilities

Energy is needed to pump, treat, and deliver water to homes and businesses. For a municipality, the energy costs for managing water and wastewater can represent one-third of electricity costs. Water supply treatment plants, pump stations located throughout municipalities, and wastewater treatment plants all provide an opportunity for water and energy efficiency upgrades.

The Oregon Association of Clean Water Agencies has actively partnered with its member agencies, providing training and best practices to drive down the use and cost of electricity in Oregon's wastewater treatment plants.[27] The association named the City of Gresham its outstanding member agency in 2015 for becoming a "net-zero energy" wastewater treatment plant. Gresham's activated sludge treatment plant generates all the power it needs to drive the wastewater plant through best-in-class energy conservation, a ground-mounted solar photovoltaic array, and co-generation engines driven in part by fats, oil, and grease collection. The City saves $500,000 annually on power bills, while generating $250,000 annually from fats, oil, and grease hauler tipping fees. Gresham is the first wastewater utility in the Pacific Northwest to reach net-zero energy status and one of only a handful in the United States.

Action 4C

Promote Strategies that Increase/Integrate Energy and Water Savings

Examples of how to carry out this action:

- Move toward energy independence and resiliency for publicly operated treatment works (wastewater treatment)
- Continue to implement and evaluate building codes that encourage water and energy efficiencies
- Encourage individuals, communities, industries, and businesses, including agriculture, to look for and integrate ways to conserve both energy and water
- Encourage cross-sector and cross-agency collaboration to achieve energy and water savings
- Strive to capture and publicly report energy and water savings data
- Promote resources that expand irrigation water and energy efficiency and conservation
- Promote regenerative agriculture and permaculture practices
- Improve availability of cost savings associated with ENERGY STAR and similar programs to low-income or disadvantaged households and businesses
- Explore new or innovative technologies to accomplish energy and water savings
- Consider developing an energy/water nexus efficiency program that could support industrial water and energy intensive uses (e.g., data centers, paper mills)
- Increase interagency and energy/water sector collaboration, to identify co-benefits and opportunities for water efficiency (See Action 10A)

Saving Water and Energy through Building Codes and Standards

Building codes and standards provide a basic starting point for water and energy savings in both residential and commercial buildings. Oregon has mandatory building codes in 11 different specialty areas, including plumbing (e.g., faucets, showerheads, urinals, and toilets) and residential energy efficiency.[28] To provide guidance to local jurisdictions on water conservation, the State of Oregon Building Codes Division approved Statewide Alternative Methods in 2008 for rainwater harvesting (applicable to both commercial and residential construction as well as potable and non-potable uses) and for the use of graywater for toilet flushing.[29] The Building Codes Division updated these Statewide Alternate Methods in 2017 and is also directed by Executive Order 17-20[30] to amend the code by October 1, 2025 to require water efficiency improvements in all newly constructed commercial buildings through standards for capture and safe reuse of water for irrigation purposes.

The Building Codes Division has also published a series of Oregon Smart Guides for consumers; two of those guides focus on rainwater harvesting and water conservation systems.[31]

The Oregon Department of Energy sets efficiency standards for certain products that must be met for those products to be sold or installed in Oregon. In 2021, the Department in coordination with the Building Codes Division completed rulemaking and subsequent legislation to establish efficiency standards for showerheads and faucets to require high-efficiency fixtures that align with the most efficient standards in the country and exceed WaterSense® fixture efficiencies.[32] The Building Codes Division's 2023 Oregon Specialty Plumbing Code adoption included updates to align with these standards.[33] Also, in 2022 the Department of Energy updated rules for demand-response capable water heaters and completed rulemaking to establish minimum standards for spray sprinkler bodies for residential irrigation sprinklers.

Saving Water and Energy in the Home

ENERGY STAR, a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy, rates energy efficient products and practices to help consumers and businesses save money and energy on new

purchases. Many qualifying appliances also reduce water use. Some utilities in Oregon offer incentives for installing ENERGY STAR appliances, some even offer incentives for premium water-heating technologies, such as tankless and heat pump water heaters, that help reduce the energy needed to heat water in the home.

Cross-Sector Coordination

Addressing the water-energy nexus cannot occur in isolation; the state must focus on cross-sector and cross-agency collaboration to develop solutions. Oregon's state agencies, working with their civic and industrial partners, should focus efforts on maximizing the efficient use of our water resources, particularly with respect to the generation of low-carbon electricity. Developing new partnerships between the water and energy sectors to better understand how energy is used in water services and how water is used in energy production is critically important.

Critical Issue | Natural Hazards

Since the adoption of the first Strategy in 2012, Oregon has recorded its warmest year (2015), experienced the lowest snowpack on record (2015), had one of the most severe wildfire seasons (2020), and declared drought emergencies in 26 counties (2021). Recognizing that natural hazards or extreme events, such as drought, floods, and earthquakes occur at great cost to society and the environment, Oregon communities must prepare themselves for these natural hazards. The negative impacts of such events can be far-reaching and may worsen already existing water challenges, such as water scarcity, water quality, and instream habitat conditions.

Oregon uses a natural hazard mitigation planning process to prepare for such events. Natural hazard mitigation focuses on identifying risk and taking actions to reduce potential impacts that a natural hazard might have on people, property, and the environment. Oregon has developed a Natural Hazards Mitigation Plan (NHMP) that addresses twelve hazards (coastal hazards, dam failure, drought, earthquakes, extreme heat, floods, landslides, tsunamis, volcanic hazards, wildfires, windstorms, and winter storms). The Oregon NHMP was last updated in 2020, is required to be updated and reapproved by the Federal Emergency Management Agency every five years to maintain eligibility for certain pre- and post-disaster funds, and has two primary parts: (1) risk assessment-characterizing each hazard, assessing probabilities, vulnerabilities, and describing risks; and (2) mitigation strategy - mitigation goals, a capability assessment, mitigation actions, and an implementation plan. Tribes may work directly with the Federal Emergency Management Agency to develop and update their own NHMP's. Cities, counties, and special districts create and update local NHMPs. Jurisdictions the Oregon Interagency Hazard Mitigation Team oversees provides expertise and information for Oregon NHMP updates.

Public, private, tribal, and non-profit organizations working together, as well as individuals who take personal responsibility for thorough preparation, will be critical for Oregon to withstand these extreme events. Key organizations play roles in mitigation, communication, response, and recovery. Their work will be to design resiliency into community and environmental planning, determine which communities, infrastructure, systems, and habitats are vulnerable, and document the economic, social, environmental, and other impacts of such events.

Action 5A Plan and Prepare for Drought and Wildfire Resiliency

Drought is not an abnormal occurrence in Oregon, with notable droughts in the 1930s, 1976-77, 1992, 2001-02, 2012-2015, 2018, and 2020-2023. The severity and frequency of drought has increased in recent years and climate change projections indicate this will continue. Precipitation and temperature are the main drivers of drought, and largely determine snowpack, soil moisture, and streamflow levels, which are commonly used as indicators of drought. In Oregon, many watersheds depend heavily on snowpack for annual water supply, and the timing of peak runoff from snowmelt is critical to providing water when and where it is needed most. Climate change predictions indicate that warm winters may be more common, with more precipitation falling as rain rather than as snow, leading to earlier runoff.

In the case of severe or multi-year droughts, soil moisture does not recover in time for the next growing season. Parched soils can absorb precipitation before it can become available to streams. Increased temperatures can lead to increased evaporation and fish die-off. Groundwater levels do not rebound, and refilling reservoirs can prove difficult. Fish populations may suffer loss of a year-class. These conditions can lead to limited water quality and quantity for fish, wildlife, livestock, drinking water beneficial uses, and crops, reduced irrigation deliveries, and poor yields. Warm summer temperatures can also cause changes in the timing of water supply and water quality issues (e.g., algae blooms and waterborne diseases), as well as shift fish distribution. Because droughts are a slow-moving disaster where impacts develop over time, persisting even after the rain and snow returns, building drought

resiliency in Oregon requires a portfolio of water management methods that are put into place long before the next drought arrives.

Defining Drought

As noted in Oregon's 2016 Drought Annex, a drought response plan within the state's emergency operations plan, droughts can generally be characterized by an increased demand or decreased supply of water.[34] In the early 1980s, researchers with the National Drought Mitigation Center (NDMC) and the National Center for Atmospheric Research located more than 150 published definitions of drought. To simplify analysis, the NDMC now provides five different ways in which drought can be defined.

- **Meteorological Drought** – Defined based on dryness, compared to some type of normal or average amount. Due to climatic differences, what might be considered drought in one location of the state may not be the same in a different location. The concept of a "snow drought" has emerged in recent years. Experiencing below average snowpack with above average precipitation has spurred the study of snow droughts.
- **Hydrological Drought** – Occurs when surface and subsurface water supplies are below normal, caused by shortfalls in precipitation, including snow. A hydrological drought usually lags behind a meteorological or agricultural drought. Low precipitation takes longer to show up in streamflow and groundwater, for example.
- **Agricultural Drought** – Occurs when the amount of moisture in the soil no longer meets the needs of a particular crop. This type of drought links together the various characteristics of meteorological (or hydrological) drought to agricultural impacts.
- **Socioeconomic Drought** – Occurs when physical water shortages begin to affect people and the supply of economic goods and services.
- **Ecological Drought** – Occurs when as a prolonged and widespread deficit in available water supplies — including changes in natural and managed hydrology — creates multiple stresses across ecosystems.

Action 5A

Plan and Prepare for Drought and Wildfire Resiliency

Examples of how to implement this action:

- Implement Oregon's Natural Hazard Mitigation Plan and recommendations from the Drought Vulnerability Assessment
- Identify, assess, and assist those communities and ecosystems most vulnerable to drought and wildfire (e.g., assess water supply systems for vulnerability)
- Develop the appropriate set of indicators that signal and forecast differing stages of drought
- Document the economic, social, and environmental impacts of drought and wildfire, including the frequency, distribution, intensity and duration
- Prepare for, respond to, and mitigate for the impacts of drought and wildfire
- Improve the drought toolbox through education and outreach, drought contingency plans, more efficient water distribution systems, and additional voluntary measures to improve streamflow
- Increase education and outreach efforts to help landowners minimize risk to their property from wildfires
- Invest in built and green/natural infrastructure, (ie., nature-based solutions), refer to Actions 6B, 7A, 11A-11E
- Provide technical assistance and funding to local governments to evaluate the need and opportunities for inter-tie projects in Local Natural Hazards Mitigation Plans
- Prioritize resources for planning and preparation to those most vulnerable to drought and wildfire impacts
- Explore ways to protect minimum stream flow s during drought declarations
- Educate the public about the importance of having an emergency supply of drinking water

Impacts of Drought

Drought impacts instream and out-of-stream uses in a variety of ways, requiring additional management actions. It is important to note that these impacts may affect communities and ecosystems disproportionately. Water insecurity is an environmental justice issue and can have health, environmental and economic impacts for communities.

Fisheries

- Restricted access to habitats, dry streams, lethal temperatures, fish die-offs
- Proliferation of parasites or bacterial disease
- Reduced access to fishing (curtailment by Oregon Department of Fish and Wildlife)

Drinking/Potable Water

- Dry domestic wells
- Increased outreach efforts by water suppliers to their customers
- Municipal water conservation and curtailment requests
- Reduced water quality (e.g., concentration of contaminants, harmful algal blooms)
- Reduced water available for firefighting

Recreation

- Reduced access to boating (waterskiing, paddling, kiteboarding, rowing etc.), fishing, hunting, skiing, swimming, diving, clamming, crabbing
- Economic impacts to tourism destinations
- Reduced access due to water quality (e.g., harmful algal blooms)

Agricultural

- Crop damage
- Reduced yields
- Stressed livestock and reduced ranching profit
- Fallow fields
- Soil erosion

Wildfires

- Lost/damaged property
- Crop damage (e.g., viticulture)
- Economic losses associated with property damage/loss
- Damage to water supply systems (health and economic impacts)
- Damages from smoke (health and economic impacts)
- Destruction of terrestrial and aquatic ecosystems
- Displacement of fish and wildlife
- Loss of culturally important lands/water

A Closer Look at Drought Declarations

County-wide drought declarations go through a two-part process before securing a drought declaration from the Governor. First, County Commissions, Boards, or Courts meet to determine whether they need to request a Governor's declaration. Then these requests go to the Water Supply Availability Committee and Drought Readiness Council (co-chaired by the Office of Emergency Management and Water Resources Department) for review and recommendation to the Governor. The Drought Readiness Council is a standing body comprised of federal and state natural resource, public health, and emergency response agencies. The Governor can issue an Executive Order to declare drought—either independently or in response to a request by counties. In recent years, these Executive Orders have been set to expire at the end of a calendar year.

A Governor's drought declaration can trigger a number of requirements and water management tools not otherwise accessible. Declarations allow the Water Resources Commission to grant a temporary preference of use of water for human consumption and/or stock watering. Drought declarations also authorize the Water Resources Commission and Governor to require state agencies and local governments to develop and file water conservation and/or

curtailment plans; the Governor may require the implementation of such plans. Finally, declarations allow the Water Resources Department to use an expedited process in a number of water right areas, including the issuance of emergency drought permits for groundwater. Expedited processes do not weaken or allow loopholes to protective laws.

Drought declarations focus on managing human water needs but do not provide additional protections for instream flows or ecosystem needs. Additional work is needed to protect minimum stream flows during drought declarations.

Communities and businesses looking to offset drought-related losses often turn to the federal government, which can provide payments or emergency loans after a federally issued drought disaster designation by the Secretary of Agriculture. Federal drought funds generally cannot cover all losses suffered by producers, but they can help.

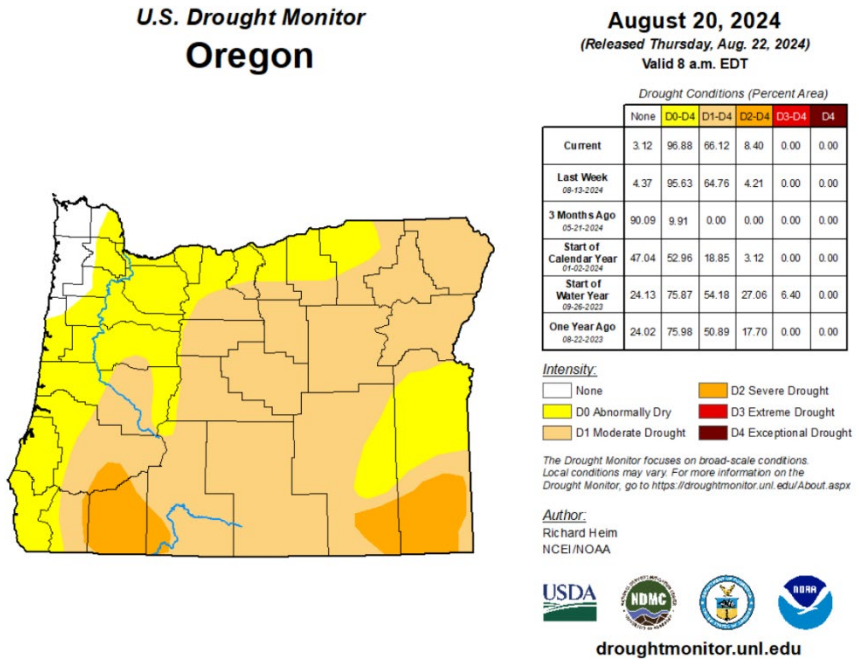
Drought Vulnerability Assessment

In 2023, the Water Resources Department contracted with the National Drought Mitigation Center, the Oregon Climate Change Research Institute, and the University of Oregon to complete a statewide drought vulnerability assessment, addressing Recommendation B from the 2016 Task Force on Drought Emergency Response (HB 4113): "Provide resources for assessments of drought impacts, risks, and vulnerabilities on instream and out-of-stream sectors in order to better prepare for, respond to, and recover from drought," and part of the 2017 Strategy Recommended Action 5.5A: "Plan and Prepare for Drought Resiliency." The drought vulnerability assessment examines drought exposure, drought sensitivity, and adaptive capacity with a focus on drinking water supplies, agriculture, and water-dependent recreation. The final assessment is anticipated in 2025.

Drought Early Warning System

The National Integrated Drought Information System is a program authorized by Congress in 2006 to coordinate and integrate drought research and create a national drought early warning information system. These systems explore and demonstrate a variety of early warning and drought risk reduction strategies that incorporate drought monitoring and prediction information. The Pacific Northwest Drought Early Warning System (DEWS) includes Idaho, Oregon, Washington, the western portion of Montana that feeds into the Columbia River Basin, and British Columbia. The Pacific Northwest DEWS is a collaborative federal, tribal, state, and local interagency effort to improve early warning capacity and resilience to drought in the region.

Figure 3-6: Drought Conditions Across Oregon on August 20, 2024



Action 5B Plan and Prepare for Flood Events

This section focuses on the public safety and emergency nature of flooding. Other parts of the Strategy call for actions that can help protect floodplains and reduce risk of flooding. Oregon's land use planning system, described above under "Land Use Planning", can be used to reduce risk to people and property. Floodplain protection and restoration is called for in Chapter 4 under "Healthy Ecosystems" Action 11A. Dam safety is discussed later in this chapter under "Water Infrastructure" Action 7C. Statewide efforts to prepare and respond to floods are addressed in the Oregon Emergency Operations Flood Annex.

Oregon's mountain ranges are part of the reason there is tremendous variation in the types of flooding we experience. Although floods are a common natural hazard in Oregon, floods west of the Cascades tend to be large-scale events, while eastern Oregon typically experiences more localized, intensive events. The four types of flooding described in the 2020 Natural Hazard Mitigation Plan include:

- **Riverine flooding –** This is the most common flood hazard in Oregon and usually occurs during winter. The most severe flooding conditions occur in "rain on snow" events, when heavy rainfall is augmented by rapid snowmelt. Longer duration storms and floods are more common in western Oregon. Very large and widespread floods occurred in parts of western Oregon in 1861, 1891, 1948, 1964, 1996 (three separate storms), and 2007.
- **Flash flooding –** Flash floods are caused by extremely intense rainfall over a short period of time, commonly within a single drainage. Such events usually occur in the summer during the thunderstorm season. In eastern Oregon, local convective thunderstorms often produce the most severe flooding. One of the worst flash floods in history occurred in eastern Oregon in June 1903, killing 247 people (one-fifth of the population at the time) in the town of Heppner.[35]
- **Coastal flooding –** Coastal floods result from different conditions. Winds generated by tropical storms or intense offshore low-pressure systems can drive ocean water inland, causing significant flooding.
- **Urban flooding –** Urban floods occur because land is converted from fields or woodlands to roads, roofs, and parking lots, losing its ability to absorb rainfall. This transition from pervious surfaces to impervious surfaces results in more and faster runoff of water. During periods of urban flooding, streets can become swift moving rivers, and basements can fill with water. Storm drains may back up with yard waste, causing additional nuisance flooding.

Dam and Levee Failure

In addition to the types of flooding described above, large precipitation events can also place stress on dams and levees. Dam or levee failures can cause catastrophic downstream flooding, risking both life and property. The Dam Safety Program, administered by the Water Resources Department, works to evaluate the safety of dams. More information about the program can be found under Action 7C. Oregon does not currently have a levee safety program. The establishment of such a program is called for in Action 7C and would provide increased public safety, increased resilience to climate change and natural disasters such as earthquakes.

Atmospheric Rivers

Atmospheric rivers are relatively long, narrow regions in the atmosphere – like rivers in the sky – that transport water vapor from the tropics. When atmospheric rivers make landfall, they often release this water vapor in the form of rain or snow. Although atmospheric rivers come in many shapes and sizes, those that contain the largest amounts of water vapor and the strongest winds can bring extreme rain and floods, often by stalling over watersheds vulnerable to flooding. These events can disrupt travel, induce landslides or mudslides, and cause catastrophic damage to life and property.[36]

The Water Resources Department is currently leading a project to analyze the extreme atmospheric river precipitation potential for Oregon. The first phase was completed in 2023, analyzing how extreme precipitation is influenced by ocean and air temperature, and other factors. The second phase, targeted for completion at the end

of 2024, will provide an updated method and procedure for determining extreme precipitation in Oregon and guidance on how that precipitation could result in flooding. This project, once complete, will provide the Dam Safety Program with better information to evaluate the Probable Maximum Flood potential when assessing new and existing dams and ensuring proper design to prevent dam failures.

Understanding Oregon's Flood Risk

Like drought, Oregon should develop indicators of flood emergency stages that can be used as a planning, communication, and response tool. We know with reasonably high confidence that the frequency of extreme precipitation and flooding events are likely to increase around the state under a warming climate. Oregon does not have a consolidated assessment of past floods and their economic, social, and environmental impact and is one of only five states that lack up-to-date precipitation-frequency analysis prepared by the National Weather Service. Oregon also does not have a reliable extreme maximum flood document, which most other states have. Oregon should research how changes in land use, land cover, forest cover, and watersheds—including upstream impervious surfaces, geomorphology, logging, and forest fires—may change the location, strength or duration of floods, flood ways, and flood discharge. This information could be beneficial to local planning efforts.

Uncertainty in precipitation information coupled with climate change and possibly more extreme precipitation events has significant implications for the design and safety of water resources infrastructure. Oregon now relies mostly on information from 1973, with a very partial update completed in 2008. Better information, is needed to inform infrastructure upgrades or retrofits to avoid failure during a major flood and as a result, imperil public safety and property.

Flood Risk Mapping - Publicly available mapping educates Oregonians about their flood risk and helps inform future development to reduce flood risk. The Department of Land Conservation and Development supports the Oregon Explorer Hazards, an online web application that allows users to explore GIS data depicting natural hazards in the state. The Department of Geology and Mineral Industries has produced a Statewide Geohazards Viewer that shows 100-year flooding potential along with several other hazards. They have also produced a channel migration map that shows historic river or stream channels which can indicate locations prone to flooding.

There are also federal sources of flood mapping. The Federal Emergency Management Agency maintains and updates flood hazard data through regulatory flood maps.

Increased Risk Following Wildfires

Where forest fires have burned and changed land cover, updated precipitation frequency information can be used in hydrologic models to predict new flows in the watershed. After a wildfire, the charred ground repels rainwater, increasing the risk of flooding and debris flows for several years. Intense storms can lead to severe flooding and landslides, which threatens drinking water supply, degrades aquatic habitat, and even suffocates fish. Considering frequent drought and recent wildfires, state emergency managers recognize the need to be able to respond to these environmental stressors rapidly and responsibly.

The Department of Land Conservation and Development and the Department of Geology and Mineral Industries are partnering on four Post-Fire Debris Flow risk reduction projects, with funding provided by the Federal Emergency Management Agency. The four project projects are in areas impacted by the Eagle Creek Fire (2017), Beachie Creek and Lionshead Fires (2020), Holiday Farm Fire (2020), and Archie Creek Fire (2020).

Interagency Coordination

Dealing with floods and the potential for landslides requires interagency partnerships across multiple jurisdictions. Silver Jackets is a group of local, state, federal and tribal agencies chaired by the U.S. Army Corps of Engineers and is focused on reducing the risk of flooding and other natural disasters. Most states have a Silver Jackets program, and Oregon's program focuses on flood preparedness, communication, and recovery. The Oregon Silver Jackets Team is

a subcommittee under the State Interagency Hazard Mitigation Team. Oregon also has a Flood Core Team that is focused on updating the flood-related portion of Oregon's Emergency Operations Annex.

Local soil and water conservation districts work with the federal Natural Resources Conservation Service to provide technical and financial assistance to communities through the Emergency Watershed Protection Program. The program does not require a federal or state disaster declaration to provide assistance.

Action 5B
Plan and Prepare for Flood Events

Examples of how to implement this action:

- Implement Oregon's Natural Hazards Mitigation Plan
- Develop indicators of flood emergency stages, using information about meteorologic, hydrologic, hydraulic, and watershed conditions
- Document the economic, social, and environmental impacts of floods
- Evaluate potential for extreme flooding, under atmospheric rivers and climate change scenarios
- Establish early flood and debris-flow warning systems in areas where recent drought and wildfire have affected forests and vegetation
- Complete update of precipitation frequency estimates for Oregon
- Update methods and procedure for determining extreme precipitation and flooding
- Support DLCD to continue to provide assistance and training to local floodplain managers, property owners, surveyors, real estate agents, and other to support compliance with the National Flood Insurance Program
- Increase education and outreach efforts to help landowners minimize risk to their property from floods
- Invest in built and green/natural infrastructure (i.e., nature-based solutions), refer to Actions 6B, 7A, 11A-11E
- Prioritize resources for planning and preparation to those most vulnerable to flood impact
- Develop an inventory of levees in Oregon and assess their condition and risk (also see Action 7C)
- Educate the public about the importance of having an emergency supply of drinking water

Action 5C Plan and Prepare for a Cascadia Earthquake and Tsunami Event

Seismic activity in the state has been relatively low since the time of European settlement. Up until the mid-1980s, Oregon was not considered to be at high earthquake risk. Infrastructure built before 1980 was designed with criteria based on that seismic understanding. However, during the past 25 years geological analyses have led to a very different understanding of seismic risk in Oregon.

Statewide efforts to prepare and respond to earthquakes and tsunamis are each covered in separate Oregon Emergency Operations Annexes.

Earthquakes and Tsunamis in Oregon

The Oregon Department of Geology and Mineral Industries (DOGAMI) is the lead agency for earthquake hazards. DOGAMI has created maps that identify areas in selected Oregon communities that will suffer more damage, relative to other areas, during a damaging earthquake. A clearinghouse of tsunami information is also maintained by DOGAMI and includes information for coastal residents, visitors, planners, and scientists.

There are two major types of earthquakes that occur in Oregon: megathrust earthquakes that occur along the Cascadia Subduction Zone near the coast, and smaller crustal earthquakes. For the most part, crustal earthquakes occur on shore on much smaller fault systems. The two largest earthquakes in recent years occurred in Scotts Mills (magnitude 5.6) in March 1993 (known as "The Spring Break Quake") and six months later in Klamath Falls (magnitude 5.9 and magnitude 6.0), both of which were crustal earthquakes. The last major subduction zone (megathrust) earthquake and tsunami occurred more than 300 years ago in 1700.

Figure 3-7: Cascadia Subduction Zone

A Cascadia Earthquake

The Cascadia Subduction Zone fault, shown in Figure 3-7, spans from Northern California to southern British Columbia and can produce earthquakes as large as magnitude 9.0 with corresponding tsunamis. Scientific evidence indicates that an earthquake of this size occurs along the fault on average once every 200 to 500 years.

The Cascadia Subduction Zone closely mirrors the subduction zone in northern Japan that produced the 2011 Tohoku earthquake. The incredibly destructive tsunami that resulted from the Tohoku earthquake should serve as a warning to Oregon.

When a Cascadia earthquake occurs, it will affect mostly western Oregon, and in particular, coastal communities. Following such an event, it is estimated that it will take one to three years to restore drinking water and sewer services in the coastal zone.

Available studies estimate that a Cascadia earthquake and resulting tsunami could result in 1,250 to more than 10,000 fatalities, tens of thousands of buildings destroyed or damaged so extensively that they will require months to years of repair work, tens of thousands of displaced households, more than $30 billion in direct and indirect economic losses (close to one-fifth of Oregon's gross state product), and more than one million truckloads of debris.[37]

The Oregon Coastal Management Program is coordinating with coastal communities to help them prepare for a Cascadia Subduction Zone tsunami through land use planning. The Program, administered through the Department of Land Conservation and Development, has helped many coastal cities and counties create tsunami mapping, adopt Tsunami Hazard Overlay Zones, and develop Tsunami Evacuation Facility Improvement Plans.

2013 Oregon Resilience Plan

In 2013, the Oregon Seismic Safety Policy Advisory Commission published the Oregon Resilience Plan describing likely outcomes from a Cascadia Subduction Zone earthquake event. The plan notes that while we cannot predict when the next Cascadia earthquake will occur, we can calculate odds. Experts estimate the odds that a Cascadia earthquake will occur in the next 50 years range from 7 to 15 percent for a great (magnitude of 8.7 to 9.3) earthquake affecting the entire Pacific Northwest to about 37 percent for a very large (magnitude of 8.3 to 8.6) earthquake affecting southern Oregon and northern California. The likelihood and predicted consequences of a Cascadia event during our lifetimes are both so great that it is prudent to

consider this type of earthquake when designing new structures or retrofit of existing structures, evaluating the seismic safety of existing structures, or planning emergency response and preparedness.

The Oregon Resilience Plan encompasses a set of short- and long-term recommendations regarding critical and essential structures, transportation, energy, information and communication, and water and wastewater systems:

- Begin aggressive public information efforts to re-set public expectations for a realistic response time. The old guideline of having a 72-hour emergency survival kit falls far short.
- Public agencies should be advised that the Oregon Water/Wastewater Agency Response Network is a vital resource and membership is recommended.
- Service providers from all sectors should be required to have a business continuity and seismic response plan that includes resources normally provided by functioning infrastructure (e.g., food, water, and communications).
- Service providers should plan for and support employee preparedness.
- Water-related industry associations and manufacturers should evaluate the need for seismic design standards for pipelines.
- Seismic vulnerability criteria should be incorporated into overall capital improvement project planning and asset management priorities, particularly updates to water system master plans.
- The Oregon Health Authority should be encouraged to include a seismic design requirement as part of routine design review of water system improvements.
- Encourage the Oregon Department of Environmental Quality and the Oregon Health Authority to establish goals and expectations for post-earthquake regulatory compliance and applicable standards. For example, will it be acceptable to discharge into waters of the state the chlorinated water from main breaks and main repairs?
- Encourage public health, water, and wastewater agencies to plan for significant water quality impacts to rivers downstream from urban areas.

Action 5C

Plan and Prepare for a Cascadia Earthquake and Tsunamic Event

Examples of how to implement this action:

- Implement Oregon's Natural Hazard Mitigation Plan
- Follow the recommendations provided by the Oregon Seismic Safety Policy Advisory Commission, including in its 2013 Oregon Resilience Plan and 2021 Tsunami Resilience on the Oregon Coast Report
- Incorporate earthquake and tsunami resilience regulations in local land use plans (see model policies developed by DLCD)
- Evaluate and retrofit dams and other water infrastructure to meet new seismic standards (see Action 7C)
- See recommended actions in the infrastructure section of the IWRS (7A – 7C)
- Consult or develop a local Tsunami Evacuation Facilities Improvement Plan
- Prioritize resources for planning and preparation to those most vulnerable to earthquake and tsunami impacts
- Evaluate and mitigate the seismic vulnerability of bulk oils or liquid fuel terminals (SB 1567, 2022) that pose significant pollution risks to critical waterways

The plan further describes the vulnerabilities facing our water delivery systems. These include numerous potential points of system failure at reservoirs, intakes, treatment plants, pump stations, and outfalls. Many materials are inflexible, joints are push-on, and pipelines may be prone to failure at connections to above-ground structures. Vulnerabilities also include interdependence with other potentially damaged systems, such as power, transportation, chemical, and financial industries. Water from leaks and breaks in water pipelines and private plumbing systems will cause collateral damage, drain available water storage, and contribute to loss of water supply and pressure, which will in turn result in a loss of fire protection capability.

Finally, the performance of gravity sanitation and storm sewers depends on appropriate grades and slopes, which are disrupted by ground displacement associated with liquefaction. Liquefaction is when water-logged sediments at

or near the ground surface lose their strength in response to strong ground shaking. Because nearly all water and wastewater treatment plants are built near rivers, they are vulnerable to liquefaction and effective mitigation may require rebuilding these plants on more stable soils.

Seismic Retrofits

Throughout Oregon, businesses and service providers are taking another look at critical infrastructure and undergoing seismic retrofits where feasible. Retrofits to roads, schools, and hospitals receive sizable sums of money from the Oregon Legislature. Water infrastructure in the agricultural, municipal, industrial, and domestic sectors also requires seismic upgrades, but have been less well funded. The Oregon Health Authority has recently started funding for seismic evaluations of water infrastructure. Some dams, transmission lines, and treatment plants have received state or federal funding for seismic study and upgrade, although more work in this area is needed.

Land and water are connected in many ways. Land use planning is a process to regulate the location of different types of land uses, restricting or promoting various land uses through zoning and permitting, to protect the environment, conserve resources, and support economic growth. This is an important step in determining how best to develop the land to protect the quantity and quality of our water resources. The statewide land use program and its implementation by cities and counties is an important framework for integrating water resource issues with land use and development decisions.

This section covers considerations and regulation for land use planning which is distinctly different from regulating land management. Land management practices including pollution management are addressed in Chapter 4, under "Clean Water" identifying ways in which urban, farm, and forest practices are regulated to protect water quality for humans and the environment.

Considering Oregon's projected changes in population, industrial, and commercial growth, communities need to adequately plan and prepare for meeting a larger demand on a shared resource. Water quality, water quantity, and ecosystems all need to be considered within the context of land use planning and development. Efforts aimed at directing development to appropriate areas and minimizing the impact of development can help meet statewide goals related to protection and use of water resources.

Plan for Changes in Land Use

Oregon's statewide land use planning program was designed to: foster livable and sustainable development; protect agricultural land, forest lands, and other natural resources; to conserve coastal and ocean resources; and to improve the well-being and prosperity of Oregon's citizens, businesses, and communities. Originating in 1973 under Senate Bill 100, the program positioned Oregon as a nationally recognized leader in the arena of land conservation and development.[38] Changes in land use in urban and rural areas can affect the function of forested lands, wetlands, riparian habitat, and other landscapes. When natural functions are impacted, there are consequences for our water resources.

Local Comprehensive Plans

Land use planning is a function that resides with local planners, local planning commissions, boards, and councils, all of which include a public process and oversight from the Oregon Department of Land Conservation and Development. Local governments in Oregon are responsible for developing and implementing their own comprehensive land use plan that complies with the statewide planning goals, shown in Figure 3-8. The Land Conservation and Development Commission and the Department of Land Conservation and Development are responsible for reviewing city and county comprehensive plans for consistency with the Statewide Land Use Planning Goals.

When the Commission officially approves a local government's plan, the plan is said to be "acknowledged." Local governments then "adopt" the plan, and it becomes the controlling document for land use in the area covered by that plan. Local governments develop code to implement the plan.

Figure 3-8: Oregon's Statewide Land Use Planning Goals

Oregon's Land Use Planning Goals	
Goal 1 – Citizen Involvement	Goal 11 – Public Facilities and Services
Goal 2 – Land Use Planning	Goal 12 – Transportation
Goal 3 – Agricultural Lands	Goal 13 – Energy Conservation
Goal 4 – Forest Lands	Goal 14 – Urbanization
Goal 5 – Natural Resources, Scenic & Historic Areas, and Open Spaces	Goal 15 – Willamette River Greenway
Goal 6 – Air, Water & Land Resources Quality	Goal 16 – Estuarine Resources
Goal 7 – Areas Subject to Natural Hazards	Goal 17 – Coastal Shorelands
Goal 8 – Recreational Needs	Goal 18 – Beaches & Dunes
Goal 9 – Economic Development	Goal 19 – Ocean Resources
Goal 10 – Housing	

Statewide Land Use Planning Goals - There are several statewide land use planning goals that are relevant to water resources, specifically Goals 3, 4, 5, 6, 7, 11, 16, and 17. Descriptions of all goals are available on the Department of Land Conservation and Development's website. Local governments coordinate with state agencies to ensure that land use decisions comply with statewide planning goals and local comprehensive plans as well as other applicable state regulations. This includes permit applications submitted by state agencies. State actions are needed to strengthen some of these goals. Specific needs are described below and included as example actions under Action 6A.

Goal 5 covers 13 resource categories, including wetlands, riparian areas, and groundwater resources. Goal 5 ground water resources include critical groundwater areas and restrictively classified areas designated by the Oregon Water Resources Commission, and certain wellhead protection areas. Oregon Administrative Rules for Goal 5 set procedures for local governments to identify and protect "significant natural resources." Few local governments have completed planning for groundwater resources, particularly since completing the process for wellhead protection areas is not mandatory. Many communities have not updated their Goal 5 inventories since the 1980's or 1990's and therefore many important riparian, wetland, and wildlife habitat resources are not considered during the land use review process because they are not identified in the local plans. Resources are needed to support communities in updating their Goal 5 resource inventories.

Goal 7 directs local governments to adopt measures to reduce the risk to people and property from natural hazards, such as floods, landslides, earthquakes, tsunamis, coastal erosion, and wildfires. Protecting people and property from natural hazards requires knowledge, planning, coordination, and education. This goal directs jurisdictions to apply appropriate safeguards, such as hazard overlay area zones and review standards when planning for and authorizing new development. Good planning does not put buildings or people in harm's way. Planning, especially for the location of essential services like schools, hospitals, fire and police stations, is done with sensitivity to the potential impact of nearby hazards. A local government addresses natural hazards in its comprehensive land use plan by adopting a natural hazard inventory and supporting plans and policies. A limited amount of planning grant money is available through the Department of Land Conservation and Development to help communities address these planning needs. The Department of Land Conservation and Development works with the Oregon Department of Geology and Mineral Industries, the Federal Emergency Management Agency, and others to help communities plan for natural hazards.

There is no implementing rule for Goal 7, so comprehensive plans have been acknowledged for consistency with the goal based solely on participation in the National Flood Insurance Program. Additional information about planning for natural hazards was provided in the previous section, Actions 5A-5C. Funding for local governments to conduct natural hazard inventories and Goal 7 rulemaking by the Department of Land Conservation and Development may help further protect people and the environment from natural hazards.

Goal 11 and its administrative rules require cities with populations greater than 2,500 to prepare public facilities plans addressing drinking water, wastewater disposal and treatment, and stormwater management needs. These plans focus on the costs and timing of infrastructure needs consistent with planned uses and coordination among providers within the jurisdiction. Funding the development and implementation of these plans can avoid water quality impacts associated with deteriorating infrastructure or systems operating beyond their design capacity.

Periodic Review - Periodic review is a is a process for certain local governments in Oregon to examine and, as necessary, update their comprehensive land use plan and implementing codes. The process was once mandatory, but now is voluntary. The intent of periodic review is to make sure that local comprehensive plans respond to changes in local, regional, and state conditions, are coordinated with other comprehensive plans and investments, and are in compliance with statewide planning goals, statutes, and rules. Requirements for who must complete periodic review and which statewide goals are addressed have been scaled back to focus on economic development and housing needs and no longer includes Goal 5 Natural Resources, Scenic & Historic Areas, and Open Spaces.

Excluding Goal 5 resources from periodic review can have cumulative impacts on water resources and associated sensitive habitats. In addition to updating Goal 5 inventories (described above,) there is a need to encourage and support periodic review and updates to comprehensive land use plans to reflect current Goal 5 resources.

Plan for Population Changes in Oregon

Recent population projections indicate a slowing of statewide growth, compared with what Oregon has experienced in recent years. Oregon's Demographic and Population Outlook, published in March 2023 by the Oregon Office of Economic Analysis shows that Oregon's growth rate from 2020-2030 will be the lowest in recent history. This is due to an increase in deaths and rapid decline in births, with migration into the state providing for the only population increase. [39] Population changes will likely be experienced differently across the state, with some areas growing while others decline. Some areas that experienced growth in population over the last decade were also areas with known water resources issues. Planning for future development must consider pressures on Oregon's water resources, in terms of both water quantity and water quality and impacts to the environment and ecosystem services.

Each city and metropolitan area in Oregon has an urban growth boundary that separates urban land from rural land. The boundary contains a 20-year planning area for a city to plan to grow into considering the extension of public services, like water, sewer, and road networks, that will be required to serve future urban growth. By law, every city must maintain a long-term supply of buildable land in its urban growth boundary to accommodate anticipated economic and population growth. The development of public facilities plans (Goal 11), municipal water management and conservation plan (when required by the Water Resources Department), or a Water Master Plan (when required by Oregon Health Authority) can help a municipality plan for growth.

Oregon's statewide planning program discourages "sprawling" development that takes place in rural areas, outside an urban growth boundary. However, rural development is permitted under certain circumstances. A county decides where rural development should be allowed by following what is called the "exceptions process." Rural residential, recreational, commercial, and industrial zones (in "exception areas") allow development in certain rural areas. The Land Conservation and Development Commission has listed allowed rural uses in its administrative rules. For example, non-farm and non-forest uses are permitted in exclusive farm use and forest zones. Goal 11 (public facilities) limits extension of urban services such as sewerage to areas outside of urban growth boundaries to lessen demand for urban development in rural areas.

Housing

The Oregon Legislature passed House Bill 2001 in 2023 which aims to help communities meet the housing needs of Oregonians. The law requires Oregon's cities with a population over 10,000 to plan for and encourage housing production, affordability, and choice through the regular completion of a Housing Capacity Analysis and a Housing

Production Strategy. The Department of Land Conservation and Development is responsible for the rulemaking associated with House Bill 2001 (2023).

This bill includes a new accountability system by which the state allocates need to all local governments, assigns housing production targets to cities above 10,000 population, and measures production and outcomes in these cities over time. If a city is falling behind relative to the region and peer cities, the Department of Land Conservation and Development is required to conduct an audit of the potential state and local barriers to production. This audit process should take water availability and conservation measures into account in communities where future water supplies are known to be limiting factor for housing production. Meeting housing need will require cities to implement strategies that reduce per capita water demand to successfully facilitate production while minimizing impacts on water supplies. Developing or updating a Water Management and Conservation Plan may help communities plan for their housing needs, while sustainably utilizing and managing our limited water resources.

Action 6A Integrate Water Information and Land Use Planning

Local government land use planners do not always have the tools or information needed to assess the positive or negative effects of their long-term planning decisions on water resources. The need to better integrate water management and land use planning is not a challenge unique to Oregon. Other states have addressed the lack of decision-making tools or information with:

- Laws and policies that force coordination through certain approval processes
- Financial incentives that link land use development proposals to beneficial water management strategies or projects (e.g., incentives for green infrastructure, see Action 6B)
- Training sessions and workshops where land use planners and water management staff interact
- Requirements for consultation with water agencies during updates to land use plans

How Local Governments Utilize State or Federal Agency Information

Local governments need access to information collected by state and federal agencies. Below are several examples of information or agency programs that support local land using planning.

Natural Resource Information - To protect and plan for Goal 5 resources, local governments may utilize data from the Oregon Department of Forestry's stream classification maps, Oregon Department of Fish and Wildlife's fish and wildlife distribution maps, local, state, and federal wetland inventories, and the Federal Emergency Management Agency's floodplain maps.

Source Water Assessments -Source water assessments were developed by the Oregon Department of Environmental Quality and Oregon Health Authority and provide improved information about the natural- and human-caused risks within municipal drinking water source areas. Some local governments use maps showing municipal drinking water source areas and source water assessment reports (when available) to voluntarily initiate a process to protect drinking water sources. Cities and other public water suppliers are encouraged to use their source water assessment to identify risks and develop measures for protection of drinking water supply.

Existing and Future Land Uses - Municipalities consider water rights and their capacity to produce and distribute drinking water for uses within incorporated cities and districts. Access to existing land use data and future land use projections helps municipalities make critical water infrastructure investments to preserve and accommodate future demands.

Demographic Information - Population and employment forecasts are of interest to municipalities when estimating water demands for residential, industrial, and other uses. Individual studies conducted to evaluate land use requests, particularly to show that there is an adequate supply of groundwater for a proposed urban use, are

frequently completed. The Portland State University Population Research Center produces county and urban growth boundary population projections, which are funded by the Department of Land Conservation and Development.

Rural Water Supply - Oregon's land use laws provide opportunities for counties to consider the appropriate level of rural development in areas that are not zoned for "resource" (i.e., farm or forest) use and to study whether new areas for development should be designated. Since rural development typically relies on wells, counties need data on the availability of groundwater early in the planning process to make informed decisions on what density of development to permit in rural development zones.

Stormwater Management – Local urban governments have many potential permitting relationships with the Oregon Department of Environmental Quality associated with stormwater. The Department of Environmental Quality can identify certain federal, state, and local governments and agencies, including cities, counties, and special districts as a Designated Management Agency, with authority to manage and regulate water pollution listed in a Total Maximum Daily Load (TMDL) plan. Municipalities may also hold a municipal separate storm sewer (MS4) permit. A MS4 is a conveyance or system of conveyances, such as roads with drainage systems, municipal streets, catch basins, curbs, gutters, constructed channels or storm drains, owned or operated by a governmental entity that discharges to waters of the state.

Underground Injection Control systems (UICs) are a way to legally, through permit, emplace water (e.g., stormwater, remediation fluids, low-temperature geothermal return water) below ground. UICs often consist of a concrete structure (e.g., drywell), placed below ground that receives stormwater and then slowly releases it over time. The UIC program is managed by the Oregon Department of Environmental Quality and intended to prevent the contamination of groundwater. UIC locations are available to local governments and the public on a web-based map application. A user can enter an address or a latitude and longitude and check if there are permitted UICs at or near that location.

Data Gaps

There are areas where data is lacking and improvements can be made to connect land use planning and water resources planning. Of primary concern, local land use decision makers need more information about groundwater quality and availability at specific locations, as well as the long-term ability of local aquifers to yield water, when making decisions about appropriate locations for development, particularly in those rural areas already designated as groundwater administrative areas. Available groundwater information tends to be either too broad (based on regional studies) or too narrow (based on specific project sites) to help with land use planning decisions. Refer to Strategy Action 1B, calling for additional groundwater basin studies, for a list of priority basins that will be studied in the coming years.

The land use planning program at the Department of Land Conservation and Development needs accurate geographic information regarding water rights and district boundaries to better support local governments.

Land use decision makers also need better information about the cumulative impacts of development on water quantity and quality, to comprehensively plan land uses. Municipalities need information related to natural resources to support preservation and better information about the carrying capacity of land to absorb and/or mitigate stormwater and onsite wastewater disposal.

Action 6A

Improve Integration of Water Information and Land Use Planning

Examples of how to implement this action:

- Protect natural water bodies in the course of land use decisions, such as wetlands, estuaries, groundwater aquifers, rivers, and lakes
- Update land use protections for water bodies incorporating best available data
- Integrate regulation of water master plans with local comprehensive land use plans to sustainably support municipalities' development
- Make accurate geographic information on water rights and district boundaries available to local governments and DLCD
- Support local governments to perform periodic review of their comprehensive plans
- Update Goal 5 resource inventories in local comprehensive plans (e.g., riparian areas, wetlands)
- Develop and share information with local governments regarding the location, quantity, and quality of water resources for use in land use decisions; consider mechanisms for increasing access to water data such as through the Oregon Water Data Portal
- Improve coordination, technical guidance, and assistance to local governments for land use decisions that rely on water availability or could have negative impacts to water quality
- Take next steps to implement land use goals related to water resources—establish implementing rules, support local governments to update acknowledged plans, and the application of appropriate safeguards during permitting
- Build partnerships with state agencies and local governments to share land use information
- Increase resources for local governments to update their natural hazard inventories (Goal 7)
- Increase resources for local governments to update their facilities plans (Goal 11)
- Work towards achieving a statewide dataset of tax lots (identified as a priority by DAS)
- Update State Agency Coordination Programs and associated rules (see Action 9D)
- Include environmental and social justice information in land use planning

Action 6B Encourage Low Impact Development Practices and Green Infrastructure

Runoff from urbanized lands and impervious surfaces such as paved streets, parking lots, and building rooftops during rainfall and snow events often contain pollutants that negatively affect water quality. This polluted runoff commonly includes heavy metals, pesticides and fertilizers, oil and grease, bacteria, and sediment that impair human health and aquatic habitat. Urban runoff is a major source of degraded surface water quality and can also contaminate groundwater. In addition to pollution, the increased amount and timing of runoff from urban areas can have negative impacts on receiving streams. This action focuses on incorporating stormwater management into planning and development. See Actions 7A, 11A, 12A-12C for additional ways to manage point and non-point sources of pollution.

Green infrastructure provides a way to manage stormwater and protect water quality and ecosystem health. "Green infrastructure" is defined by Oregon statute (ORS 550.160) to include both engineered stormwater practices (e.g., green roofs) as well as natural areas. Green infrastructure includes infrastructure adapted to wet weather management that:

- Infiltrates, evapotranspirates, captures and reuses stormwater to maintain or restore natural hydrology
- Protects or restores natural landscapes
- Rain gardens, porous pavements, green roofs, infiltration planters, trees, tree boxes, bioswales, or other green infrastructure strategies, or
- Harvests rainwater from an artificial impervious surface for non-potable uses, including landscape irrigation or toilet flushing

Low Impact Development (LID) uses techniques such as green infrastructure to manage stormwater quantity and quality close to its source. Green infrastructure, such as bioswales, rain gardens, large trees, or vegetated roofs mimic natural processes to intercept, infiltrate, evapotranspirate, or retain stormwater or runoff on the site where it is generated. The goal is to treat stormwater runoff at its source before it reaches the storm sewer system, reducing stormwater infrastructure maintenance, and reducing downstream impacts to receiving streams.

Effective LID must be incorporated at the beginning of the project, during site analysis and planning. Site topography, soils, and previous development status (e.g., brownfield) can guide the design for specific LID strategies. LID and green infrastructure support climate mitigation, adaptation, and resiliency strategies.

The Department of Land Conservation and Development is positioned to play an important role in promoting the use of green infrastructure. House Bill 3409 (2023) established a Community Green Infrastructure Fund, directing the Department to provide grants for community green infrastructure projects, and for the development and implementation of green infrastructure master plans. Green infrastructure plans must provide social, environmental, or economic benefits to an environmental justice community and be developed in coordination with that community.

Action 6B
Encourage Low Impact Development Practices and Green Infrastructure

Examples of how to implement this action:

- Continue to compile and provide online information on low impact development best practices
- Support updates to local development codes, improving local capacity to review and permit low impact development and green infrastructure designs
- Encourage communities to consider natural infrastructure in lieu of, or as a complement to, built infrastructure
- Consider how and where co-benefits of natural/green infrastructure will occur, including flood abatement, clean drinking water, lower water/wastewater utility rates, educational opportunities, and climate resilience

Green Infrastructure - Defined in Oregon Statute

Oregon Revised Statute 197.469	Oregon Revised Statute 550.160
(a) Green infrastructure as defined in ORS 550.160; or	(5) "Green infrastructure" means infrastructure adapted to wet weather management that:
(b) Infrastructure that:	(a) Infiltrates, evapotranspires, captures and reuses storm water to maintain or restore natural hydrology;
(A) Mimics natural systems, or enables natural systems to be less stressed through water conservation, water protection or ecosystem restoration, at the neighborhood or site scale as part of an integrated approach in residential, municipal or industrial developments or water infrastructure; and	(b) Protects or restores natural landscapes;
(B) Implements community-based concepts, principles and practices to conserve and manage resources for future generations, sequester carbon and provide environmental and social benefits.	(c) Uses rain gardens, porous pavements, green roofs, infiltration planters, trees, tree boxes, bioswales or other green infrastructure strategies; or
	(d) Harvests rain water from an artificial impervious surface for nonpotable uses, including landscape irrigation and toilet flushing.

Critical Issue | Water Infrastructure

Built and green (i.e., natural) infrastructure used to store, transport, distribute, disperse, collect, and treat water is an important, but often overlooked, piece of our collective water management and stewardship responsibilities. Maintenance of our built water and wastewater infrastructure is critical for maximizing equipment longevity and minimizing the risk to water resources from equipment failures. Ensuring that Oregon's built and green infrastructure is well maintained and functioning is important for a variety of public health and safety reasons, but also for meeting our state's economic needs.

It takes an extensive system of pumps, pipes, treatment, and storage facilities to deliver water to our homes, businesses, and fields every day. Built water infrastructure includes storage, drinking water, stormwater, irrigation-related, and wastewater treatment infrastructure. Natural areas, including forest, floodplains, and rivers, provide valuable storage, flood abatement, climate resiliency, climate mitigation, and water quality benefits while also providing important habitat for fish and wildlife.

Examples of built water infrastructure include:

- Storage facilities, e.g., dams and reservoirs
- Levees
- Wells
- Municipal/community drinking water treatment systems
- Canals and pipelines
- Pumps and pumping stations
- Headgates, headworks, and valves
- Spillways, siphons, drains, penstocks, and transmission lines
- Telemetry systems
- Measurement devices
- Fish screens and fish passage facilities
- Drainage pumps, ditches, and tiles
- Municipal/community wastewater treatment systems
- Fish screens and fish passage facilities
- Drainage pumps, ditches, and tiles
- Municipal/community wastewater treatment systems
- Stormwater conveyance and treatment systems
- Septic systems
- Tidegates

Examples of green water infrastructure include:

- Rivers and streams
- Floodplains
- Riparian vegetation
- Telemetry systems
- Measurement devices
- Wetlands and estuaries
- Meadows
- Forests
- Coasts
- Parks
- Urban elements like bioswales, green roofs, street trees, and lawns/gardens

Action 7A Maintain, Upgrade, or Decommission Water Infrastructure

Built and green infrastructure both require ongoing management and maintenance. Climate change and associated changes in weather patterns have new implications for infrastructure. Infrastructure may need to upgraded to improve resiliency, also providing an opportunity to improve fish passage (Action 11C), and improve water and energy efficiency and water conservation (Actions 4C and 10A and 14B). When wells, dams, or levees have significantly deteriorated, the costs of repair may exceed the expected benefits, and proper decommissioning and removal may be a less expensive and more environmentally beneficial alternative.

Protect and Enhance Green Infrastructure

Built infrastructure, such as pipes, tanks, dams, reservoirs, and wastewater treatment plants, are constructed by humans to accomplish a water management objective such as flood control, conveyance, storage, and treatment. In contrast, green infrastructure can meet an infrastructure need, but using a naturally occurring feature (e.g., floodplain, forest, wetland) or created or enhanced natural feature (e.g., constructed wetland) to provide multiple benefits for humans and the environment. Investing in green infrastructure projects helps communities adapt to and mitigate for climate change. There is overlap between this action and Action 11A, to protect and enhance the green infrastructure that provides valuable ecosystem functions and can sometimes reduce our reliance on built infrastructure to accomplish a similar function. For example, it can be more cost effective to enhance riparian vegetation to cool water rather than construct infrastructure to accomplish the same task.

Green infrastructure can provide co-benefits such as flood abatement, clean drinking water, lower water/wastewater utility rates, educational opportunities, and climate resilience. Green infrastructure projects should be located to benefit environmental justice communities.

Plans Guiding Built Infrastructure Investments

Various planning documents prepared by cities, counties, utilities, or districts can help identify upcoming infrastructure investment needs.

Public Facilities Plans - Discussed under the critical issue "Land Use Planning," Statewide Planning Goal 11 and its administrative rules require cities with populations greater than 2,500 to prepare public facilities plans addressing drinking water, wastewater disposal and treatment, and stormwater management needs. These plans focus on the costs and timing of infrastructure needs and coordination among providers within the jurisdiction. Funding the development and implementation of these plans can avoid water quality impacts associated with deteriorating infrastructure or systems operating above their design capacity.

Water Master Plans – Oregon Health Authority requires existing and new Community public water systems with 300 or more connections to develop a Water Master Plan. The master plan considers a 20-year period and includes extensive system information including present and future system deficiencies, alternatives to address deficiencies, implementation schedule, and a financing program for construction. Business Oregon provides funding to help Community systems prepare their Water Master Plans and offers grant and loan programs to finance system improvements.

Wastewater Facility Plans – As described under Action 12C, failing wastewater systems increases the risk of contamination of both surface water and groundwater and can be a public health hazard. A wastewater facility plan presents alternatives to meet a community's wastewater needs and is often required when seeking funding for improvements. Oregon Department of Environmental Quality must review wastewater plans at least every five years. Business Oregon provides support for developing wastewater plans and financing system improvements.

> "We can modernize our flood protection infrastructure where appropriate, while fully incorporating the benefits of natural infrastructure and ecosystems. Combined, these will help mitigate impacts of increased flooding and drought, while reducing the impacts of sea level rise to coastal communities."
> -100-Year Water Vision (2020)

Support Irrigation Infrastructure Modernization

Irrigation infrastructure is used throughout Oregon, from small-scale to large-scale applications. Oregon is home to many irrigation districts, water control districts, drainage districts and water improvement districts which manage the distribution of irrigation water. In central and eastern Oregon, these districts often utilize manmade canals or flumes to convey and distribute water. Water losses often occur in unlined canals through porous soils, and evaporative losses occur from the water surface from both canals and flumes. In the last twenty years, irrigation districts have been implementing projects to

pipe their distribution canals to reduce these losses. In cases where the applicant is going through the Allocation of Conserved Water Program at the Water Resources Department, and a state or federal funding source is used to finance a portion of the piping, pursuant to statute and rule, the minimum of 25% of the conserved water must be allocated to the State to remain instream.

There is a need to continue supporting irrigation modernization projects that lead to water conservation and benefit agriculture as well as fish and wildlife. The Oregon Watershed Enhancement Board's Irrigation Modernization Grants and Oregon Water Resources Department's Water Projects Grants and Loans are just two funding sources that help finance irrigation infrastructure improvements.

Support Oregon's Well Construction Program

Oregon's well construction standards are designed to protect groundwater resources and the public by preventing contamination, waste, and loss of artesian pressure. With several thousand wells drilled each year, state agency oversight and inspection is critical to ensure wells are constructed using proper methods, materials, and equipment. The Water Resources Department has made important efforts to modernize policies and procedures for well construction to provide more timely well inspections and better protection of the groundwater resources (House Bill 2145, 2021).

Homeowners with old, unused, neglected, or poorly maintained wells should contact the Water Resources Department for information regarding the proper methods of decommissioning their wells.

The Water Well Abandonment, Repair, and Replacement Fund (WARRF), established by House Bill 2145 in 2021 authorized the Water Resources Department to provide financial assistance to low- or moderate-income households where the well has gone dry or is no longer able to provide sufficient water for household use. The Special Legislative Session in December 2023 modified the focus of the fund to prioritize financial assistance to those domestic wells in areas recently impacted by drought or wildfire. In 2023, House Bill 2010 revised WARRF again to include eligibility for wells with contamination levels that exceed drinking water standards. As of January 2024, WARRF provided funding that restored water to 175 homes located within 17 counties across Oregon.

Dam Safety & Decommissioning

Oregon has a dam safety program, described in detail in Action 7C. Dams that are at the end of their useful life, pose a public safety risk, or no longer serve their intended purpose may need to be removed. Dam removal projects should be coupled with ecological restoration activities to restore hydraulic and ecological function. For example, the Department of Fish and Wildlife has identified priority artificial barriers across the state and is actively pursuing restoring fish passage at sites that maximize the return of native migratory fish to critical habitats, as described in Action 11B.

Improve Oregon's Levees

Levees are used around the country to protect low lying areas from river flooding, coastal flooding, and other floods that are intensified by high tides. Levees are very similar to embankment dams, in that they are generally constructed of local soils and intended to retain water without leakage or overtopping. Levees can affect riparian and floodplain functions and only provide flood protection if they are of sufficient height and stability. Even then, levees must be monitored during flooding, with leakage and overtopping identified correctly and immediately addressed. Failure of levees in some cases can be catastrophic, as was the case when a levee adjacent to the Columbia River failed, killing 15 people and destroying the City of Vanport in 1948. At the time, it was the second largest city in Oregon and the largest public housing project in the nation.

Action 7A

Maintain, Upgrade, or Decommission Water Infrastructure

Examples of how to carry out this action:

- Provide timely inspection of well construction, review of well logs, and educate drillers and pump installers to ensure construction standards are met
- Inventory, inspect, and make safety improvements to levees, accounting for future conditions associated with climate change
- Properly decommission infrastructure, such as a well, culvert, levee, or dam, at the end of its useful life
- Upgrade infrastructure to improve water and energy efficiency and conservation (e.g., pipe irrigation canals, leak detection and repair in municipal water distribution systems)
- Provide funding for planning, design, and construction of point source and nonpoint source water pollution control projects to upgrade infrastructure systems, protect, restore, and improve water quality
- Provide funding for projects based on USEPA "green" project eligibility
- Incorporate equity and community vulnerability assessments into infrastructure planning to inform strategies for repair, replacement, and funding infrastructure improvements
- Assess additional locations where levee accreditation could help lower floodplain insurance costs for low-income households and improve flood protection for vulnerable communities
- Continue to support the OWRD Well Abandonment, Repair, and Replacement Fund to provide financial assistance to low to moderate income individual households or members of federally recognized tribes in Oregon
- Incorporate environmental justice considerations in targeting funding and resources for water infrastructure improvements in underserved communities
- Support water and wastewater infrastructure investments that prioritize (efficient) infill development, provision of affordable housing, and jobs within walkable service areas

The U.S. Army Corps of Engineers (Corps) sponsors and certifies a portion of the levees in Oregon. The Corps keeps an inventory of those levees it sponsors and certifies. In exchange for assistance with inspections and emergency response, owners of those levees are required to maintain them to federal standards. These levees are well inventoried, regularly inspected and have a reasonable margin of safety. The Corps is not routinely involved in levees constructed to manage coastal (tide related) flooding. There are other levees in Oregon that have not been maintained to federal standards, nor are they part of the Corps of Engineers certification program. Some of these other levees have been inventoried, while many have not which means the condition and ownership status is unknown. Based on information from the Corps of Engineers, there could be nearly 2000 levees that are not in their inventory.

The Department of Geology and Mineral Industries has compiled a dataset of levee like features throughout parts of the Willamette Valley and the Oregon Coast. The dataset is a starting point for developing a geospatial inventory of levees. However, the inventory only identifies levee like features. As a result, there are many structures in the inventory that are not levees and the inventory needs to be vetted. A geospatial inventory of levees is an important resource for assessing flood risk, flood mitigation planning and for emergency response during flood events. It also benefits ecological restoration efforts by helping locate levees to remove or breach to expand habitat for aquatic species. The 2021-2023 legislative session authorized $10 million to Business Oregon for levee grant funding available to provide financial assistance for levee projects that result in improvement, expansion, or repair of levees, flood control facilities, or flood control embankments.

New Standards for Levee Certification – Levees must be accredited to be recognized in the Federal Emergency Management Agency's flood insurance program. An accredited designation means that a levee is built and maintained to protect against a one-percent-annual-chance flood event, commonly known as the 100-year flood. To achieve accreditation, a professional engineer must certify the levee. Levee failures resulting from Hurricane Katrina (2005) spurred the U.S. Army Corps of Engineers to re-evaluate their levee inspection and certification program. New

evaluation standards were established in 2012 for all levee certifications, including those that were previously completed.

Given the large number of un-accredited levees and public safety risk, the State should establish a levee safety program (like its Dam Safety Program), see Action 7C.

Wildfire Damage & Public Health Risk

Drinking water and wastewater infrastructure can be damaged during a fire in unexpected ways. Intense heat from wildfires can release toxic chemicals into a public drinking water system, interruption of electrical power can cause a loss of pressure in the system and risk of contamination, and systems served by surface water can experience a spike in sediment, minerals, and nutrients. Septic systems that sustained only partial damage during a fire may still need to be replaced. The Department of Environmental Quality maintains a website with several resources for addressing infrastructure issues following a fire.

Action 7B — Encourage Regional Water and Wastewater Systems

Many Oregon communities, particularly smaller ones, struggle to adequately fund drinking water and wastewater-related infrastructure. The high capital costs of infrastructure, construction, operation, ongoing maintenance costs, and the salary and training costs of retaining qualified personnel can be prohibitively expensive to communities with a small ratepayer base. In Oregon these tend to be rural, coastal, and/or small urban communities.

Developing a regional water and wastewater system makes sense, if it is cost-effective. A regional system could include physical consolidation, system redundancy, or shared contracts, services, purchases, mutual assistance agreements, interties, and back-up supplies. State and federal agencies often provide incentives such as funding and technical assistance to encourage a regional approach to meeting water needs.

Oregon should encourage regional approaches to water and wastewater services, particularly if these approaches create efficiencies for smaller communities and support resilience to natural hazards and climate change. Business Oregon has recently completed a rulemaking allowing them to provide funding for regionalization projects. Organizations such as the Oregon Association of Clean Water Agencies can play a key role in making connections and encouraging regional approaches among water and wastewater systems.

Action 7B
Encourage Regional (Sub-basin) Approaches to Water and Wastewater Systems

Examples of how to carry out this action:

- Make use of shared contracts, services, and purchases
- Develop mutual assistance agreements between neighboring communities and water/wastewater systems
- Establish inter-ties and back-up supplies for water supplies
- Provide incentives to encourage regional approaches to water distribution, efficiency, and wastewater treatment
- Incorporate DLCD equity and community vulnerability assessments into asset management planning to inform strategies for repair, replacement, and funding infrastructure improvements
- Identify transition strategy for providing water and wastewater to urbanizable areas (UGB) consistent with comprehensive land use planning.

Action 7C Support Dam & Levee Safety

Dam safety represents a significant area in which the state has responsibility for the communities located downstream from important but aging water impoundments.

A "dam" is a hydraulic structure built above the ground surface that is used to impound water. Dams include all related structures and together are sometimes referred to as "the works." Dams can include wastewater lagoons and other hydraulic structures that store water, attenuate floods, and divert water into canals. Many traditional dams are constructed on stream channels to form reservoirs. Dam owners include homeowners, farmers, irrigation districts, private industry, municipalities, associations, and public agencies.

As mentioned under Action 5B, dam safety and flood events are included in the state's Natural Hazard Mitigation Plan, being updated in 2025.

Action 7C
Support Dam & Levee Safety

Examples of how to carry out this action:

- Authorize resources to determine if dams have safety deficiencies; evaluate and retrofit dams to meet new seismic and hydrologic standards
- Implement actions to improve the safety of dams
- Properly decommission dams and levees at the end of their useful life
- Coordinate interagency emergency response regarding dam inspection, communication, and evacuation
- Define the legal responsibilities of dam owners
- Dedicate grant and loan resources for rehabilitation of deficient dams
- Improve clarity of statute and rule regarding enforcement mechanisms to ensure dam owners follow through with Emergency Action Plan exercises and updates
- Map potential impacts to critical infrastructure (e.g. schools, hospitals, water treatment facilities) and demographics of who will be impacted by dam failures

Establish a Levee Safety Program

Levees, described under Action 7A, have received less recognition than dams regarding their potential for failure and ability to cause life and property loss. The US Army Corps of Engineers estimates that there are as many as 2,000 levees in Oregon. However, the Water Resources Department is only aware of about 260 levees. Oregon needs to establish a Levee Safety Program, in concert with the Dam Safety Program, to protect public safety and increase resilience to climate change and natural hazards (e.g., floods, earthquakes).

Managing Oregon's Dam Safety Program

Oregon strives to maintain a good dam safety record to ensure public safety. The Association of State Dam Safety Officials notes that, while *"dams bring water, power, flood control, recreation, economic possibilities and many other advantages to people…people must understand that safe operation and maintenance is key to sustaining these advantages and avoiding potential disaster."*

The original focus of Oregon's dam safety program was the review and approval of designs for new dams. A majority of Oregon's dams were constructed decades ago, with some more than 100 years old. As a result, the dam safety program now focuses on evaluating the condition of existing dams through regular inspections and providing feedback to owners regarding needed safety improvements.

Oregon Revised Statutes authorize and direct the Water Resources Department to take specific actions related to the design, construction, inspection, and safety of dams. The State Engineer for Water Resources oversees the Dam Safety Program and inspects all the state-regulated high hazard dams. Among their many duties, Oregon's watermasters conduct inspections of low hazard dams.

Those Subject to the Dam Safety Program – Approximately 1,200 dams in Oregon are at least 10 feet high and store 3 million gallons or more (9.2 acre-feet of water), making them subject to Oregon's dam safety program. The largest dams, however, are regulated by federal agencies. The Water Resources Department is the lead public authority responsible for 941 non-federal dams.

Figure 3-9: Hazard Classifications for Dams

76	**High Hazard Dams** Failure will likely cause fatalities. These dams are inspected annually.
154	**Significant Hazard Dams** Failure will damage property but loss of life is unlikely. These dams are inspected every 2 to 3 years.
711	**Low Hazard Dams** Failure is unlikely to cause major property damage or loss of life. These dams are inspected every 5 to 6 years.
941	**Total Dams in the Program**

Source: OWRD, February 2024

The Department works with owners to bring these dams up to current safety standards. Many of Oregon's dams are old and could fail, greatly increasing the severity and consequences during major flooding. Additional resources are needed to determine if dams have safety deficiencies.

Hazard Ratings – Like most states, Oregon rates dams by hazard classification—high, significant, or low (Figure 3-9). A dam's hazard rating is based on what could happen if the dam fails, not on the condition of a dam. A high hazard dam, for example, means that failure would likely cause fatalities. There are currently 76 non-federal dams rated as high hazard. These dams are inspected annually.

The condition of High hazard dams is evaluated using four categories: satisfactory, fair, poor, and unsatisfactory. The condition analysis of each high hazard dam is updated after its formal inspection.

Monitoring High Hazard Dams – Remote monitoring can detect a potential problem before there is harm to people and property. The most important information includes the current water level in the reservoir and any change in seepage flow through the dam. The Water Resources Department is now authorized to require remote monitoring on deficient, high hazard dams.

Emergency Authorities – In Oregon, if a dam is imminently unsafe, the Department will notify the owner and schedule a hearing to see if a water level restriction or other action is deemed warranted by an administrative law judge in accordance with the dam safety statutes and Oregon administrative law. The process takes several months unless the owner voluntarily signs a consent agreement.

Legal Responsibilities for Dam Safety – The Association of State Dam Safety Officials notes that dams are a unique type of infrastructure, because while public entities tend to own roads, bridges, and sewer systems, this is not the case with dams. Most dams in the United States are privately owned. Dam owner responsibility and liability is outlined in statute (ORS 540.459 and 491). Owners should know what their responsibilities are, including keeping the dam safe and taking immediate action if the dam begins to fail and threaten people or property.

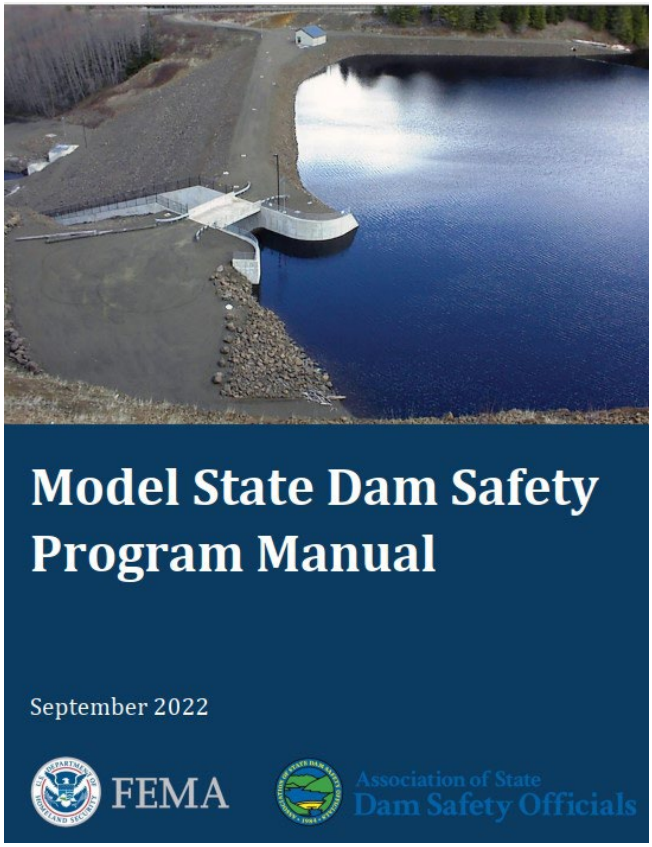
Emergency Action Plans – An Emergency Action Plan (EAP) helps identify situations where a dam failure might occur and spells out actions that could save the dam and hasten evacuations. The 2017 Legislature passed a bill requiring owners or operators of high-hazard dams to develop an emergency action plan and file it with the Water Resources Department, Office of Emergency Management, and the local county emergency agency no later than January 1, 2019. Dam owners are required by statute to update and exercise their EAPs periodically.

Emergency Inspection after Extreme Events – Oregon has no interagency agreements in place to inspect multiple dams damaged by an earthquake or widespread flood. After extreme floods and multiple dam failures in 2013 and 2015, Colorado and South Carolina had to improvise, but fortunately, both states had federal and local dam safety engineers available to make inspections quickly. In Oregon, this will be difficult after a Cascadia Earthquake or flood if access via roads is no longer possible. Emergency access and dam inspections are essential to avoid dam failures in the aftermath of a Cascadia Earthquake or significant flood. Additional arrangements are needed for effective and coordinated response during extreme events so that the public can be reassured that dams are safe, or can be evacuated, if necessary.

Grant and Loan Programs – Most conventional loan programs cannot be applied to dam repair or maintenance, and since many dams are privately owned, many owners do not have the financial resources necessary to rehabilitate their dams. This is especially true for dams that generate no income. It is essential to inspect, monitor and analyze those dams with known deficiencies. With older dams, there are often a great number of unknowns, uncertainties, and defects, including the reliability or existence of design information.

Recently, the dam safety program and other grant programs provided some funds to dam owners to conduct engineering analysis of high hazard dams. Although Oregon has efficiently leveraged limited resources to improve the overall safety of state-regulated dams, many important activities have been deferred, some indefinitely. Establishing formal grant and loan programs would allow owners to make seismic and flood related upgrades, rehabilitate unsafe dams that still have value, or to provide funds for removal of dams that no longer provide benefits.

Federal sources of funding include the Federal Emergency Management Agency's (FEMA) High Hazard Potential Dam Grant and National Dam Safety Program Grant programs.



Ecological Impacts from Dams

The existing Dam Safety Program provides for periodic review of dams, only in relation to human safety and property. Dams requiring upgrades to meet safety requirements may trigger fish passage laws. Periodic reviews for hydrologic or ecological harms would require additional authority and resources for several agencies.

Climate uncertainty, water scarcity, and public health and ecological crises all require that we share information in a timely and accessible manner. Agencies and many types of partners can provide the public, and one another, with information about our water resources and challenges to help everyone engage in water stewardship actions. Expanding our collective knowledge about water can increase the attention and care we devote to protecting our shared resource.

The health and sustainability of Oregon's water resources can benefit greatly from a variety of education and outreach efforts. The value of water and the role it plays in Oregon's economy and the environment is not always well understood or even recognized. Everyone can benefit from a reminder that our human activities and decisions have a significant impact on both the quantity and quality of our water and the many economic and ecological uses it supports.

Action 8A Support Implementation of K-12 Environmental Literacy Plan

Environmental Literacy Plan

In 2009, the Governor and the Oregon Legislature launched the development of an Environmental Literacy Plan as part of the No Child Left Inside Act. Oregon is the first state to pass legislation directly related to the development of an environmental literacy plan. Last updated in 2013, the Environmental Literacy Plan is aimed at helping students become lifelong stewards of their environment and community, exercising the rights and responsibilities of environmentally literate citizenship, and making choices to interact frequently with the outdoor environment. The program also supports teachers by providing professional development training, guidance for conducting research and assessment, maintaining a database of resources, and building capacity through partnerships (Oregon Environmental Literacy Resource Directory). In 2014, Oregon State University became the administrative body overseeing the Environmental Literacy Program to help implement the plan.

Other Resources

Children's Clean Water Festival - The Children's Clean Water Festival, held annually in the Portland metro area, is a community-supported event, organized by public, private, and non-profit organizations committed to water and environmental education in Oregon. The festival's goal is to teach fourth and fifth grade students that they can have positive impacts on water resources, including lessons on the water cycle, watersheds, stormwater, drinking water, water conservation, and wastewater. The festival's website currently provides 'Festival Lessons' that can be accessed anytime.

Oregon Envirothon – Oregon Envirothon is a hands-on, problem-solving education program and competition that teaches high school students about environmental sciences. Oregon Envirothon works in cooperation with local conservation districts, natural resource associations, educators, and environmental agencies to provide mentorship, training, and competition to high school students and their teachers.

Outdoor School - Oregon State University also serves in a leadership role for Oregon's Outdoor School Program, a week-long field-science curriculum for fifth and sixth graders, focusing on the environment, natural resources, economic development, and related careers. Since the late 1950s, nearly one million students have participated, studying natural sciences and the responsible use of natural resources alongside students from other schools. Participation in Outdoor School varies by school district and has not been available on a statewide basis.

Salmon and Trout Enhancement Program's Fish Eggs to Fry – The Oregon Department of Fish and Wildlife's Salmon and Trout Enhancement Program provides valuable tools, resources, and support to provide education

opportunities in and outside the classroom as well as in the community. One of the most popular programs is "Fish Eggs to Fry" where salmon or trout eggs are raised in a classroom incubator, giving students first-hand experience with how water quality impacts fish survival.

Project WET - Project WET, established in 1984, has a coordinating center at Western Oregon University, and other coordinating centers located nationally and internationally. The organization offers K-12 water related-curricula for educators, available for a fee, providing an overview of water quality and quantity issues, focusing on topics such as watersheds, wetlands, oceans, sanitation and hygiene, water history, and more.

4-H Youth Development - The 4-H Youth Development Program is the largest out-of-school youth program in the United States. The program is over 100 years old and was developed to share new agricultural developments with young people in rural communities. Today 4-H opportunities are available in every Oregon county, delivered through Oregon State University Extension Service. Example learning topics relevant to water stewardship include agriculture, geology, forestry, and horticulture.

Action 8A
Support Implementation of K-12 Environmental Literacy Plan

Examples of how to implement this action:

- Support funding for implementation (e.g., Outdoor School, Children's Clean Water Festival)
- Natural resource agencies, community organizations, and others should engage in education for environmental literacy activities
- Incorporate environmental justice, and culturally specific water stewardship values in environmental literacy programs
- Engage and support culturally specific community-based organizations in the design and implementation of environmental literacy programs

Action 8B Provide Career Training for the Next Generation of Water Professionals

Challenges posed by climate change, aging infrastructure, poor water quality, population shifts, degraded instream habitat, and land use change have increased the demand for water professionals. Water professionals are needed in a wide range of specialties, including water and wastewater treatment, well drilling, science, engineering, policy, law, planning, engagement, and science communications.

An alarming national shortage of workers exists in the water utility sector, including water and wastewater treatment operators. This shortage will become more critical as a large percentage of the utility industry becomes eligible for retirement. Upcoming retirements from the Baby Boomer generation will impact other job sectors too, elevating a need for more graduates to fill the demand.[40]

A career in water provides an opportunity for a rewarding career, competitive wages, and the satisfaction of delivering clean water to your community or supporting Oregon's fish and wildlife.

> "Communities with fewer resources are challenged to strategically plan for and invest in their water future and need access to a skilled workforce to implement, manage, and monitor water projects.
> We can begin investing now in strong community capacity and a skilled water workforce in every region across Oregon."
>
> .-100-Year Water Vision (2020)

Oregon State University hosts a website of water-related education and training programs offered by Oregon's public universities and community colleges. The Office of Community Colleges and Workforce Development also provides a listing of colleges that offer water-related courses, degrees, and programs throughout Oregon. The American Water Works Association, the Water Environment Federation, and the U.S. Environmental Protection Agency have partnered to create a website to promote career choices in the water sector geared toward jobseekers of all levels: workforwater.org.

Water Utility Workforce

During the 1970s and 80s, the water and wastewater treatment industry grew rapidly to fulfill the requirements of the federal Clean Water Act and the Safe Drinking Water Act. In the next ten years, approximately one-third of drinking water and wastewater operators will be eligible for retirement, and filling those jobs requires a new set of technical skills.[41] In 2020, the U.S. Environmental Protection Agency launched the America's Water Workforce Initiative to respond to this challenge, acknowledging the environmental and public health implications associated with operations and maintenance of essential drinking water and wastewater infrastructure. The Initiative identifies needed partnerships across federal, state, tribal, and local governments along with public utilities, the private sector, community groups, and educational institutions. The Initiative's goal is to help make water a career of choice through education and sustained public outreach.

The U.S. Environmental Protection Agency also developed a grant program to build a pool of skilled and diverse workers in the water and wastewater utilities sector. During 2023, the Innovative Water Infrastructure Workforce Development Grant Program offered more than $20 million nationally for various workforce development activities.

Administrative challenges associated with providing water and wastewater services, like staffing and skilled trades to support and maintain municipal water systems, may have cascading impacts on the ability of cities and special districts to function. The Oregon Community College Association reports that out of the seventeen publicly chartered community colleges in Oregon, only Clackamas Community College offers a water and wastewater operator training program. Umpqua Community College offers a water quality technician program. Lane and Clackamas Community Colleges offer a water conservation technician program—specializing in the connection between energy and water efficiency. Certification and training programs are critical resources for plant operators.

Some water providers have initiated internship and apprenticeship programs to help fill the void for water operators. More state funding is needed to fund apprenticeship programs.

In 2023, the Oregon Legislature authorized $1.6 million to the Oregon Association of Water Utilities to construct a Water System Training Center.

Oregon Science, Technology, Engineering, and Math (STEM) Hubs

Legislation passed in 2015 led to the establishment of "Oregon STEM" and several regional Science, Technology, Engineering, and Math (STEM) Hubs across the state to increase access to STEM education and develop a skilled workforce. The program has since been expanded to include art, now referred to as "STE(A)M" learning opportunities. There are currently 13 STE(A)M Hubs that provide equitable learning opportunities for students through partnerships with local leaders, PreK-20 education, after school programs, local industry, and community-based organizations serving youth. Oregon STEM published an impact report in 2023, which included a finding that STE(A)M Hubs advance equity for historically underserved students.[42]

Action 8B

Provide Career Training for the Next Generation of Water Professionals

Examples of how to implement this action:

- Determine whether career training programs are available and equipped to meet the demand for water professionals
- Offer job shadow programs to expose students to careers in water
- Continue funding support for water-related trade and science programs at Oregon community colleges
- Increase coordination between state agencies and universities to develop programs that foster interest in water-related fields and career progression for graduating students
- Offer paid apprenticeship or internship programs to expose BIPOC and underrepresented students and new professionals to careers in water
- Partner with Hispanic Serving Institutions (HSI) to increase support for water-related trade and science programs at Oregon community colleges and universities
- Partner with water/wastewater utilities to promote careers and provide on-the-job training

Other Careers in Water

Numerous programs for science, planning, engineering, law, and other water careers are available at community colleges and universities throughout Oregon. However, there is still a need to increase water professionals, including diversity, entering the work force to meet demand and fill openings left by retirements.

Agencies and professionals in the private sector could assist with recruitment through participation in K-12 career days, offering job shadow programs, and internships. Establishing and maintaining programs between state agencies and colleges and universities can also provide an opportunity for students to learn about water-related career paths.

Esther Shin, Assistant Watermaster, teaches an Oregon State University class about measuring streamflow.
Credit: Kim Fritz-Ogren

Action 8C

Promote Community Education and Outreach

State and federal agencies offer a variety of educational resources and programs. Oregon is also home to an extensive network of community-based organizations that offer technical assistance and information on water quantity, water quality, and watershed-related issues. With 45 soil and water conservation districts and 76 watershed councils, Oregon is well positioned to advance locally led education and outreach efforts.

Many drinking water providers and non-profit organizations have also developed their own educational and outreach materials, making them available to the public. Oregon should continue providing support and technical training to soil and water conservation districts, watershed councils, and other on-the-ground organizations. State agencies need to continue to expand their role in community education and outreach, including supporting community-based organizations and smaller water providers. One way to do this is to increase outreach and educational resources, providing communications in multiple languages and making them accessible to a variety of learning styles.
The important role that state agency field staff play in on-the-ground education is further supported by Strategy Action 12F in Chapter 4.

Soil and Water Conservation Districts - In 1939, the Oregon Legislature passed legislation to establish conservation districts in Oregon. Oregon's soil and water conservation districts (SWCDs) are special districts which provide for the conservation of renewable resources and serve as an important educational resource. SWCDs work with local landowners and residents, natural resource organizations, natural resource users, and local, state, and federal governments and agencies to conserve natural resources, control and prevent soil erosion, conserve and develop water resources and protect water quality. They also preserve wildlife, conserve natural beauty, and promote collaborative conservation efforts to protect and enhance healthy watershed functions. They are governed by an independently elected board of directors and are funded through grants, contracts for services, and in some cases a property tax levy. The Oregon Department of Agriculture provides statutory oversight and assistance to the 45 SWCDs, and maintains an interactive map showing district service areas.

Watershed Councils - The 1995, the Oregon Legislature unanimously passed House Bill 3441 to provide guidance on the formation of watershed councils. Oregon watershed councils are groups of people who meet regularly in local communities to assess conditions in a given watershed and implement projects with willing property owners that support ecological restoration or enhancement that benefits local economies, fish and wildlife, people, water quality, and water quantity. Watershed councils work with local, state, and federal partners and private landowners and serve an important role in community education. Councils are designated by county governments and are expected to have broad and balanced representation and viewpoints. There are 76 locally designated watershed councils as defined by Oregon Revised Statutes 541.890 (14) and 541.910. Other watershed organizations and groups exist, but do not meet this definition. The Oregon Watershed Enhancement Board

Action 8C
Promote Community Education and Outreach

Examples of how to implement this action:

- Look for opportunities to keep Oregonians informed about the importance of water resources to people and the environment
- Look for opportunities to provide outreach, including informational materials, about water-related programs (e.g., streamflow restoration, water conservation, transfers)
- Promote technical training for public and private partners
- Promote access to water-related recreational opportunities using state programs
- Develop a centralized location and outreach materials for people to access information about water conservation
- Develop and distribute informational materials related to the suite of tools available to protect instream flow
- Partner with community-based organizations to deliver water education to the public
- Provide resources for interested local organizations to conduct education and outreach to the communities they serve
- Increase outreach and education resources to produce communications in multiple languages and accessible to a variety of learning styles

currently funds 56 of the 76 watershed councils and maintains an interactive map showing council service areas.
Water Utilities and Municipalities – Water and wastewater providers, including utilities and municipalities, contribute to public outreach and education. They offer a variety of opportunities to learn about the important role the public plays in protecting our water resources and affordability through tours, K-12 programs, and hosting college field trips and internships.

Select Educational Resources

State and federal agencies offer a wide range of educational resources. A brief list of resources addressing water conservation, water quantity and quality, environmental stewardship, and recreation are provided below, reflecting some of the educational needs heard during the Strategy engagement efforts throughout 2023. Several resources focusing on youth-specific education are provided in Action 8A.

Water Efficiency & Conservation

One of the most mentioned concerns during outreach and engagement for the 2025 Strategy was access to information and tools for accomplishing water conservation. A limited list of education resources are listed below, and additional information about implementing conservation practices are addressed in Strategy Action 10A "Improve Water Use Efficiency and Water Conservation." The Water Resources Department currently offers the following resources that provide information regarding water conservation:

- Water Rights in Oregon – An Introduction to Oregon's Water Laws
- Water Conservation Fact Sheets (for residential, farm/ranch, and municipal users)
- Allocation of Conserved Water Program
- Instream Lease
- Instream Transfer
- Water Projects Grants and Loans and Irrigation Modernization Funding
- Guidebook for Municipal Water Management and Conservation Plan
- Guidebook for Agricultural Water Management and Conservation Plan

Agriculture & Forestry - At the federal level, the Natural Resources Conservation Service provides information about water conservation techniques and resources for farmers, ranchers, and forest landowners.

Graywater Reuse & Rainwater Harvesting - The Department of Environmental Quality offers information about permitting and constructing graywater reuse systems, which can conserve water by reducing a business or household's demand on drinking water supplies. The Building Codes Division of the Department of Consumer and Business Services developed an Oregon Smart Guide to Rainwater Harvesting.

Water Quality Information and Advisories

The public must have access to information about the quality of water for drinking, recreating, or food harvesting (e.g., shellfish and fish).

The Oregon Health Authority maintains several sources of information specific to drinking water. The Resources for Consumers webpage includes helpful links to information about water quality for public systems and private wells. A mapping tool is also available depicting the location of active drinking water advisories.

Harmful algal blooms (HABs), can make water unsafe in which to drink or recreate. HABs can also make it unsafe to consume fish from affected waters. The Oregon Health Authority has expanded its education and outreach resources and offers a communications toolkit for drinking water providers. The Oregon Health Authority also provides recreational advisories, informing the public about the presence of HABs, high levels of bacteria at Oregon's beaches, and shellfish harvest closures. More information about HAB monitoring and advisory programs is provided in Chapter 1, Action 1A and Chapter 4, Actions 12A-12C.

Protecting Water Quality – While it is important for Oregonians to know how to access information about water quality, there are also ways that individuals can participate in protecting water quality. Here are just a few examples:

- Drug Take-Back Program, administered by the Department of Environmental Quality, provides a convenient and safe way to dispose of unwanted or expired prescription and over-the-counter medicines. This prevents people from flushing medicines down the drain or putting them in a landfill, where they can degrade water quality and cause environmental harm.
- Oregonians that get their water from a domestic well can learn about well stewardship in the Well Owner's Handbook (English or Spanish), which includes information about proper installation and maintenance of domestic wells, wellhead protection, testing wells for contaminants, interpreting the results, addressing any contaminants Oregon Health Authority also provides resources through their Domestic Well Safety Program.
- Septic system owners can learn about proper care and maintenance to prevent groundwater contamination through the Department of Environmental Quality's Septic Systems webpage. Additionally, the Oregon Septic Smart Initiative provides resources to ensure the longevity of the system and find an industry professional to inspect your system.

Environmental Stewardship & Recreation

Awareness and enjoyment of water resources helps people connect with the environment, which leads them to use water responsibly and promote water resource protection. Support for responsible, sustainable recreation is one way to encourage social investment in protection of these resources.

The Recreation Trails, Scenic Waterways, and grant programs for local governments administered by the Oregon Parks and Recreation Department help increase access to water-based outdoor recreation and enhance stewardship of the state's waterways. The Oregon State Marine Board offers numerous environmental and recreation-based boating safety programs and often partners with other agencies such as the Department of Fish and Wildlife and Parks and Recreation Department. Some of these programs include:

- Water Wits, a K-12 curriculum with interactive lessons in boating, water safety, and marine stewardship
- Interactive Boat Oregon Map of public boating access facilities, launch ramps, boating obstructions, Certified Clean Marinas, pumpouts and floating restrooms, clear gasoline locations, rivers where personal watercraft (e.g., jets skis) are allowed, boating regulations, and boating waterways.
- Boating obstructions dashboard, maintained by the Oregon State Marine Board
- Nationally accredited boater education courses
- Free online paddling education and promotion of Oregon Water Trails
- Aquatic Invasive Species Prevention Program
- Clean Marinas
- Clean Boaters
- Oregon Department of Fish and Wildlife's Angler Education Program

Canoe at Agate Lake.
Credit: Kim Fritz-Ogren

Action 8D Identify Water Research Needs and Partnerships

The water resources sector will need to continue identifying ongoing research needs that could use assistance from undergraduate and graduate students, public and private universities, research institutions, and other partners. Partnerships between higher education and both the public and private sectors can result in innovative solutions for addressing water quantity and quality challenges.

Research collaboration between agencies and higher education may be mutually beneficial, as research institutions can bring innovative tools, technology, and other resources to the effort, while agencies can bring expertise in data, evidentiary and scientific standards, and management knowledge.

Several state and federal agencies offer internship programs for students to gain real-world experience. Business Oregon, for example, has an internship program that includes work in clean technology and renewable energy. Other agencies – the Department of Fish and Wildlife, Department of Forestry, and Water Resources Department – often provide summer internships or seasonal employment opportunities to support monitoring and assessment projects, or other field-based activities.

Some current and upcoming research needs that might be well suited for partnerships with higher education include:

- Prediction of water temperature through remote sensing (also see Action 1A)
- Research into the application of artificial intelligence (AI) into data processing (e.g., processing streamflow data) (also see Action 1C)
- Continued development of techniques to quantify ecological flow needs, particularly channel maintenance and pulse flows (also see Action 2A)
- Improved techniques for remote sensing of water use (also see Action 3A)

Action 8D
Identify Water Research Needs and Partnerships

Examples of how to implement this action:

- Continue to identify ongoing research needs at the local and state level
- Support partnerships with state and federal agencies, tribes, public and private institutions to address research needs
- Fund and/or participate in research initiatives
- Consider research initiatives that would address frontline communities' environmental and climate justice challenges

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CHAPTER 4

Objective 4: Meet Oregon's Instream & Out-of-Stream Needs

Oregon needs to further integrate and coordinate both the long-term planning and day-to-day management of Oregon's water resources among its natural resources and economic development agencies, at all levels of government. Key factors to consider include state-level and place-based water planning, wise water use and management, and the protection of ecosystems and public health. The Strategy's objectives of better understanding and meeting our water needs require adequate funding.

Chapter 4 describes several actions needed to adapt and mitigate for climate change and build a more secure water future for people and the environment.

Chapter 4 Actions at a Glance

Objective 4: Meet Instream and Out-of-Stream Needs

Critical Issue – Water Planning

9A Support Place-Based Integrated Planning and Other Water Planning Efforts
9B Coordinate Implementation of Natural Resource Plans
9C Partner with Tribes, Federal Agencies, and Neighboring States in Long-Term Water Resources Management
9D Improve State Agency Coordination
9E Lead Meaningful Community Engagement

Critical Issue - Water Use & Management

10A Improve Water-Use Efficiency and Water Conservation
10B Encourage Water Reuse Projects
10C Improve Access to Storage
10D Reach Environmental Outcomes with Non-Regulatory Alternatives
10E Provide an Adequate Field Presence
10F Strengthen and Improve Oregon's Water Quantity and Water Quality Permitting Programs

Critical Issue - Healthy Ecosystems

11A Improve Watershed Health, Resiliency, and Capacity for Natural Storage
11B Develop Additional Instream Protections
11C Prevent and Eradicate Invasive Species
11D Protect, Restore, and Provide Access to Instream Habitat for Fish and Wildlife
11E Develop Additional Groundwater Protections

Critical Issue - Clean Water

12A Ensure the Safety of Oregon's Drinking Water
12B Reduce the Use of and Exposure to Toxics and Other Pollutants
12C Implement Water Quality Pollution Controls

Critical Issue - Funding

13A Fund Development and Implementation of Oregon's Integrated Water Resources Strategy
13B Fund Water Resources Management Activities by State Agencies
13C Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Critical Issue | Water Planning

Water is a finite resource, and effective water planning is an important tool to help support sustainable management for present and future generations of people as well as fish and wildlife. Water planning and management is crucial for balancing competing demands, mitigating water scarcity, protecting public health and the environment, and building resilience to climate change. Done properly, water planning can also facilitate dialogue, negotiation, and cooperation among interested parties to resolve conflicts and promote equitable access for instream and out-of-stream uses.

Water planning can occur in many forms and at different scales. Place-based water planning was established as a permanent program in the Water Resources Department in 2023. Oregon currently has several water-infrastructure related planning tools (e.g., water management and conservation plans, Goal 11 facilities plans, water master plans, wastewater facility plans) but would benefit from more holistic and integrated water planning. Planning for streamflow restoration, conservation, and land management are also critical to improve our ecosystems. In the coming years, an effective statewide Strategy will require more extensive and integrated planning at the local or regional and state levels.

Action 9A Support Place-Based Integrated Planning and Other Water Planning Efforts

Forging partnerships between local communities and state agencies through planning offers a unique opportunity for the implementation of a wide range of recommended actions described in the 2025 Strategy. From land-use practices to natural resources management and emergency preparedness, communities are well-positioned to build trust, hold difficult conversations, and make progress on issues beyond what state agencies can do on their own.

Place-Based Water Planning

The 2012 Strategy tasked state agencies with creating a statewide framework for developing place-based integrated water resources plans. This resulted in the development of Draft Planning Guidelines that outline how communities can undertake place-based integrated water resources planning in partnership with state agencies. The process starts by building a collaborative and inclusive process among balanced water interests. Planning steps include characterizing water resources for the area and examining current and future instream and out-of-stream water needs. Ultimately, a Place-Based Water Plan is a hydrologically bound plan that includes a set of prioritized, strategic, and integrated solutions to meet multiple water needs.

Providing Financial & Technical Assistance - In 2015, the Oregon Legislature passed Senate Bill 266,[1] providing the Water Resources Department with authority to issue grants, enter into contracts or agreements, and provide technical assistance to pilot place-based integrated water resources planning. Following a funding solicitation process, four areas were selected to form planning collaboratives and develop place-based integrated water resources plans. These planning collaboratives have been able to leverage this funding to pursue significant in-kind and cash contributions from other funders and organizations.

Figure 4-1:
Key Draft Place-Based Planning Principles

- Locally-initiated and led collaborative process
- Voluntary, non-regulatory approach
- Includes a balanced representation of water interests
- Conducted in partnership with the state
- Addresses instream and out-of-stream needs, including water quantity, quality and ecosystem needs
- Utilizes an open and transparent process that fosters public participation
- Facilitates implementation of local solutions
- Builds on and integrates existing studies and plans
- Does not jeopardize existing water rights
- Recognizes the public interest in water
- Consistent with the principles in the Integrated Water Resources Strategy, and state laws and policy

In addition to providing planning and financial support, state agencies also provide technical assistance to the planning collaboratives. Several state agencies – primarily Water Resources, Fish and Wildlife, Agriculture, and Environmental Quality – contributed time and resources to the planning efforts to better integrate agency efforts at the local level. Many federal agencies, non-profits, private individuals, and foundations have also contributed resources, including staff, funding, and expertise.

Place-Based Water Planning continues to enhance inter- and intra-agency coordination and has improved access to agency data and information. The planning process has also created the space for sharing local knowledge and agency expertise about water issues. Continued investments are critical to ensure agencies can partner with communities and provide ongoing support.

Place-Based Integrated Planning Pilot Program

Consistent with the spirit of a place-based approach, the process and resulting plans reflect the unique characteristics of the areas they represent. Using a place-based water planning framework, the planning groups (Figure 4-2) brought together individuals and organizations representing instream interests (such as fish and wildlife needs and recreation), out-of-stream interests (such as agriculture, municipalities, domestic, and industry), as well as representatives from local, state, federal, and tribal governments.

These planning groups, in partnership with the State, continue to build the capacity to collaboratively solve water problems, improve coordination of existing information and plans, foster partnerships among different water sectors and water users, leverage public and private investments to maximize impact, engage the broader public in community conversations about water, and encourage continuous improvements in water planning and management. Place-Based Water Planning can help Oregon communities identify and develop widely supported project concepts that can meet multiple needs. Projects that are collaboratively developed and yield multiple benefits generally have a competitive edge for implementation funding.

Planning groups that formally adopt a plan can seek state recognition from the Water Resources Commission. Three planning groups – the Upper Grande Ronde, Lower John Day, and Mid-Coast – have successfully adopted an integrated water resources plan, receiving the Commission's recognition in 2022. Implementation is underway with federal funding through the American Rescue Plan Act. The Harney planning group took a slightly different planning approach due to pressing groundwater issues in the basin. The groundwater portion of the plan is complete, following an intensive groundwater study conducted by the US Geological Survey and the Water Resources Department. Partners are finalizing the surface water element of the plan and anticipate adoption and seeking the Commission's recognition in 2025.

Figure 4-2:
Pilot Place-Based Integrated Planning Groups

Upper Grande Ronde River Watershed Partnership
Convened by Union County. union-county.org

Lower John Day Place-Based Partnership
Co-convened by the Gilliam County Soil and Water Conservation District and the Mid- John Day/Bridge Creek Watershed Council. lowerjohndaypbp.com

Mid-Coast Water Planning Partnership
Initially co-convened by the City of Newport and the Water Resources Department. Other conveners include Gibson Farms and Seal Rock Water District. midcoastwaterpartners.com

Harney Community-Based Water Planning Collaborative
Co-convened by the Harney County Watershed Council and the Harney County Court. harneyswaterfuture.com

Action 9A

Support Place-Based Integrated Planning and Other Water Planning Efforts

Examples of how to implement this action:

- Promote success by continuing to support the places currently following the draft planning guidelines and as they develop integrated implementation plans
- Continue to provide financial and technical assistance to support collaborative water planning
- Develop or recapitalize funding pathways for plan implementation to achieve instream and out-of-stream objectives
- Promote peer-to-peer learning between communities pursuing collaborative water planning
- Refine planning guidelines, and implement process improvements
- Include public outreach and engagement activities to encourage participation by under-represented populations
- Consider OWEB Focused Investment Partnership model to support plan implementation
- Offer place-based planning training for interested people and community groups
- Support a range of local or regional planning efforts (e.g., OWRD administrative basin plan and rule updates, water management and conservation plans)

Independent Evaluation of Place-Based Water Planning - In 2021, the National Policy Consensus Center and Oregon State University's Cooperative Extension Program conducted an extensive independent evaluation of Place-Based Water Planning to document interested parties' perspectives regarding their experiences with the program as well as to suggest ways that the program could be improved. The Participatory Evaluation report highlights positive outcomes from the planning process, beyond simply creating a plan.[2] These included productive discussions between previously polarized water interests, increased local support for plan implementation, the ability to use the plan to leverage funding, identifying key data gaps, increased knowledge of water resources, and the establishment of an actively engaged water planning network. The report also highlights nine key lessons learned during the pilot and how place-based integrated water resources planning can be improved in the future.

The independent evaluation noted that the four planning groups and the core state agencies providing them with support, have invested considerable time, thought, and energy in putting the Legislature's vision for place-based planning into action. The journey to completed Plans has been neither easy nor short, but much learning, skill-building, and social network building has taken place on the part of the planning groups and state agencies. State agencies now have a much better idea of where there are key data gaps and what steps the agencies can take to help fill them. The pilot Place-Based Water Planning program established a solid foundation that the state and communities can build on and improves the likelihood that Oregon can achieve the Strategy's goal of meeting instream and out-of-stream water needs while also addressing water quantity, water quality, and ecosystem needs.

Regional Water Planning and Management Workgroup

In 2022, the State-Supported Regional Water Planning and Management Workgroup was formed, made up of diverse interests, Place-Based Water Planning participants, tribes, and agencies to develop a framework and path for state-supported water planning and management at the region and/or basin level. After holding facilitated discussions for a year, the workgroup made a set of recommendations to inform policy development, funding, and guidance around water planning and management as well as recommendations for the next generation of place-based integrated water resources planning.[3]

The workgroup report highlights the need to make significant investments in water planning to meet statewide goals and mandates for managing instream and out-of-stream water needs with a changing climate. Specifically, any state-supported regional water planning effort must be underpinned with the budgets and capacity needed to do this work at the state level and to meet this need, state leadership must prioritize and address the current

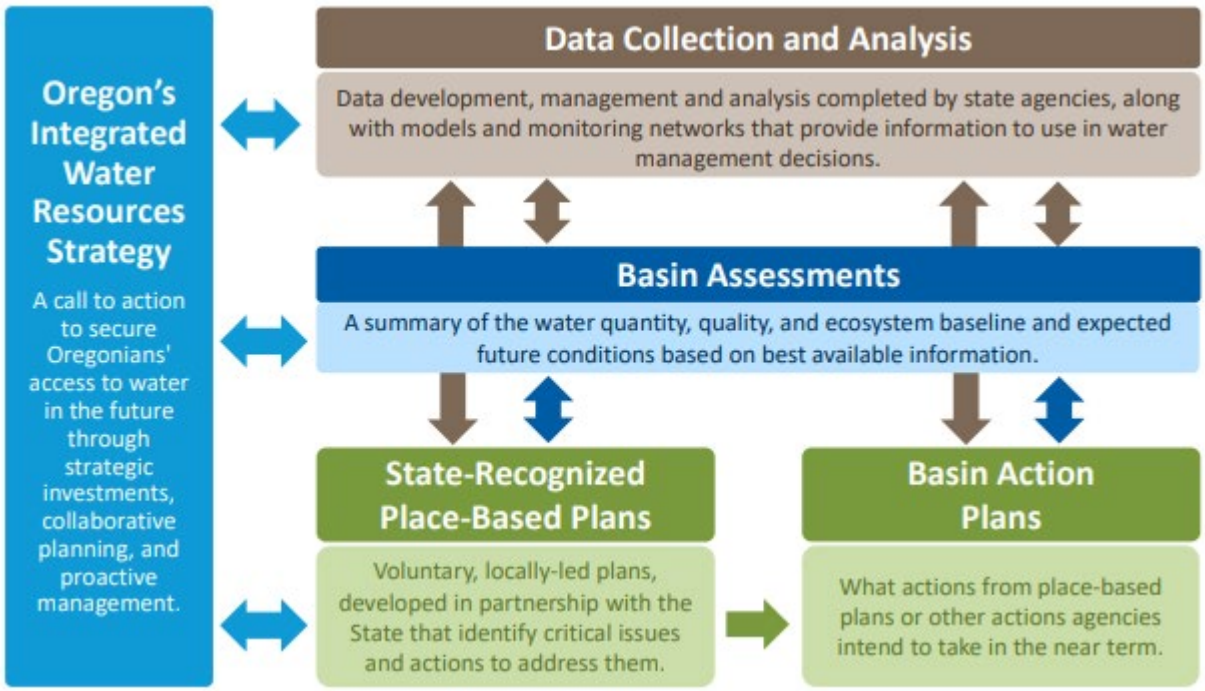
overarching system-level need for funding related to state agency data collection and analysis, agency capacity, and interagency coordination.

Next Steps for Place-Based Integrated Water Resources Planning - In 2023, the Oregon Legislature made the Place-Based Water Planning program permanent and allocated $2 million to the Water Resources Department to support place-based integrated water resources planning. Work is underway to incorporate the lessons of the pilot phase, the independent evaluation, and recommendations of the Regional Water Planning and Management Workgroup into a permanent program. To succeed, Place-Based Water Planning must be championed by local leaders, coordinated with state agencies, and supported by instream and out-of-stream interests. It will require new partnerships, creative approaches to problem-solving, a continued commitment to improved coordination and integration, and sustained investments of time and money from the public and private sectors.

Other Water Planning Efforts

Administrative Basin Planning - Many western states have made water planning at the regional level an essential component to further develop and periodically update statewide water plans. In Oregon, water planning was completed at the Water Resources Department administrative basin-scale and largely implemented through administrative rule adoption. However, this type of comprehensive river basin planning has not occurred in more than thirty years. Over the years, the Water Resources Department has been able to update some of its rules with minor revisions, but a more comprehensive update would require planning-level support and data (e.g., basin assessments). Oregon will need to consider this gap in basin-level water planning in tandem with next steps for place-based integrated water resources planning. Additionally basin-scale or regional assessments are essential for informing future updates to the Strategy, as directed in ORS 536.220, updated in 2023. The Water Resources Department published An Updated Scope for the Stewardship and Supply Initiative legislative report in September 2024 outlining the approach and resources needed to pursue statewide basin assessments. The report includes several helpful figures (see Figure 4-3) to explain the possible relationship between the Strategy and other planning and data efforts.

Figure 4-3: Possible relationship between the Strategy and other data and planning efforts



"Learning from other successful models, Oregon can implement best approaches to ensure water planning and investment decisions are strategic and coordinated across jurisdictions, and with public and private partners. This system can successfully combine a state-level framework with local and regional planning and flexibility."

.-100-Year Water Vision (2020)

Other Basin Planning - Other communities across the state are pursuing integrated water resources planning at the basin scale. Partners in the Deschutes River Basin are developing a comprehensive water plan for the basin that aligns with Oregon's place-based planning model, building upon years of extensive studies and collaborative projects and solutions. The State of Oregon, State of Washington, and Confederated Tribes of the Umatilla Indian Reservation co-led the development of the Walla Walla Water 2050 Plan. The Partnership for Lake Abert and the Chewaucan assessed collaborative possibilities in the Chewaucan Basin and is working on joint fact-finding and a shared narrative report. Many other places across the state are ready to engage in water planning.

Water Management and Conservation Plans - Water management and conservation plans, typically developed by larger public water suppliers, are planning tools that lay out steps to meet long-term water demands in the future. These plans can be costly and often small water systems lack the technical or financial capacity to develop these on their own. Providing funding to support development of municipal or agricultural water management and conservation plans could help those communities most in need.

Watershed Action Plans - Watershed Councils work with state and federal agencies, regional Tribes, and their local communities to develop watershed assessments and watershed restoration action plans that are guided by state and Federal aquatic species recovery plans. The watershed councils then seek grant funding and partnerships to implement the restoration actions and monitor the resulting improvements to habitat and water quality.

Focused Investment Partnerships - OWEB-funded Focused Investment Partnerships address ecological priorities by developing a strategic action plan that is then implemented through targeted restoration project investments. An example of a Focused Investment Partnership is the 2015-2021 Deschutes Partnership which has helped to restore stream flows and stream habitat conditions for salmon, steelhead, and resident trout in Whychus Creek and the lower Crooked River.

Action 9B Coordinate Implementation of Natural Resource Plans

One of the major challenges of taking on a regional, more integrated approach to water planning is that in any given basin, there are multiple parties and interests to convene. These include irrigation districts, municipal water providers, conservation districts, watershed councils, drainage districts, wastewater and stormwater utilities, local governments (counties/cities), and environmental groups. In addition to this list are the state, federal, and tribal natural resource agencies with water, land, or fish management responsibilities, and other public, private, and nonprofit organizations with an interest in water management and resource issues.

Within a basin or sub-basin, multiple state and local planning documents that involve water management, directly or indirectly, exist. These plans can be

Action 9B
Coordinate Implementation of Natural Resource Plans

Examples of how to implement this action:

- Dedicate resources to coordinate and reconcile existing planning documents
- Support local governments to update their local comprehensive land use plans with current natural resource information (e.g., Goal 5 natural resources)
- Support water management and conservation plan development in conjunction with local land use planning to achieve sustainable water use
- Dedicate resources for state and local implementation of existing plans
- Support the application of equity and social justice principals in plan reconciliation and updates

contradictory or complementary. Coordination of these plans will lead to improved collaboration, resulting in greater benefits for natural resources.

A few examples of plans include water management and conservation plans (by a municipal water provider or irrigation district); fish conservation and recovery plans; biological opinions; basin plans for water allocation; Total Maximum Daily Load plans for improving water quality; water system master plans; and many local implementation plans. There are also local land-use plans, watershed restoration action plans, and locally developed agricultural water quality management plans. Taken together, these plans and their respective strategies engage many agencies and entities at every level.

In envisioning a place-based approach to water planning, these existing plans and programs do not go away, but instead provide a baseline of information, history, and rules that must be integrated into the water plan. A place-based approach can help reconcile and implement the state's programs and plans more effectively. Any new water planning initiative should account for the time and resources needed to compile, review, and reference relevant tribal, federal, statewide or local natural resource plans.

Action 9C Partner with Tribal Governments, Federal Agencies, and Neighboring States in Long-Term Water Resources Management

Partnerships with tribes, federal agencies, and neighboring states continue to play an important and necessary role in Oregon's management of water resources. Oregon is home to nine federally recognized tribes, all of which have responsibilities for protecting and managing water resources. Federal agencies manage a large percentage of Oregon's landscape and Oregon shares groundwater and surface water, including three major rivers, with California, Washington, and Idaho.

State and Tribal Partnerships

The Strategy presents an opportunity to strengthen state and tribal government-to-government relationships. State agencies are directed by law to improve working relationships with the nine federally recognized tribes in Oregon. Agencies invite informal staff-to-staff coordination and formal government-to-government consultation on issues that may be of interest to tribes. If requested, agency directors engage in formal consultation with tribal leaders.

These consultations often revolve around cultural and natural resource issues, water needs and water rights, water quality monitoring, or watershed management, protection, and restoration. Tribal members are represented on various agency boards, commissions, and committees to provide perspective and guidance. A Consultation Task Force is currently developing standardized guidance for state agencies to improve the government-to-government processes.

Fisheries management is an area where state and federal agencies work closely with tribal governments. In the Columbia River Basin, the Oregon Department of Fish

Action 9C
Partner with Tribes, Federal Agencies, and Neighboring States on Long-Term Water Resources Management

Examples of how to implement this action:

- Protect tribal and state interests in shared bi-state surface water and groundwater basins
- Negotiate agreements such that water protected instream is shepherded across state lines to the mouth of the river
- Partner with neighboring states and tribes to continue or improve managing shared resources
- Carry out actions identified in the 2023 Tribal Water Task Force Report
- Coordinate with tribes on instream flow protection
- Conduct collaborative planning to develop water management approaches to protect species and avoid or minimize impacts to endangered or threatened species
- Identify who may benefit, or be impacted by, long-term water management approaches

and Wildlife works with the Columbia River Treaty Tribes (Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, and the Confederated Tribes and Bands of the Yakama Nation), the Shoshone-Bannock Tribe, state fish and wildlife agencies in Washington and Idaho, the U.S. Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration on a variety of fisheries management and fish production issues under the *2008 - 2017 U.S. v. Oregon, Management Agreement*.[4] The Agreement was developed and is being implemented under the ongoing supervision of the U.S. District Court.

To build upon existing working relationships with federally recognized tribes, the Oregon Department of Fish and Wildlife has entered into Memorandum of Agreements (MOAs) with several tribes to restore hunting and fishing opportunities and access for tribal members while increasing tribal sovereignty over management of fish and wildlife populations. The MOAs represent a voluntary, cooperative partnership to collaborate, share resources, and work as partners to develop and implement plans to protect, restore, and enhance fish and wildlife populations and their habitat within specific geographies of Oregon.

State and Federal Partnerships

The role of the federal government in natural resources management, land management, and therefore, water resources management is significant. The federal government manages 53 percent of all land in Oregon, including 60 percent of forestlands. Appendix A discusses the roles of key federal agencies with water-related responsibilities. State and federal agencies often work together on cooperative studies, such as groundwater basin studies, discussed in Chapter 1. Oregon also uses its Federal Consistency authority under the Coastal Zone Management Act to facilitate coordination between federal, state, and local authorities concerning federal actions in the coastal zone that have the potential to impact water resources.

The federal government also owns or manages key pieces of water infrastructure, including federal reservoirs that store water for irrigation districts, cities, industries, and landowners. Many federal projects also produce and sell power from several hydropower facilities in the Northwest. The U.S. Bonneville Power Administration manages mitigation programs to offset habitat losses associated with hydropower projects.

Biological opinions are developed by federal agencies, such as the U.S. Fish and Wildlife Service, and outline ways to reduce and minimize the effects of federally funded, authorized, or permitted actions on Oregon's species and critical habitats, making certain such actions don't jeopardize listed species or adversely modify critical habitat. Biological opinions can impact water operations and management, especially the use of stored water involving federally owned or operated reservoirs. Implementing actions in a biological opinion often requires close coordination and open communication with others, especially state agencies with water management, water quality, and fish and wildlife responsibilities.

In 2016, National Marine Fisheries Service issued a Biological Opinion stating the Federal Emergency Management Agency's implementation of the National Flood Insurance Program jeopardizes species and habitat protected by the Endangered Species Act. In 2021, the Federal Emergency Management Agency issued a Draft Implementation Plan to change how floodplains are protected, restored, and developed. State and local governments are being told they must adopt new standards, or they will be removed from the National Flood Insurance Program. This would impact the ability for these communities to qualify for federal disaster assistance or funding for federal projects in the floodplain. The Federal Emergency Management Agency has set a January 2025 deadline for communities to document compliance. This emerging issue will require staff resources, at the state and local level, to understand and respond to the impacts of the biological opinion and associated implementation plan.

Oregon Coastal Management Program – The National Oceanic and Atmospheric Administration funds and provides technical assistance for the Oregon Coastal Management Program, administered by the Department of Land Conservation and Development. The program supports local government management for hazard resiliency

and other water related issues including nonpoint pollution control. Many additional federal agencies contribute to managing Oregon's coastal resources.

Municipal Watersheds – Many municipal water supplies in Oregon obtain their water from watersheds at least partially owned by the federal government. This requires municipalities to protect federal Endangered Species Act-listed species in their water management decisions. For example, the Portland Water Bureau has a Habitat Conservation Plan that was developed in partnership with federal agencies to protect fish and other species in the Bull Run Watershed.

Deschutes Basin Habitat Conservation Plan – The Deschutes Basin is an area where irrigation interests and fish and wildlife needs have often been in conflict. Over 10 years ago, tribes, agencies, irrigation districts, and the public came together to forge a new approach to water management in the basin. The partners, led by the local irrigation districts, developed a Habitat Conservation Plan (HCP), which is a long-term plan that includes specific conservation measures to minimize and mitigate the effects to the covered species caused by the activity (managing water in this case). The Deschutes Basin HCP was finalized and approved by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service in 2020, and 2023, respectively. The HCP offers many practices to better align the water management operations with the life-history needs of covered species. The aquatic species covered by the U.S. Fish and Wildlife Service in this HCP include the Oregon spotted frog and bull trout. The National Marine Fisheries Service permit covers steelhead and sockeye salmon - all federally listed as threatened. The HCP has resulted in increased coordination across many interests which has helped the area navigate irrigation and wildlife challenges during consecutive years of drought.

Partnerships with Neighboring States

Oregon shares surface water resources with its neighboring states, including the Columbia River, Walla Walla River, the Snake River, and the Klamath River. It also shares significant groundwater aquifers with its neighbors, and coordinates data collection and sharing so that water managers on both sides of the border can manage the resource effectively. Oregon will continue to work with neighboring states to strive towards sustainable management of surface water and groundwater resources.

Oregon, Washington, the Confederated Tribes of the Umatilla Indian Reservation, and many others have come together to develop the Walla Walla 2050 Strategic Plan to guide integrated water resource management in the Walla Walla Basin. Senate Bill 1567 (2024) passed by the Oregon Legislature directs the State to work collaboratively with Washington and partner with federal agencies, tribes, and water users to manage water resources in the Walla Walla Basin. The bill closely matches a House Bill 1322 passed in 2023 by the Washington Legislature. An important implication of the legislation is that water protected instream in Oregon can cross state lines into Washington and remain protected from appropriation.

United States, Canada, and Tribes: Columbia River Management

The Columbia River Treaty between the United States and Canada was ratified in 1964, bringing significant management efforts for flood control and power generation benefits to both countries. In 2024, certain aspects of the treaty are set to expire. The United States and Canada re-initiated earlier negotiations to modernize the Treaty in 2018. The U.S. Army Corps of Engineers and the Bonneville Power Administration, the agencies responsible for implementing the Treaty on behalf of the United States, conducted a multi-year effort to study these post-2024 Treaty issues. The *U.S Entity Regional Recommendations for the Future of the Columbia River Treaty after 2024* recommends that the United States pursue a number of modifications to the Columbia River Treaty, along with some unresolved domestic matters.[5] The U.S. Department of State is now leading efforts for updating the Columbia River Treaty.

On September 27, 2023, a Presidential Memorandum by the Biden-Harris Administration made a commitment to honor the United States' obligations to Tribal Nations to protect and restore America's natural wonders for future generations, while also recognizing the important co-benefits that the Columbia River provides to communities and

businesses throughout the region. The Presidential Memorandum makes "healthy and abundant" salmon populations in the Columbia Basin an Administration Priority, and it directs agencies to review existing and necessary authorities to assure consistency and carry out the goal. It also directs agencies to develop funding needs, including reviewing budgets to identify any unallocated funding that might contribute towards the goal.

Columbia Basin Restoration Initiative - The Columbia River Basin, which once sustained 10- 18 million salmon and a wide variety of native fish, has experienced significant change in the past 150 years. Dams constructed on the Columbia and Snake Rivers and their tributaries have decimated salmon and other fish populations, pushing them towards extinction. Four Columbia River Treaty Tribes alleged that the federal agencies operation of the dams violates the Endangered Species Act and the National Environmental Policy Act because it causes too much salmon mortality. Litigation began in 2001 and settlement was memorialized in the Biden Administrations December 14, 2023 Memorandum of Understanding and Motion to Stay the NWF v NMFS litigation. During mediation, the four Columbia River Treaty Tribes joined Oregon and Washington to create a strategy for restoring abundant salmon and other fish species to the Columbia Basin. This strategy became known as the Columbia Basin Restoration Initiative.

In September 2024, Oregon's Governor signed Executive Order No. 24-28 "directing coordinated and transparent implementation of Oregon's commitments to the Columbia Basin Restoration Initiative and the Resilient Columbia Basin Agreement." The Executive Order identifies various state agency responsibilities.

Federal Columbia River System Operations - The U.S. Army Corps of Engineers, Bonneville Power Administration, and Bureau of Reclamation prepared an Environmental Impact Statement under the National Environmental Policy Act for the Columbia River System in response to changing conditions in the basin. The system is comprised of 14 federal dam and reservoir projects in Idaho, Montana, Oregon, and Washington. The final Environmental Impact Statement, released in 2020, documents the review and environmental effects of implementing the Selected Alternative, proposing a variety of structural and operational changes.

Oregon, California, and Tribes: The Klamath River

Representatives from Oregon and California, several federal agencies, tribal governments, counties, irrigators, and conservation and fishing groups signed the Klamath Basin Restoration Agreement[6] and Klamath Hydroelectric Settlement Agreement[7] in February 2010. The Upper Klamath Basin Comprehensive Agreement was later signed in 2014. These agreements set signatories on a path to comprehensive solutions for the Klamath Basin. However, Congress did not enact authorizing legislation and the Klamath Basin Restoration Agreement expired in December 2015 and the Upper Klamath Basin Comprehensive Agreement was terminated in December 2017.

The Klamath Hydroelectric Settlement Agreement has been amended twice and continues to be in place. The Agreement lays out the process for additional studies, environmental review, and a set of decisions by the Secretary of the Interior regarding the removal of four PacifiCorp dams. This decision set in motion the largest dam removal project in United States history. The Klamath River Renewal Corporation is a non-profit organization formed to carry out the dam removal. Four hydroelectric dams on the Klamath River, one in Oregon and three in California, were removed in 2024. Restoration following the dam removal is expected to continue for five to ten years. Over the next five years, there is a significant opportunity for the tribal nations, irrigators, and other interested parties in the Klamath Basin to consider integrating water rights and requirements under the federal Endangered Species Act. Doing so will require collaboration to consider reworking irrigation infrastructure and water management practices while also addressing species recovery.

Action 9D Improve State Interagency Coordination

Water-related responsibilities are distributed across multiple state agencies, making it critical that agencies coordinate to support one another's work. Agencies should seek to improve interagency coordination to ensure an efficient use of public resources. Agencies need communication tools to help tribes, the public, local government, and community-based organizations navigate state agencies.

Interagency Permit and Grant Review

Agencies utilize interagency permit review teams to enhance coordination and ensure permit conditions or limitations meet the needs of multiple agencies. The Departments of Environmental Quality and Fish and Wildlife contribute to water right permit review for the Water Resources Department, reviewing for impacts to water quality and fish and wildlife habitat.

Grants awarded for water acquisition, land acquisition, and habitat restoration projects often require review by multiple agencies. Some existing review teams include Oregon Plan Monitoring Team (for the Oregon Plan for Salmon & Watersheds), Oregon Watershed Enhancement Board Technical Review Teams, Water Resources Department feasibility study grants and water project grants and loans, and Business Oregon's process for awarding water infrastructure grants and loans.

Interagency Teams & Work Groups

Several state agencies perform monitoring activities, collect data, and have a need to share information to make timely decisions. The Oregon Stream Team represents many agencies with monitoring duties and has published a Monitoring Strategy to help guide these efforts. It is important to support work groups that provide for staff-staff coordination, as well as those that function at the leadership level. The Environmental Justice Council is a 13-member statewide council responsible for advising the Governor and natural resource agencies on EJ issues. The Water Core Team is made up of deputy-level representatives from approximately 15 state agencies that meet regularly to coordinate on water related policies and programs.

Implementing the Integrated Water Resources Strategy

Agency Strategy implementation requires coordinated efforts across many agencies. Many levels of agency staff need to be involved in creating, carrying out, and tracking activities included in Strategy biennial work plans. Agency budget processes should be used to coordinate funding requests needed to carry out actions.

State Agency Coordination Program

Twenty-five state agencies have a State Agency Coordination (SAC) Program, which is intended to assure that its "rules and programs affecting land use" comply with the statewide planning goals, and that agency actions are compatible with acknowledged city and county comprehensive plans and land use regulations. (See ORS 197.180, OAR 660-030 and OAR 660-031.) This process may identify a need for local governments to revise their local comprehensive plans. Most SACs were certified by the Land Conservation and Development Commission around 1990. Since that time, only the Oregon Department of Aviation and Oregon Department of State Lands have written a new State Agency Coordination Program. State agency coordination programs must be updated to keep pace with changes to statutes, rules, and the creation of new programs or authorities.

Action 9D

Improve State Interagency Coordination

Examples of how to implement this action:

- Update State Agency Coordination Programs in partnership with the Department of Land Conservation and Development
- Establish efficient procedures for cross-agency coordination and approval of relevant state agency permits
- Coordinate Strategy implementation, develop interagency biennial workplan for implementing Strategy actions
- Develop formal memorandum of agreement/understanding (MOA/MOU) between agencies to establish clear and transparent expectations for interagency cooperation where agencies share affiliated authorities/responsibilities
- Support new and existing interagency review teams or interagency work groups
- Create tools to help tribes, the public, local government, and community-based organizations navigate state agencies to address complex water issues
- Support the development and use of Oregon's Environmental Justice Mapping Tool
- Support interagency communication around community engagement (also see HB 3293 (2021))
- Support interagency coordination to implement water-related plans (e.g., Oregon's Natural Hazard Mitigation Plan, Oregon Plan for Salmon and Watersheds, etc.)

Action 9E

Lead Meaningful Community Engagement

Public engagement efforts for the 2025 Strategy, the 2023 Secretary of State Water Advisory Report 2023-04, 2022 State of Water Justice Report, 2022 Oregon Water Justice Framework, 2020 Oregon Water Futures Project Report, and the 2020 100-Year Water Vision effort all document water insecurities and inequities in Oregon. Oregon's tribes have been excluded from decision-making, where those same decisions have resulted in degradation of water resources and inability to meet their federally granted treaty rights. Issues across Oregon include inadequate infrastructure and drinking water quality, lead exposure in drinking water, affordability of water utility rates, inadequate water in the workplace, and climate change impacts. Populations experiencing related challenges include "frontline communities," or those that experience impacts "first and worst" and have fewer resources, capacity, safety nets, or political power to respond to water challenges. Oregon must find ways to equitably improve the safety, affordability, reliability, and availability of water for all.

Oregon's environmental justice and frontline communities are experts based on their lived experiences and this expertise must be centered in climate resilience and water planning work. However, common community engagement challenges such as resource allocation and trust-building with historically marginalized communities have limited meaningful engagement. The 2025 Strategy acknowledges that efforts must be made to enhance and expand community engagement to better identify workable solutions to improve water equity and security for everyone in Oregon.

> "Community leaders across Oregon have limited awareness of Oregon's water challenges, the urgency to act now, and potential water solutions.
>
> We can work with communities to build a culture and leadership that prioritizes water at the local, regional, and statewide levels."
>
> .-100-Year Water Vision (2021)

Figure 4-4: Environmental Justice Tools & Resources

The U.S. Environmental Protection Agency has developed an environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and an approach that combines environmental and demographic indicators in maps and reports. This screening tool highlights places that may have higher environmental burdens and vulnerable populations. EJSCREEN can also be used to support educational programs, grant writing, and community awareness efforts.

Oregon's Environmental Justice Council was created by the Legislature to help protect Oregonians from disproportionate environmental impacts on minority and low-income populations. The Council is developing a statewide environmental justice mapping tool to provide more detail than EJSCREEN. The mapping project is scheduled to be completed in 2025.

There are many reasons inequities around water exist. Oregon established a system to issue water rights which includes inherent inequities that cannot easily be resolved. Oregon relies on the doctrine of prior appropriation to issue new water rights. The doctrine dates back to the 1800s, when federal homesteading acts awarded "surplus" lands to primarily white settlers. Under common law, settlers initially appropriated and retained water rights as riparian landowners, but those rights were subject to the rights of prior appropriators. Concurrently, Tribes predating white settler occupation, in most cases by thousands of years, were removed forcibly from their native lands and relocated to reservations (1800s). Meanwhile, racist, exclusionary laws also prevented Black and mixed-race people from settling in the Oregon territory (1840s and 50s) and expelled Chinese migrants from Oregon altogether (1882-1943). In 1909 Oregon codified the prior appropriation doctrine for issuing new surface water rights, effectively grandfathering in existing water rights acquired through inequitable land acquisition laws and policies. Later, through the Ground Water Act of 1955, the state codified the prior appropriation doctrine with respect to groundwater allocation, further cementing the inequities of the prior century.

On the heels of codification of prior appropriation, Tribes faced more challenges with respect to retention of what are arguably the most senior of water rights. During the 1950s, many Tribes faced termination, stripping them of sovereign recognition and ending federal trusteeship over the reservations. With termination came the further loss of lands used for hunting, trapping, gathering, and fishing and any water rights that may have supported those uses. Beginning in the mid-1970s, some tribes have been restored to full sovereignty and are recognized federally again, but even so, many of the water rights associated with the original reservations have either been eliminated or diminished or remain under dispute. See Oregon Secretary of State, 2023, Advisory Report 2023-04, for more information about racial inequity and Oregon water rights.

Oregon's Environmental Justice Council is a resource for agencies to create authentic community relationships, design inclusive programs and projects, and communicate honestly with community members to create and sustain meaningful community engagement and public participation.

Oregon's Climate Equity Blueprint (2021) was developed as part of the 2021 Climate Change Adaptation Framework and helps state agencies center equity at the forefront of climate adaptation work, not as an afterthought. The Blueprint provides a set of best practices for agencies to apply an "equity lens" as they design state policies, processes, and programs to address climate change. The Blueprint provides solutions to common challenges regarding meaningful engagement, which have been incorporated into the example actions for Action 3C.

Six state agencies (Water Resources Department, Department of Fish and Wildlife, Oregon Health Authority, Oregon Watershed Enhancement Board, Department of Environmental Quality, and Business Oregon) have collaboratively developed and are pursuing rulemakings to recognize best practices in community engagement for water projects (Oregon Revised Statute 541.551). In 2024, Agencies published a report outlining the draft recognized best practices which represents input from many voices throughout Oregon. Draft best practices include:

1. Identify disproportionately impacted communities with interest in engaging in water project planning.
2. Define the water project purpose and goals, including what will be done to involve disproportionately impacted communities.

3. Develop new, or assess current, decision-making frameworks to identify opportunities to enhance access to the decision-making process for disproportionately impacted communities.
4. Invite tribal communities in Oregon to participate in the water project, acknowledging their preferences and capacity for collaboration.
5. Co-create water project capacity opportunities that are inclusive, including to disproportionately impacted communities.
6. Build collaborative relationships with disproportionately impacted communities and ensure all parties' voices are heard in the water project.
7. Coordinate with the community and across water project participants to leverage resources, staff, and data.
8. Ensure water project communications and information are shared in a timely, transparent manner, and in languages and formats commonly used or preferred by disproportionately impacted communities.
9. Evaluate community engagement effectiveness before, during, and after the water project, based on communities' and projects' purposes and goals as well as capacities, and adapt future projects as appropriate.
10. Strive to monitor and document the positive and negative impacts of the water project on disproportionately impacted communities and their environments.

Under Oregon law, all water within the state belongs to the public. Wise management and use of this precious public resource is a shared responsibility for all Oregonians. The choices we make impact the quantity and quality of water available today and in the future. The Water Resources Department is responsible for allocating Oregon's surface water and groundwater supplies to a multitude of instream and out-of-stream uses. The Department is also responsible for determining the amount of water available for these diverse uses in basins and aquifers throughout the state, relying on modeling and measurements of surface water and groundwater conditions to help make those determinations.

The Water Resources Department works with water right holders and domestic well owners to help manage their use. While the Department's focus is water supply, they work with other state agencies such as the Oregon Departments of Environmental Quality, Agriculture, Fish and Wildlife, and others, to manage Oregon's water in an integrated manner to meet diverse and often competing uses.

The state and water users partner to carry out water efficiency, reuse, and storage projects. State agencies provide technical assistance, permitting, regulation, compliance, enforcement, and in some cases funding, to support projects that steward our shared public resource.

Action 9E

Lead Meaningful Community Engagement

Examples of how to implement this action:

- Provide resources for capacity-building for community-based organizations
- Use accessible and inclusive engagement strategies
- Create opportunities for communities to identify and engage decision-makers
- Conduct outreach to invite underserved/under-represented populations to participate in planning activities
- Provide funding for agencies and organizations to sustain engagement over the life of a project
- Provide resources for facilitation and coordination, and staff experts in outreach and engagement best practices
- Use best practices for engagement as identified in the State of Oregon Diversity, Equity, and Inclusion Action Plan and other documents, including cultural and language-specific needs
- Use Oregon's environmental justice mapping tool and federal EJ Screen to evaluate potential impacted communities for state-led planning, engagement, policy development and management activities

Critical Issue | Water Use and Management

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Action 10A Improve Water-Use Efficiency and Water Conservation

One of the more widely recognized approaches to managing demand for water—and stretching supplies of water—is water conservation. Water conservation, as defined in state law, is a means of eliminating waste or otherwise improving the efficiency of water use by modifying the technology or method of diverting, transporting, applying, or recovering water.

This section notes many of the programs and funding resources that exist today and makes recommendations for improving access to information, incentives, and program participation. The next action, Action 10B, "Encourage Water Reuse Projects" addresses the water savings that might be gained from a reuse or recycled water project.

Water Conservation within the Home and Cities

Water conservation is a tool that can be implemented in any water use sector, and much has already been done to conserve water within our homes and businesses. Many municipalities have robust water conservation programs and resources for their communities. Replacing certain appliances, such as toilets, dishwashers, and washing machines with more water efficient models, adding faucet aerators to bathroom and kitchen sinks, or installing low flow showerheads to use less water are common activities. However, outdoor water use for residential or municipal irrigation (e.g., lawns, parks, and golf courses) provides a continued opportunity for water savings. The U.S. Environmental Protection Agency notes that outdoor water use accounts for more than 30 percent of total household water use, on average, but can be as much as 60 percent of total household water use in arid regions.[8] Water-saving technologies such as irrigation controllers, soil moisture sensors, and rain sensors can be incorporated into irrigation systems to improve their efficiency.

> "We can incentivize water conservation and reuse, and invest in modern water delivery systems statewide. Efficiency gains and updated systems will help improve water reliability for cities and counties, tribes, ecosystems, and the many aspects of a thriving economy that depend on water."
>
> -100-Year Water Vision (2020)

Municipalities or water utilities often provide residential customers with guidance or technical assistance to reduce

residential water use. Many water providers in Oregon offer rebates for the purchase and installation of water efficient appliances; some also provide shower timers and leak detection kits free of charge to homeowners and businesses alike.

WaterSense Program - WaterSense, a partnership program started by the U.S. Environmental Protection Agency in 2006, offers a quick and simple way to find water-efficient products and services. A WaterSense label means a product has been certified to use at least 20 percent less water, save energy, and perform as well as or better than regular models. Since the program's inception through the end of 2022, it has helped consumers save a cumulative 7.5 trillion gallons of water and $171 billion in water and energy bills. In Oregon, more than 40 organizations, including non-profits, drinking water providers, and various distributors promote WaterSense labeled products. [9]

The WaterSense program also provides tips for reducing outdoor water use for household irrigation. The WaterSense Water-Smart Landscapes Guide provides information about choosing native or drought-tolerant plants, supporting soil health, and proper maintenance.

Municipal Water Management and Conservation Plans – Some municipal water providers are required to prepare and submit a Water Management and Conservation Plan to the Water Resources Department, described in more detail in Appendix B. Examining conservation-based rate structures is a required element of Water Management and Conservation Plans. As a result, some water providers have modified their water rates, further driving down demands for water.

Water Conservation within Industry

Water conservation in business and industry not only saves money by using less water, it can also save on energy required to heat water and run equipment. In manufacturing operations, service and retail establishments, and other businesses, there are ample opportunities to use water efficiently. Just like in the home, water-efficient toilets, faucets, showerheads, clothes washers, and dishwashers used in the industry setting can save significant amounts of water.

Action 10A

Improve Water Use Efficiency and Water Conservation

Examples of how to implement this action:

- Establish a comprehensive water-use efficiency and conservation program that provides incentives and technical assistance to water users in all sectors
- Conduct a statewide water conservation potential assessment, considering high priority water management needs
- Prioritize and provide funding for agricultural water-use efficiency and conservation projects (often saving energy and supporting Action 4C)
- Develop or continue municipal incentives (e.g., xeriscaping rebates, metering, tiered rate structures)
- Develop an outreach strategy to expand participation in already-existing water-use efficiency and conservation programs
- Develop outreach materials, a user-friendly website, and online clearinghouse that highlights best practices, funding, and technical resources
- Ensure disadvantaged communities are not overburdened by mandatory or voluntary water conservation measures
- Borrow best practices and experience from energy efficiency programs in implementing water efficiency programs
- Partner with broadly supported well-developed energy efficiency programs that also save water (See Action 4C)
- Assess the value of establishing statewide efficiency standards
- Update state definition of "waste" for enforcement purposes

Water-intensive industries have an opportunity to use more efficient processes, or even recycled water (see Action 10B), for washing or flushing, in industrial processes, in chillers, and in cooling towers. Several water providers offer walk-through inspections to help commercial customers detect leaks or develop additional water-saving ideas. Some businesses also take the opportunity to convert their greenspaces to xeriscapes, or to install weather-based irrigation systems to improve irrigation efficiencies.

Water Conservation within Agriculture

Diverting an estimated 80 percent of the total water diverted in the state, agriculture is the largest user of water in Oregon, and therefore, offers the highest chance of conserving measurable amounts of water.[10] Statewide efforts should focus on increasing voluntary conservation and efficiency efforts in the agriculture sector. This could result in significant water savings statewide. Although there are several water conservation and efficiency technologies already in use by the agricultural community, there needs to be an increase in funding and incentive opportunities.

Many irrigators have worked extensively with both public and private sector partners to install and model some of the most modern water conservation techniques. These include more efficient irrigation systems, including weather-based irrigation systems, soil moisture controls linked to weather data and computer-controlled irrigation, drip irrigation, variable speed pumps that adjust to water-use needs, and piping or lining canals. Agricultural practices such as no-till, dryland, and/or regenerative agriculture, and permaculture strategies may also contribute to water conservation. Several irrigation districts, particularly in Central Oregon, have improved their water delivery systems through lining and piping projects to better manage water supplies. Many of these projects have been funded by the Water Resources Department's Water Project Grants and Loans Program, which may include dedicating water in-stream all or a portion of water savings due to infrastructure upgrades. The Farmers Conservation Alliance and Energy Trust of Oregon have also helped support the irrigation modernization and water conservation projects. The Oregon Watershed Enhancement Board administers a statewide irrigation modernization grant program that supports drought relief and resilience.

Crooked River pump station. Credit North Unit Irrigation District

The potential for reduced return flow or injury to other water users are also factors to consider when designing a water conservation project. Piping, lining, or other water efficiencies can greatly reduce the quantity and rate of return flows that traditionally make their way back to the stream or groundwater reservoir. However, return flows can also be a major source of nutrient, sediment, and thermal loading to waterbodies. Some Agricultural Water Quality Management Plans call for a reduction in return flows for that very reason. An alternative to piping irrigation canals may be covering them with photovoltaic panels to reduce evaporation and produce power. The North Unit Irrigation District was awarded $2.55M in 2024 in federal funding from the Inflation Reduction Act for the Main Canal Floating Photovoltaics Project. The North Unit Irrigation District will construct floating photovoltaic solar panels on the Main Canal of the Deschutes Project, serving as a case study to understand how the panels impact water efficiency and produce clean energy.

Several funding resources exist to help water users make water-use efficiency gains. The Bureau of Reclamation offers competitive WaterSMART Water and Efficiency Grants, providing grants for water and energy efficiency projects. Examples of past awards to Oregon irrigation districts have helped pay for piping or lining canals and ditches and installing telemetry systems and related micro-hydro projects.[11]Federal funding for this program has been enhanced through the Bipartisan Infrastructure Law, which designated $140 million for Water and Efficiency grants in 2023. Other funding sources are available from USDA's Natural Resources Conservation Service, Oregon Water Resources Department, and Oregon Watershed Enhancement Board.

Agricultural Water Management and Conservation Plans – Irrigation districts and other agricultural water suppliers may be required to prepare and submit a Water Management and Conservation Plan to the Water Resources Department, described in more detail in Appendix B. Application of appropriate conservation tools may also lead to an increase in available water supplies to better meet their patrons' crop demands. Irrigation districts with plans approved by the Water Resources Department can take advantage of certain statutory provisions that allow the transfer of water rights from one district user to another to prevent forfeiture of the rights due to non-use.

Allocation of Conserved Water Program – Described in Action 11B, Oregon's Allocation of Conserved Water Program allows a water right holder who plans to implement a water conservation project to legally use a portion of the conserved water on additional lands, while another portion is permanently protected instream. Examples of eligible conservation projects include lining or piping open or leaky canals or ditches, or changing from a less efficient water distribution system, such as flood irrigation, to sprinkler or drip irrigation. Irrigation modernization projects provide a valuable opportunity to legally protect conserved water instream.

Future Water-Use Efficiency and Conservation Programs

Water users in Oregon have many tools available to encourage water conservation and more efficient use of water resources. However, the state does not have a coordinated program to promote such tools. Developing such a program could include creating a user-friendly website, conservation materials for use by public and private partners, an on-line clearinghouse that highlights best management practices, funding, and technical resources. A clearinghouse could help water providers identify the potential for conservation and then design or improve their programs.

Conservation tools, such as those offered by the Alliance for Water Efficiency and the Water Research Foundation that help entities calculate the economic benefits of conservation programs, are good examples to feature in the clearinghouse. Having analytical tools easily available is of critical importance in determining the feasibility of investing in water efficiency and conservation programs. Lastly, because water and energy are so closely tied, water conservation goals and efforts should be coordinated with energy efficiency programs, see Action 4C.

Action 10B Encourage Water Reuse

Water reuse is the practice of treating "used" water (or effluent) and making it available for another beneficial use. Reusing water can be an environmentally sound way to manage graywater or wastewater while conserving surface water and groundwater supplies.

Reusing water can provide many benefits to both water quantity and quality and support drought mitigation and climate adaptation and resiliency. In general, recycled water places fewer demands on freshwater, leaving more water instream or in the ground for other uses. Municipal reuse can provide a benefit to water quantity by reducing the demand on drinking water. Municipal reuse for irrigation can support green infrastructure and maintain soil moisture, helping to mitigate the urban heat island effect. Irrigating and maintaining healthy green infrastructure during the summer months helps ensure it can provide important stormwater management functions during the wet winter months. Reuse for agricultural uses may reduce the need for surface water withdrawals, helping to maintain stream flows and support a variety of beneficial uses.

Reuse laws and permitting processes take into consideration potential environmental and public health impacts. See Action 10F regarding strengthening and improving water quality and quantity permitting processes.

Reuse projects often require expensive equipment and infrastructure with ongoing operations, maintenance, and energy needs. Potential projects must evaluate the costs and benefits, including impacts to water affordability.

Reuse Terminology

There are many terms used regarding wastewater treatment and reuse, and the use of some of these terms varies by state agency or local government. The national organization WateReuse provides the following descriptions for commonly used water reuse terms:

- *Reused water* - water that is used more than once and has been treated to a level that allows for its reuse for a beneficial purpose
- *Recycled water* - treated domestic wastewater that is used more than once before it passes back into the environment
- *Reclaimed water* - used water that has been treated to be fit-for-purpose for reusing or recycling

Agency Roles

Oregon's policies encourage the reuse of water, so long as the use protects public health and the environment. Several agencies, including the Oregon Health Authority, Department of Environmental Quality, Department of Fish and Wildlife, Water Resources Department, and Department of Consumer and Business Services (Building Codes Division), are all involved in different aspects of water reuse projects.

The Department of Environmental Quality is the lead agency in regulating the use of recycled water. The Department of Fish and Wildlife identifies potential impacts to fish and wildlife and instream flow targets from proposed projects.

Action 10B

Encourage Water Reuse Projects

Examples of how to carry out this action:

- Conduct a statewide assessment of the potential for additional water reuse, considering impacts, costs, and benefits to water quantity and quality, and management of water and wastewater systems
- Ensure that state agencies coordinate and communicate various policies, procedures, and regulations to facilitate reuse projects
- Provide incentives to increase and track water reuse
- Complete evaluation and updates of ODEQ and OWRD water reuse programs (see House Bill 2010 (2023))
- Develop technical assistance capacity to promote and inform water reuse practices and projects
- Develop and maintain adequate staffing to support increased utilization of state reuse programs
- Develop water reuse rules to ensure implementation of an effective and protective reuse program
- Connect reuse actions to the Water Management and Conservation Plan Program
- Explore opportunities for the state, tribes, and other interested parties to partner on water reuse projects
- Evaluate who benefits, or is negatively impacted by, reuse projects

The Water Resources Department refers to recycled water as "reclaimed" water. The Department determines whether the reclaimed water use will cause harm to other water rights; it also tracks the reclaimed water use in the Water Rights Information System database, noting the source of the water and where and how the water will be reused. The Water Resources Department has two exemptions in statute where a new water right permit is not needed for recycled water; when water is used for municipal purposes and when groundwater associated with an industrial or Confined Animal Feeding Operations permit is used for irrigation.

Types of Reuse

Three general categories of water reuse include:

- **The Use of Graywater –** Graywater refers to water from showers, baths, bathroom sinks, kitchen sinks, and laundries. Graywater can be reused for limited activities, such as subsurface irrigation, with minimal treatment. Homeowners and small businesses can reuse graywater for toilet and urinal flushing with the appropriate plumbing permit from a local building department. Outdoor reuse of graywater can occur by carefully planning reuse activities and obtaining a Water Pollution Control Facility graywater reuse and disposal system permit from the Department of Environmental Quality.

- **The Use of Domestic Recycled Water** – Recycled water refers to treated effluent from a municipal wastewater treatment facility. Oregon has approximately 340 wastewater treatment facilities and there are more than 120

municipal facilities operating recycled water programs throughout Oregon. Communities have been taking advantage of State Revolving Fund loans for developing and upgrading recycled water systems, with seventeen such requests in 2022 alone.

- **The Use of Industrial Wastewater** – Industrial wastewater refers to treated effluent from an industrial process, manufacturer or business, or from the development or recovery of any natural resource. An example of industrial wastewater is water derived from the processing of fruit, vegetables, or other food products. A more recent development in industrial wastewater is the water left over from use as cooling water in data centers throughout Oregon.

Although water reuse activities have been traditionally limited to non-drinking water purposes, a wide range of activities can occur, including irrigation of crops and pastureland and irrigation of urban landscapes. Cities commonly use recycled water to irrigate golf courses, athletic fields, and business parks. Recycled water can also be used for industrial cooling, dust control, street sweeping, and artificial recharge of groundwater.

Specific water reuse activities depend on the level of treatment and resulting quality. More reuse activities can occur with higher-quality water. As public awareness of water reuse benefits increase, additional innovative uses of water will become more common.

Recent Legislative Support

In 2023, the Oregon Legislature enacted provisions for expanding the application of reuse. The Department of Environmental Quality, in consultation with other state agencies such as the Water Resources Department, must submit a report to the Legislature in 2024 that addresses:

- Changes agencies can make to their internal policies, guidance, or processes to increase reuse
- Recommended changes needed to administrative rules, or new rules needed
- Recommended changes need to amend existing law, or new laws needed
- Programmatic needs to support access to water reuse and beneficial land application projects
- Technical assistance resources and incentives needed to support jurisdictions in evaluating and pursuing reuse and beneficial land application projects

Innovative Approaches

Direct-Potable Reuse – Direct-potable reuse refers to the treatment of wastewater to a quality high enough that it can be used for drinking water. The technology used to accomplish this treatment is often at the municipal scale and includes reverse osmosis or other membrane technology. Direct potable reuse projects can include piping highly treated water directly into a water distribution system or blending the treated water with raw water supply right before the drinking water treatment plant. States that commonly experience water supply shortages, such as Texas and California, have been using direct-potable reuse and other states are positioned to follow. In 2013, Texas became the first state to operate a direct potable reuse facility in the country.[12]

Regulations ensure that direct potable reuse projects manage risk to drinking water supplies and public health. Projects must comply with the Clean Water Act and Safe Drinking Water Act.

Environmental Restoration – Water recycling can support environmental restoration efforts or provide a co-benefit to the environment when restoration is not the primary driver for the project. Recycled water can recharge groundwater (see Action 12D) and has the potential to augment streamflows, supporting species that have been impacted by declining groundwater and low stream flows.

Fertigation – "Fertigation" generally refers to combined delivery of fertilizer in irrigation water. Oregon State University has been conducting studies on the use of wastewater effluent to fertilize crops, avoiding the need for chemical fertilizers. The technology used to treat and reuse the wastewater includes a two-stage hybrid membrane

filtration that would remove bacteria but keep valuable nutrients including nitrogen, phosphorus, and potassium. The studies will help determine if this technology is economically viable for use by farmers.

Action 10C Improve Access to Storage

The history of storing water in Oregon dates to the 1800s when projects consisted mostly of ponds or small dams across streambeds. As the state's population grew, so did the scale and purpose of these projects. Before long, developers and governments were building major dams and reservoirs to meet the increasing water demands for power production, flood protection, and out-of-stream needs during the dry summer months.

In Oregon today, there are more than 15,000 water rights authorizing the storage of surface water in reservoirs. Another 5,000 ponds were registered with the state in the mid-1990s. The Water Resources Commission adopted the state's water storage policy, identifying water storage as an integral part of Oregon's strategy to enhance public and private benefits from use of the state's water resources.[13] The policy acknowledges that both structural and nonstructural methods should be used in Oregon to store water, with preferences for storage that optimizes instream and out-of-stream public benefits and beneficial uses. In 1993, the Oregon Legislature codified the state's policy regarding water storage facilities, declaring it a high priority to develop environmentally acceptable and financially feasible multipurpose storage projects, and to enhance watershed storage capacity through natural processes using non-structural means (e.g., floodplain restoration). Watershed protection and restoration to improve natural storage capacity is addressed Action 11A.

Below-Ground Storage — Aquifer Storage and Recovery and Artificial Recharge

Oregon can improve access to groundwater storage by encouraging the increased use of Aquifer Storage and Recovery (ASR) and Artificial Recharge (AR) for water storage. The use of these techniques is gaining interest, particularly in the northwest and north-central regions of Oregon, due to the smaller environmental footprint, moderate cost, and potential associated benefits for water quality, compared to above-ground storage. Areas of Oregon designated as "groundwater limited" or "critical groundwater areas" may have greater capacity to develop ASR and AR projects.

Forming partnerships between different user groups, such as a municipality that treats water and an irrigation district needing an alternative source of water, could help meet the financial and water quality obligations for ASR injection, but risks and unintended impacts to water quantity also need to be considered.

Water that is treated to standards safe enough for drinking water is the only source water allowed for ASR projects. Direct injection of water also must be geochemically compatible with natural groundwater. This protects the groundwater resources, but can be an expensive standard to meet, particularly for non-municipal projects with large tracts of land. Grants for feasibility studies from the Water Resources Department have been used to explore potential aquifer storage projects. Business Oregon also offers an Aquifer Recharge Due Diligence Grant and Forgivable Loan Program.

The state has issued authorizations for approximately 20 ASR and 10 AR projects. Municipalities use aquifer storage to supplement their water supplies for their communities, as in the case of Baker City and the City of Beaverton. Farmers and ranchers use aquifer storage to supplement irrigation water during the summer months. A barrier to advancing AR/ASR projects includes a lack of Water Resources Department's agency staff capacity. Figure 4-5 compares both technologies.

Figure 4-5: Comparing Artificial Recharge and Aquifer Storage and Recovery Technologies

Category	Artificial Recharge (AR)	Aquifer Storage and Recovery (ASR)
Water Use	Primarily irrigation, industrial	Primarily drinking water
Recharge Method	Seepage systems, injection wells	Injection wells only
Water Quality Requirements	Recharge water cannot impair or degrade groundwater quality	Recharge water must meet drinking water standards
Water Rights	Permits required to appropriate source water and to pump recharged groundwater	Can use existing rights to store and recover the water
Oregon Revised Statutes (ORS) **Oregon Administrative Rules (OAR)**	ORS 537.135 OAR 690-350-0120	ORS 537.531 to 537.534 OAR 690-350-0010 to 690-350-0030

Identifying Potential Below-Ground Storage Sites – In 2009, the Water Resources Department created an inventory of potential below-ground storage sites.[14] Site-specific investigation is needed for the inventory to be useful, including consideration of local aquifer characteristics, infrastructure, water availability, cost-benefit relationships, water quality, and authorization requirements.

Above-Ground Storage — Reservoirs

Reservoirs have existed as a critical piece of Oregon's stored water landscape for many decades. They allow water to be captured and stored for later use, and some even generate hydropower. However, changing patterns of precipitation, snowpack, and heat have impacted the effectiveness of existing water storage systems. Reduced rainfall and snowpack are resulting in less water available for use during the high demand summer season, while earlier spring temperature increases and intensifying summer heat waves are increasing evaporation loss in reservoirs and further reducing supplies. These issues, combined with competing environmental demands, complicate considerations for new above-ground reservoirs.

In 2008, the Water Resources Department created an inventory of potential reservoir sites from past surveys conducted by different entities[15] The purpose of developing the inventory was to create a clearinghouse of storage information. Unfortunately, no attempt was made to assess the ecological or economic feasibility of these sites, so additional work is needed to utilize the inventory.

Federal Reservoir Systems – The U.S. Army Corps of Engineers (USACE) and the U.S. Bureau of Reclamation (USBOR) are key partners in the operation and management of key pieces of water infrastructure, including reservoirs used for power production, irrigation, and flood control.

Recently, the USACE completed a feasibility study, co-sponsored by the Water Resources Department, to determine the potential to use stored water from the Willamette Valley Project reservoirs for multiple purposes. The study was needed because demands on the basin's water supplies have changed significantly since the dams were constructed, due to increasing population, development, irrigation needs, and the listing of fish species under the Endangered Species Act. The study evaluated several options for reallocating storage space that could better meet water needs not only for irrigation—the only use allowed under existing water rights—but also as a source of drinking water for communities, industries, and instream flow needs for listed fish species in the basin.

In 2020, the U.S. Congress approved the reallocation of storage space, designating 69 percent for fish and wildlife, 21 percent for agricultural irrigation, and 10 percent for municipal and industrial uses. There is a strong interest and desire among agencies, basin partners, and others to contribute to a longer-term water management plan that optimizes the use of a shared resource for all uses of water, both instream and out-of-stream. To fully carry out reallocation, several steps need to occur, including additional consultation under the Endangered Species Act, a

water rights transfer, a new contracting process for municipalities and industries, as well as securing instream water rights to protect the release of stored water for fish and wildlife purposes.

Identifying Potential Above-Ground Storage Sites – As part of the Oregon Water Supply and Conservation Initiative (2008), the Water Resources Department conducted an inventory of potential above-ground storage sites. Most of these potential dam sites in the inventory are located on major stream channels. Since the time of these surveys, Oregon has moved away from locating dams on significant stream and river channels, in large part because of effects on fish and aquatic life that must migrate through these streams and water quality parameters such as temperature and dissolved oxygen. There has been very limited evaluation of above-ground storage sites that are located off-stream or at sites with little or no effect on fish and other aquatic life. Additional work is needed to locate and evaluate impacts of potential reservoir sites in locations that minimize impacts to ecosystems.

Action 10C
Improve Access to Storage

Examples of how to carry out this action:

- Encourage increased use of environmentally acceptable below-ground storage sites and practices
- Assess and make improvements to the Aquifer Storage and Recovery and Artificial Recharge Programs to promote and increase the use of this tool
- Carry out implementation of the Willamette Basin reallocation recommendations
- Investigate potential off-channel sites for environmentally acceptable above-ground storage projects
- Evaluate the status of storage infrastructure, including the maintenance and rehabilitation needs of reservoirs, and potential for expanding existing storage capacity
- Investigate the use of existing reservations of water during planning efforts
- Consider equity, environmental justice, and water insecurity in the prioritization of storage sites

Evaluating Storage Infrastructure – Oregon should evaluate the status of its existing storage capacity and infrastructure, including determining the maintenance and rehabilitation needs of dams. To improve access to stored water, Oregon should continue to support the Dam Safety Program and identify multipurpose ways to expand the capacity of existing above-ground storage projects—by raising a dam's height, removing sediment, or repairing dams where safety restrictions have required lower water levels. Fish passage and other environmental issues must be considered when evaluating raising a dam's height.

In some cases, sediment accumulation has reduced storage capacity and dredging may restore its original capacity. Reservoir owners should be aware that dredging activities fall under the State Removal Fill laws enforced by the Department of State Lands and requires a permit. Reservoir dredging is intended to restore the original capacity, not to increase capacity.

Evaluating Reservations for Storage – The 1987 Instream Water Right Act included a provision to request a reservation of water for future economic development (ORS 537.356 through 537.358). A reservation sets aside an amount of unappropriated water in some basins for storage to meet future needs. Although it assigns a priority date, it is not the same as a water right application or permit. For example, approval of a reservation does not mean that any future application will be approved, or that a reservoir may be constructed. Water users wishing to access reserved water must submit a water use application to the Water Resources Department, referencing the reservation. The Department then reviews the application based on current, applicable public-interest review standards and applicable basin rules regarding the reservation.

Reservations are in place in six basins: Grande Ronde, Hood River, Malheur, Malheur Lake, Owyhee, and Powder River, and are established by rule in basin programs.

Action 10D Reach Environmental Outcomes with Non-Regulatory Alternatives

Water conservation, storage, and reuse are a set of conventional tools for meeting water needs, used in conjunction with state and federal regulatory tools that protect water resources for future generations. We also need to consider non-regulatory and market-based approaches to meeting our collective and often competing demands for water and consider holistic strategies to meet water quality, water quantity, and ecosystem needs.

Potential solutions include voluntary actions by water users that often include funding and technical assistance from agencies. Oregon should continue to explore new alternatives and promote and expand existing programs.

Related Strategy Actions

Many actions already described throughout the Strategy require voluntary participation to provide positive environmental outcomes, and many require strong partnerships with senior water users. These programs and related Strategy Actions include:

- Water efficiency/conservation projects and allocation of conserved water, Actions 10A and 11B
- Aquifer Recharge (AR) and Aquifer Storage and Recovery (ASR) projects, Action 10C Ecological restoration on public or private property, Actions 11A, 11C, 11D
- Water transfers and leases, Action 11B
- Voluntary agreements among water users within one basin to limit water use, Action 11E
- Source water land acquisition, Action 12A
- Pesticide Stewardship Partnership participation, Action 12B

Conservation Reserve Enhancement Program (CREP)

The Conservation Reserved Enhancement Program (CREP) is administered by the U.S. Department of Agriculture Farm Services Agency and supports private-land conservation. This voluntary program pays farmers and ranchers to remove environmentally sensitive land from production, paying them an annual rental rate and other incentives. This is an important tool that can be used to pay to retire groundwater rights in basins where groundwater is overallocated. A CREP contract payment period is typically 10-15 years. In 2018, eligible partners expanded beyond individuals, state and tribal governments to also include non-governmental organizations such as non-profits, private companies, and foundations.

Conservation Stewardship Program (CSP)

The Natural Resources Conservation Service administers the Conservation Stewardship Program, paying agricultural producers to implement practices that benefit wildlife, improve soil health, reduce water quality impacts and reduce irrigation. The program can be used to fund innovative agricultural practices like multi-species cover crops or deep-rooted cover crops that break up compacted soil.

Action 10D
Reach Environmental Outcomes with Non-Regulatory Alternatives

Examples of how to carry out this action:

- Research and develop-voluntary, non-regulatory tools to meet environmental outcomes
- Continue to develop water quality trading programs
- Develop protocols for translating streamflow restoration into credits and accounting strategies
- Investigate and establish incentives for voluntary efforts to achieve positive environmental outcomes
- Make improvements to transfer processes and develop potential adaptive transfer tools, including instream leases and transfers
- Develop an outreach strategy for informing the public about non-regulatory alternatives
- Support agencies to provide technical assistance regarding voluntary efforts
- Develop a voluntary agreement framework (O.R.S. § 537.745) for groundwater right holders
- Partner with federal agencies with Conservation Reserve Enhancement Programs to permanently retire groundwater rights where groundwater resources are overallocated
- Identify community benefits from improved environmental outcomes

Water Quality Trading

The Oregon Environmental Quality Commission approved rules in 2015 establishing a voluntary water quality trading program to facilitate pollution reduction and protect the quality of Oregon's waterways. The rules provide clarity for regulated entities, the public, and Department of Environmental Quality staff.

Cities and utilities have utilized water quality trading to address temperature pollution challenges. The City of Medford partnered with The Freshwater Trust to establish leases with landowners to plant trees along the Rogue River. The City of Ashland implemented a similar project in the Rogue River basin, also in partnership with The Freshwater Trust. Clean Water Services implements a water quality credit trading program that includes flow enhancement and riparian planting activities. The Clean Water Services 2022 Annual Water Quality Trading Report said they had implemented 200 planting projects along streams in the Tualatin River Watershed that have generated a total of 614 million kcal/day of thermal credit since they established the program in 2004.

The Metropolitan Wastewater Management Commission of the Eugene-Springfield area partnered with The Freshwater Trust to implement a temperature project in the Willamette River basin. Streamside planting is expected to be completed in 2027.

The Deschutes Water Bank

The Deschutes River Conservancy has developed an expanded water bank program to help manage water resources in the basin. The Deschutes Water Bank provides a platform for both permanent and temporary voluntary water transactions among water users in the region. The goal of the Bank is to support flexible market-based opportunities to help address and balance complex water use and water management objectives. Example water transactions include permanent instream transfers, instream leasing, irrigation district "district-to-district" transfers, and mitigation banking.

Action 10E Provide an Adequate Field Presence

Several of Oregon's natural resources agencies have personnel in the field. Adequate field capacity is needed for data collection, inspections, technical assistance, and effective coordination between agencies and partners.

Field personnel are well positioned to work with local, state, and federal water managers, watershed councils, local planners, county commissions, and other entities in the community with responsibility for water. These individuals are also on the front lines of public education with broad and deep policy, technical, and legal expertise in their disciplines. They are the state's first responders to requests for technical assistance or information and an integral part of fulfilling the agencies' statutory authorities. The state's watermasters, biologists, water quality specialists, basin coordinators, and other field staff have a unique opportunity to strengthen ties and build relationships with local communities.

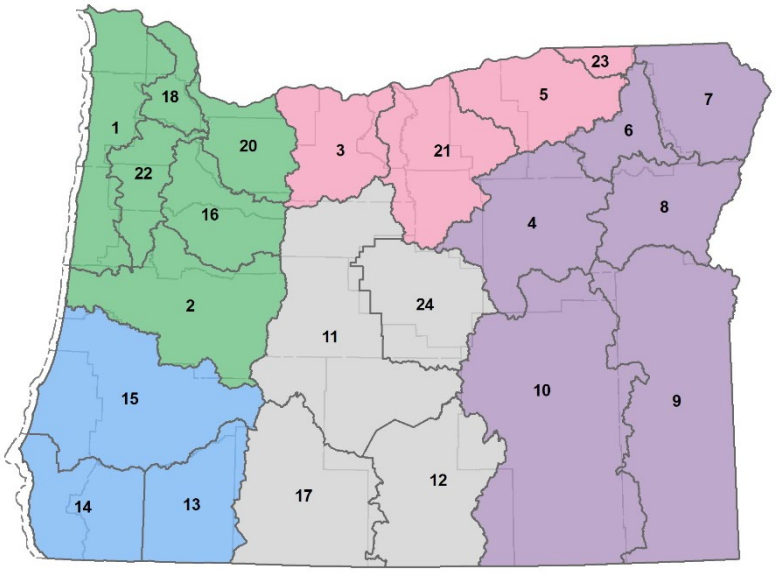
Data Collection - Field personnel collect data, including hydrological, biological, and chemical data. Field-related work also involves installing and calibrating water measurement and monitoring equipment as well as conducting instream flow studies.

Inspections and Enforcement – Field personnel protect public and environmental health through inspections and enforcement activities. Field personnel conduct site inspections, confirm compliance with permit conditions, guard against waste and contamination, inspect for hazards, and pursue enforcement actions when necessary. Inspection activities associated with dam safety are supported by Action 7C.

Partnerships between the Oregon Liquor and Cannabis Commission, the Department of Agriculture, Water Resources Department, and local law enforcement have been instrumental in identifying and halting illegal water use associated with hemp and marijuana growing operations.

Water Distribution – At the Water Resources Department, field personnel implement Oregon water law and the Doctrine of Prior Appropriation. Under the Doctrine, field personnel—the state's watermasters and assistant watermasters— are responsible for regulating and distributing water, curtailing the water use of junior water right holders during times of water shortage.

Figure 4-6: OWRD Watermaster Regions & Districts



The Department's limited number of field staff is noteworthy, given the large geographic territory and responsibilities (Figure 4-6). In southeast Oregon, District 10, has just two staff responsible for regulating and distributing water in an area covering 11,700 square miles, the largest district in the state. In northwest Oregon, the District 16 watermaster oversees several hundred dams of various sizes and configurations that need routine inspection and site visits. In this district alone, there are 14,700 water rights that authorize the use of groundwater, surface water, and storage for a variety of uses. The Department needs adequate field personnel to distribute and regulate water rights to protect instream and out-of-stream uses.

Action 10E

Provide an Adequate Field Presence

Examples of how to carry out this action:

- Review and assess agency staff workloads; establish priorities and seek efficiencies
- Improve regulatory tools, including updating laws, modernizing technology and enforcement tools, and providing (cross) training
- Improve the ability for field staff to conduct education and outreach within their districts; develop outreach materials to have on hand when interacting with the public
- Enhance all natural resources agencies capacity to conduct field studies and work directly with water users and conservation interests
- Support cross-agency communication to expedite regulatory enforcement
- Employ staff in rural and remote areas to respond to and assist more communities across the state
- Increase field staff capacity to build and maintain relationships with communities, community-based organizations, and farmworker advocates
- Provide access to training that addresses equity, environmental justice, and community engagement
- Develop culturally appropriate education materials

Support Needed for Field Personnel

Training – Investing in field activities means more than just increasing the number of staff, it also refers to investing in technical training and distribution of workload. There is a need for more advanced equipment and software. Utilizing new tools and technologies may require additional education, training, and certification. Agencies also see the benefit of cross-training staff in the field, so that employees are familiar with multiple issue areas and can assist in the work of other staff or even other districts.

Regulatory Tools – The legal and statutory framework underpinning agency activities needs to be up-to-date, clear, and responsive enough to keep up with modern day water use. Needs vary across agencies, but for the Water Resources Department, they include improving property access agreements and making enforcement tools more responsive. Communities where field presence is robust and public education is strong and consistent exemplify compliance with rules and laws. Areas of the state with a long tradition of regulation and partnership have higher rates of compliance, resulting in more timely and efficient water management.

Technology that is available to field staff (information, equipment, communications platforms, and transportation) must be efficient and accessible to be useful.

Coordination and Communication – Strengthening Oregon's field-based work will require financial investments in communications equipment, information platforms, and outreach materials. It also means researching more efficient ways to coordinate and partner with other agencies to carry out our shared responsibilities. The Department of Fish and Wildlife and Water Resources Department are examples of state-agency partners. Department of Fish and Wildlife field staff provide expertise on instream flow needs and can help prioritize streamflow restoration efforts, water use measurement projects, and voluntary initiatives or projects. Department of Fish and Wildlife staff determine potential impacts to fish, wildlife, and habitats from proposed allocations of water and can recommend conditions and/or mitigation to offset the impacts.

Watermasters Terra Kemper and Matt Anderson removing a defective gage station.
Credit: Garrett Steensland

Action 10F Strengthen and Improve Oregon's Water Quantity and Water Quality Permitting Programs

Several natural resources agencies in Oregon are engaged in water-related permitting. Just like the field staff described earlier, permit reviewers frequently answer calls or questions from water users, realtors, and others, conduct records research, and process case files. It is imperative that agencies have enough well-trained permitting staff in place to process requests in a timely, accurate manner.

For staff to be effective, improving and expanding staff training and interagency coordination is critical. Investments need to be made to update technologies, manuals, and procedures that continue to improve transparency, efficiency, permit application processing time, and consistency between sections of the respective agency. Interagency staff need access to accurate, quality data on which to design projects or base permitting decisions, supporting the need for continued development of the Oregon Water Data Portal. Staff also need appropriate communications resources to inform permittees about their permit conditions.

Water Quantity Permits

The Water Resources Department administers several water right programs, described in more detail in Appendix B. Staff are responsible for preparing, reviewing, and processing water use permits, limited licenses, temporary drought permits, permit amendments, extensions, transfers (temporary and permanent), certificates, instream leases, conserved water projects, hydroelectric permits, reclaimed water use registrations, among others. The Department oversees water management and conservation planning efforts of local entities and completes adjudication proceedings.

There is a need for the Department to also evaluate each permitting program to ensure that it is helping the Department to accomplish its mission to ensure sustainable water supplies for both instream and out of stream purposes. For example, the Department is currently evaluating ways to modernize and streamline the water rights application process.

Action 10F
Strengthen & Improve Water Quantity and Water Quality Permitting Programs

Examples of how to carry out this action:

- Expand staff training opportunities, including interagency trainings; provide adequate staffing
- Update technologies, processing manuals, and expand guidance documents for transparency
- Develop outreach materials and follow-up procedures to help water users understand the application process and permit, transfer, or extension requirements
- Develop a statewide mitigation strategy in coordination with relevant state agencies (DEQ, ODFW, OPRD, OWRD)
- Create stronger linkages among partner agencies
- Develop and implement a workplan to improve the quality and timeliness of individual National Pollutant Discharge Elimination System permits
- Regularly update Oregon's water-related permitting guide (formerly 2017 Strategy Action 2E)
- Improve the timeliness of water right transactions and reduce backlogs
- Modernize and create more efficient and user-friendly permitting processes while maintaining protections for public process and the environment
- Incorporate climate change forecasting into water availability analyses and permitting decisions (also see Action 1D)
- Develop programs and resources to support BIPOC farmers and business owners, as well as farmers and business owners for whom English is not a primary language, in obtaining and managing permits and other authorizations
- Improve resources for NPDES monitoring and permitting to help attain water quality that aligns with fish consumption standards for Oregon Tribes
- Support continued development of the Oregon Water Data Portal to provide interagency access to accurate, high quality water data for permits

Water Right Permits and Certificates - In Oregon, reviewing water right permits is done in partnership with other state agencies. The Oregon Departments of Fish and Wildlife and Environmental Quality regularly review new water use permit applications to ensure that the proposed use is not detrimental to fish, wildlife, and habitats and the use is consistent with existing water quality standards, as outlined in Department rules. In many cases, a new permit application can only be approved if it is conditioned in certain ways or mitigation is provided to offset impacts due to water quality and quantity already being impaired across much of the state.

Failure to meet some permit conditions cannot be rectified and can result in cancellation of the permit. Early, up front customer service at permit-issuance helps water users avoid later compliance issues.

The Water Resources Department was allocated $3 million of American Rescue Plan Act (2021) funding to work on water right related backlogs for the 2021-23 biennium. The Department focused resources on three major backlog areas: water rights, transfers, and reviewing claims of beneficial use for possible certificate issuance. Approximately $1.5 million of the funding remained unused at the end of the biennium, however the 2023 Legislature reauthorized the remaining amount to be used on backlog reduction throughout the 2023-25 biennium. Figure 4-7 shows the progress that has been made on reducing the three different types of permit and certificate backlogs.

Figure 4-7 Water Resources Department Backlog Reduction Efforts Between 2021 and 2024

Date	Water Rights	Transfers	Claims of Beneficial Use	Total
July 1, 2021	657	310	1220	2187
January 1, 2024	561	398	882	1841

Water Right Transfers - Having a water right certificate opens the door to other tools, such as transfers, that allow water users to change where their authorized water is diverted from, where it is used, or what it is used for. There is growing interest in the use of water right transfers to move water around to support out-of-stream uses, streamflow restoration, and economic growth. This interest is driven by the fact that most of the surface water in the state has already been allocated and securing additional water through a new water use permit is difficult. This is especially true for obtaining water during the summer, when instream and out-of-stream demands are high, and supplies are scarce.

The filing of transfer applications has steadily increased during the past twenty years, a growing trend in most western states. The program includes options for permanent transfers, temporary transfers, and instream leases. The Allocation of Conserved Water Program, discussed later in this chapter, is an innovative conservation tool available as part of the water right transfer program.

Water Quality Permits

The Department of Environmental Quality administers several water quality related permits and the Department of State Lands administers removal/fill permits. These programs need continued evaluation and support to improve permitting effectiveness. Permitting managed by the Department of Environmental Quality includes:

- National Pollutant Discharge Elimination System (NPDES)
- Water Pollution Control Facility (WPCF)
- Onsite Septic System
- Municipal Separate Storm Sewer System
- Section 401 Certifications
- Underground Injection Control
- Graywater Reuse and Disposal System

Critical Issue | Healthy Ecosystems

Responsibility for managing, stewarding, protecting, and restoring Oregon's ecosystems falls to all Oregonians across a broad range of local, state, federal, and tribal agencies, as well as on private landowners, interest groups, and local organizations. Oregon has a rich history of work in this area, using numerous tools and institutions to help address and improve ecological conditions. Chapter 2 described the actions needed to support measurement and monitoring efforts and better define instream and ecosystem water quantity and quality needs. This "Healthy Ecosystems" section describes five actions to protect and improve ecosystem function and climate resilience. Actions address improvements needed in watershed protection and restoration, instream habitat and fish passage, instream flow protections, invasive species eradication, and groundwater protections. Protection, restoration, and responsible management of ecosystems offers the additional benefit of climate mitigation.

Oregon's Ecosystems Provide Critical Benefits

Generally, the term "ecosystem" refers to a system of interdependent relationships between organisms and their surrounding environments. Healthy ecosystems provide a wide variety of benefits to Oregon's fish and wildlife as well as our communities. Oregon's ecosystems provide high quality water, carbon sequestration, flood control, fish and wildlife habitat, and productive soils while sustaining economically viable activities such as farming, ranching, fisheries, timber harvesting, power generation, and outdoor recreation.

By degrading or neglecting the natural functions of ecosystems, we risk jeopardizing the fish and wildlife that depend on these systems as well as our own quality of life. Ecosystem degradation subsequently results in a need to engineer unnatural solutions that attempt to mimic ecological functions, often at a great expense that yields a lesser quality function. For instance:

- Fish and wildlife populations are more expensive to maintain through restoration actions and hatchery operations than through the maintenance and protection of natural habitat and watersheds that provide clean, cold water;
- It costs far more to obtain drinking water when treated by a multi-million-dollar facility than maintaining a relatively healthy watershed that naturally provides a clean source of water;
- Flooding is far more frequent and costly when waters cannot be well absorbed by the physical environment and wetlands or stream floodplains cannot attenuate flood waters; and
- Crop production costs are higher when soil productivity is compromised.

Habitat & Ecosystem Functions

Flowing Water and Riparian Areas – Flowing water habitat includes all naturally occurring freshwater streams and rivers, including perennial, intermittent, and ephemeral streams and rivers, as well as springs and seeps. These systems support a wide variety of species, including fish, invertebrates, amphibians, birds, plants, and algae. Human activities such as constructing dams, deepening, widening, or straightening stream channels has had the unfortunate impact of degrading habitat and water quality. Methods to enhance the amount of water remaining instream are discussed in Action 11B. See Action 11D for recommendations regarding improving flowing water (e.g., stream) habitat including stream channel restoration and fish barrier removal.

Riparian areas are plant communities located in a zone of transition from an aquatic ecosystem to a terrestrial ecosystem, often containing a mix of trees and shrubs adjacent to a stream or river. Riparian areas provide important functions like bank stabilization, shade to keep water cool for fish, filtration of runoff before it enters the stream, and habitat for many species. Riparian habitats directly affect natural water storage, hydrology, water quality, water temperature, and habitat quality through their ability to hold and slowly release water, filter and

biologically process nutrients, and provide shade and habitat. Riparian ecosystems are dependent upon surface or subsurface water through the zone's soil-vegetation complex to support their overall health.

Oregon should continue encouraging efforts to prevent further degradation and improve riparian conditions through enforcement of existing regulations and voluntary restoration, such as the efforts conducted under the Oregon Plan for Salmon and Watersheds[16], Oregon's Agriculture Water Quality Management Plans[17], Forest Practices Act[18] and Riparian Lands Tax Incentive Program[19].

Floodplains - Floodplains are diverse habitats, adjacent to a river, stream, lake, estuary, or other water body that is subject to flooding. These areas, if left undisturbed, act to store excess floodwater which can protect downstream property from flooding and release water slowly, later in the year. They also provide valuable habitat for fish and wildlife. In the Willamette River Basin, flood control modifications have largely disconnected the Willamette River from its braided channels, oxbows and sloughs—wetland types that are remnants of its historical river channel. This fundamental disconnect in the valley's hydrologic regime has changed the character of the valley's floodplain and wetlands and greatly altered their storage, filtration, and habitat functions.

Reconnecting rivers and streams to their floodplains; restoring stream channel location and complexity; removing dikes and revetments; allowing seasonal flooding; restoring wetland and riparian habitats; and removing priority high-risk structures within floodplains[20] and other actions described in Oregon's Conservation Strategy can restore floodplain functions.

Wetlands - Wetlands are distinct ecosystems that are flooded or saturated with water either temporarily (seasonally) or permanently. They provide valuable functions such as nutrient cycling, water storage, reduced flooding, clean water, recreation, and support a high diversity of microbes, insects, amphibians, birds, and other species. Wetlands can be found in wide variety of locations, within floodplains, isolated in uplands, or near the ocean.

Large wetlands in Oregon, such as the Klamath Basin National Wildlife Refuge Complex and Malheur Wildlife Refuge support continental bird diversity by providing habitat for migrating species. In southern Oregon, the Lower Klamath National Wildlife Refuges' shallow marshes, open water, and grassy uplands support one of the most biologically productive refuges within the Pacific Flyway migration route. Approximately 80 percent of the flyway's migrating waterfowl pass through the Klamath Basin on both spring and fall migrations.[21] The refuge provides habitat for 25 species of special concern listed as threatened or sensitive by California and Oregon.

Land development has changed Oregon's landscape, eliminating and degrading wetlands and waters. Oregon has lost about 40 percent of its original wetlands. The U.S. Fish and Wildlife Service estimates that Oregon has 1.4 million acres of wetlands today, compared to about 2.3 million acres of tidal and non-tidal wetlands that covered the same area in the late 1700s.[22] A 2024 U.S. Fish and Wildlife Study reports that under a high sea level rise climate change scenario, all salt marsh is predicted to be lost in Oregon by 2100.[23] Oregon must protect our remaining wetlands through rigorous permitting (e.g., Department of State Land's Removal-Fill permitting) and conservation on public and private lands. The state must also restore degraded wetlands to regain water storage capacity and other hydrologic benefits and support the many declining species reliant on these ecosystems.

Estuaries - An estuary is a zone of transition between the marine-dominated systems of the ocean and the upland river systems, a zone which yields one of the most biologically productive areas on Earth. Estuaries provide important habitat for many fish and wildlife species for rearing, nesting, foraging, and as a migration route. They also provide valuable flood attenuation, an important consideration under climate change scenarios that predict sea level rise and more frequent coastal storms. Numerous species can be found in Oregon's estuaries, such as salmon, herring, flounder, crabs, oysters, clams, ducks, geese, shorebirds, and harbor seals.

There are 22 major estuaries in Oregon. Although most estuaries along the coast are relatively small, the Columbia River estuary at Astoria is the largest in area at more than 80,000 acres. Some of the issues affecting the health of Oregon's estuaries include increased sedimentation and nutrient loading, introduced nuisance and invasive species, recreational and development pressures, and low freshwater inflows. Climate change and increased demand for out-of-stream uses will further impair freshwater inflow, impacting the salinity gradient, sedimentation, and nutrient loading of the estuary, and, therefore, the productivity of fish, shellfish, and other estuarine life. Managers along the West Coast are also concerned about how sea-level rise and ocean acidification will alter estuaries and impact threatened species.[24] Some communities are restoring tidal inundation to estuarine lands to build resiliency for coastal sea level change and tidal flooding.

Forests - Oregon's forests help filter drinking water, keep water cool, provide habitat for diverse animal and plant species, supply oxygen, moderate temperatures and rainfall, store atmospheric carbon, and support Oregon's economy. Healthy forests promote soils that provide natural filtration to keep streams clean and water quality high. Nearly 50 percent of the state, or 30 million acres, is classified as forestland.

Most of Oregon's municipal water systems rely on water that originates from forestlands, including those managed for wood production. At the state scale, data collected from the Department of Environmental Quality's ambient monitoring network indicates that public forestlands have the highest percentage of excellent or good water quality sites, compared to agriculture, urban areas, rangelands, and mixed land uses.[25]

Forests are part of the essence of Oregon, and our waters benefit from their sound management. However, many federal forestlands, particularly in drier regions, have massive ecological restoration needs. The rising expense of owning forestland and the land's growing value as real estate increases economic pressure to sell private forestland for development. As forests are converted to other uses, this leads to habitat fragmentation and displaces the species that rely on forest ecosystems. Increased home density within forested areas, coupled with increased wildfire risk from climate change, elevates the need for restoration actions that address fire mitigation.

Forest diversity can offer a range of benefits when land managers account for values such as wood production, aesthetics, recreation, habitat, water quality, and clean air. The Forestry Program for Oregon emphasizes the importance of efforts to maintain healthy, resilient, and functional forested areas, in part, for the benefit of water resources.[26] Keeping forests as forests, however, requires public support, investment, and resource protection policies that make continued forest ownership an economically viable alternative to conversion.

Twin Lake near Hells Canyon, Oregon. Credit United States Forest Service

Oregon's Ecosystems Support Economic Health

Oregon's ecosystems sustain economically viable activities such as farming, ranching, fisheries, timber harvesting, power generation, and outdoor recreation, while providing high quality water, carbon sequestration, flood control, fish and wildlife habitat, and productive soils.

Navigation - Oregon's waterways have long served as important routes for travel and trade. According to the American Society of Civil Engineers (ASCE) Infrastructure Report Card,[27] Oregon boasts 680 miles of inland waterways, ranking 15th nationally. Many of the agricultural products grown in Oregon and elsewhere in the United States move down the Columbia River by barge. Instream flows sufficient for navigation facilitate ocean-going and river-going commerce and promote economic activity at ports and cities throughout Oregon.

Water-Related Recreation and Tourism - The focal point of many recreational activities in Oregon is often a river, waterfall, lake, wetland, or snow-covered mountain. Water resources offer opportunities for skiing, boating, kayaking, rafting, canoeing, camping, hiking, fishing, and observing wildlife, all of which greatly contribute to Oregon's economy. In their 2020 analysis, Earth Economics[28] estimated that all outdoor recreation in Oregon generates $15.6 billion annually in consumer spending, and supports 224,000 direct jobs—$9.3 billion in wages and salaries.

Many of Oregon's counties receive a significant boost to their local economy from those who travel to participate in fish and wildlife recreation activities. The economic value of fish and wildlife recreation is one of the many reasons for protecting water instream for the benefit of future generations.

Many of the state's day-use parks and overnight camping facilities reside along rivers and lakes. The Oregon Parks and Recreation Department manages more than 250 properties that include day-use areas and overnight camping facilities available for public use. Each year, these facilities[29] host over 50 million daytime visitors and 3 million campers.

Boating and kayaking are popular recreational activities as well, with more than 159,000 recreational boats in the state.[30]According to the Earth Economics analysis of outdoor recreation in Oregon, in 2019, boaters spent over 6.8 million activity days power boating, over 650,000 activity days canoeing, kayaking, rowing, or tubing, and over 500,000 activity days on personal watercraft (jet skis, etc.). Boaters divide their time evenly between rivers and lakes/reservoirs. The Columbia and Willamette Rivers are the most popular rivers, and Lake Billy Chinook, Brownlee Reservoir, Detroit Lake, Wallowa Lake, Prineville Reservoir, and Diamond Lake are the most visited lakes and reservoirs.

Fisheries - Healthy fisheries support the traditional and cultural identity of many Oregon communities. Northwest tribal communities, for example, rely on salmon and other fish species as a major food source and a foundation of life, culture, economy, and spirituality. Because of Oregon's collective interest in the health of its fisheries, management responsibilities are shared among state, federal, and tribal agencies.

Adequate instream flows are necessary to support tribal treaty rights and Oregon's recreational and commercial fisheries. Native fish such as salmon, steelhead, and trout are an Oregon icon and support a vigorous recreational and commercial fishing economy. In their 2020 analysis of outdoor recreation in Oregon, Earth Economics reported that in 2019, anglers spent over 3.5 million activity days fishing Oregon's waters. The Recreational Boating & Fishing Foundation[31] reported that, as of 2019, the number of anglers in America aged 6-years or older reached 50.1 million, accounting for approximately 1/6 of all Americans.

Hatcheries - The construction of dams, beginning in the 1800's, has had negative impacts to fish populations, leading to the construction of fish hatcheries to mitigate fish losses and augment fisheries. The need for hatcheries continues today, with hatcheries distributed across the state.

The Oregon Department of Fish and Wildlife operates more than 30 hatcheries and several rearing ponds statewide. Five of the hatcheries include tribal co-management. These facilities raise salmon, steelhead, and several species of trout. Hatcheries play a vital role in the state's overall efforts to maintain healthy fish populations and supplement recreational and commercial harvests. Each year, the state raises and releases 45 million fish on average from hatcheries. Clean, cold water is critical for the proper functioning of these facilities.

Action 11A Improve Watershed Health, Resiliency, and Capacity for Natural Storage

Ecosystem resilience is the capacity to absorb and adapt to disturbance and change—while maintaining essential functions. Healthy water resources are directly related to the resiliency of an ecosystem. Oregon's floodplains, rivers, riparian areas, wetlands, estuaries, forests, and other uplands provide essential habitat for fish and wildlife and valuable benefits for humans. These places have been modified to support human needs including flood control, irrigation, navigation, hydropower, recreation, and land development and use. Watershed protection and restoration is needed at many scales, including uplands and lowlands, to improve degraded habitat, restore resiliency, improve water quality, and increase capacity for natural storage. While this Strategy action addresses the need to improve watershed health, the next action, Action 11D, specifically addresses instream habitat improvements including fish passage.

This section describes existing statewide planning documents guiding ecosystem protection, restoration, and recovery. Actions outlined in these documents are voluntary, so success may depend on such components as public-private partnerships and a variety of funding sources.

The Oregon Plan for Salmon and Watersheds

The Oregon Plan for Salmon and Watersheds (the "Oregon Plan"), is a statewide initiative launched in 1997 to help restore healthy watersheds that support the economy and the quality of life in Oregon. The Oregon Plan has a strong focus on salmon, largely because of the significant cultural, economic, and recreational importance to Oregonians—and because they are important indicators of watershed health. The Oregon Plan makes recommendations to improve water quality and quantity and to address factors that contribute to declines in fish populations and watershed health. Many of these measures are voluntary and depend upon the willingness of private citizens to implement restoration projects. These voluntary measures continue to be fundamental to the success of the Oregon Plan.

Landowners and other private citizens, community organizations, interest groups, and all levels of government come together to organize, fund, and implement these measures in a coordinated manner. Oregon's watershed councils, soil and water conservation districts, land trusts and water trusts assist landowners with projects and lead restoration and land and water protection efforts in many watersheds throughout the state. The Oregon Plan has bolstered interagency and state-federal coordination and collaboration.

> "We can increase investments in watersheds to store, filter, and deliver water for fish and wildlife."
>
> -100-Year Water Vision (2020)

Along with the Oregon Watershed Enhancement Board, several state agencies, federal agencies, and non-profit organizations provide financial assistance for these restoration projects. The U.S. Department of Agriculture's Natural Resources Conservation Service, U.S. Bureau of Land Management, National Fish and Wildlife Foundation, the U.S. Environmental Protection Agency, the U.S. Forest Service, the U.S. Fish and Wildlife Service, NOAA Fisheries, and the Oregon Departments of Fish and Wildlife and Environmental Quality are actively funding watershed restoration projects. As part of its responsibilities, the Bonneville Power Administration funds regional efforts to protect and enhance fish and wildlife populations affected by federal dams in the Columbia River Basin. Other state agencies may administer programs or undertake actions that help advance the work of the Oregon Plan.

Future conservation efforts will be enhanced by continuing to implement and build upon the successful collaborative efforts of the Oregon Plan for Salmon and Watersheds, and other relevant documents including the Oregon Conservation Strategy, Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program, Conservation and Recovery Plans and Biological Opinions, and water quality implementation plans. The Integrated Water Resources Strategy should be used to strengthen and forge new partnerships.

The Oregon Conservation Strategy

The Oregon Conservation Strategy was developed in 2006, for the goal of maintaining healthy fish and wildlife populations by maintaining and restoring functioning habitats, preventing declines of at-risk species, and reversing declines where possible. The Conservation Strategy is revised every 10 years, with the next updated version available in 2026. The Oregon Department of Fish and Wildlife leads the implementation of the Conservation Strategy.

The Oregon Conservation Strategy takes a non-regulatory, statewide approach, while recognizing that conservation issues vary by region and must be tailored to the unique needs of the fish, wildlife and human communities that coexist. The Oregon Conservation Strategy engages citizens in addressing Oregon's conservation needs by offering recommended voluntary actions and tools and encourages monitoring key species and attributes of ecosystems as well as measuring the effectiveness of conservation actions.

The Conservation Strategy has several components, including identifying key conservation issues (e.g., climate change, water quantity/quality), conservation opportunity areas, and 294 strategy species of greatest conservation need.

A Restoration Tool – Beaver Modified Landscapes

American beaver (*Castor canadensis*), Oregon's state animal, are common to Oregon's riparian areas and waterways (rivers, streams, lakes, ponds, marshes, and wetlands) where they have an ample supply of food and year-round water flow for shelter and protection from predators[32]. Beaver-modified floodplains and wetlands can trap sediment, filter or bind excess nutrients and toxic chemicals, thereby improving water quality. The sponge-like properties of these floodplain-wetland habitats may also reduce the severity of drought, wildfire, or flooding events.[33] Many planning and conservation efforts have identified the importance of beaver and beaver-modified habitats (e.g., beaver dams, pools, and wetlands) for Oregon's state sensitive and federally listed fish and wildlife species in a changing climate[34,35,36,37,38,39,40,41]. In 2023, the Oregon Department of Fish and Wildlife published the 3-Year Action Plan for Beaver-Modified Landscapes, August 2022-2025, which outlines goals and actions to be taken by the Department to advance the protection and restoration of beaver-modified habitat in Oregon[42].

Wetlands and slow-moving water created by beaver dams provide key habitat for amphibian, reptile, and bird populations. Beaver dams, pools, and off-channel habitats such side-channels and meanders, can provide juvenile rearing and overwintering areas for salmon and steelhead.

Legislation from the 2023 legislative session (House Bill 3464) acknowledged the benefits of beaver to fish, wildlife, habitat, and humans in a changing climate and removes beavers from the "predatory animals" definition under ORS 610.002 to simplify management of beaver in Oregon. While beavers play an important role in healthy ecosystems, their burrowing,

foraging, and damming activities can damage timber, crops, landscaping, human infrastructure, and property, so balanced solutions are needed.

Installing planting protections (e.g., fencing, gritted paint) or beaver flow devices (e.g., pond levelers, culvert exclusion devices) can reduce beaver-human conflict and prevent further property damage. Oregon Department of Fish and Wildlife's Living with Beaver[43] guidance document provides facts about Oregon's beaver and tips for coexisting with them on the landscape. Additionally, the U.S. Fish and Wildlife Service developed a Beaver Restoration Guidebook, updated in 2023, summarizing information for landowners, restoration practitioners, managers, and other parties who are interested in working with beaver to restore streams, wetlands, and floodplains.

The Private Forest Accord Grant Program

The Private Forest Accord Mitigation Fund and its associated grant program (known as the PFA Grant Program) was established in the 2022 Legislative Session (Senate Bills 1501 and 1502; House Bill 4055) as an outcome of the landmark agreement between timber and conservation groups designed to enhance aquatic resource protections in the Forest Practices Act while providing long term regulatory assurances for the timber industry. The Private Forest Accord Grant Program, administered by the Department of Fish and Wildlife, is an incredible opportunity to move the dial toward conservation and recovery for some of Oregon's most sensitive fish and amphibians. With significant investment from the State of Oregon and timber harvest tax revenue, the Private Forest Accord Grant Program will be capable of delivering nearly $15 million in conservation grants every year (up to $250 million over the life of the program). Watershed-scale investments in projects like stream habitat restoration, removal of barriers to fish passage, cold water and flow protection, beaver-modified habitat creation, and more will create statewide benefits for the species covered by the Private Forest Accord Habitat Conservation Plan.

Soil Health Improves Watershed Health

Soil health describes the overall composition of soil, including soil structure, the water and nutrient holding capacity of the soil, the amount of organic matter in the soil and the continued capacity of the soil to function as a biological system. Healthy soils with a high percentage of organic matter and water holding capacity provide both climate mitigation and climate adaptation resilience. Climate-smart agricultural practices provide an opportunity to improve soil health, increase plant and wildlife diversity, and protect and improve water quality. Soil and water conservation districts, the Oregon Department of Agriculture, Oregon State University, and the U.S. Natural Resources Conservation Service can all serve as resources for providing technical assistance, outreach, education, financial incentives to guide voluntary efforts to improve soil health and implement climate-smart agriculture.

Action 11A

Improve Watershed Health, Resiliency, and Capacity for Natural Storage

Examples of how to carry out this action:

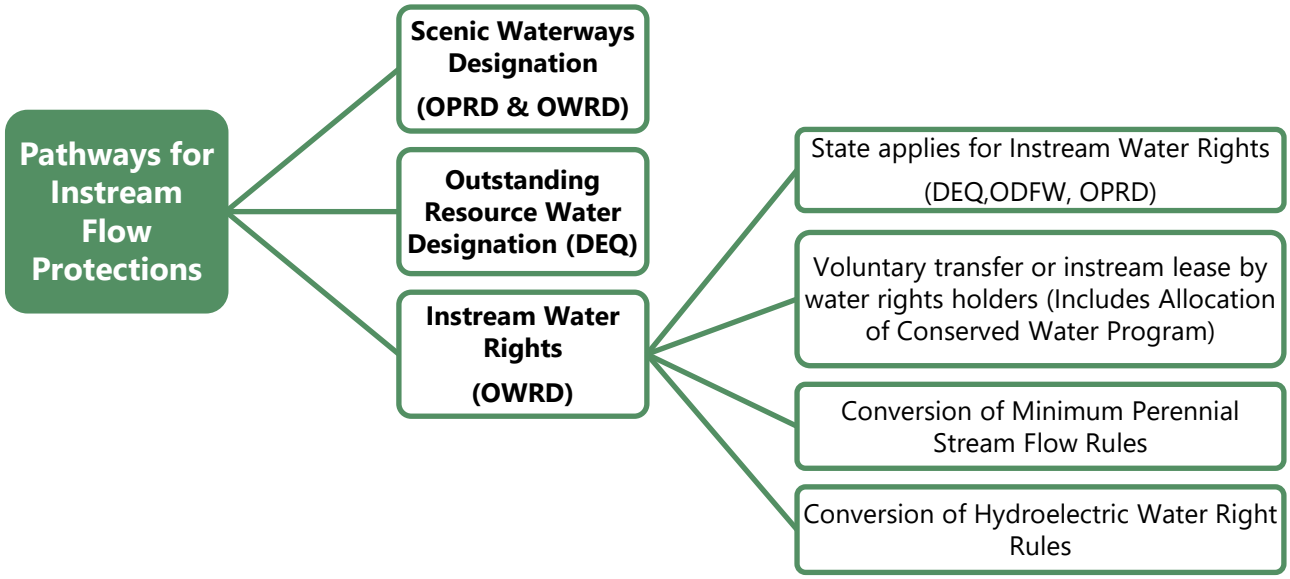
- Protect and restore instream habitats and watersheds to build climate change resiliency
- Improve and protect riparian conditions to create a healthy buffer between aquatic ecosystems and adjacent land use and development to provide fish and wildlife habitat and protect water quality
- Restore meadows, wetlands, and hydraulic connectivity to side channels and floodplains to maintain critical functions like processing nutrients, providing habitat, and natural storage
- Protect and restore estuarine conditions to maintain the natural mixing of freshwater and marine systems and allow for safe tidal inundation to build resiliency for sea level change and flooding
- Protect and restore beavers, beaver habitat, and beaver-modified habitat
- Protect and restore floodplains and native riparian-floodplain vegetative communities
- Identify and implement actions to protect and maintain drinking water source areas quality and quantity in upland and forested areas
- Collaborate with Tribes and the state to prioritize locations targeted for protection and restoration and restore access to First Foods
- Invest in restoration projects led by Tribes, low-income communities, and communities of color to discover new approaches and best management practices that meet community goals for clean water
- Strengthen protections under Oregon Statewide Land Use Planning Goal 4 which limits development on non-federal forestlands.
- Implement climate-smart agricultural practices to improve soil and watershed health

Action 11B Develop Additional Instream Protections

In many areas of Oregon, streamflows are very low or even non-existent during late summer months, largely due to human causes like diversions for irrigation or other beneficial water uses. Low streamflow conditions are made worse by periods of intensive water use or drought. Low streamflows often mean higher water temperatures and increased nutrient concentrations, contributing to poorer water quality for fish, wildlife and humans. Oregon needs to conserve and protect streams by developing additional instream flow protections and seek opportunities for enhancing and restoring streamflow.

Several laws, policies, and regulations that can be used to protect Oregon's rivers and streams are described in detail in Appendix B. The primary pathways for protecting water instream are illustrated in Figure 4-8 and described below.

Figure 4-8: Pathways to Protect Water Instream



Scenic Waterways Designation

In 1970, Oregonian's voted to establish the Scenic Waterways Program to allow designation of a river or lake to protect its unique character and protect it from future degradation. The construction of dams or other impoundments are prohibited within a scenic waterway. Designation limits new surface water rights within or above scenic waterways as well as groundwater rights where pumping (individually or cumulatively) will reduce surface water flows. Land use activities that can affect a scenic waterway or adjacent land are also regulated, including constructing roads or buildings, mining, and forest harvesting.

The Oregon Parks and Recreation Department administers the Scenic Waterways Program. The governor designates a candidate river or lake as State Scenic Waterway after a recommendation from Oregon Parks and Recreation Commission and concurrence from Oregon Water Resources Commission.

A portion of the Nehalem River was the most recent waterbody receiving scenic waterway designation, in 2019. There are currently portions of 22 rivers and one mountain lake designated as scenic waterways.

The public can participate in additional waterway protection by supporting the Oregon Park and Recreation Department process for designation. The Department must conduct Scenic Waterway Studies to assess waterway eligibility, including engagement with state and federal agencies, tribes, local governments, landowners, conservation groups, and others.

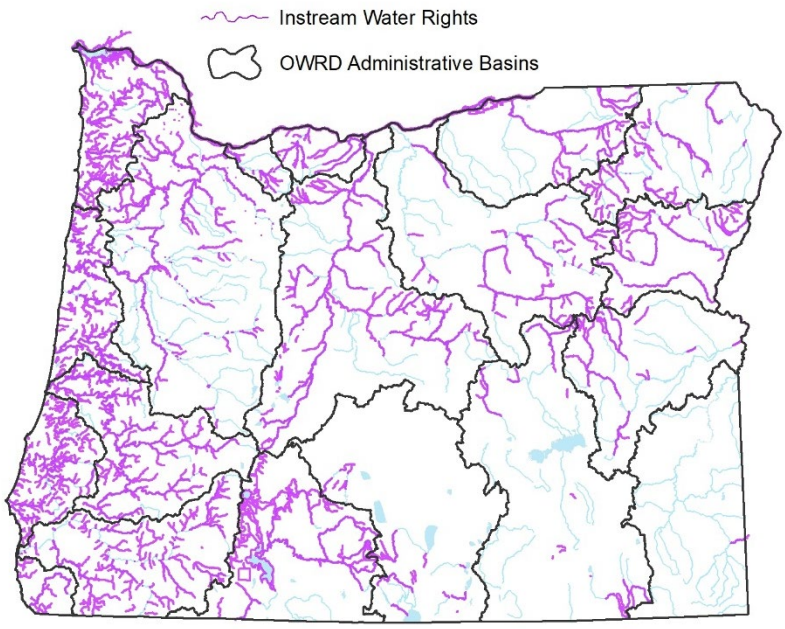
Outstanding Resource Water Designation

An Outstanding Resource Waters designation by Oregon's Environmental Quality Commission adds water quality protections, including restrictions on point source discharges to identified streams or lakes. Designation protects high quality water from degradation, thereby protecting exceptional ecological characteristics, and other outstanding values of the waters. In July 2017, the North Fork of the Smith River and its tributaries and associated wetlands became the first Outstanding Resource Water designated in Oregon. In 2021, Waldo Lake and Crater Lakes were designated as Outstanding Resource Waters.

Instream Water Rights

As described in Appendix B under the Instream Water Rights Act, the Department of Fish and Wildlife, Parks and Recreation Department, and Department of Environmental Quality can submit applications to protect water instream for uses such as fish and wildlife, water quality, recreation, and scenic values. The State's policy is to obtain an instream water right on every stream, river, or lake which can provide significant public benefits. There are almost 1,600 certificated instream water rights across the state covering approximately 10,000 river miles (only about 7% of Oregon's streams). Therefore, Oregon needs to continue establishing additional instream water rights to protect instream flows, resolve existing protested instream water right applications, and expand the scope and scale of its toolbox to conserve and restore flow.

Figure 4-9: Instream Water Rights
January 2024



Additional data needs regarding instream water rights were discussed in Chapter 2, Action 2A, including the need to identify the full suite of flows and temperature conditions necessary to support species habitat (e.g., ecological flows) to inform the amount of flow requested in instream water right applications. A potential Department of Fish and Wildlife rule change may be necessary to incorporate a broader range of techniques that lead to protection of ecosystem needs, including consideration of temperature-based flows.

Oregon's original Water Code formalized a system of water allocation that did not consider water for instream uses, causing Oregon's freshwater habitats to quickly become degraded. Because the Instream Water Right Act was not enacted until 1987, most instream water rights today are quite junior compared to existing out-of-stream water rights, some of which date back to the 1800s. In most instances, achieving instream water right flow targets will depend on both healthy, functional watersheds and voluntary partnerships with senior water right holders to be effective.

Instream Transfers and Leases and Flow Restoration-

The Instream Water Rights Act also allows water users with valid, existing surface water rights to voluntarily transfer water instream to restore streamflow through a program administered by the Water Resources Department. An out-of-stream use, such as irrigation for agricultural crops, can be transferred instream to restore flows on a temporary or permanent basis with the priority date of the original right. The water user has the option of transferring an entire water right instream, or a portion thereof. One of the basic tenets of instream transfers and instream leases is

ensuring that other water users are not injured as a result of the changes to the use. Education and incentives are needed to encourage voluntary actions such as instream transfers or leases.

Instream flow restoration activities have predominantly occurred in a handful of basins, although streamflow restoration needs have been identified in every basin. As of 2022, there were 452 active instream leases and instream transfers in place. Active instream leases resulted in nearly 5,000 cubic feet per second (cfs) protected instream, with most of that flow reflecting leases for hydroelectric power generation. Approximately 422 cfs is kept instream associated with permanent or long-term transfers. In addition, the majority of water put instream on a permanent basis is associated with senior water rights, resulting in an impactful instream benefit.

Flow restoration through instream transfers and leases benefits greatly from active partnerships between the state, tribes, soil and water conservation districts, watershed councils, private landowners and Oregon's conservation organizations, including The Freshwater Trust, the Deschutes River Conservancy, Trout Unlimited, and others. Incentives offered by these organizations and others can help land remain productive and profitable, while also benefitting freshwater ecosystems. State funding sources can also pay individuals to transfer or lease water instream. The Water Resources Department's Water Projects Grants and Loans can fund projects and the Oregon Watershed Enhancement Board offers water acquisition grants that fund transfers, leases, water conservation projects, and other water use agreements where ecologically beneficial. The state needs to increase resources and capacity to expand flow restoration efforts. Biological flow targets help guide agencies and other collaborators in voluntary restoration efforts and long-term basin planning that benefit fish, wildlife, and their habitats. Developing and implementing strategies that identify and target watersheds with the highest instream flow needs helps to expand voluntary streamflow restoration beyond current efforts, on both public and private lands.

Action 11B
Develop Additional Instream Protections

Examples of how to carry out this action:

- Designate Scenic Waterways where needed to protect recreation, fish, and wildlife uses
- Designate Outstanding Resource Waters where needed to protect extraordinary water quality or ecological values
- Establish additional instream water rights where needed to protect the full suite of flows for fish and wildlife, water quality, recreation, and scenic attraction
- Promote utilization of voluntary OWRD programs including Allocation of Conserved Water and instream transfers and leases to restore flow instream
- Expand education, funding opportunities, and use of voluntary programs to protect and restore streamflow, lake levels, and cold water refugia
- Increase resources and capacity to expand the geographic range and increase effectiveness of flow restoration efforts by identifying flow restoration priorities and focusing resources to priority areas
- Update ODFW Rules (OAR 635-400; last modified in 1989) to incorporate a broader range of techniques to determine flow amounts to protect ecosystem needs including consideration of temperature-based flows
- Increase compliance with water rights laws (Also See Actions 10E and 10F)

Some wastewater and stormwater utilities in Oregon may pursue purchasing or leasing water rights to keep cold, clean water instream while meeting their compliance requirements, particularly when coupled with reuse (see Action 10B). This approach has the potential to help meet temperature TMDL requirements in some watersheds.

There are also some federal funding sources to support flow restoration, including the National Fish and Wildlife Fund and Bonneville Power Administration's Columbia Basin Water Transactions program.

Allocation of Conserved Water - The Allocation of Conserved Water Program at the Water Resources Department allows a water user who conserves water to use a portion of the conserved water on additional lands, put the portion of water to a new use, lease or sell the water, or dedicate the water to instream use. To participate in the program, the water user must make a physical change to their water delivery system, being a change to how the water is distributed (piping of a canal) or making efficient changes to the on-farm delivery system (changing from

pivots to drip irrigation). Use of this program is voluntary and provides benefits to both water right holders and instream values. One program requirement is that at a minimum, 25% of the conserved water is dedicated instream. By the end of 2022, the Water Resources Department had approved 99 applications resulting in approximately 250.23 cfs both permanently protected and temporarily reserved instream.

Conversion of a Hydroelectric Water Right – Oregon Administrative R ules (OAR 690-054) outline procedures for converting a hydroelectric water right to an instream water right in accordance with ORS 543.305. Hydroelectric water rights that have not been used in five years, have expired, or are voluntarily retired can be converted to an instream water right. The point of diversion and priority date of the hydroelectric water right apply to the instream water right, which is held in trust for the people of the State of Oregon.

Action 11C Prevent the Spread of Invasive Species

The Oregon Invasive Species Council defines an invasive species as a non-native species that can cause economic or environmental harm or cause harm to human health. It can be a plant, animal or any other biologically viable species that enters an ecosystem beyond its native range. Invasive species disrupt the natural function of an ecosystem by competing and replacing native species and disrupting the natural habitat.

Oregon experiences threats from invasive species in both aquatic and terrestrial ecosystems. Aquatic invasive species can flourish in waterways, reducing water quality, competing with native plants, and clogging boat, hydropower, municipal, and irrigation infrastructure. Native plant species in riparian and wetland areas adjacent to waterways face competition from invasive species, limiting their capacity to provide benefits such as shade, shelter, and food. Invasive species can also impact the health of uplands, where well-managed forests are critical to protecting source water quality.

Climate change is expected to increase the introduction and spread of invasive species. Disturbances to natural and working landscapes from severe storms, flooding, and wildfires can damage or kill native plant communities, making them vulnerable to non-native invaders. Increased temperatures may increase the range of invasive species, requiring diligent monitoring to identify new infestations before they become problematic.

The scale and pace of invasive species management will need to increase accordingly. Multi-agency coordination is critical for timely and effective eradication and management. A good example of this is the state's response to the Emerald Ash Borer that threatens native ash trees along our rivers and streams, as well as ornamental ash trees located throughout neighborhoods, parks, and cities.

Impacts to First Foods

Invasive species can cause major changes to ecosystems, reducing biodiversity and the availability of Tribal First Foods that are essential to tribal traditions and culture. Invasive species management must consider ecological processes that relate to the sustained production of First Foods and be done in a way to prevent impacts to tribal people reliant on those resources.

Action 11C
Prevent and Eradicate Invasive Species

Examples of how to carry out this action:

- Support and continue funding for the Aquatic Invasive Species Prevention Program
- Support and continue funding for the Oregon Invasive Species Council
- Identify and implement projects to support the Oregon Conservation Strategy's seven statewide actions to prevent new introductions, and decrease the scale and spread of infestations
- Continue to implement and enforce ballast water management regulations
- Provide technical assistance and landowner education for invasive species detection and potential control and management actions on agricultural and forestlands
- Couple invasive species eradication with native species restoration efforts (see 11A)
- Support protection of culturally significant plants, animals, and ecosystems from invasive species
- Promote the propagation, growth, and sale of native plants

Aquatic Invasive Species

Quagga and zebra mussels, along with hydrilla (a waterweed), and Northern Pike are currently among the top aquatic species of concern to keep out of Oregon. Quagga and zebra mussels and aquatic vegetation can be easily transported by trailered watercraft and have spread rapidly in portions of the United States due to their adaptability, lack of natural predators and physical transport. Species like Eurasian watermilfoil and New Zealand mudsnails already contaminate some Oregon waterbodies.[44]

The Aquatic Invasive Species Prevention Program and invasive species actions contained in the Department of Fish and Wildlife's Oregon Conservation Strategy are key tools for fighting invasive species. Key elements of the Conservation Strategy are to prevent new introductions of invasive species, control the scale and spread of infestations, and eradicate invasive species, if possible, through boat inspection stations. Inspections act as a line of defense and an opportunity to educate the public about the risk of aquatic invasive species entering our state.

Ballast Water – The discharge of ballast water, used to provide stability for large commercial ships, is a primary pathway of concern for introducing non-native species from foreign ports, potentially threatening our regional waterways. The Department of Environmental Quality implements and enforces ballast water management regulations to reduce the risk of introducing new aquatic invasive species by prohibiting ballast water discharge unless it meets specified criteria. Since 2012, the Department of Environmental Quality ballast water program has been supported by a 50-50 cost share between the General Fund and a fee on regulated vessels using Oregon waters. In addition to monitoring vessels for pre-arrival ballast management compliance, the Department identifies high-risk arrivals and conducts vessel inspections and compliance verification sampling on at least 12 percent of vessels calling on Oregon ports.

Invasive Species in Forests

Invasive species also cause issues in uplands, and their impact on Oregon's forests can lead to water quality and quantity concerns. Diseased or dying trees, on a large scale, are unable to provide the watershed benefits of filtering and storing water. The Oregon Department of Agriculture and Oregon Department of Forestry coordinate on monitoring and response to invasive species on forestlands (Figure 4-10).

Figure 4-10: Invasive Species Common in Oregon Forests and Uplands

Insects:	Diseases:
Asian giant hornet	Sudden oak death
Elongate hemlock scale	White pine blister rust
Emerald ash borer	Port-Orford-cedar root disease
Larch casebearer	
Mediterranean oak borer	
Spongy moth	

Urban Forests - Maintaining and increasing tree canopy in urban areas can help both mitigate and adapt to climate change. Urban trees are also vulnerable to climate change and threats from pests and disease. The Urban and Community Forestry Program through the Oregon Department of Forestry is collaborating with the Department of Land Conservation and Development on the Community Green Infrastructure Grant Program that can help fund climate resilient green infrastructure projects.

Invasive Species in Agriculture

Invasive species can threaten the health and profitability of crops, and the ability of agricultural infrastructure to work properly. Aquatic invasive species can clog irrigation intakes or ditches. Irrigation structures that create shallow pools can elevate water temperatures that are unsuitable for native aquatic species but are tolerated or preferred by invasive species.

Invasive species management, including pesticide and herbicide use, must avoid negative impacts to soil, water, and air. Pesticide or herbicide residue or runoff can find its way into local waterways, potentially harming aquatic wildlife or polluting drinking water sources. The Oregon Department of Agriculture leads the Oregon Invasive Species

Council, which provides extensive resources on their website. They have developed a Digital Information Hub that provides species profiles of the numerous invasive species of concern for agricultural landscapes.

Action 11D Protect, Restore, and Provide Access to Instream Habitat for Fish and Wildlife

Freshwater ecosystems including perennial, intermittent, and ephemeral rivers and streams, seeps and springs, and wetlands are essential for providing habitat to many at-risk species, including important spawning and rearing habitat for salmonids, amphibians, freshwater mussels, and other invertebrates. However, most river systems in Oregon have been heavily modified to achieve various flood control, irrigation, navigation, hydropower, recreation, and other water supply benefits. The construction of roads and their associated bridges, culverts, and tidegates have altered many river and stream systems. These modifications have greatly reduced the amount of accessible stream habitat for many aquatic species, degraded habitat and water quality, and caused the decline of many species and subsequent Endangered Species Act listings.

Oregonians can be proud of the work that has been done to protect and restore the condition of rivers and streams throughout the state. Tens of thousands of degraded stream miles have been improved through riparian habitat projects, removal of fish passage barriers, instream habitat enhancement, and restoration of streamflows. These efforts have helped improve the ecological and economic health of Oregon's fish, wildlife, and communities. Our cooperative, community-level approach to watershed and stream restoration, through partnerships developed under the Oregon Plan for Salmon and Watersheds, has significantly improved water quality and fish and wildlife habitat. Oregon should build upon this good work to further enhance stream restoration and fish protection efforts.

Habitat for Aquatic Species

Freshwater habitats contain an incredible proportion of Oregon's biodiversity. Water is crucial for all fish and wildlife, and high quality freshwater aquatic systems provide essential habitat for many at-risk species. Beyond the multitude of Oregon's iconic fish species, many species of wildlife, such as the Oregon Spotted Frog, rely on instream habitat for a portion or all their life cycle.

Installing fish screens, replacing culverts with bridges, building fish-friendly culverts, constructing fishways, stabilizing road fill material, and removing obsolete infrastructure (also see Action 7A) are all techniques that can be used to restore and protect fish, habitat, and passage for fish.

Ways to improve instream habitat conditions include protecting streams from degradation, including channelization, riparian vegetation removal, erosion, runoff, and pollution, and restoring channel and floodplain function and complexity with restoration projects. For example, ongoing efforts to replace culverts present opportunities for developing, testing, and implementing methods to maximize habitat connectivity for a variety of aquatic and terrestrial species. Wildlife crossings are becoming more popular on busy roads as well. There are many regional, state, and local documents and plans outlining species-specific protection and recommended habitat improvements, including the Oregon Conservation Strategy. For example, the Oregon Conservation Strategy provides a list of "Strategy Species," or species of greatest conservation need, along with voluntary conservation actions and resources to benefit those species.

Credit Ryan Hagerty / USFWS

Fish Passage – Barriers such as dams, dikes, road fill, culverts, and tide gates change hydrological conditions and alter natural flow regimes. Many of these artificial obstructions create safety hazards for fish, can prevent fish passage altogether, alter transport of sediment, boulders, gravel, and wood, and create an uneven distribution of habitat.

The Department of Fish and Wildlife works with owners or operators of artificial obstructions in several ways to address barriers to fish passage, including administering a cost share program for voluntary upgrades. Recognizing the unique nature of migratory fish in the Pacific Northwest, many other agencies and organizations have helped Fish and Wildlife to compile data on fish passage barriers throughout the state. Compiling this information is a first step in a long-term process to fill existing gaps related to fish passage data and fish habitat distribution data, with the hope of integrating the two datasets to further fish passage restoration opportunities.

This ongoing effort has resulted in the identification of approximately 45,000 potential barriers to fish passage, which includes both natural (waterfalls, steep gradients, etc.) and artificial obstructions (dams, bridges, culverts, tide gates, etc.). Almost 70 percent of the potential barriers that were compiled are culverts. Although significant progress has been made to compile data on fish passage barriers and fish habitat distribution, more work is needed to fill data gaps, including the inclusion of several local, county, tribal, and federal agency inventories and information regarding barriers on private land. Oregon should continue to address and/or remove barriers, particularly at high-priority sites identified on the Department of Fish and Wildlife's Statewide Fish Passage Barrier Priority List.

The National Oceanic and Atmospheric Administration has developed West Coast Fish Passage Guidelines to communicate the importance of considering climate, hydrologic, geomorphic, and biologic processes when designing fish passage for salmonids. Native fish such as Pacific lamprey, sculpins, and sturgeons are not as strong swimmers as salmonids and generally get less attention in fish passage and screening discussions. However, the Pacific Lamprey Conservation Initiative and its technical advisory committee, the Lamprey Technical Workgroup, have released several publications that provide guidance for fish passage and screening for native lamprey.

Action 11D

Protect, Restore, and Provide Access to Instream Habitat for Fish and Wildlife

Examples of how to carry out this action:

- Implement Oregon's fish screening and passage laws
- Continue to update the inventory of fish passage barriers and priority unscreened diversions
- Address and/or remove barriers, particularly at high-priority sites identified on the Department of Fish and Wildlife's Statewide Fish Passage Barrier Priority List
- Support fish screening efforts
- Build upon existing ecological planning and restoration efforts by incorporating fish screening and passage needs and enhancing instream habitat conditions (e.g., water quality, channel complexity)
- Update streamflow restoration priority areas using new species distribution, climate change projections, hydrologic data, and water quality impairments related to streamflow
- Couple stream restoration projects with voluntary flow restoration projects (see Action 11B)
- Restrict livestock access to riparian areas and streambeds through regulatory compliance, where applicable, and support cooperative fencing programs/efforts
- Provide financial and technical assistance, when applicable, to landowners and other interested parties to implement projects that improve fish habitat and mitigate risks to natural resources (e.g., road construction with fish-friendly culverts, large wood placement)
- Ensure fish screening and fish passage laws are addressed in FERC hydroelectric project relicensing or when adding hydroelectric generation to an unpowered dam

Fish Screening – Another aspect of fish protection is fish screening, an important part of the Oregon Plan's efforts for the protection, restoration, and recovery of native migratory fish, such as salmon and steelhead. Fish screening significantly reduces juvenile fish mortality at water diversions by preventing fish from entering diversion ditches, machinery, pumps, or irrigated fields. Since the early 1990s, the state has required fish screening and/or bypass devices as a condition of approval for surface water permits and transfers, when applicable. The Department of Fish and Wildlife operates the state's fish screening program and has helped install more than 1,500 fish screens through its cost-share and tax credit programs. The 2023 Legislature extended the sunset for fish screen tax credits through January 1, 2030. Oregon should continue to require fish screening at new diversions and work to screen unscreened diversions, particularly at priority sites.

Historic Klamath Dam Removal Effort

Many dam removal projects occur throughout the state in an effort to restore ecosystems and fish passage. As introduced in Action 9A, a historic dam removal project in Oregon and California was completed in 2024. Four Pacificorp dams, JC Boyle, Copco No. 1 & 2 and Iron Gate, located on the Klamath River were all removed, and as of August 28th, 2024, the river was free-flowing and providing access to over 400 stream-miles of historic spawning and rearing habitat for Chinook, Coho, steelhead, and lamprey. Almost immediately post-removal, hundreds of fall Chinook were observed spawning in the Oregon portion of the project area. The dam removals are expected to improve water quality, reducing stagnant water that can support harmful algal blooms (HABs), and support the cultural lives, health, and economic well-being of Native American communities in the Klamath Basin.

This dam removal project took decades of negotiations and is currently the largest dam removal project in the country, possibly the world. The Klamath River Renewal Corporation leading the effort has contracted with the Yurok Tribe to revegetate the land exposed from draining the dams. Restoration activities along the Klamath River will continue for about the next 10 years. More information about the project can be found on the Klamath River Renewal Corporation's website.

Action 11E Develop Additional Groundwater Protections

The Oregon Atlas of Groundwater Dependent Ecosystems, published in 2022, found that more than a third of all streams and rivers depend on groundwater, and about two-thirds of all lakes and ponds do as well[45]. Groundwater discharge contributes to springs, wetlands, and streamflow throughout the state, often providing sustained flows and vital cold water for aquatic species during summer months. Contributions from groundwater support ecosystems (known as groundwater-dependent ecosystems) and human systems alike. Just as this Strategy calls for the development of additional instream protections (Action 11B), it also calls for the development of additional groundwater protections. Such protections should support a goal of sustainable groundwater management to benefit groundwater dependent ecosystems as well as water rights and public health.

In some locations of the state, groundwater withdrawals are occurring at a rate greater than what can be replaced with rain or snow. Consecutive years of drought and climate change are intensifying this situation. Groundwater contamination is also an issue, with ongoing nitrate contamination in the Lower Umatilla Basin Groundwater Management Area proving to be a difficult problem to improve or resolve.

The Groundwater Act of 1955 (see Appendix B) established the authority for groundwater management and monitoring for the preservation of the public health, safety, and welfare. There are existing regulatory programs designed to protect groundwater quantity and quality, however, they are limited in effectiveness by the resources allotted to the respective responsible agencies and programs. Additionally, rules that guide groundwater management sometimes need to be updated to reflect new scientific analyses and current conditions.

Designate and Manage Groundwater Administrative Areas

Introduced in Chapter 1, Action 1A the Water Resources Department oversees 22 Groundwater Administrative Areas designated to limit further water level declines or groundwater interference with surface water. Specific rules apply to each Groundwater Administrative and Limited Area and may include withdrawing the area from future allocation, curtailing existing uses, or mitigating for new uses where groundwater is hydraulically connected to surface water. Adequate data (see Actions 1A and 1B) and agency capacity are needed to designate and manage Groundwater Administrative Areas.

Improve Water Quality in Groundwater Management Areas

Introduced in Chapter 1, Action 1A, the Department of Environmental Quality may designate a Groundwater Management Area when monitoring and assessment shows evidence of groundwater contamination (ORS 468B.175-188). Commonly tested contaminants include nitrates, bacteria, and arsenic. Groundwater Management Areas can be designated for other contaminants, although the only current designations are due to nitrate. The three areas designated due to nitrate contamination are the Lower Umatilla Basin, Northern Malheur County, and Southern Willamette Valley. Common sources of nitrate contamination are agricultural use of fertilizers, manure, and septic systems.

Once a Groundwater Management Area has been declared, a local groundwater management committee is formed and then works with state agencies to develop an action plan to address the contamination. The Department of Environmental Quality must coordinate projects and activities of other agencies designed to reduce impacts on ground water from:

- Commercial and industrial activities;
- Commercial and residential use of fertilizers and pesticides;
- Residential and sewage treatment activities; and
- Any other activity that may result in contaminants entering the ground water.

Statute outlines additional requirements that include promoting public awareness, awarding grants for projects that address contamination, coordination with federal agencies, and more.

Groundwater Management Rulemakings

Beginning in 2023, the Water Resources Department worked with the Water Resources Commission to conduct a groundwater allocation rulemaking to update the state's process for issuing new groundwater rights in a manner more sustainable and more protective of existing water rights. The updates focus on the definition of "water is available" for future allocation and redefines the criteria for determining availability based on best available science while honoring the doctrine of prior appropriation. For example, the Ground Water Act of 1955 refers to determining and maintaining "reasonably stable groundwater levels," but the term is not defined in rule. Acknowledging the hydraulic connection between surface water and groundwater, these updated rules also set criteria to address the potential impacts of new groundwater permits on already depleted streams and other surface waters. The updated rules were adopted by the Water Resources Commission in September 2024.

Action 11E
Develop Additional Groundwater Protections

Examples of how to carry out this action:

- Implement actions for sustainable groundwater management through voluntary, incentive-based, and regulatory means
- Develop clear objectives and metrics for defining sustainable groundwater management
- Designate groundwater limited areas
- Protect groundwater through proper well construction (also see Actions 7A, 12A)
- Identify and protect and/or restore springs, cold water discharge to surface water, and wetlands (also see Action 11A)
- Prioritize resources where frontline communities are experiencing unsafe drinking water, with potentially serious health consequences (also see Action 12A)

The Water Resources Department is also working with various community working groups in the Harney Basin to reduce groundwater use by rulemaking and other means. The proposed rulemaking is in response to findings from the Department's observation wells and the 2022 Harney Basin groundwater study. The study found that groundwater withdrawals are not being recharged where groundwater withdrawals in the lowlands of the basin exceed natural recharge by 110,000 acre-feet per year. If adopted, the proposed rules would designate a Critical Groundwater Area to control groundwater use in over-appropriated areas of the basin.

Voluntary Agreements

Voluntary agreements are a cooperative management tool available to groundwater users. Oregon Revised Statute 537.545 authorizes the Oregon Water Resources Commission to approve such agreements among groundwater users from the same groundwater reservoir. These agreements must align with the intent, purposes, and requirements of the Ground Water Act of 1995, including the provisions pertaining to the designation of Critical Groundwater Areas. As of yet, this tool is untried; however, the Oregon Water Resources Department is exploring opportunities to encourage its use among groundwater users as a means of either avoiding a Critical Groundwater Area designation or in place of one. The primary goal of these agreements is to reduce groundwater use in areas experiencing excessive groundwater declines. One means of achieving this goal is for groundwater users to agree to use only a portion of their fully allocated groundwater right.

Related Strategy Actions

Many Strategy actions seeking to improve water management, increase water efficiency and water conservation, and protect people and the environment from pollution have the combined benefit of protecting surface as well as groundwater. Just a few such actions are listed below to illustrate the wide range of Strategy actions that seek to protect groundwater quantity and quality:

Strategy Actions to Protect Groundwater Quantity

- Conduct additional groundwater studies (Action 1B)
- Improve water use measurement and reporting (Action 3A)
- Support modernization of Oregon's Well Construction Program (7A)
- Provide outreach and educational resources for communities regarding water conservation (Action 8C)
- Improve water-use efficiency and water conservation (Action 10A)
- Encourage water reuse projects to reduce use of potable water for non-potable uses (Action 10B)
- Support voluntary programs to reduce the amount of irrigated land (e.g., Conservation Reserve Enhancement Program) (Action 10D)
- Provide an adequate field presence to identify and address illegal water use (10E)
- Strengthen water quantity permitting programs (10F)
- Restore wetlands and floodplains to increase capacity for natural storage (Action 11A)
- Fund water resource management activities such as distribution (Action 13B)

Strategy Actions to Prevent Groundwater Contamination

- Fund water resource management activities such as groundwater quality monitoring (Action 1A, 13B)
- Plan and prepare for flood events to minimize water quality issues (e.g. sewage releases into the environment) (Action 5B)
- Protect groundwater quality from contamination through proper well construction or decommissioning (Action 7A)
- Support modernization of Oregon's Well Construction Program (7A)
- Repair or upgrade wastewater infrastructure that poses a risk to groundwater contamination (Action 7A)
- Provide outreach and educational resources regarding domestic well and septic system maintenance/ownership (Action 8C)
- Engage with communities to develop plans to address contamination (Actions 9A, 9E)
- Provide an adequate field presence to identify sources of pollution (10E)
- Strengthen water quality permitting such as the TMDL program (Action 10F)

- Protect and restore watersheds, including wetlands, floodplains, etc. (Action 11A)
- Protect municipal drinking water source areas (Action 12A)
- Reduce pesticide use and educate pesticide users through the Pesticide Stewardship Partnership (Action 12B)

Tools to protect water quality, and thereby protect public health and the environment, are shared among many entities. Actions described throughout this section are needed to increase the protection of our drinking water, reduce the use and exposure to toxic chemicals and other pollutants, and reduce point and nonpoint sources of pollution of our surface and groundwater through sound land management and implementation of regulatory authority.

Action 12A Ensure the Safety of Oregon's Drinking Water

Drinking water is vulnerable to contamination from many potential threats. Climate change contributes to decreases in supply, increases in contaminant concentrations, increases in flooding, and the potential for harmful algal blooms (HABs). Some drinking water contaminants, such as bacteria, can cause acute health effects that generally occur within a few days or weeks. Prolonged exposure to chemical contaminants, such as nitrate or arsenic, can cause cancer or organ damage.

Appendix B provides a detailed overview of the laws and regulations protecting surface and groundwater quality and drinking water quality. The Oregon Health Authority and the many water system operators across the State are instrumental in making sure the water that enters our homes is safe for consumption and use. They need adequate resources to carry out the applicable federal and state laws help to protect public drinking water, including:

- Federal Safe Drinking Water Act
- Oregon's Drinking Water Quality Act
- Oregon's Reduction of Lead in Drinking Water Act
- Oregon's Domestic Well Testing Act

Drinking Water Source Protection

Whether people obtain their drinking water from a private well, a small community system, or a large municipal system, the original source of that water is from groundwater, surface water, or a combination of the two. Therefore, the means for protecting the safety of Oregon's drinking water includes protecting those sources. Protecting the source of our drinking water can be accomplished by many parties, including individuals, private landowners, businesses, municipalities, tribes, and agencies. Land use planning, land use management, land acquisition, proper well construction, and wellhead protection are all useful ways to protect Oregon's drinking water.

Land Use Planning – Described in Chapter 3, land use planning has the potential to protect drinking water sources from incompatible land uses. Data regarding the location of drinking water supplies (e.g., private wells, watersheds for municipal systems) can be used to inform land use zoning. Planning and implementing low impact development techniques can protect water resources. Also see Strategy Actions 5B, 6A, 6B, and 9D.

Land Use Management – The way we manage land for urban, agricultural, and forestry uses impacts the quality of water within a given watershed. Land management practices such as limiting stormwater runoff, minimizing erosion, limiting use of pesticides and herbicides, maintaining septic systems, and maintaining healthy vegetation and stream buffers can all reduce impacts to our shared water resources. Agencies require adequate resources to implement and enforce existing laws and regulations to limit the pollution of surface and groundwater sources. Also see Strategy Actions 5B, 7A, 10F, 11A, 12B, and 12C.

Action 12A

Ensure the Safety of Oregon's Drinking Water

Examples of how to carry out this action:

- Assist drinking water systems of all sizes; increase technical, administrative, and funding resources for small and very small water systems (less than 15 connections)
- Protect drinking water sources (e.g., proper well construction, onsite septic system maintenance, responsible land management, nutrient reduction, riparian/upland/forest restoration, watershed land acquisition)
- Increase understanding of occurrence and health implications of contaminants of emerging concern (e.g. pharmaceuticals, personal care products, microplastics, perfluoroalkyl and polyfluoroalkyl substances (PFAS)).
- Encourage water providers to join the Oregon Water/Wastewater Agency Response Network
- Increase domestic well testing and provide updated support materials and education (including translations, when needed) (Also see Action 1A)
- Amend Domestic Well Testing Act to require laboratories to electronically report domestic well testing results associated with real estate transactions to the state
- Increase resources for education, outreach, monitoring, and treatment for disadvantaged/underserved domestic well users
- Support resiliency efforts for maintaining operation of drinking water systems during emergencies (e.g., solar/renewable energy, battery storage)
- Seek alternative to EPA's definition of "disadvantaged communities" to increase eligibility for funding drinking water improvements in underserved communities in urban areas

Land acquisition – Land ownership of a community's drinking water source area is an effective way to manage water quality and quantity. Land ownership allows for land management and creates the opportunity to implement practices that maximize watershed health, groundwater recharge, and natural filtration. Limited water supply options on the coast have led many coastal communities to prioritize acquisition of their watersheds to protect the quality and reliability of their water supply. The 2023 Legislature (House Bill 2010) allocated $5 million and directed the Oregon Watershed Enhancement Board to develop a fund to "protect, restore, or enhance sources of drinking water," which can be used for land acquisition and conservation easements.

Proper Well Construction – Proper well construction is critical for anyone using groundwater for domestic, municipal, industrial, environmental monitoring, or agricultural purposes. The Well Construction and Compliance Section at the Water Resources Department is responsible for several program areas to ensure that wells are properly constructed, altered, maintained, and decommissioned to prevent contamination, loss of artesian pressure, and waste of Oregon's groundwater resources. Also see Strategy Actions 7A and 11E.

Wellhead Protection – A local government could choose to protect any wellhead protection area that is within their jurisdiction. Often wellhead protection areas extend into other jurisdictions, for example, from a city into a county. Periodic review of a county comprehensive plan may increase the opportunity to adopt protections for wellhead protection areas identified by a city. Also see Strategy Actions 6A, 9B and 9D.

Source Water Assessments for Public Water Systems

A source water assessment evaluates the potential contamination sources to a public water supply. An assessment is used to develop and voluntarily implement a drinking water protection plan. The Department of Environmental Quality has completed source water assessments for public water supplies that use surface water as their source. The Oregon Health Authority is updating delineated drinking water source areas and potential contaminant inventories for groundwater-supplied systems.

Many municipal watersheds are located on U.S. Forest Service lands, however source areas for smaller communities often include multiple private and public landowners. Source water assessments include property ownership information that allows drinking water providers to involve landowners when developing protection strategies for source water protection.

Source water assessments also provide key information that enable communities to focus limited resources on higher risks within their drinking water source area. The information can be supplemented with local water system and community knowledge and help address local water quantity and water quality challenges.

Desalination

Rising sea levels, over-pumping, or storm surges may lead to salt-water intrusion in some coastal aquifers.[46] Desalination is a technique that allows communities to stretch limited water resources by removing salt and other contaminants using reverse osmosis technology. Some of the greatest challenges to building a desalination plant include intense energy requirements to treat the water; expansive coastline to site an energy source, pumps, pipes, inflows, and outfalls; damage to marine organisms during water intake; and brine disposal options. These challenges make desalination one of the most expensive sources of drinking water.

Despite the challenges associated with desalination, many states are including it in their water supply strategies. In 2024, the U.S. Department of Energy announced $75 million in funding over five years for a desalination innovation hub. The funding will be used to find solutions to the technical barriers associated with desalination.

Regulating Public Water Systems

The Oregon Healthy Authority administers and enforces drinking water quality standards for public water systems. Public water systems are defined as having more than three service connections (i.e., hookups) or serving more than 10 people year-round. Service connections are defined as a piping connection that conveys water from a public water system to a user's premise (e.g., real estate and the structures on it). For example, a standpipe at a campground or RV park is not a "premise" so all standpipes at the campground are considered as one "connection." Public drinking water systems are regulated differently, depending on how many people they serve and/or the number of service connections.

Figure 4-11: Online Public Water System Information

Find Data on Public Water Systems

https://yourwater.oregon.gov/

Oregon Health Authority Drinking Water Services maintains an online searchable platform to display data on public water systems in Oregon. You can find data such as coliform and chemical test results, violations, enforcements, public notices, and basic system information, such as sources used, treatment applied, and contact information.

The Oregon Healthy Authority has developed a Public Water System Classification Guide to help classify different types of public water systems into community, non-transient/non-community, transient non-community, and Oregon very small water systems. Oregon Health Authority maintains a webpage outlining Oregon Drinking Water Rules, including recent rulemakings that address arsenic treatment monitoring and lead service lines.

Oregon Very Small Water Systems - Water systems that were called "State Regulated" have been renamed to "Oregon Very Small" (OVS) systems, effective January 1, 2022. The technical description of an OVS is a system serving 4 to 14 service connections and commercial or public premises used by 10 to 24 people at least 60 days per year. State resources to regulate or support these systems are limited, leaving OVS users potentially exposed to contaminants in drinking water. These systems would benefit from state technical support regarding contaminant

standards, source water treatment options, and best practices to help prevent drinking water contamination. The Oregon Healthy Authority website provides several links to helpful resources for Oregon's very small water systems.

The Oregon Legislature has recently demonstrated support for increasing resources for OVSs. House Bill 2010 (2023) allocated funding for the Oregon Association of Water Utilities to study the needs and vulnerability of small and very small community water systems, design and construct water utility training center, and for the state to hire staff to provide related support and resources.

Private and Domestic Sources

Private and Domestic Wells – In rural areas, private wells are more commonly used to provide drinking water than public water systems. In fact, more than 90 percent of people living in rural areas rely on groundwater from such wells to meet their drinking water needs. The Safe Drinking Water Act applies to public water systems; however, it does not regulate private wells providing water for fewer than 25 individuals.

Pursuant to Oregon's Domestic Well Testing Act, the owner of a property with a private well must test for nitrate, coliform, and arsenic, but only if the property is being sold or changing ownership. There is currently no authority for the Oregon Health Authority to enforce this requirement. Public health officials estimate a 10 to 20 percent compliance rate. An amendment to the Domestic Well Testing Act requiring laboratories to electronically report testing results associated with a real estate transactions could increase compliance and improve public safety.

The Oregon Health Authority's Environmental Public Health Program administers the Domestic Well Safety Program, providing information about water quality testing, treatment, maintenance, and other resources. In 2015, the Water Resources Department partnered with Oregon Health Authority to develop and distribute a Water Well Owners Handbook for rural homeowners.[47]

Private and Domestic Surface Water Systems – In rural areas, some private and domestic water supplies are sourced from surface water. Just like domestic wells, these systems are not regulated for drinking water quality.

Contaminants of Emerging Concern (CECs)

Improved testing methods now reveal some chemicals previously undetected during sampling events. These chemicals are referred to as "contaminants of emerging concern" (CECs) because the risk to human health and the environment associated with their presence, frequency of occurrence, or source may be unknown. State and federal agencies are working to improve the understanding of several CECs, particularly pharmaceuticals, personal care products, and perfluorinated compounds, among others. Monitoring of public drinking water for CECs should be increased to determine the occurrence and concentration of contaminants. This data is crucial to assess whether and how such contaminants may pose individual, cumulative, or synergistic health risks to the public. This monitoring data can be used in conjunction with the U.S. Environmental Protection Agency's Unregulated Contaminant Monitoring Rule data (also see Appendix B) to evaluate connections among source sensitivity, potential contaminant sources in the area, and overall system vulnerability to contamination.

> "We can invest in resilient built and natural water infrastructure, and reduce pollutants to provide clean water for all Oregon communities."
> -100-Year Water Vision (2020)

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) – The recent discovery of the widespread presence of perfluoroalkyl and polyfluoroalkyl substances (PFAS) in drinking water sources has gained attention from the U.S. Environmental Protection Agency and will likely result in future testing and treatment requirements. PFAS are also referred to as "forever chemicals" as they break down very slowly. The Oregon Health Authority's website provides a list of potential health risks from PFAS including reproductive, developmental, liver, kidney, and immunological effects. Between 2021 and 2023, the Oregon Health Authority sampled 143 public water systems, finding that 22 of

the systems had detections of at least one PFAS compound. Sampling results can be found at Drinking Water Data Online.

The U.S. Environmental Protection Agency is continuing to study PFAS. Their website provides resources for better understanding the topic, and actions they are taking to address PFAS.

Manganese – Manganese is a naturally occurring element found in rocks, soil, water, air, and the food we eat. Humans need to consume small amounts of manganese to stay healthy. Some parts of Oregon have been identified as having elevated manganese in their drinking water which, may not be safe for long-term consumption. With additional study, manganese may eventually become regulated under the Safe Drinking Water Act. The Oregon Health Authority has developed a Manganese Fact Sheet in English and Spanish.

Drinking Water Emergencies

Equipment failures, harmful algal blooms, E. coli outbreaks, natural hazards including drought (Action 5A), floods (Action 5B), and earthquakes (Action 5C), and chemical releases/spills (also see Action 12B) are just some events that can contribute to drinking water emergencies. The Oregon Health Authority requires public water systems to develop and maintain an emergency response plan. Community water systems serving more than 3,300 people also must conduct a risk and resilience assessment.

Oregon's statewide emergency response system must be designed to quickly respond to drinking water emergencies. All water providers should be encouraged to join the Oregon Water/Wastewater Agency Response Network, a statewide mutual aid agreement specific to water and wastewater agencies that provides access to equipment and personnel. The Regional Disaster Preparedness Organization and the Regional Water Providers Consortium in the Portland Metro area are two such networks that can help with the development of regional emergency preparedness, response and recovery, and coordination of resources.

Access and Affordability

Access to drinking water in Oregon is not equitable, with some people experiencing contaminated water coming from their tap, others unable to afford their utility bills, while others lack water access in workplaces. The State of Water Justice in Oregon report and Secretary of State Advisory Report 2023-04 outline these and many other challenges facing frontline communities across the state.

House Bill 2010 (2023) directed the Legislative Policy and Research Office to research and report on approaches and funding sources for an ongoing statewide assistance program for low-income ratepayers of drinking water, wastewater, and stormwater services. The report, Approaches and Funding for Low-Income Water Ratepayer Assistance and Household Infrastructure in Oregon was published in 2024. Legislation also expanded eligibility for the Water Well Abandonment, Repair, and Replacement Fund (WARRF) to cover household water wells with contamination levels that exceed drinking water standards. The Water Resources Department administers the WARRF program, prioritizing financial assistance for low-to-moderate income households in areas impacted by drought or wildfire.

Addressing water access and affordability at a statewide scale will continue to be challenging, as water distribution happens at many scales (e.g., domestic well, municipal water system, etc.) and does not lie within the purview of one agency. Solutions to water access and affordability will need to reflect the varied circumstances found across urban and rural parts of the state.

Action 12B Reduce Use of and Exposure to Toxics and Other Pollutants

Protecting Oregonians from the impacts of toxic pollutants is a top priority for the Department of Environmental Quality and Oregon Health Authority. Thousands of toxic chemicals are in products that are used daily. Old chemicals that may not be sold today but are stored in homes, schools, and businesses also pose risks. These chemicals are released into Oregon's air, water, and land as toxic pollutants in a variety of ways. Once in the environment, toxic pollutants can adversely affect the health of people and other living organisms. Additional pollutants including plastics and micro-plastics also pose risks to human and aquatic life, with the full impact of these waste products still being studied. Accidents, including chemical spills and train derailments also pose environmental and public health risks, emphasizing the need for prevention, planning, and expedient clean-up. Toxic pollutants that affect air, land, and water quality intersect with and become cumulative impacts that disproportionately affect frontline environmental justice communities.

Addressing permitted discharges of pollutants, TMDLs, point and nonpoint sources of pollution, are covered in Strategy Action 12C.

Toxics Reduction Strategy

Oregon Department of Environmental Quality's 2018 Toxics Reduction Strategy emphasizes collaboration and partnerships with other agencies and organizations to reduce priority toxic chemicals in the environment and exposure to such chemicals by people.[48] The Strategy emphasizes reducing toxic pollutants at the source, rather than managing them after they are generated. In addition, Executive Order No. 12-05 ("Environmentally Friendly Purchasing and Product Design") provides additional support for Department of Environmental Quality's Toxics Reduction Strategy by focusing the work of other state agencies on reducing toxics.[49] The Executive Order has become the official policy of the Department of Administrative Services and resulted in low toxicity procurement guidelines for state agencies, and other public entities that join state price agreements.

Two other high priority short-term actions identified in the 2018 Toxics Reduction Strategy were to expand and enhance the Pesticide Stewardship Partnership program and ensure support for pesticide waste collection events.

Water Quality Pesticide Management Plan

As the lead agency for the Federal Insecticide, Fungicide, Rodenticide Act, the Oregon Department of Agriculture's Pesticides Program holds the primary responsibility for pesticide registration and use regulation. Oregon's Pesticide Management Plan for Water Quality Protection outlines the roles, policies, and legal authorities of each government agency with responsibilities to protect Oregon's water resources from pesticides and the process by which these activities will be coordinated. Under this plan, the Oregon Department of Agriculture created an interagency team, the Water Quality Pesticide Management Team (WQPMT), composed of representatives the Department of Forestry, Department of Environmental Quality, Oregon Health Authority, Oregon Department of Fish and Wildlife, and Oregon State University. The goals of the WQPMT are to:

- Select and prioritize pesticides of interest and pesticides of concern;
- Establish guidelines and reference points;
- Conduct watershed vulnerability assessments;
- Design, conduct, and guide monitoring efforts (including the Pesticide Stewardship Partnership Program monitoring);
- Recommend and facilitate management options; and
- Develop communication strategies.

Pesticide Stewardship Partnerships


Credit Hood River Soil and Water Conservation District

The Pesticide Stewardship Partnership (PSP) Program, led by the Oregon Department of Agriculture, is a voluntary program that relies on local partnerships to monitor pesticide levels in waterways and implement solutions to protect water quality while managing pests and maintaining crop yield. Efforts include technical assistance, outreach, and education-based projects. The PSP works as a feedback loop with the water quality sampling data continuously being used to evaluate pesticides of concern, the effectiveness of education, and collaborative projects on an annual basis.

The goals of the PSP Program are to:

- Identify potential concerns and improve water quality affected by pesticide use around Oregon.
- Combine local expertise in water quality sampling results to encourage voluntary changes in pesticide use and management practices.
- Find ways to reduce pesticide levels while measuring improvements in water quality and crop management.
- Advance measurable environmental improvements, making Oregon waters safer for aquatic life and humans.

As of 2023, there are PSPs established in nine watersheds: Amazon, Clackamas, Hood River, Middle Deschutes, Middle Rogue, Pudding, Yamhill, Walla Walla, and Wasco. PSP areas and sampling locations can be found at the Oregon Department of Agriculture website. Several of the partnerships have shown improvements in water quality in response to education created around water quality data and subsequent changes in pesticide management practices. These successes demonstrate the Pesticide Stewardship Partnership approach can be an effective alternative to traditional regulatory approaches dealing with "nonpoint" sources of chemicals in water.

Pesticide Waste Collection – Pesticide waste collection events are part of the PSP program and provide an opportunity to bring pesticides from agricultural growers and other commercial or institutional pesticide users for free disposal. Some state pesticide collection funds are transferred to county and regional entities (representing Hood, Sherman, and Wasco counties) that operate permanent hazardous waste collection facilities to support periodic free agriculture pesticide collections for local growers and other pesticide users.

Contaminated or Hazardous Sites

Sites, facilities, or structures that were once used for industrial, military, transportation, energy, or other purposes may have historical releases of hazardous substances that pose a threat to water resources. The nature and degree of such threats depend on the types and amounts of contaminants, when they were released, the likelihood of migration to surface water or groundwater, and remedial actions completed, if any.

Addressing hazardous and contaminated sites is not only important for protecting environmental and public health but can also lead to economic development opportunities for local communities. The redevelopment of brownfields—sites where future use may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant—is changing the way contaminated property is perceived and addressed. In Oregon, brownfields have been cleaned up and turned into new businesses and created new jobs. Brownfield redevelopments include urban community gardens; mixed-use developments that include housing, retail, and commercial facilities this includes food bank operation centers; thrift stores; and health-care centers in rural Oregon communities. Community health concerns and environmental justice are integrated throughout brownfield redevelopment and reuse planning to prevent future exposure to contamination.

Underground Storage Tanks – Oregon's Leaking Underground Storage Tank Program, administered by the Department of Environmental Quality, identifies and addresses hazardous or contaminated sites and prioritizes investigative and remedial actions based on threats to human health and the environment with a focus on protecting sensitive water resources. Site owners complete most work on a voluntary basis, with program oversight.

The program uses enforcement mechanisms to eliminate or treat discharges to sensitive water resources as needed. This includes use of the Department of Environmental Quality's Orphan Site Account when site owners are unknown, unable, or in some cases unwilling, to perform immediate cleanups.

Abandoned and Derelict Vessels - There are hundreds of hazardous boats and ships in Oregon's public waterways, including large tugboats, barges, former military vessels, and recreational vessels. In April 2023, the Department of State Lands began working to propose a comprehensive program for abandoned and derelict vessels in Oregon, including identifying funding needs and potential sources. The passage of House Bill 2914 (2023) directed the Department of State Lands to develop the program in coordination with other state agencies including the State Marine Board, Department of Environmental Quality, and the State Parks and Recreation Department.

Polychlorinated Bisphenyls (PCBs) – Monsanto Company manufactured many products (e.g., coolants, hydraulic oils, paint, caulk, copy paper, etc.) that contained PCB's. PCB's are highly toxic and were banned in 1977, however, they persist in Oregon's land and water. In December of 2022, Monsanto was ordered to pay Oregon $698 million to address remediation associated with PCBs. House Bill 1561(2024) established the Oregon Environmental Restoration Fund. This Fund, comprised of money received from the Monsanto Settlement Agreement, will be managed by the Environmental Restoration Council. The Governor's Office, with assistance from the Oregon Watershed Enhancement Board, is setting up the Environmental Restoration Council.

Unused Medications

Often, unused or expired medications are disposed of by flushing down drains in homes, care facilities, medical clinics, and hospitals. Wastewater treatment plants and septic systems, depending on the level of treatment, may

Action 12B

Reduce the Use of and Exposure to Toxins and Other Pollutants

Examples of how to carry out this action:

- Update and implement the Department of Environmental Quality's 2018 Toxics Reduction Strategy
- Implement green chemistry executive order, including revising purchasing practices related to toxic chemicals
- Update and implement Water Quality Pesticide Management Plan
- Support Pesticide Stewardship Partnerships and enhance program to focus on environmental justice communities
- Continue "take back programs" and develop partnerships with community-based organizations and tribes to facilitate culturally relevant "take back programs"
- Continue to identify and address hazardous or contaminated sites (e.g., Lower Umatilla Basin nitrate contamination, brownfields, abandoned/derelict vessels)
- Prevent blue-green algae (including Harmful Algal Blooms or HABs) from forming beyond natural background levels and support advisory/notification efforts
- Support implementation of the 2023 ODEQ Freshwater Cyanobacteria Harmful Algal Bloom Strategy
- Monitor recreational waters and inform the public when contaminants are present, including communications to reach non-English speaking, low-income, tribal, and rural residents and businesses
- Update Oregon's water quality criteria for toxic pollutants to protect aquatic life and human health based on the latest science
- Support programs and organizations to help communities and utilities prevent, prepare for, and respond to chemical spills
- Support no-till, organic, and regenerative agricultural practices that reduce herbicide, pesticide, and fertilizer use
- Engage historically or currently impacted communities in design of toxics source reduction and clean-up efforts so that they can experience the benefits of the effort, such as utilizing Community Benefits Agreements

only partially treat pharmaceuticals which allows certain chemical compounds to reach surface water or groundwater resources. Risks to aquatic organisms by long-term exposure to pharmaceuticals is still being studied.

More than 50 Oregon communities have established permanent, free collection boxes for unused medications, which can be located at the Oregon Health Authority website. The U.S. Drug Enforcement Agency offers a national drug take-back event twice a year, in April and October. The Oregon Department of Environmental Quality also administers a drug take-back program, in partnership with the Oregon Board of Pharmacy.

Public Health Advisories

Public health advisories alert the public to water quality issues and help prevent exposures to toxics and other pollutants that may negatively impact human health. Millions of people participate in recreational activities each year, including harvesting shellfish, fishing, swimming, boating, and enjoying Oregon's coastline. State agencies use a variety of approaches and tools to protect people living, working, and playing near beaches, rivers, lakes, and other water bodies. In addition to advisories, it is critical that land management activities do not contribute to further water quality degradation (see Action 12C).


Credit Oregon Health Authority

Harmful Algal Bloom (HAB) Advisories – An overgrowth of cyanobacteria in lakes, rivers, and ponds can result in the development of a harmful algal bloom (HAB), which can produce extremely dangerous toxins (cyanotoxins) that can sicken or kill people and animals. HABs have become increasingly common across Oregon, impacting recreational waters as well as drinking water supplies. In July 2018, the City of Salem's drinking water source, Detroit Lake, became contaminated with cyanotoxins, causing a public health emergency. Since then, the Oregon Health Authority has developed regulations that require drinking water systems using surface water sources susceptible to HABs to routinely test for cyanotoxins. Additional cyanotoxin resources for drinking water can be found on the Oregon Health Authority website. See Action 12C for the Department of Environmental Quality's HABs Strategy for reducing the occurrence of HABs.

The Oregon Health Authority is the agency responsible for posting warnings and educating the public about HABs at waters used for recreation. In Oregon, HAB advisories are issued for lakes, reservoirs, and rivers only after a lab has verified the presence and quantity of a harmful algae species or the toxins they produce. Current cyanobacteria recreational advisories can be found on the Oregon Health Authority website.

The Oregon Beach Monitoring Program – The Oregon Health Authority and the Department of Environmental Quality are responsible for monitoring recreational water quality at coastal beaches in Oregon. Marine waters are tested for the bacterium enterococcus, which is an indicator of the presence of other illness-causing organisms. Enterococcus is present in human and animal waste and can enter marine waters from a variety of sources such as streams and creeks, stormwater runoff, animal and seabird waste, failing septic systems, sewage treatment plant spills, or boating waste. When bacteria levels are above normal, a water contact advisory is issued.

The goal of the program is to protect public health by providing information about water quality, monitoring water quality standards at beaches, and promoting scientific research. The public can sign up for email alerts to receive notices when advisories have been issued at certain beaches.

Fish and Shellfish Consumption – Fish and shellfish can accumulate toxic chemicals from legacy contamination, spills, or toxic algal blooms, posing health risks to those who consume them. The Department of Environmental Quality establishes the level of protection needed to ensure public health, by setting human health toxics criteria based on fish consumption rates. Oregon's fish consumption rate is 175 grams per day is one of, if not the highest in the nation, in recognition of the consumption rates by tribes, subsistence fishers, and Asian and Pacific Islanders in the Pacific Northwest. The Oregon Health Authority issues fish consumption advisories, due primarily to moderate-to-high mercury levels or PCBs (polychlorinated biphenyls) found in locally-caught fish. The Departments of Agriculture and Fish and Wildlife jointly issue shellfish safety closures to protect recreational shellfish harvesters from consuming clams or mussels contaminated with harmful biotoxins. The Department of Agriculture also maintains an online website with biotoxin results, recent news releases, and encourages the public to call the shellfish safety hotline before harvesting.

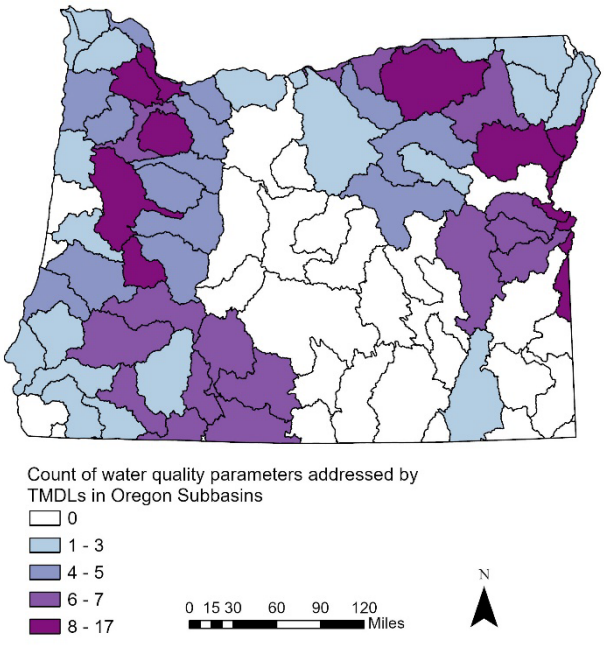
Action 12C Implement Water Quality Pollution Controls

It is important that land management activities and their associated point and nonpoint sources of pollutants are managed to protect water quality for humans and the environment. The Clean Water Act, described in Appendix B, administered by the Oregon Department of Environmental Quality, provides the regulatory structure for addressing point and nonpoint sources of pollution.

Total Maximum Daily Load (TMDL) Implementation

A Total Maximum Daily Load (TMDL) describes the maximum amount of a pollutant from all sources: municipal, industrial, commercial, surface runoff and background; that can enter a waterway without violating clean water standards associated with the Clean Water Act. The Department of Environmental Quality sets TMDL limits and communities work together to develop TMDL implementation plans. TMDL plans identify pollution controls across agricultural, forest, urban, and rural residential land uses to protect and improve water quality.

Figure 4-12: Number of 303(d) listed parameters addressed by TMDLs in each Oregon sub-basin



It is important to continue developing and implementing TMDL plans for waterbodies that do not meet water quality standards. This includes developing TMDLs for the remaining waterbodies and pollutants on Oregon's 303(d) impaired waters list and for those added in the future, in accordance with the federal Clean Water Act. It also includes reviewing and updating existing TMDLs and providing oversight to ensure that TMDL implementation measures are effective. By the end of 2023, the Department of Environmental Quality completed 46 TMDL actions that require pollutant reduction on more than 200,000 miles of streams and rivers in Oregon. In total, these TMDLs address 28 water quality parameters listed on the 303(d) list of impaired waters. The map in Figure 4-12

summarizes the number of parameters that have been addressed by a TMDL for each subbasin in Oregon. The full list of water quality parameters addressed can be found on the Department of Environmental Qualities website.

In 2024, the Environmental Protection Agency (USEPA) signed a final rule that changes how Clean Water Act water quality standards are applied to Tribal reserved rights. Historically, USEPA has addressed Tribal reserved rights under the Clean Water Act on a case-by-case basis in state-specific actions. This practice led to uncertainty for Tribes, states, and entities looking to comply with Clean Water Act requirements. USEPA's final rule provides clarity and transparency by revising the federal water quality standards regulation to better protect Tribal reserved rights under the Clean Water Act. With this rule, USEPA is ensuring that water quality standards are established taking into consideration Clean Water Act-protected aquatic and aquatic-dependent resources where Tribes hold and assert rights to those resources under federal treaties, statutes, or executive orders. This final regulatory framework will be applied consistently while accounting for local conditions and factors to inform the development of specific water quality standards.

Oregon's Nonpoint Source Management Program Plan

A nonpoint source of pollution is any pollution entering a waterbody that does not come directly from a visible source such as a pipe or ditch. Unlike end-of-pipe (point source) pollution that originates from industrial and sewage treatment plants, nonpoint source pollution comes from many diffuse sources, including runoff from agricultural, forest, and ranching activities, construction sites, home landscaping, and road surfaces.

The Department of Environmental Quality leads the development of the statewide Nonpoint Source Management Program Plan, which identifies programs and actions that will be implemented by multiple state agencies, local governments, non-governmental organizations, and local citizens. The Program's multi-agency strategy, including the Departments of Agriculture and Forestry, involves using water quality management programs in conjunction with regulatory, voluntary, financial, and technical assistance. The program's primary components are assessment, planning, implementation, and education.
The federal Clean Water Act provides states, territories, and tribal governments opportunities for funding to address nonpoint pollution, commonly referred to as Section 319 grants. These grants can be used for technical assistance, education, training, technology transfer, demonstration projects, and monitoring to assess the success of specific nonpoint source implementation projects. In 2010, Oregon was awarded more than $1.38 million in Section 319 grants for 33 projects that address nonpoint source pollution. Since 2015, the amount of 319 funds Oregon has received annually has been reduced by 30-percent due to the disapproval of the states Coastal Nonpoint Source Pollution Program under the Coastal Zone Reauthorization Amendment (CZARA). In 2022 and 2023 only $135,067 and $137,567, respectively, in 319 grant funds were available to support on the ground projects from the state's total 319 allocation. To receive additional funding, Oregon must meet CZARA requirements.

The Nonpoint Source Management Program Plan refers to many other state programs that manage nonpoint sources of pollution. A selection of these programs is described, below.

Agricultural Water Quality Management Plans – The Department of Agriculture's Agricultural Water Quality Program is part of the state's effort to address the federal Clean Water Act, ensuring that farmers and ranchers do their part in meeting water quality standards. There are 38 area Agricultural Water Quality Management Plans and rules around the state. Water q uality specialists with the Department of Agriculture work with farmers, ranchers, community leaders, and other interested parties who serve as members of local advisory committees for each management area. Each committee identifies local agricultural water quality problems and opportunities for improvement.

Coastal Nonpoint Pollution Control Program – The Coastal Zone Act Reauthorization Amendment (CZARA) established the national Coastal Nonpoint Pollution Control Program requiring coastal states to address nonpoint source pollution. The Departments of Land Conservation and Development and Environmental Quality lead the state's management of the program. Oregon has not met CZARA requirements since 2015 due to forestland

management issues. New rules and rule revisions to the Forest Practices Act in 2022 are expected to result in improved water quality associated with private forestland management along the coast.

Farm Bill Programs – There are several Farm Bill conservation programs, administered through the Natural Resources Conservation Service, for agricultural producers and landowners. Oregon ranchers have worked with public and private sector partners to install and monitor effective habitat restoration techniques, including fencing and building stock water troughs to protect sensitive riparian areas from livestock.

Forest Practices Act Implementation – Non-federal forestland is managed in accordance with the Forest Practices Act (see Appendix B), as well as individual management plans based on geographic area (Northwest, Southwest, and Eastern Oregon). Example actions that can help prevent pollution of waterways include leaving vegetated buffers adjacent to streams, road placement and drainage to minimize runoff, and avoiding harvesting on steep slopes.

Harmful Algal Blooms (HABs) Strategy – Once a waterbody is identified as having HABs, the Department of Environmental Quality is responsible for investigating the causes, identifying sources of pollution, and writing a pollution reduction plan. The Department developed a Harmful Algal Bloom Strategy in 2011 to describe and recommend improvements to an overall strategy that they can implement in order to prevent and control, where possible, HABs in Oregon.[50] In 2023, the Department also published a Freshwater Cyanobacteria Harmful Algal Blooms Strategy that supports the continued implementation of many of the actions in the 2011 Strategy, but is written more specifically for agency staff and identifies additional needs to expand current operations[51].

Stormwater in Urban Areas

Stormwater runoff often contains pollutants that can adversely affect water quality. Strategy Action 6B calls for promoting low impact development and green infrastructure practices to reduce and manage stormwater. Strategy Action 7A supports the need to maintain and upgrade stormwater infrastructure, which is often a combination of built and green infrastructure.

Credit Portland Bureau of Environmental Services

National Pollutant Discharge Elimination System (NPDES) permits, issued by the Department of Environmental Quality (see Appendix B), are required for certain stormwater discharges that leave a site through a "point source," often a pipe, and reaches surface waters either directly or through storm drainage. A municipal separate storm sewer system, or "MS4", is a conveyance or system of conveyances (e.g., roads with drainage systems, municipal streets, catch basins, curbs, gutters, manmade channels or storm drains) owned or operated by a governmental entity that discharges to waters of the state. The population of an urban area determines whether they require an MS4 discharge permit. Oregon needs to ensure the effective management and oversight of stormwater in urbanized areas through the implementation of NPDES and MS4 permits, TMDL Implementation Plans for Urban Designated Management Agencies, best management practices, or through comparable voluntary plans.

Action 12C

Implement Water Quality Pollution Controls

Examples of how to carry out this action:

- Continue to develop and implement TMDLs for water bodies that do not meet water quality standards
- Continue to address nonpoint sources of pollution across all land uses
- Ensure effective management and oversight of stormwater in urbanized areas
- Assist communities with septic system challenges, including technical and funding resources for underserved communities
- Continue to update and revise TMDLs to conform with current temperature standards
- Continue to work with Designated Management Agencies, as defined in each TMDL, to achieve water quality standards
- Develop more programmatic implementation plans for common TMDL issues
- Continue to meaningfully engage with communities within the boundaries of new and updated TMDL's
- Review TMDL prioritization process to ensure geographic equity among places with a completed and approved TMDL
- Recognize role of water management and water withdrawals in meeting TMDL objectives

Septic Systems in Rural Areas

State law provides the Department of Environmental Quality with regulatory authority over on-site (e.g., septic) sewage treatment and disposal. More than one million Oregonians, or about 35 percent of the state's population, use on-site sewage systems, also known as septic systems. Most of these are single-family homes in rural areas without access to community sewer systems.

A failing septic system increases the risk of contamination of both surface water and groundwater and can be a public health hazard. Septic systems are required to be inspected at the time of construction to ensure they are correctly installed and functioning properly. Ongoing maintenance carried out by the system owner is critical to avoid system failures. Businesses that install septic systems or provide pumping services are regulated through a statewide licensing program. The Department of Environmental Quality provides direct service for on-site system permitting and installation in the counties of Baker, Coos, Curry, Grant, Jackson, Josephine, Morrow, Union, Wallowa, and Wheeler. The 26 remaining counties work directly with their local governments for permitting and installations, with oversight from the state.

The Department of Environmental Quality has established a new program, Oregon Septic Smart, to provide Oregonians with easy access to information and improve access to certified industry professionals that can perform septic system inspections. The Department also administers an Onsite Financial Aid Program to provide grants and low-cost loans to address failing septic systems. The program will utilize $15 million in federal American Rescue Plan Act funds that the 2021 Oregon Legislature allocated to the Department. The Department maintains a list of additional financial resources for onsite septic systems on their website

Critical Issue | Funding for Oregon's Waters

The 2023 Secretary of State Advisory Report regarding water security (Report 2023-04) identified that natural resources state agencies are chronically underfunded and understaffed in relation to their respective responsibilities[52]. Meeting the water challenges of today and tomorrow will require an increased investment in state agencies and programs.

Most Strategy actions require some type of funding, whether it is to hire or keep agency staff, purchase equipment, hire a specialist/consultant, or plan, design, and implement a project. Since 2021, the Legislature has increased the state's spending on water. Water investments from the 2021, 2022, and 2023 Legislative sessions are provided, below.

This section concludes with three distinct Strategy Actions: funding the development and implementation of the Strategy, funding water resources management by state agencies, and assisting with local or regional water challenges by funding planning, feasibility studies, and instream and out-of-stream water projects.

The Business Case for Investing in Water

The Business Case for Investing in Water in Oregon[53] outlines the risks, opportunities, and benefits associated with making some specific investments in water. The report finds that "Oregon should invest in ways that increase resiliency and flexibility and should do so in advance of crises rather than in response to crises." Figure 4-13 outlines the reports' five guideposts for investment and shows the corresponding critical issues and actions in the Strategy.

Figure 4-13: Business Case Guidance for Investment and Associated Strategy Actions

Business Case Five Guideposts to Meet Oregon's Current and Future Water Challenges	Critical Issues & Actions in the 2025 Strategy Aligned with Guidepost
Invest in whole-watershed and **nature-based approaches** for a range of benefits including future avoided costs of potential negative impacts from climate change	Instream & Ecosystem Needs, Actions 2A-2C Land Use Planning, Action 6B Infrastructure, Action 7A Healthy Ecosystems, Actions 11A-11E Funding, Action 13C
Fund innovative governance and **policy adaptations** to increase flexibility of water management and capitalize on collaboration and creativity	Water Use & Management, Actions 10D-10F Healthy Ecosystems, Action 11E Funding, Action 13B
Focus on **modernizing infrastructure** across the landscape in ways that help address specific risks like flooding, stormwater management, reduced summer baseflow, shrinking glaciers, fish passage, etc.	Energy & Water, Actions 4B-4C Infrastructure, Actions 7A-7C Healthy Ecosystems Actions 11A-11B
Enhance water justice by authentically **engaging frontline communities** in policy and power and targeting investments so that benefits are distributed to these communities equitably	Water Planning, Action 9E Funding, Action 13C
Recognize and invest to **support Tribal economic, spiritual, and cultural values** for water and fish and engage with Tribes as sovereign co-managers of the resource	Instream and Ecosystem Water Needs, Actions 2A-2C Out-of-Stream Water Needs, Action 3C Water Planning, Action 9C Healthy Ecosystems, Actions 11A-11E Clean Water, Actions 12A-12C Funding, Action 13C

"Oregon faces significant threats to its environment, economy and way of life from current and future water-related risks and challenges. Oregonians have demonstrated that they have many of the required strategies and tools at hand and have the expertise and motivation to develop new approaches when necessary. Wielding the tools and deploying the strategies, however, requires major investment not just once, but for the foreseeable future. The necessary investment cannot be underestimated and requires determination, commitment and engagement across all sectors, agencies, communities and levels of government and power. Importantly, it also requires inclusion of frontline communities that have been traditionally left out of decision-making and power over water including Tribes, low-income communities, rural communities, communities of color and others."

-The Business Case for Investing in Water in Oregon (2023)

Recent Legislative Investments in Water

2021 Legislative Water Package

The 2021 Oregon Legislature made historic investments in Oregon's water future, with the passing of a $538 million water package. Approximately $500 million of the funding package came from the federal American Rescue Plan Act (ARPA). This funding resulted in investments in many types of water infrastructure across Oregon, through grants, loans, and direct appropriations and came at a time when many communities had experienced several years of consecutive drought and/or devasting wildfires. While funding was provided to agencies for additional staff capacity, much of the water package included pass through funding where agencies used the money for contracting services or increasing funding through grant and loan programs. Continued funding for agency day to day operations remains a consistent funding challenge.

Figure 4-14: Investments from the 2021 $538 Million Water Package (House Bill 5006) and Related Strategy Actions

Investment Amount	Description	Related Strategy Actions
$275.7 M	Direct appropriations of ARPA funding for drinking water, wastewater, and stormwater infrastructure projects throughout Oregon	13C, 12A-12C, 7A-7C
$135.7 M	Public works funds and financial assistance programs to repair and replace water infrastructure	13C, 12A-12C, 7A, 7C
$46.5 M	Regional and basin-specific projects (Deschutes & Willamette Basins, Wallowa & Newport dams, Umatilla County)	13B, 13C, 9A, 10A-10C, 7A-7C
$39.9 M	Water Projects Grants and Loans, Feasibility Grants	13B, 13C, 5B, 10C-10F, 7C
$11.2 M	Modernize the data collection and technology used to monitor Oregon's water supply	13B, 1A-1C
$17.7 M	Water quality improvements (included research and technical assistance, TMDL development, fish screen/passage projects)	13B, 1A, 11B, 11D, 12A-12C, 7A
$6.5 M	Make Oregon's water infrastructure safer and more resilient (including dam safety)	5A-5C, 12A-12C, 7A, 7C
$5 M	Update Integrated Water Resources Strategy, regional water planning workgroup, place-based integrated planning, statewide business case assessment	13B, 13C, 9C, 6A, 12A

2022 Legislative Investments

During the 2022 Legislative Session, House Bill 5202 identified $25 million in funding to support Oregon's waterways and wetlands and to protect fish and other aquatic species during times of drought. Funding provided support for the Oregon Watershed Enhancement Board's voluntary water acquisitions program, the Oregon Department of Fish & Wildlife's fish passage barrier removal program and temperature and flow monitoring, and the Oregon Conservation and Recreation Fund. This funding provided meaningful benefits to drought-imperiled rivers, wetlands, and fish. Specifically, it funded:

- Increase in real-time temperature and streamflow gages throughout the state,
- Temperature loggers and staff time to identify and map cold water refugia areas that provide critical habitat for fish in times of drought when rivers reach lethal temperatures,
- Increase in Oregon Watershed Enhancement Boards's existing Water Acquisition Program which compensates water users who voluntarily choose to engage in instream transfers,
- Department of Fish and Wildlife staff and legal capacity to address a backlog of instream water right protests awaiting contested case hearings,
- Funding to improve fish passage to cooler habitats, and
- Increase in habitat restoration projects funded through the Oregon Conservation and Recreation Fund that improve drought resiliency of our rivers, waterways, and aquatic habitat.

2023 Drought Resilience and Water Security Package

The 2023 Oregon Legislature passed a $143 million Drought Resilience and Water Security Package, marking an important milestone in achieving support for many Strategy actions that address not only drought resilience, but many parts of water security. A fifteen-page summary of the 2023 Drought Resilience and Water Security Package lists the numerous pieces of legislation that support building drought resilience across Oregon. This funding package contains seven priority "focus areas," related to actions found throughout the Strategy.

1. **Water Project Investments – $68.9M**
   Funding associated with water project investment included direct appropriations for a range of water infrastructure projects, support for irrigation modernization projects, and a new grant program to complete feasibility studies and testing for potential aquifer recharge projects.

2. **Water for Fish: Instream Priorities and Watershed Health - $35.2M**
   Increased investments were made to Oregon Department of Fish and Wildlife's existing Fish Passage Fund and to the Oregon Conservation and Recreation Fund to improve wildlife passage and mobility and increase drought resilience in natural systems. Various funding sources were allocated for restoration across the state, including wetlands, floodplains, and watersheds impacted by western juniper.

3. **Water for Farms: Agricultural Resilience and Food Security - $9.7M**
   Funding has been allocated to help small-scale agricultural producers increase their resilience to drought and support the Oregon Community Food Systems Network to develop food hub infrastructure and drought resilience. Support was also provided for increasing access to agricultural water technical assistance through Oregon State University's Extension Service and Agricultural Experiment Station.

4. **Data and Analysis - $8.8M**
   Notable investments included funding to update the statewide water availability model (WARS), continued support for the Oregon Water Data Portal, and expanded authority for the Water Resources Department to require water use reporting.

5. **Planning, Coordination, and Capacity - $8.3M**

This focus area included permanent funding for Place-Based Integrated Water Resources Planning, grants to support other types of planning and coordination, and staff to address water distribution and water rights and protest backlog reduction.

6. **Water for Families: Drinking Water Security - $7.5M**
   Drinking water security will be enhanced by a new grant program to help water suppliers protect drinking water source areas, administered by the Oregon Watershed Enhancement Board. Additional investments include funding to research small community water system vulnerability and funding to expand the existing Water Well Abandonment, Repair, and Replacement Fund (WARRF).

7. **Outreach and Engagement - $4.4M**
   This funding focus area included $1.6M for the construction of a water system training center, to be managed by the Oregon Association of Water Utilities, facilitation support to continue the Tribal Water Task Force, and resources for the University of Oregon's Just Futures Institute to research and address water needs of environmental justice communities.

Oregon's Water Caucus

The Oregon Legislature's Water Caucus is a bipartisan, bicameral group of state legislators and staff committed to fostering a resilient water future for all. The Water Caucus recognizes that tackling complex water challenges requires focused leadership, innovation, and long-term commitment to learning and working together. Core functions include facilitating learning, convening conversations, promoting informed decision-making, and elevating the priority of water-related policies and investments. The Caucus includes members of diverse backgrounds and is led with balance across the Legislature's House and Senate as well as the state's major political parties.

Remaining Funding Gaps

Funding needs remain even after the two consecutive biennia of significant investments in water infrastructure, planning tools, and technical assistance. Agencies continue to need funding for data and analysis to inform near and long-term decision-making. Underinvestment in water infrastructure has been a problem for decades and will take time to adequately address. Small communities continue to need technical and financial support for water infrastructure, including assistance in pursuing grants. Senior water rights holders in the agricultural sector need financial incentives to dedicate water instream. Some agencies have seen flat funding for carrying out regulatory responsibilities and water management duties that do not keep up with increased costs or increased responsibilities. Agency funding for technology infrastructure and administrative support have not increased proportionally with growth in some agency programs.

> *"The state's water infrastructure suffers from decades of disinvestment and natural resource agencies lack funding and capacity to properly enact their duties."*
>
> -Secretary of State Advisory Report 2023-04 (2023)

Action 13A Fund Oregon's Integrated Water Resources Strategy

Agencies need funding to carry out a robust public process in updating the Strategy, as well as guide the ongoing implementation of the Strategy actions. The Water Resources Department lacked a full-time position dedicated to Strategy implementation after 2018. The Department regained a permanent, full-time position in 2023.The 2023 Legislative session also resulted in the addition of staff positions at other agencies to support the Strategy, including one staff member to the Department of Agriculture, two at the Department of Environmental Quality, and three at the Water Program at the Department of Fish and Wildlife. All natural resources agencies need adequate capacity to participate in the Strategy, especially those with statutory responsibilities.

Since 2009, Oregon has been required to update the Strategy every five years. However, in 2023, the Oregon Legislature extended this period to a maximum of every eight years, also adding the requirement for developing a biennial agency work plan to implement the Strategy. These changes go into effect after the adoption of the 2025 Strategy. Staff support across many agencies will be needed to coordinate efforts in developing the biennial work plan and implementing the Strategy's five objectives and 47 actions.

Action 13A
Fund Development and Implementation of Oregon's Integrated Water Resources Strategy

Examples of how to implement this action:

- Fund implementation of the Integrated Water Resources Strategy
- Fund the development and implementation of biennial Strategy workplans
- Fund the required Integrated Water Resources Strategy updates, including support from partner agencies
- Fund communication resources regarding the Strategy including web-based information and translations
- Fund the development of biennial progress reports to communicate progress on Strategy implementation

Ongoing Strategy implementation requires effort for coordination and communication. Updating the Strategy involves coordination with tribes, interested parties, the public, multiple federal and state agencies, briefings of boards and commissions, and countless hours collecting information on Oregon's water-related policies, programs, and practices. Consistent resources for agencies for Strategy coordination, implementation, and updates will allow for steady progress towards understanding and meeting our states instream and out-of-stream needs.

Action 13B Fund Water Resources Management by State Agencies

Although some of the Strategy actions fall under the purview of the private sector, nonprofit organizations, or academic institutions, most actions will fall to the public sector, particularly state agencies. The state plays a complex role when it comes to water resources management—supporting economic development while also protecting the public interest in areas like the environment, public health, and public safety.

Oregon has made historic investments in water over the last two biennia. It is important to continue to build upon these investments, while not losing sight of core responsibilities related to water. This action is intended to be broadly interpreted to include the many supporting roles natural resources agency personnel play in water management. For example, information technology, administration, education, communication, research, and monitoring are all critical activities that support effective water management.

For day-to-day operations at state agencies, there are many examples of Strategy implementation activities that require funding:

- Coordinating and partnering with other agencies and public and private entities
- Updating plans and participating in federal, state, and local planning activities
- Improving scientific information, including data collection, analysis, sharing, and use in decision-making
- Updating technical tools, including software, databases, maps, models, field equipment, and education/outreach materials
- Protecting and restoring instream flow, habitat, and access, including fish passage and fish screening
- Providing engineering, scientific, permitting, regulatory and other technical expertise to partners, interested parties, and customers
- Measuring and distributing water
- Assessing, developing, issuing, and denying or renewing permits that are protective of water resources
- Conducting compliance, public health/safety monitoring and inspections
- Enforcing compliance with permits (water rights, water quality, removal-fill, etc), statutes, and regulations
- Monitoring for and preventing invasive species, toxics, pollution, and hazards

Agency Budgets Support Local Governments and Districts

Many state agency budgets provide funding for local, on-the-ground organizations. For example, the Oregon Watershed Enhancement Board provides funding for watershed councils and soil and water conservation districts, in collaboration with Oregon Department of Agriculture. The Department of Land Conservation and Development provides technical assistance and funding for local governments relating to comprehensive land use planning and coastal resiliency.

Sources of Agency Funds

Oregon's natural resources agencies' operating budgets depend on a variety of funding sources, and the source can dictate the activities of an agency's time, staff, and resources. There are four primary funding mechanisms for most natural resources agencies: General Funds, lottery funds, federal funds, and fees. Economic development activities are often partially supported by fee revenues or contract funds for work performed. Environmental protection activities have often depended on public funds.

The General Fund is used for a variety of public purposes and the amount of General Fund is limited, meaning there is competition for these dollars. The legislatively approved budget for 2023-25 shows the General Fund investment in natural resources agencies equated to almost 2 percent, or $606 million, of the $31.9 billion General Fund budget. The budget for 2021-2023 was also about 2 percent of the General Fund, however, the previous decade consistently allocated closer to 1 percent of the General Fund to natural resources agencies.

Over the years, natural resources agencies have become increasingly reliant on lottery funds and federal funds, which are often geared toward specific, local projects, rather than maintaining core functions and daily operations. Many natural resources agencies also rely on permit fees however, these funds do not cover the real cost of conducting transactions.

An agency's ability to maintain consistent levels of staffing and services requires consistent General Fund and fee revenue. When fee revenue is low, an agency must administratively manage the budget to control costs. This includes leaving positions across the agency open as they become vacant and shifting General Funds, or other available funding sources, to cover fee gaps. This ultimately results in misalignment between staffing levels and workloads agencywide. Often, as water becomes scarcer, the work required of natural resources agency staff becomes more complex and time consuming and fees are typically not enough to recoup the costs.

Action 13B

Fund Water Resources Management Activities by State Agencies

Examples of how to implement this action:

- Fund those water management activities for which the state has responsibility
- Ensure increased and adequate funding from the General Fund
- Seek additional funding sources (e.g., federal funding, bonding)
- Provide funding for agency operations and equipment (e.g., administration, information technologies, interagency coordination, data acquisition and management)
- Allow agencies to adjust fees to ensure that their programs protecting water resources are sustainably funded
- Evaluate and implement opportunities to improve equitable delivery of services by state agencies
- Support agency capacity to carry out the Strategy
- Provide ongoing support for the Oregon Water Data Portal to provide a platform for state agencies and partners to share data and information with the public to support water-related decision making
- Provide equitable access to technical assistance (e.g., state and federal agencies, SWCD's) for communities

Federal funding sources can help support targeted agency projects; most recently, they provided a much-needed boost to help replace and upgrade water infrastructure. Many federal funding opportunities require state matching funds, highlighting the need to have state resources available to leverage federal dollars. Federal funding for many core environmental protection programs carried out by the state, such as the Clean Water Act, have remained flat for many years. As a result, program service levels have been reduced, elevating the need for additional sources of funding.

Action 13C Invest in Planning, Feasibility Studies, and Project Implementation

Agencies often administer grants and loans to support many types of instream and out-of-stream projects. This role carries with it responsibility for distributing public funds in an equitable manner, addressing racial and environmental justice. Oregon's DEI Action Plan provides guidance for investments, stating they should be targeted to historically and currently under-resourced populations and/or organizations. Project funders should also consider how project outcomes might negatively impact water affordability. Resources have historically been limited to provide financial assistance to low-income households for water and wastewater utilities.

The Federal Justice40 Initiative provides an aspirational model for identifying disadvantaged communities and prioritizing investments to benefit those same communities. Specifically, the Initiative requires that 40-percent of overall benefits of certain climate, clean energy, and other federal investments flow to disadvantaged communities marginalized by underinvestment and overburdened by pollution.

Planning

Planning is done successfully by ensuring that resources exist to help organize people and facilitate the conversation. It also takes resources to gather existing information and to complete new technical assessments that fill key knowledge gaps. In any planning effort, communication and outreach are fundamentally important and require investment of both time and resources.

Investments are needed to support existing state agency planning programs and new planning initiatives. The Water Resources Department administers the Place-Based Integrated Planning Program. The Department of Land Conservation and Development administers numerous planning-focused grants including the General Fund Grant Program to support local governments with local comprehensive planning and plan updates, the Oregon Coast Management Program Coastal Grants to support coastal resiliency, and the Community Green Infrastructure Grant Program to fund planning and development of community green infrastructure projects.

Feasibility Studies

Local communities find it most difficult to secure feasibility study funding as part of their project development. Such studies help determine the viability of a project as well as the environmental, engineering, economic, and social implications of proposed water projects.

One way Oregon can help with costs is to bridge the existing funding gap for feasibility studies. In 2008, the Water Resources Department began providing funding for Feasibility Study Grants for water conservation, reuse, and storage projects. Since then, approximately $9.9 million has been awarded to support 120 feasibility studies.

Business Oregon and Oregon Health Authority provide funding for feasibility studies through the Sustainable Infrastructure Planning Projects forgivable loan program. Business Oregon also funds feasibility studies through other programs, including the Safe Drinking Water Revolving Loan Fund and Water/Wastewater Financing Program.

The Oregon Watershed Enhancement Board can also fund feasibility studies through their Technical Assistance Grants, if the applicant can demonstrate it is necessary for an acquisition or restoration project. The Department of Land Conservation and Development offers Technical Assistance Grants for public facilities feasibility studies in support of housing production.

In 2024, the Oregon Department of Environmental Quality offered forgivable loans up to $100,000 for planning and feasibility studies with Bipartisan Infrastructure Law funds through their Clean Water State Revolving Fund.

Instream and Out-of-Stream Project Implementation

The Strategy identifies many actions needed to meet instream and out-of-stream water demands. Many of these actions point to types of projects that are needed, such as ecological restoration (Actions 10A-10E), modernizing irrigation infrastructure (Actions 12B & 13A), or upgrading many types of water infrastructure to be more resilient to climate change and natural hazards (Actions 6A-6C, 13A-13C). Fortunately, many existing state agency programs can help fund a wide range of water projects. The Oregon Watershed Enhancement Board has grant programs that can fund many aspects of a habitat restoration project including community engagement, technical assistance, construction, and monitoring. The Oregon Watershed Enhancement Board also funds voluntary instream water transactions with water right holders to benefit fish and wildlife habitat and water quality. Business Oregon has numerous grant and loan programs that fund site assessment, remediation, and water infrastructure planning, design, and implementation. The types of water infrastructure projects that receive funding include drinking water supply, stormwater conveyance, wastewater treatment, water storage, and levees.

The Water Resources Department's Water Projects Grants and Loans Program funds evaluation, planning, and the development of instream and out-of-stream water projects that have an economic, environmental, and social or cultural benefit. The Irrigation Modernization Funding program is also led by the Department, providing grants for projects that improve water use efficiency on currently irrigated agricultural lands.

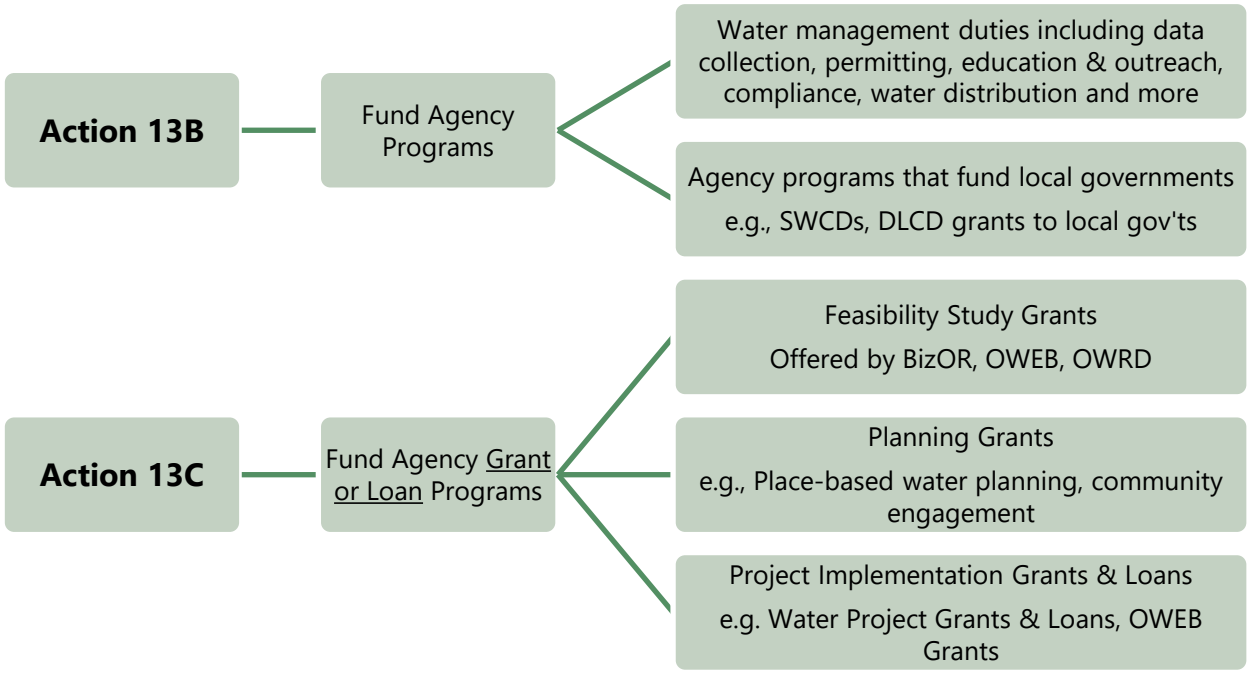
> "Coordinated and new investments will ensure communities – including Oregon's federally recognized tribes and those people living in disproportionately impacted and rural communities - can afford and access adequate clean water, and return it to our rivers for downstream users, fish, and wildlife."
>
> .-100-Year Water Vision (2020)

The Department of Fish and Wildlife administers the Private Forest Accord Grant Program and the Oregon Recreation and Conservation Fund. The Private Forest Accord Grant Program can support watershed-scale investments in projects like stream habitat restoration, removal of barriers to fish passage, cold water and flow protection, beaver-modified habitat creation, and other statewide benefits for the species covered by the Private Forest Accord Habitat Conservation Plan. The Oregon Recreation and Conservation Fund supports projects that help implement the Oregon Conservation Strategy, protecting and enhancing species and habitats, and providing opportunities for wildlife-associated recreation and education.

The Oregon Department of Environmental Quality leads the Clean Water State Revolving Fund, which provides below-market rate loans for water infrastructure projects. Business Oregon and the Oregon Health Authority partner on the Drinking Water State Revolving Fund which provides low-cost loans to community and non-community water systems for planning, design, and construction of drinking water facility improvements.

Throughout Oregon, municipalities, organizations, businesses, and individuals apply for state funding. Projects often require multiple funding sources to be viable, increasing the impact of grant application and award timing. Project applicants can benefit from agency communication, coordination, and technical assistance to piece together various funding sources.

Figure 4-15: Guidance for using Action 13B or Action 13C



Action 13C

Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Examples of how to implement this action:

- Continue to authorize and fund public and private investments in efforts such as Place-Based Integrated Water Resources Planning, including plan implementation
- Provide funding to assist small water systems to develop and implement water management and conservation plans
- Provide funding to support hazard mitigation planning (e.g. droughts, floods) at the local level
- Support river basin-planning updates
- Authorize bonds to finance investments in water resource-related projects
- Ensure that basic water infrastructure maintenance needs continue to be eligible for grant and loan funding
- Advocate for continued state and federal funding for water and wastewater-related infrastructure
- Develop funding and technical support for low-income, small communities, and districts to maintain, upgrade, and operate water and wastewater-related infrastructure
- Continue funding and support for watershed restoration and OWEB Focused Investment Partnerships
- Continue to fund OWRD Feasibility Study Grants, Water Project Grants and Loans, and Water Well Abandonment, Repair, and Replacement funding opportunities
- Continue to provide BIZOR and OWEB administered grants that cover feasibility studies
- Support water project community engagement, including participation by representatives of disproportionately impacted communities (See HB 3293 (2021) that applies to BIZOR, ODEQ, ODFW, OHA, OWEB, and OWRD)
- Target investments so that benefits are distributed to frontline communities equitably
- Look for ways to support the federal Justice40 Initiative, a goal that 40 percent of benefits of specific federal investments are directed toward those marginalized, underserved, and overburdened by pollution
- Develop a centralized funding platform to help link people with project-appropriate funding programs

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CONCLUSION

Implementation and Looking Forward

Water is a finite resource with growing demands; water scarcity is a reality in Oregon. Water-related decisions should rest on a thorough analysis of supply, the demand / need for water, the potential for increasing efficiencies and conservation, and alternative ways to meet these demands."

- Policy Advisory Group (2016)

Chewaucan River near Paisley, Oregon. Credit: Garrett Steensland

Strategy Workplan and Implementation

The statute guiding the development and implementation of the Strategy was updated in 2023 to require a biennial workplan. Following the adoption of the 2025 Strategy by the Water Resources Commission, the Water Resources Department will work with agencies to develop the first biennial workplan that reflects the agency priorities and the legislatively adopted budget for the 2025-27 biennium. Future workplans will include engagement with agencies, water partners, and the public in advance of biennial agency budget processes and legislative concept development to adequately support Strategy implementation. Workplan development provides an opportunity to coordinate work across many agencies and partners and must be done in a way that protects the public interest and balances instream and out-of-stream needs.

Agencies will continue to make progress as resources allow. Each agency budget cycle and legislative session provides a new opportunity to identify and secure necessary resources to implement the Strategy.

Closing Thoughts

Since 2012, the Strategy has provided Oregon with a roadmap to improve our understanding of our water resources and work towards meeting our instream and out-of-stream needs. Most years, steady progress has been made on the Strategy actions. The last four years of legislative investments have allowed for a significant increase in activity. Private landowners, communities, non-profits, businesses, local governments, utilities, tribes, and state and federal agencies have come together to discuss difficult topics, develop creative solutions, find funding, and implement projects on the ground.

During public engagement for the 2025 Strategy, differences in opinion were shared about how to address our water challenges. But commonalities were also shared, across different communities throughout the state. Participants also shared a message of hope:

- Encouragement about the development of new devices and technology for both addressing water quantity (such as more efficient tools for agriculture or for households) and water quality
- Empathy and care for what people in other parts of the state might be facing with water in their communities. As one Marion County resident put it, "There are so many of us who care deeply about water, and there are not many ways to show that or ways to find each other if we are not already involved in water management as large-scale customers, professional experts, or administrators."
- A desire to learn more
- Hope in future generations as water and land stewards
- Appreciation for opportunities to be part of the statewide conversation on water

More work is yet to be done. Let the Strategy be the springboard for conversations about both water problems and water solutions. We can't live without water, and we can make choices now that make future conversations easier rather than harder. To quote many Strategy engagement participants, "water is life."

The next edition of the Strategy is due eight years.

ACKNOWLEDGEMENTS

Documents of this scope and depth are the product of a talented team and a public who cares deeply about the future of water in Oregon. With gratitude for their time, expertise, and patience, we would like to thank:

The IWRS Project Team:

- Crystal Grinnell (Project Manager), OWRD
- Hilary Foote and Amanda Punton, DLCD
- Danette Faucera and Spencer Sawaske, ODFW
- Victoria Binning and Kevin Fenn, ODA
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- Jason McClaughry, DOGAMI
- Andre Ourso, OHA
- Stephanie Page, OWEB
- Amanda Punton, DLCD
- Bill Ryan, DSL
- Isaac Stapleton, ODA
- Jon Unger, BIZOR
- Jennifer Wigal, ODEQ
- Paul Wirfs, ODOT
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The Federal Liaison Team:

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- Hilaire Bojonell, USFS
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- Molly Schmelzle, OWRD
- Tim Seymour, OWRD
- Lisa Snyder, OWRD
- Jason Spriet, OWRD

Public Engagement and Facilitation

- Wendy Willis, Director, Oregon's Kitchen Table
- Thien-Kim Bui, Oregon's Kitchen Table
- Sarah Giles, Oregon's Kitchen Table
- Ruby Mitchell, Oregon's Kitchen Table
- Suk Rhee, Oregon's Kitchen Table
- Robin Teater, Oregon's Kitchen Table
- Oregon's Kitchen Table organizers, translators, and interpreters

The Oregon Board of Agriculture:

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APPENDICES

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Appendix A

Water Governance – Tribal, State & Federal Agency Water Roles & Responsibilities

Water Governance

In Oregon, all water belongs to the public and no single agency or entity has sole jurisdiction when it comes to water management. There are many public and private organizations with specific responsibilities and authorities related to the management of water resources. These organizations reside at the state, federal, and local level, and with tribal governments within Oregon, and each has a different mission, funding base, and constituency. The 2025 Strategy recognizes the importance of Oregon's legal, scientific, and institutional foundation and commits to continue to improve it.

Tribal Governments

Tribes in Oregon

Many tribes have established longstanding roots in Oregon, dating back to time immemorial, with nine of them currently holding federal recognition. Federally recognized tribes are recognized as sovereign with control of their governance, land, and resources. This recognition establishes a formal government-to-government relationship between Oregon and these tribes. Unless otherwise specified, references to tribes in this document pertain to those federally recognized.

Historical Context of Sovereignty

It is critical to understand the history surrounding sovereignty of federally recognized tribes as independent nations, to understand the current state of water management in Oregon. Oregon's tribal history encompasses the ceding of land, reservation establishment, the loss of sovereignty during the 1950s termination era, and the subsequent efforts to reinstate sovereignty from the 1970s onwards. The impact of these events varied among tribes, with some facing challenges in fully restoring their sovereignty. There are currently at least 14 modern indigenous tribal nations in Oregon. The summary, below, provides an overview of the general history surrounding tribal sovereignty.

Excerpted from the Oregon Blue Book, Introduction to Native Peoples of Oregon[i]:
"Tribal governments are separate and unique sovereign nations with powers to protect the health, safety and welfare of their enrolled members and to govern their lands. This tribal sovereignty predates the existence of the U.S. government and the State of Oregon. The members residing in Oregon are citizens of their tribes, citizens of Oregon, and since 1924, citizens of the United States of America.

The U.S. Department of the Interior, Bureau of Indian Affairs, oversees tribal interests and administers the federal government's trust obligations. At times, the federal government has been supportive of tribal self-determination, and in other periods, has adopted policies and passed legislation having a negative impact on the ability of tribes to govern as sovereigns. "Termination," one such policy in the 1950s, was an attempt to sever federal trusteeship and support for tribal sovereignty. Of the 109 tribes and bands terminated nationwide, 62 were in Oregon. In 1975, the federal government recognized the failure of its termination policy and passed the Indian Self-Determination and Education Assistance Act, and later, the Tribal Self-Governance Act.

Several tribes began the process to restore their status as sovereign nations. In 1977, The Confederated Tribes of Siletz was the second tribe in the nation to achieve restoration. Following Siletz was the Cow Creek Band of the Umpqua Tribe of Indians in 1982, the Confederated Tribes of Grand Ronde in 1983, the Confederated Tribes of Coos, Lower Umpqua and Siuslaw in 1984, the Klamath Tribes in 1986 and the Coquille Indian Tribe in 1989. Another three federally recognized tribal governments exist in Oregon: The Confederated Tribes of Warm Springs (Treaty of 1855), the Confederated Tribes of Umatilla (Treaty of 1855) and the Burns Paiute Tribe (1972 Executive Order). Fort McDermitt Paiute Shoshone Tribe is a federally

recognized tribe with reservation lands straddling Oregon and Nevada, but the tribe's population center is in Nevada. Celilo Village is a federally recognized tribal entity near The Dalles, jointly administered by the Confederated Tribes of Warm Springs, the Confederated Tribes of Umatilla, and the Yakama Indian Nation (Washington).

All Oregon tribal governments have reservation or trust lands created by treaties, statutes or executive branch actions. Tribal governments have regulatory authority over these lands, unless that authority has been removed by Congress. Nearly 904,000 acres, or at least 1.6% of land within Oregon's boundaries, are held in trust by the federal government or are designated reservation lands. Tribal governments have the authority to decide their own membership qualifications and have a right to exclude individuals from their reservations.

Public Law 280 gave the state certain civil and criminal jurisdiction over tribes with the exception of the Confederated Tribes of Warm Springs, the Confederated Tribes of Umatilla and the Burns Paiute Tribe, which are "non Public Law 280" tribes. Notwithstanding Public Law 280, all Oregon tribes have the authority to elect their own governments and adopt laws and ordinances. Oregon tribal governments have their own departments dealing with governmental services, including law enforcement and tribal court systems. In addition, each tribal government operates programs in the areas of natural resources, cultural resources, education, health and human services, public safety, housing, economic development and other areas to serve their members."

Websites for each of the nine federally recognized tribal nations in Oregon provide additional information about the Tribes' history, culture, and current projects:

- Burns Paiute Tribe
- Confederated Tribes of Coos, Lower Umpqua, and Siuslaw
- Confederated Tribes of the Grand Ronde Community of Oregon
- Confederated Tribes of Siletz Indians of Oregon
- Confederated Tribes of the Umatilla Indian Reservation
- Confederated Tribes of Warm Springs Reservation of Oregon
- Coquille Indian Tribe
- Cow Creek Band of the Umpqua Tribe
- Klamath Tribes

It is important to note that there are tribes that have pursued, but not received, federal recognition. Without formal recognition, these tribes are not able to engage in government-to-government processes or benefit from some federal resources.

Tribal Relations with the State of Oregon

Oregon was the first state to adopt a legal government-to-government relationship with tribes through both executive action and legislation. Even so, tribes have historically been left out of water planning and water rights decisions in Oregon. State agencies are continuing efforts to collaborate and consult with Tribes on water issues. Each state agency has a staff person assigned to the role of Tribal Liaison, and as part of this role, is tasked with identifying changes and initiatives in the agency which may impact tribes and/or tribal members, and then to engage early and appropriately with tribes. Each agency's Tribal Liaison is responsible for developing an annual Government-to-Government (G2G) report that outlines the agency's efforts and actions during the past year to consult, coordinate, collaborate, and enhance relations with tribal nations. These reports are submitted to the Legislative Commission on Indian Services.

Legislative Commission on Indian Services (LCIS)
LCIS was created by statute in 1975 to improve services to Indians in Oregon. Its 13 members are appointed jointly by the Senate President and the Speaker of the House to a two-year term. LCIS members select their own officers to serve one-year terms. Prior to its establishment, there was no suitable mechanism in state government to consider Indian concerns directly. LCIS serves as the main forum in which Indian concerns are considered. It serves as a conduit through which concerns are channeled through the network to the appropriate entity; it serves as a point of access for finding out about state government programs and Indian communities.

Working Groups
There are several topic-specific working groups established between tribes and state agencies. Two groups that frequently discuss water-related work include the Cultural Resources Cluster and the Natural Resources Working Group.

Tribal Water Task Force
In September of 2021, the nine sovereign tribes of Oregon wrote to the Governor addressing Oregon's 100-year Water Vision. The letter shared tribal perspectives on water and noted the importance of tribal engagement in any water planning process. The letter requested the establishment of a Tribal Water Task Force, which would serve two primary functions:

- Educate Oregon's nine Tribes to the full complement of state agencies that touch upon water and that have a bearing on one or more of Oregon's water resources
- Educate Oregon's nine water-related agencies on the full complement of Tribal interests/issues that "Oregon's Water Vision" needs to acknowledge and address

The Task Force met five times during the summer and fall of 2022 and the 2023 Legislature has allocated funding for future facilitation. The Task Force released a summary report of their findings and recommendations from the 2022 meetings, also identifying a number of shared values about water that were agreed upon between both the Tribes and the State of Oregon:

1. The foundational and inherent importance of water for life and culture;
2. The need to plan for and invest in water with a long-term vision. The Tribes have an important value of making decisions with seven future generations in mind and the State has embarked on a 100-year water vision. It is clear that all parties understand the importance and need for long term visioning and planning;
3. Importance of Tribal engagement in water planning in Oregon at all levels;
4. Recognizing and emphasizing the urgency of the current and ongoing impacts of climate change on our environment and the effect climate change has on water; and
5. Understanding that we will all be better and stronger if we work together moving forward.

Tribal Water Authorities

As sovereign entities, tribal rights and authorities may be derived, retained, or defined from treaties, Congressional Acts, or Executive Orders, and are often further clarified through case law and adjudications. The right to hunt, fish, and gather is an important right to Northwest Tribes, and may extend to areas outside of reservation lands. The ability to fulfil a right to hunt, fish, and gather is notably

dependent on ecosystem health, including water quality and quantity conditions necessary to sustain populations of culturally significant species.

Tribal reserved water rights are generally determined through an adjudication or settlement agreement. While several tribes are working closely with the Water Resources Department to resolve historic water right claims, many tribes hold water rights associated with the purchase of land. The priority date associated with a water right is maintained, even after the land changes ownership. Therefore, some tribes hold senior water rights based on the priority date of the water right they acquired through land purchase.

Tribes may apply to the U.S. Environmental Protection Agency for authorization to administer water quality standards under the Clean Water Act. This means they may obtain similar authority to the Oregon Department of Environmental Quality, referred to as "primacy." The Confederated Tribes of Umatilla Indian Reservation, the Confederated Tribes of Warm Springs Reservation of Oregon, and the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw have established such authority.

Refer to the section "Water Laws, Policies, and Regulations," in Appendix B, for a more holistic description of water quantity, quality, and ecosystem regulations, including roles of tribal, state, and federal governments.

State Government

There are several agencies in Oregon with responsibilities related to water resources. The following text provides a brief description of each agency's' role, to enhance coordination and help illustrate how they might best participate in the Strategy.

State Interagency Project Team

Many state agencies contributed to the 2025 Strategy, however, five of these agencies served on an interagency project team from 2022 to 2025 and significantly supported its development. Agencies are listed in alphabetical order.

Oregon Department of Agriculture (ODA)
ODA's mission is to "ensure healthy natural resources, environment, and economy for Oregonians now and in the future through inspection and certification, regulation, and promotion of agriculture and food." ODA oversees many programs that protect water quality and habitat. The Agricultural Water Quality Program implements a compliance and enforcement program, identifies Strategic Implementation Areas needing additional water quality improvement, and supports water quality monitoring. The Soil & Water Conservation District (SWCD) program administers grants to SWCDs to provide technical assistance, for education and outreach, and for voluntary water quality projects. The Confined Animal Feeding Operations (CAFO) and Pesticide Programs led by ODA also focus on collaboration and strategies to protect water quality. The Insect Pest Prevention & Management Program supports invasive species eradication.

Oregon Department of Environmental Quality (ODEQ)
ODEQ's mission is to "be a leader in restoring, maintaining, and enhancing the quality of Oregon's air, land, and water" and is responsible for implementing the federal Clean Water Act and state water quality law in the state. ODEQ has four Divisions: Air Quality, Land Quality, Water Quality, and Laboratory Administration. The Land Quality Division oversees programs that address pollutant management and

cleanup, while the Laboratory performs various tasks in support of the agency mission, including many that are related to the Strategy, such as overseeing water quality monitoring programs. The Water Quality Division implements state and federal laws to protect and restore Oregon's rivers, lakes, streams, oceans, estuaries, and groundwater. This work plays a critical role in ensuring that Oregon's water resources are safe and available for both instream and out-of-stream beneficial uses, such as drinking water, fish and other aquatic organisms, recreation, the ability to consume fish safely, and irrigation. Programmatic and regulatory responsibilities within the Water Quality Division include developing and issuing permits for wastewater treatment systems and industrial, construction, and municipal stormwater discharges that protect land, surface, and ground waters.

ODEQ coordinates with other state and federal agencies on actions that may affect Oregon waters including partnering with other state agencies to support water quality programs and implement water-related regulations.

Oregon Department of Fish and Wildlife (ODFW)
ODFW's mission is to "protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations." ODFW is responsible for implementing Oregon's Endangered Species Act (ORS 496.171-496.192). ODFW has three main Divisions - Fish, Habitat, and Wildlife - all of which provide some level of support for the Strategy. Fish Division programs include fish passage/screening, engineering, public education, conservation, and recovery. The Habitat Division programs collect and share data, identify conditions needed to support aquatic and terrestrial species including instream flow, and support restoration activities. The Wildlife Division includes a conservation program that implements the Oregon Conservation Strategy and a habitat program that oversee 16 ODFW Wildlife Areas. ODFW also co-manages an Aquatic Invasive Species Prevention Program with OSMB.

Oregon Department of Land, Conservation, and Development (DLCD)
DLCD's mission is to "help communities and citizens plan for, protect and improve the built and natural systems that provide a high quality of life." DLCD fosters sustainable and vibrant communities and protects Oregon's natural resources legacy. DLCD's work is guided by Oregon's 19 Statewide Land Use Planning Goals, requiring each city and county to adopt and maintain a comprehensive plan addressing these goals. DLCD has been leading Oregon's Climate Change Adaptation Framework and Climate Change Vulnerability Assessment. Additionally, DLCD administers a variety of grants for comprehensive plan updates, public facilities plan updates, natural hazard mitigation planning, and climate change adaptation and mitigation. DLCD provides annual funding to Portland State University (PSU) to update county-level population forecasts. DLCD's work on housing production is relevant to the Strategy's focus on meeting water resource needs. Within the coastal zone – defined as the crest of the coast range out to three nautical miles offshore – the Oregon Coastal Management Program within DLCD uses its Federal Consistency authority under the Coastal Zone Management Act to review federal permits, licenses, and federal agency-led activities against the enforceable policies of the coastal program. These include state policies related to water quality, water appropriation, submerged land uses, archaeological resources, and species and habitat protection. Proposed projects found inconsistent with these policies may be subject to conditions or a formal objection that can prevent the action from proceeding.

Oregon Watershed Enhancement Board (OWEB)
OWEB's mission is "to help protect and restore healthy watersheds and natural habitats that support thriving communities and strong economies." The agency provides grants to a variety of public and private entities to accomplish habitat conservation, restoration, protection, land and water acquisition, and monitoring. OWEB currently offers more than 20 different grant programs. OWEB's work supports the Oregon Plan for Salmon and Watersheds, including the task of coordinating watershed monitoring data from a variety of private landowners, federal, and state agencies. OWEB maintains the Oregon Watershed Restoration Inventory (OWRI) database which quantifies conservation and restoration results to inform future efforts.

Oregon Water Resources Department (OWRD)
OWRD's mission is "to serve the public by practicing and promoting responsible water management through two key goals; one, to directly address Oregon's water supply needs, and two, to restore and protect streamflows and watersheds in order to ensure the long-term sustainability of Oregon's ecosystems, economy, and quality of life." Under Oregon law, all water belongs to the public, and with some exceptions, all water users must obtain a permit or license from OWRD to use water from any source. OWRD collects, analyzes, and provides water quantity data to other agencies and to water users. OWRD processes water rights transactions, adjudicates claims to water uses which predate Oregon Water Law and federal and tribal reserved water claims, distributes water under the water rights system of prior appropriation, and addresses unauthorized uses of water. OWRD also protects public safety through the well construction and dam safety programs. OWRD provides planning, technical assistance, and funding to address instream and out-of-stream water supply needs. OWRD is responsible for developing and updating the Strategy, in collaboration with other state agencies, tribes, interested parties, and the public.

Other Water-Related State Agencies

Many state agencies play a role in the Strategy and include natural resource agencies in addition to agencies that support economic development and public health. Agencies are listed in alphabetical order.

Business Oregon (BizOR)
BizOR is the state's economic development agency, with a mission to "invest in Oregon businesses, communities, and people to promote a globally competitive, diverse, and inclusive economy." BizOR administers a variety of loan and grant programs that support site assessment, remediation, and water infrastructure planning, design, and implementation. The types of water infrastructure projects that receive funding include drinking water supply, stormwater conveyance, wastewater treatment, water storage, and levees.

Department of Geology and Mineral Industries (DOGAMI)
DOGAMI's mission is to "provide earth science information and regulation to make Oregon safe and prosperous." DOGAMI works to increase understanding of Oregon's geologic resources and hazards through science and stewardship. There are two main programs at the Agency: Mineral Land Regulation and Reclamation (MLRR) and Geological Survey and Services (GS&S). The MLRR Program oversees the state's mineral production and works to minimize impacts of natural resource extraction and to maximize the opportunities for land reclamation. This includes extensive interagency coordination to enforce mining permits that protect water quality, among other environmental concerns. The GS&S program has much more extensive interaction with the Strategy, including earth science data collection, information sharing, natural hazard mapping, and identification of risk reduction strategies. Staff in the GS&S program lead the Oregon Lidar Consortium which organizes the collection of lidar data in coordination with dozens of local, state, and federal partners.

Oregon Department of Energy (ODOE)
ODOE's mission is to "help Oregonians make informed decisions and maintain a resilient and affordable energy system." The agency accomplishes this through a combination of data collection/analysis, education, technical assistance, regulation, oversight, and administration of energy programs. ODOE offers a variety of incentive programs to encourage energy and water conservation.

Oregon Department of Forestry (ODF)
ODF's mission is to "serve the people of Oregon by protecting, managing, and promoting stewardship of Oregon's forests to enhance environmental, economic, and community sustainability." The Forest Practices Act (FPA) guides ODF's management of private and federally owned forests. Publication of the Private Forest Accord Report and legislation passed in 2022 has guided modifications to the FPA and ODF administrative rules, providing additional protections to habitat and water quality. ODF's Fire Protection Program protects 16 million acres of forest, on private and public lands. ODF also manages over 700,000 acres of state-owned forests and the state's Common School Fund Forest Lands. Management approaches to both private and public forests provide an opportunity to protect water quality, conserve and restore habitat for native species, and eradicate invasive species.

Oregon Department of Higher Education, Oregon Climate Change Research Institute (OCCRI)
OCCRI was created by the Oregon Legislature in 2007. OCCRI serves several functions regarding conducting and sharing climate change research and provides technical assistance to local governments in developing climate change policies, practices, and programs. OCCRI publishes biennial assessments on the state of climate science and the likely effects of climate change in Oregon.

Oregon Department of Human Services (ODHS)
ODH's mission is "to help Oregonians in their own communities achieve well-being and independence through opportunities that protect, empower, respect choice, and preserve dignity." The ODHS Office of Resilience and Emergency Management coordinates with governmental and non-governmental agencies to provide food, water, and shelter during a major emergency or disaster, in accordance with Oregon's Comprehensive Emergency Management Plan. In recent years, ODHS provided emergency water to communities impacted by drought, wildfire, and contaminated groundwater.

Oregon Department of State Lands (DSL)
The Department's mission is "to ensure Oregon's school land legacy and protect wetlands and waterways of the state through superior stewardship and service." DSL oversees permitting associated with removal or fill in wetlands and or waterways, as defined in Oregon's Removal-Fill Law (ORS 196.795-990). The Department maintains programs and training to support natural resource identification, included the Oregon Rapid Wetland Assessment Protocol (ORWAP), Stream Function Assessment Method (SFAM), and Aquatic Resource Mitigation Framework. DSL also coordinates with state, federal, and community partners to address abandoned or derelict vessels in waterways.

Oregon Department of Transportation (ODOT)
ODOT's mission is to "provide a safe and reliable multimodal transportation system that connects people and helps Oregon's communities and economy thrive." ODOT holds a single National Pollutant Discharge Elimination System MS4 permit issued and regulated by Department of Environmental Quality that covers the operation of all ODOT storm drain systems statewide. ODOT has implemented the Guide "Routine Road Maintenance: Water Quality and Habitat Guide Best Management Practices" since 1999. The guide is considered the cornerstone of ODOT's Office of Maintenance and Operations Environmental Section.

ODOT Maintenance crews use the Guide to help minimize impacts to the environment while performing day to day highway maintenance activities and to comply with provisions of the Endangered Species Act.

Oregon Health Authority (OHA)
OHA's mission is "ensuring all people and communities can achieve optimum physical, mental, and social well-being through partnerships, prevention, and access to quality, affordable health care." OHA is the primacy agency for implementing the federal Safe Drinking Water Act. While OHA encompasses many divisions and programs that promote public health, it is the Environmental Public Health (EPH) and Drinking Water Services (DWS) sections of the Public Health Division that includes the most relevant activities in relation to the Strategy. OHA-EPH identifies, assesses, and reports on threats to human health from exposure to environmental and occupational hazards, and also advises the people and communities of Oregon on how to best understand potential risks where they live, work and play. OHA-EPH's involvement with water is through the Healthy Waters program that includes Fish Consumption Advisories, Harmful Algae Bloom Surveillance (HABS), Beach Monitoring, and Domestic Well Safety. In addition, OHA-DWS has primacy from the federal Environmental Protection Agency to implement the Safe Drinking Water Act. OHA-DWS administers and enforces drinking water quality standards for public water systems. OHA-DWS provides water system operator training, technical assistance for water systems, emergency planning and response, and infrastructure funding for the federally regulated public water systems. OHA-DWS implements Drinking Water State Revolving Funding jointly with Business Oregon and source water protection program jointly with the Department of Environmental Quality.

Oregon Parks and Recreation Department (OPRD)
OPRD's mission is "to provide and protect outstanding natural, scenic, cultural, historic and recreational sites for the enjoyment and education of present and future generations." OPRD manages and maintains state parks, campgrounds, and beaches. They administer several grant programs, all aimed at increasing access to recreation. OPRD manages the State Natural Areas Program to protect and recognize high quality native ecosystems and rare plant and animal species. OPRD also manages the Scenic Bikeways, Scenic Trails, and Scenic Waterways Programs. Waterway designation places restrictions on the types of activities that can occur within or near the banks of the waterway.

Oregon State Marine Board (OSMB)
OSMB's mission is to serve "Oregon's recreational boating public through education, enforcement, access, and environmental stewardship for a safe and enjoyable experience." OSMB titles and registers motorized boats and sailboats, issues titles for floating properties, issues Waterway Access permits for nonmotorized boats a minimum of 10 feet in length, make rules for boat operation, register outfitter guides, manage mandatory motorized boater education, contract with Counties and Oregon State Police for on-water law enforcement, administer a variety of boating access grant programs, provide technical assistance to boating access facility owners to improve access at more than 1,600 locations, manage Clean Marina Program, and Aquatic Invasive Species Prevention Program in partnership with ODFW. OSMB encourages safe boating practices, such as wearing life jackets, having sound signaling devices and following all operation and waterway rules. OSMB does not own public access sites but provides significant grant funding and assistance to improve, develop and maintain access for recreational boating.

Federal Government

Key Federal Agencies & Primary Roles

There are several federal agencies that collaborate with the tribes and state agencies regarding water management.

Bonneville Power Administration (BPA)
BPA delivers hydropower produced in the Columbia River Basin to communities across the Northwest. BPA markets wholesale electrical power from 31 federal dams in the Northwest that are operated by the U.S. Army Corps of Engineers and the Bureau of Reclamation. They also market power from one nonfederal nuclear plant and several small nonfederal power plants. BPA funds the Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program. The program funds regional efforts to mitigate the impacts of the federal dams on the region's fish and wildlife species.

Bureau of Reclamation (USBR)
USBR's mission is "to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public." USBR is a water management agency, established in 1902, responsible for the construction of over 600 dams and reservoirs across the western United States. They provide water deliveries, conservation, recycling, and reuse and have developed partnerships with customers, states, and tribes. Most USBR projects in Oregon were built in eastern half of the state. USBR's current efforts focus on improving the safety of existing dams and reservoirs, enhancing stream flows and fish passage, and working with partners on watershed restoration projects.

Bureau of Land Management (BLM)
BLM's mission is to "sustain health, diversity, and productivity of public lands for the use and enjoyment of present and future generations." BLM manages 15.7 million acres of federal land in Oregon, providing resource management, recreation, and education. The BLM Fire Program performs fire suppression, preparedness, predictive services, vegetative fuels management, community assistance and protection, and fire prevention through education. BLM provides funding for watershed restoration projects.

Federal Emergency Management Agency (FEMA)
FEMA's mission is "helping people before, during and after disasters." They develop flood maps – identifying various flood zones, or locations likely to flood during specified storm events. FEMA manages the National Flood Insurance Program and provides resources for floodplain management and risk reduction. FEMA coordinates with the Oregon Department of Land Conservation and Development regarding Oregon's Statewide Planning Goal 7 and floodplain management. FEMA also administers the National Dam Safety Program and takes actions to encourage and promote state and federal dam safety programs to reduce risks from dam-related hazards.

National Oceanic and Atmospheric Administration (NOAA and NOAA-Fisheries)
NOAA's mission is to "understand and predict changes in climate, weather, ocean, and coasts, to share that knowledge and information with others, and to conserve and manage coastal and marine ecosystems and resources." NOAA's monitoring and research provide critical information for understanding impacts from climate change. NOAA provides funding for watershed restoration projects. The National Marine Fisheries Service (NOAA-Fisheries) is an office within NOAA responsible for the stewardship of the nation's ocean resources and their habitat. NOAA-Fisheries jointly administers the federal Endangered Species Act with US Fish and Wildlife Service and is responsible for marine and anadromous species. NOAA Fisheries

manages marine and anadromous species pursuant to the Endangered Species Act, The Magnuson-Stevens Fishery Conservation Management Act, and the Marine Mammal Protection Act. NOAA's Office for Coastal Management funds the Oregon Coastal Management Program.

U.S. Army Corps of Engineers (USACE)
USACE's mission is to "deliver vital engineering solutions, in collaboration with our partners, to secure our Nation, energize our economy, and reduce disaster risk." USACE has constructed many types of infrastructure including coastal fortifications and flood control systems throughout the country, including some dams, dikes, and levees in Oregon. USACE also collaborates with DSL on Clean Water Act Section 404 and Oregon's Removal-Fill permitting programs. During natural disasters and other emergencies, USACE can respond in four main ways: under its own authority, Public Law 84-99, under the National Emergency Preparedness Program, and as the designated lead agency in support of FEMA for Emergency Support Function Number 3, Public Works and Engineering.

U.S. Department of Agriculture, Forest Service (USFS)
The mission of the USFS is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations. The agency manages almost 16 million acres of national forest lands in Oregon which comprise about 25 percent of the state and are the source of nearly 45 percent of its mean annual water supply. USFS implements diverse watershed, forest and rangeland management and restoration practices, per its Organic Act, to "improve and protect the forest, secure favorable conditions of water flows, and furnish a continuous supply of timber for the use and necessities of citizens of the United States." The agency also conducts research and provides assistance to state and local governments, forest industries, and private landowners to help protect and manage non-federal watersheds, forests and rangelands. USFS lands support many watersheds for municipal drinking water supply within Oregon and the agency plays an important role in wildfire management. USFS undertakes and provides funding for habitat and watershed restoration projects.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)
NRCS's mission is to "deliver conservation solutions so agricultural producers can protect natural resources and feed a growing world." NRCS works with producers, tribes, soil and water conservation districts, and others to plan, design, and implement conservation practices and activities, while also providing funding through its programs. NRCS conservation programs help people address resource opportunities relating to soil, water, air, animals, plants, and energy.

U.S. Environmental Protection Agency (USEPA)
USEPA's mission is to "protect human health and the environment" and works to ensure that Americans have clean air, land and water. USEPA develops and enforces regulations, administers grants, sponsors partnerships, studies environmental issues, and educates people about the environment. They lead the implementation of the Clean Water Act, Safe Drinking Water Act, and provide oversight of states that have been delegated to administer the federal program, such as ODEQ. USEPA provides funding for watershed restoration, water infrastructure, toxics reduction, water quality monitoring, nonpoint source pollution reduction, and environmental justice projects in Oregon. USEPA helps fund ODEQ's implementation of Clean Water Act and Safe Drinking Water Act programs through a Performance Partnership Grant. The workplan for this grant can be found in appendix C of the Oregon Performance Partnership Agreement.

U.S. Fish and Wildlife Service (USFWS)
USFWS's mission is to "conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people." The federal Endangered Species Act is jointly administered by USFWS and the National Marine and Fisheries Service. The USFWS primarily has oversight for terrestrial and freshwater species and some marine mammals. USFWS also implements the Bald and Golden Eagle Protection Act; and partners with all entities to conserve and restore habitats, conduct research and monitoring, and provide community education and outreach.

U.S. Geological Survey (USGS)
USGS's mission is to "monitor, analyze, and predict current and evolving Earth-system interactions and deliver actionable information at scales and timeframes relevant to decision makers." They are a "primary Federal source of science-based information on ecosystems, land use, natural hazards, water use and availability, and updated maps and images of the Earth's features available to the public." USGS collaborates with OWRD on basin studies and place-based planning efforts.

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[i] State of Oregon. 2023. Oregon Blue Book – Almanac & Fact Book. Tribal Governments Webpage. Accessed November 3, 2023. https://sos.oregon.gov/blue-book/Pages/national-tribes-intro.aspx

Appendix B
Water Laws, Policies, and Regulations

Water Laws, Policies, and Regulations

The actions described throughout the Strategy fit within an existing state and federal legal framework. Some water challenges we face in Oregon can be addressed with improved enforcement of existing regulations, modifications to laws or policies, or rulemaking within an agency program.

Both federal and state laws operate within an intricate legal structure, each with its own jurisdiction and authorities. Federal laws, enacted by Congress have supremacy and apply uniformly across all states and territories. State governments retain significant authority to legislate and regulate matters not explicitly addressed by federal law. Each type of law—statutes, regulations, and policies—carries distinct levels of authority and serves specific functions within the legal system, with statutes generally holding the highest authority. This section outlines the primary federal and state statutes, regulations, and policies that guide Oregon's management of water quantity, quality, instream, and out-of-stream needs. The section is organized featuring federal laws first and their associated state-run programs, followed by state laws.

Federal Statutes and Associated Regulations and Policies

The Clean Water Act (CWA) ***33 U.S.C. § 1251***

The primary regulatory tool used to reduce or prevent pollutants from entering surface waters is the Federal Clean Water Act (CWA), which requires states to establish water quality standards to protect all beneficial uses of water. In Oregon, the Department of Environmental Quality administers the CWA with oversight from the U.S. Environmental Protection Agency. The state establishes water quality standards to protect defined beneficial uses (e.g., fish and aquatic life, water contact recreation, domestic water supply). The Oregon Department of Environmetal Quality is required to review and update standards every three years, as resources allow.

Tribes may apply to the U.S. Environmental Protection Agency for authorization to administer water quality standards under the CWA. This means they may obtain similar authority to the Oregon Department of Environmental Quality.

Assessing, Listing and Reporting Requirements ***Section 303(d) & 305(b)***

Total Maximum Daily Loads (TMDLs)- Requires states to identify waters that are not meeting water quality standards and establish TMDLs for those pollutants impairing water quality. TMDLs specify the maximum numerical amount of a pollutant that a water body can receive while still meeting water quality standards. As part of the 303(d) requirements, each state must assess the quality of water bodies across the state. The state must then determine TMDLs and implementation plans for all waterbodies that do not meet the state's water quality standards. The Oregon Department of Environmental Quality is responsible for managing, implementing, and enforcing this program. Certain federal, state, and local governments and agencies, including cities, counties, and special districts, may be identified by the Department of Environmental Quality as a Designated

Management Agency, with authority to manage and regulate water pollution listed in a TMDL. Water quality standards can differ in adjacent states, so in cases where TMDLs cross state borders or require bi-state management, the highest standards designated are used in the TMDL.

Water Quality Status and Monitoring Reports– States are mandated to submit biennial reports known as "Water Quality Status and Monitoring Reports" to the U.S. Environmental Protection Agency. The result of these analyses and conclusions is called the "Integrated Report" because it combines the requirements of CWA sections 303(d) and 305(b) into one report. Waters identified as not meeting water quality standards ("303(d) listed") require the development of a TMDL. These reports provide comprehensive information on the condition of waters within the state.

Federal Certification ***Section 401*** – Gives states and authorized tribes the authority to grant, deny, or waive certification of proposed federal licenses or permits that may discharge polluted waters into Oregon's waters to ensure they meet Oregon's water quality standards. The Department may issue a Section 401 water quality certification, along with permit conditions.

Nonpoint Source Pollution Program ***Section 1288*** **-** - A nonpoint source of pollution is any pollution entering a waterbody, surface, or groundwater source, that does not come directly from a pipe. Nonpoint sources are often linked with agricultural, forestry, urban, and rural residential land use activities where rain or snow runs off to surface waters. As the runoff moves, it picks up and carries away pollutants (e.g., metals, nutrients, sediment) resulting from human activity, finally depositing them into lakes, rivers, wetlands, coastal waters, and groundwater. The Clean Water Act requires that each state develop a plan for controlling pollution from nonpoint sources and improving water quality. The Oregon Department of Environmental Quality is the lead agency in developing the plan. The most recent Nonpoint Source Management Program Plan was published in 2022.

Also significant in addressing nonpoint source pollution, the Coastal Zone Act Reauthorization Amendments (CZARA) established the national Coastal Nonpoint Pollution Control Program, mandating states with federally funded coastal management programs to tackle nonpoint source coastal pollution. This program is jointly overseen by the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration. In 2015, Oregon's latest Coastal Nonpoint Pollution Control Program was disapproved by the U.S. Environmental Protection Agency and the National Oceanic and Atmospheric Administration which led to temporary reductions in federal support for grant but will revisit the issue the next time they review the state's program for compliance.

Beaches Environmental Assessment and Coastal Health (BEACH) Act ***Section 1311*** – The BEACH Act amended the Clean Water Act by requiring the U.S. Environmental Protection Agency to develop performance criteria for testing, monitoring, and notifying public users of possible coastal recreation water quality problems. The Act authorizes U.S. Environmental Protection Agency to award grants to states, territories, tribes, or local governments to develop and implement beach monitoring and assessment programs.

Point Source Permitting: National Pollutant Discharge Elimination System (NPDES) ***Section 1342*****-** The Clean Water Act prohibits anybody from discharging "pollutants" through a "point source" (e.g., pesticide use, industrial or wastewater treatment plant discharge) into a "water of the United States" unless they have a NPDES permit. While a federal program, NPDES permits are issued by the Oregon Department of Environmental Quality. The Department also issues state Water Pollution Control Facility (WPCF) permits to regulate the point source discharge of wastewater onto land. Both types of permits set limits on the amount of pollution that can be discharged and require specific practices and monitoring to safeguard surface waters and groundwater aquifers.

For livestock operations, the Oregon Department of Agriculture is the lead agency responsible for assigning NPDES and WPCF permits for Confined Animal Feeding Operations (CAFOs) to owners so manure does not pollute ground and surface water.

Clean Water State Revolving Fund (CWSRF) ***Section 1381*** **–** The Clean Water State Revolving Fund (CWSRF) was established by Title VI of the 1987 amendments to the Clean Water Act. The CWSRF program is a partnership between the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality to provide low-cost financing for a variety of infrastructure projects including municipal wastewater facilities, nonpoint source pollution control, decentralized wastewater treatment systems, stormwater runoff mitigation, green infrastructure, estuary protection, and water reuse.

The Safe Drinking Water Act (SDWA) ***42 U.S.C. § 300(f)***

The 1974 federal Safe Drinking Water Act (SDWA) mandates the U.S. Environmental Protection Agency to establish and enforce standards that public drinking water systems must follow. These standards encompass a range of programs and requirements such as source water protection, treatment, monitoring, compliance, and public information. These measures aim to ensure that water system operators maintain a safe supply of drinking water for communities. The U.S. Environmental Protection Agency delegates primary enforcement responsibility, known as primacy, to state and tribal governments.

The Oregon Healthy Authority administers and enforces drinking water quality and notice standards for public water systems in Oregon. Public water systems are defined as having more than three hookups or serving more than 10 people year-round. Oregon has more than 3,300 public water systems that are fed by more than 200 surface water diversions, nearly 4,000 groundwater wells, and 225 springs. The SDWA regulates over 90 naturally occurring and man-made contaminants. Water quality data for Oregon's public water systems can be found at Drinking Water Data Online.

The Safe Drinking Water Act does not regulate private wells that serve less than 25 individuals.

Unregulated Contaminant Monitoring Rule ***40 C.F.R. 141 Subpart O*****–** "Emerging contaminants" are chemicals found in drinking water that might be harmful to health and are not yet regulated by the federal government. The SDWA mandates the U.S. Environmental Protection Agency to list such contaminants every five years for monitoring by public water systems. The Unregulated Contaminant Monitoring Rule specifies which chemicals need testing and is updated regularly. Data gathered under this rule helps the U.S. Environmental Protection Agency assess the extent of these contaminants nationwide and informs decisions about future regulations.

Reduction of Lead in Drinking Water Act ***42 U.S.C. § 300(g)- 6***- The Reduction of Lead in Drinking Water Act amends the SDWA regarding the use and introduction into commerce of lead pipes, plumbing fittings or fixtures, solder, and flux. The Act defines the percentage of lead allowed in plumbing products and provides for exempt uses where the water is not anticipated to be used for human consumption (e.g., industrial processing, fire hydrants).

In 2017, the Oregon Legislature passed Senate Bill 1062, requiring all school districts, education service districts, and public charter schools to adopt a Healthy and Safe Schools Plan. These plans must include provisions for testing and reducing exposure to elevated levels of lead in water used for drinking or food preparation, as required under guidelines adopted by the Oregon Health Authority. Rules outline that initial testing be done at all drinking and food preparation taps at all schools by 2020, and every 6 years thereafter according to a schedule determined by the Oregon Department of Education. Initial testing is intended to identify problem taps or plumbing, and once resolved, should not have issues in the future. On-going testing is required to determine whether water quality changes or plumbing deterioration has caused more lead to be released.

Endangered Species Act (ESA) ***16 U.S.C. § 35***

The federal Endangered Species Act (ESA) aims to protect and restore endangered or threatened species and their habitats. "Endangered" means a species faces extinction in its range, while "threatened" means it's likely to become endangered soon. While there are some exceptions, the ESA is administered by the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The former handles land and freshwater species, while the latter oversees marine wildlife and anadromous fish.

The state of Oregon and the federal government maintain separate lists of Threatened and Endangered species. Under state law (ORS 496.171-496.192) the Fish and Wildlife Commission through the Oregon Department Fish and Wildlife maintains the list of native fish and wildlife species in Oregon that have been determined to be either "threatened" or "endangered" according to criteria set forth by rule (OAR 635-100-0105). The Department also maintains a list of state sensitive species (OAR 635-100-0040). The Department leads the development of conservation and recovery plans for state ESA-listed fish and wildlife species. Coordinated action with citizens, and other local, state, and federal agencies is essential for successful implementation. State plant ESA listings are managed by the Oregon Department of Agriculture.

Oregon Statutes and Associated Regulations and Policies

Water Rights – Oregon's 1909 Water Code

In Oregon, water is recognized as a public resource (ORS 537.110). Since the enactment of Oregon's Water Code in 1909, a structured system for the allocation and management of water has been established statewide. Typically, individuals or entities seeking to utilize water from any source must obtain a permit from the Water Resources Department. Landowners do not inherently possess the right to utilize water flowing past, through, or beneath their property without appropriate state authorization, although certain exemptions from permitting requirements exist.

The allocation and use of water rights are governed by four fundamental provisions. Firstly, water may only be diverted for beneficial purposes without waste, whether from surface or groundwater sources. Secondly, the priority of water rights determines allocation during times of shortage, with older rights taking precedence. Thirdly, water rights are typically tied to the land they serve, known as appurtenancy, meaning they transfer with the land upon sale. Lastly, once established, water rights must be utilized as

specified at least once every five years to remain valid. Failure to do so may result in forfeiture and potential cancellation, except under certain legal exceptions.

Doctrine of Prior Appropriation

Oregon's water laws operate under the principle of prior appropriation, which dictates that the first individual or entity to secure a water right on a stream maintains priority access. In practice, this means, that when senior water rights cannot be fulfilled, junior rights may be restricted. In other words, the first person to obtain a water right on a stream is the last to be shut off in times of shortage. For more details, read *Water Rights in Oregon: An Introduction to Oregon's Water Laws.*[i]

Water Rights Permits and Certificates

The Water Resources Department administers nearly 90,000 water rights, which includes both permits and certificates, for both instream and out-of-stream uses. When the Department evaluates new requests for out-of-stream uses, various factors are considered, such as the needs of existing users, including established instream protections, as well as potential impacts to sensitive, threatened, or endangered fish species, and compliance with existing water quality standards.

Adjudication

Claims to the use of surface water that predate Oregon's Water Code are required to go through a formal administrative judicial process known as an adjudication. This process documents, quantifies, and eventually incorporates their water rights into the prior appropriation system. Similar procedures are conducted for groundwater uses that pre-date the Water Resources Department's authority to issue groundwater rights.

Federal and tribal reserved water rights, along with pre-1909 claims, are typically determined through adjudication processes. Federal reserved rights are linked to specific federal land allocations that require water, while tribal reserved rights may stem from treaties, executive orders, or congressional acts, covering uses associated with tribal lands or resources. These claims are not necessarily older than the water code, as their priority dates are tied to the respective federal actions or, in the case of tribal water rights, to time immemorial.

The adjudication process is time-consuming, requires significant state resources, and often take decades. The primarily involved agencies include the Water Resources Department, Department of Justice, Office of Administrative Hearings, and many others. Strategy Action 12A addresses the need to continue undertaking adjudications.

Oregon's 1987 Instream Water Right Act ***ORS 537.332 through 537.360***

Oregon's 1987 Instream Water Right Act was designed to protect instream flows for public benefit by establishing instream water rights. Instream water rights are a legally recognized beneficial use of water. The Department of Fish and Wildlife, Parks and Recreation Department, and Department of Environmental Quality can submit applications to protect water instream. Acceptable reasons for protecting instream flows include the conservation, maintenance and enhancement of aquatic and fish life, wildlife, and fish and wildlife habitat (OAR 635-400-0000); recreational values and scenic attraction (OAR 736-060-0000); or pollution abatement (OAR 340-056-0000). Since 1987, more than 1,000 instream rights have been established through this process and are held in trust on behalf of the public by the Water Resources Department.

In the 1950s, before the Act was passed, Oregon put streamflow protections in place to support aquatic life and protect water quality. The State has converted more than 500 of these older protections, called

"minimum perennial streamflows," into instream water rights, bringing the total certificated instream water rights to over 1,500.

Oregon law also allows water right holders to sell, lease, or donate water rights to be converted to instream water rights. This is done through a short-term lease agreement or by a formal transfer of the existing right from the current use to a new type of instream use.

Instream rights are usually set for a certain stream reach or at a specific point on the stream and have an established priority date. Many instream rights are junior water rights with the practical effect that they are often are not fulfilled during the summer months. Nonetheless, these water rights do establish flow targets essential for safeguarding aquatic life. Strategy Action 8A addresses data needs for establishing instream water rights and Action 10C identifies instream water rights as a tool for instream protections.

The Instream Water Right Act also includes provisions for a local government, watershed council, state agency, or an individual cooperating with one of these entities, to request the Water Resources Commission to reserve unappropriated water for multipurpose storage for future economic development. The Commission undertakes a rulemaking process for any approved requests for a reservation. Water users wishing to access reserved water must submit a water right application to the Water Resources Department, referencing the reservation. The Department then reviews the application based on current, applicable public-interest review standards and applicable basin rules regarding the reservation.

Groundwater

Groundwater Act of 1955 *ORS 537.505 to 537.795 and ORS 537.992*

The Groundwater Act of 1955 established the authority for groundwater management and statewide monitoring for the preservation of public welfare, safety, and health. The Act directs the Oregon Water Resources Department and Water Resources Commission to determine rights to the use of public groundwater. Furthermore, it mandates managing groundwater alongside surface water within the prior appropriation system, acknowledging their interconnectedness.

The Groundwater Act also directs the Water Resources Department to determine the extent, capacity, quality, and other characteristics of its groundwater bodies. These metrics are then used to inform resource management decisions. Oregon's groundwater management policy also provides that rights to use groundwater be protected, reasonably stable groundwater levels be determined and maintained, and groundwater overdraft be prevented.

Groundwater Quality Protection Act *ORS 468B.150-190*

The Groundwater Quality Protection Act was adopted in 1989 and aims to prevent contamination, conserve, and restore groundwater resources in Oregon. It mandates all state agency rules and programs align with protecting drinking water resources and public health. The Department of Environmental Quality oversees groundwater quality protection and uses a combination of water quality and land use programs to implement the Act.

Under this law, the Department of Environmental Quality has the authority to designate Groundwater Management Areas when groundwater has elevated contaminant concentrations. The Department has designated three Groundwater Management Areas because of elevated nitrate concentrations.

Water Rights Management

Administrative Basins *OAR 690-500*

The Water Resources Department has organized the state into 20 administrative river basins to allocate water resources. Basin programs are administrative rules which establish water management policies and objectives, and which govern the appropriation and use of the surface and groundwater within each of the administrative basins. The regulations classify surface and groundwater based on permitted uses, preferences among uses, potential for withdrawing water from further appropriation, reservation of water for specified future uses, and establishment of minimum perennial streamflows. These rules supplement statewide regulations that govern the allocation and utilization of water resources.

Water Use Measurement & Reporting

ORS 537.099 requires government entities (e.g., federal and state agencies, cities, counties, schools, irrigation districts and other special districts) to annually report monthly water use data to the Water Resources Department. Certain types of water use are also required to be measured and reported, in accordance with the conditions of a water right or permit. Governments and water right holders in serious water management problem areas have unique reporting requirements, outlined in OAR 690-085.

Distribution and Regulation

Separate and distinct from the Administrative Basins, there are 23 watermaster districts used for water right distribution and regulation. Watermasters at the Water Resources Department are responsible for distributing water in accordance with the doctrine of prior appropriation. Each summer as streamflows drop, watermasters regulate junior users to provide water to the more senior users. By the end of summer, there is typically only enough water to supply users who established their rights in the late 1800s in many areas of the state.

Enforcement

The Water Resources Department enforces the state's water laws and implements the Water Resources Commission's policies in the field. Enforcement staff are responsible for regulating water use based upon the water rights of record.

Conservation

According to Oregon's Water Code, the diversion of surface or groundwater for use is permissible only when it serves a beneficial purpose and avoids wasteful practices. Many municipal and irrigation water suppliers are required to prepare and submit a Water Management and Conservation Plan (WMCP) to the Water Resources Department as conditions of their water use permits, a final order approving a previous plan, or permit extensions. A WMCP provides a description of the water system, identifies the sources of water, and explains how the water supplier will manage and conserve supplies to meet future needs.

The Allocation of Conserved Water Program recognizes that improved technology and distribution methods may enable water users to use less water than was required in the past. Use of this program is voluntary and provides benefits to both water right holders and instream values. The program allows a water user who conserves water to use a portion of the conserved water on additional lands, lease or sell the water, or dedicate the water to instream use. At a minimum, 25 percent of the conserved water is allocated to the state (for an instream water right) but could be more, depending on funding sources and other agreements.

Transfers and Leases
The use of water under a water right is restricted to the terms and conditions described in the water right certificate: place of use, point of diversion or appropriation, and character of use. The water right holder must file a transfer application with the Water Resources Department to change a point of diversion, point of appropriation, type of use, place of use, or any combination of these. Permanent, temporary, and drought transfers are just a few of the types of transfers that may be applied for by an existing water right holder.

Oregon's instream leasing program (ORS 537.348 and OAR Chapter 690, Division 77) provides a voluntary means to aid in the restoration and protection of streamflow. This arrangement provides benefits to both water right holders and to instream values by providing water users with options that protect their water rights while leasing for instream benefits. Instream leases can be for up to 5 years and there is no limit on renewals.

Drinking Water

Oregon's Drinking Water Quality Act *ORS 448.119 to 448.285; 454.235; and 454.255.*
Enacted in 1981, the Act establishes a program for drinking water systems, ensuring safe drinking water for all Oregonians, and offering a mechanism to enhance deficient drinking water systems.

Domestic Well Testing Act *ORS 448.271*
The Domestic Well Testing Act requires that wells that supply groundwater for domestic purposes be tested for arsenic, nitrates, total coliform bacteria, and any other contaminants of public health concern that Oregon Health Authority has established in rule, when they are included in any real estate transaction and the seller accepts an offer to purchase or exchange that real estate. Only laboratories accredited according to Oregon Environmental Laboratory Accreditation Program can conduct the sample analysis. The results must be sent to the buyer and to Oregon Health Authority where they are made publicly available in the real estate transaction well report database. This data provides the public and state agencies with critical information on groundwater quality in private domestic wells, statewide. There is no enforcement mechanism with this requirement, and recent studies indicate that only about 10% of the applicable real estate transaction data is being submitted to the state.

Land Use Planning and Agriculture

Statewide Land Use Planning Goals - The Department of Land Conservation and Development implements Oregon's land use planning program, which influences how land is used throughout the state. The program began in 1973 under Senate Bill 100, it directs cities and counties to protect water resources when planning for and permitting development in their jurisdictions. The land use program plays a significant role in managing nonpoint source pollution by promoting compact urban development in designated urban areas and minimizing the impact of rural development on working lands and natural resources through rules and incentives.

Agricultural Water Quality Management Act - The Agricultural Water Quality Management Act enabled the Oregon Department of Agriculture to develop plans and rules to prevent and control water pollution from agricultural activities in order to achieve water quality standards. These rules both advance federal Clean Water Act objectives and serve as the foundation for Oregon's Agricultural Water Quality Program. There are 38 area Agricultural Water Quality Management Plans and Rules around the state.

Ecosystems and Waterway Protections

Fish Screening & Passage Laws

The Oregon Department of Fish and Wildlife oversees the state's fish screening and fish passage programs. Screens prevent fish from being caught in water diversion structures. Fish passage over man-made dams and diversions has been a requirement since before statehood in locations where native migratory fish are currently or have historically been present. Where applicable, Oregon requires fish screens, bypass devices, and/or passage as a condition of new uses (permits). Only fish screens (not fish passage) are addressed during authorized changes to an existing water right (e.g., transfers).

Forest Practices Act

The Forest Practices Act (FPA) of 1971 sets standards for all commercial activities involving the establishment, management, or commercial harvesting of trees on nonfederal forestlands. Many of the rules are aimed at protecting water sources. For example, regulations require landowners to leave forested buffers and other vegetation along streams, wetlands, and lakes to protect water quality and fish and wildlife habitat. The Oregon Board of Forestry has primary responsibility to interpret the Act and to set rules for forest practices. The FPA statute and rules are the mechanisms to implement water quality standards and Total Maximum Daily Loads (TMDLs) on nonfederal forestlands.

In March 2022 Senate Bill 1501 became effective and requires the Board of Forestry to adopt a comprehensive set of new rules and revisions to the FPA. These changes, along with the aerial herbicide buffers established in 2020 under Senate Bill 1602, are expected to significantly enhance water quality protection on private forestlands. The new rules stem from an agreement reached in October 2021 between timber industry advocates and conservation groups known as the Private Forest Accord. The Private Forest Accord also resulted in Senate Bill 1502 and House Bill 4055 which became effective in 2022. Senate Bill 1502 provides tax credits for small forestland owners complying with riparian timber harvest restrictions, while House Bill 4055 modifies taxation of forest products and allocates certain tax revenue to mitigate forest practice impacts on aquatic species. The fish-bearing stream rules for large forestland owners went into effect July 1, 2023, with other provisions going into effect January 1, 2024. Currently, the state is writing a Habitat Conservation Plan for the aquatic and riparian species covered by the Private Forest Accord, and the Adaptive Management Program to review and, as needed, update the new forestry rules as operational.

State-owned forests are managed according to forest management plans that are based on geographic area (northwest, southwest, and eastern Oregon). State forests are managed in compliance with and often surpass the standards established by the FPA. The State Forest program has voluntarily entered a long-term Stewardship Agreement that recognizes a commitment to meet and exceed regulatory requirements that cover forest land in western Oregon and is currently working on a Habitat Conservation Plan for aquatic, riparian, and terrestrial species-at-risk.

Oregon's Removal-Fill Law *ORS 196.795-990*

Oregon's Removal-Fill Law requires people who plan to remove or fill material in wetlands or waterways to obtain a removal-fill permit from the Department of State Lands. The law applies to all landowners, whether private individuals or public agencies. The purpose of the law, enacted in 1967, is to ensure protection and the best use of Oregon's water resources for home, commercial, wildlife habitat, public navigation, fishing, and recreational uses. In most cases, a permit is required if an activity involves filling or removing 50 cubic yards or more of material in a wetland or waterway. For activities in state-designated Essential Salmonid Habitat, within a quarter mile of a state-designated scenic waterway, and compensatory mitigation sites, a permit is required for any amount of removal or fill. ORS 468B.025

prohibits causing pollution or discharging waste to waters of the state and other state permits from the Department of Environmental Quality may be required for in-water activities to ensure the protection of waters of the state is consistent with the Oregon Environmental Protection Act at ORS 468.149.

Specific types of agricultural drainage channel maintenance activities may be eligible for a Notice (ORS 196.906 – 196.919, OAR 603-095-4000 to 603-095-4060) from the Oregon Department of Agriculture through the Agricultural Drainage Channel Maintenance Program instead of a Removal-Fill Permit from the Oregon Department of State Lands. The Notice provides a streamlined process by which landowners and water districts may, without paying a fee, maintain eligible agricultural channels while ensuring that maintenance protects, maintains, or improves ecological functions of the channels; upholds state objectives for fish recovery; and protects wetlands, waterways, and fish and wildlife habitats.

No-Net Loss Wetland Policy - Although Oregon's wetland management and protection authorities date back to the early 1970s, legislation passed in 1989 adopted policies maintaining the acreage, functions, and values of the state's wetlands. Oregon has adopted a goal of *no-net loss* of freshwater wetlands, administered by the Department of State Lands.

Oregon's Scenic Waterways Act *ORS 390.805-925*
Oregon's Scenic Waterways Act protects over 1,100 river miles. The Act was passed in 1970 to maintain the free-flowing character of designated rivers and lakes in quantities necessary to support recreation, fish, and wildlife. The Act includes criteria for outstanding scenic, fish, wildlife, geological, botanical, historic, archeologic, and outdoor recreation opportunities.

The Scenic Waterways Act prohibits construction of dams or other impoundments within a scenic waterway. It limits new surface water rights within or above scenic waterways as well as groundwater rights where pumping (individually or cumulatively) will reduce surface water flows. Land use activities that can affect a scenic waterway or adjacent land—such as constructing roads or buildings, mining, and forest harvesting—are limited or regulated by this Act. The Oregon Parks and Recreation Department has primary responsibility for implementing the Scenic Waterways Act and consults with several natural resource agencies, including the Water Resources Department. See Action 10C for more information about recent designations.

Outstanding Resource Waters
Outstanding Resource Waters are "high quality waters that constitute an outstanding state resource due to their extraordinary water quality or ecological values, or where special protection is needed to maintain critical habitat areas." Oregon's Outstanding Resource Waters policy is part of the state's antidegradation policy described in OAR 340-041-0004(8). The public can nominate waterbodies for designation and Oregon's Environmental Quality Commission can designate Outstanding Resource Waters. Designation adds water quality protections, including restrictions on point source discharges, to ensure no degradation of high-quality water, exceptional ecological characteristics, and other outstanding values of the waters occurs. See Action 10C for more information about recent designations.

[i] Oregon Water Resources Department, 2016. Water Rights in Oregon: An Introduction to Oregon's Water Laws. Salem, Oregon. http://www.oregon.gov/owrd/PUBS/docs/aquabook.pdf

Appendix C

Cross-walk of 2017 Strategy and 2025 Draft 2 Strategy

2017 Objectives & Critical Issues	**2025 Objectives & Critical Issues** (additions in red)
Objective 1: Understand Water Resources Today Critical Issues: • Further Understand Limited Water Supplies & Systems • Improve Water Quality & Quantity Information • Further Understand Our Water Management Institutions	**Objective 1: Understand Oregon's Water Resources ~~Today~~** Critical Issue: • Water Resources /Supply Information
Objective 2: Understand Instream & Out-of-Stream Needs Critical Issues: • Further Define Out-of-Stream Needs/Demands • Further Define Instream Needs/Demands	**Objective 2: Understand Instream and Out-of-Stream Needs** Critical Issues: • ~~Further Define~~ Instream & Ecosystem Water Needs~~/Demands~~ • ~~Further Define~~ Out-of-Stream Water Needs~~/Demands~~
Objective 3: Understand the Coming Pressures that Affect our Needs & Supplies Critical Issues: • Water & Energy • Climate Change • Extreme Events • Water & Land Use • Water-Related Infrastructure • Education & Outreach	**Objective 3: Understand the ~~Coming~~ Pressures that Affect our Needs & Supplies** Critical Issues: • Water & Energy • Climate Change • ~~Extreme Events~~ Natural Hazards • ~~Water &~~ Land Use Planning • Water~~-Related~~ Infrastructure • Education & Outreach
Objective 4: Meet Oregon's Instream & Out-of-Stream Needs Critical Issues: • Place-Based Efforts • Water Management & Development • Healthy Ecosystems • Public Health • Funding	**Objective 4: Meet Oregon's Instream & Out-of-Stream Needs** Critical Issues: • ~~Place-Based Efforts~~ Water Planning • Water Use & Management ~~& Development~~ • Healthy Ecosystems • ~~Public Health~~ Clean Water • Funding

2017 Critical Issues & Strategy Actions	2025 Critical Issues & Strategy Actions (revisions in red)
Critical Issue: Understanding Water Resources / Supplies / Institutions	**Critical Issue: Water Resource / Supply Information**
1A Conduct additional groundwater investigations	**1B** Conduct additional groundwater basin investigations
1B Improve water resource data collection & monitoring	**1A** Improve water resource data collection and monitoring
1C Coordinate inter-agency data collection, processing, and use in decision-making	**1C** Enhance interagency data coordination
Critical Issue: Understanding Oregon's Out-of-Stream Needs/Demands	**Critical Issue: Out-of-Stream Water Needs**
2A Regularly update long-term water demand forecasts	**3B** Regularly update out-of-stream water demand forecasts
2B Improve water-use measurement & reporting	**3A** Improve water-use measurement and reporting
2C Determine unadjudicated water right claims	**3C** Determine unadjudicated water right claims
2D Authorize the update of water right records with contact information	**3D** Authorize the update of water right records with contact information
2E Regularly update Oregon's water-related permitting guide	Moved to example action 10F
Critical Issue: Understanding Oregon's Instream Needs/Demands	**Critical Issue: Instream & Ecosystem Water Needs**
3A Determine flows needed (quality & quantity) to support instream needs	**2A** Determine instream flow needs (quality and quantity)
3B Determine needs of groundwater dependent ecosystems	**2B** Determine needs of groundwater-dependent ecosystems
	2C [new] Develop instream and ecosystem water need forecasts
Critical Issue: Water & Energy	
4A Analyze the effects on water from energy development projects & policies	**4A** Analyze the effects on water from energy development projects and policies
4B Take advantage of existing infrastructure to develop non-traditional hydroelectric power	**4B** Develop non-traditional hydroelectric power
4C Promote strategies that increase/integrate energy & water savings	**4C** Promote strategies that increase/integrate energy and water savings
Critical Issue: Climate Change	
5A Support continued basin-scale climate change research efforts	Moved, now **1D** Support basin-scale climate change research
5B Assist with climate change adaptation & resiliency strategies	Distributed throughout other Strategy actions
Critical Issue: Extreme Events	**Critical Issue: Natural Hazards**
5.5A Plan and prepare for drought resiliency	**5A** Plan and prepare for drought and wildfire resiliency
5.5B Plan and prepare for flood events	**5B** Plan and prepare for flood events
5.5C Plan and prepare for a Cascadia subduction earthquake event	**5C** Plan and prepare for a Cascadia earthquake and tsunami event
Critical Issue: Water & Land Use	**Critical Issue: Land Use Planning**
6A Improve integration of water information into land use	**6A** Improve integration of water Information and land

planning (and vice versa)	use planning
6B Improve state agency coordination	**9D** Improve state interagency coordination
6C Encourage low-impact development practices and green infrastructure	**6B** Encourage low impact development practices and green infrastructure
Critical Issue: Water-Related Infrastructure	**Critical Issue: Water Infrastructure**
7A Develop and upgrade water and wastewater infrastructure	**7A** Maintain, upgrade, decommission water and wastewater infrastructure
7B Encourage regional (sub-basin) approaches to water and wastewater systems	**7B** Encourage regional (sub-basin) water and wastewater systems
7C Ensure public safety/dam safety	**7C** Support dam and levee safety
Critical Issue: Education & Outreach	
8A Support Oregon's K-12 environmental literacy plan	**8A** Support implementation of K-12 Environmental Literacy Plan
8B Provide education and training for Oregon's next generation of water experts	**8B** Provide career training for the next generation of water professionals
8C Promote community education and training opportunities	**8C** Promote community education and outreach
8D Identify ongoing water-related research needs	**8D** Identify water research needs and partnerships
Critical Issue: Place-Based Efforts	**Critical Issue: Water Planning**
9A Continue to undertake place-based integrated, water resources planning	**9A** Support place-based integrated planning and other water planning efforts
9B Coordinate implementation of existing natural resource plans	**9B** Coordinate implementation of natural resource plans
9C Partner with federal agencies, tribes, and neighboring states in long-term water resources management	**9C** Partner with Tribes, federal agencies, and neighboring states in long-term water resources management
	9D [new] Lead meaningful community engagement
Critical Issue: Water Management & Development	**Critical Issue: Water Use & Management**
10A Improve water-use efficiency and water conservation	**10A** Improve water-use efficiency and water conservation
10B Improve access to built storage	**10C** Improve access to storage
10C Encourage additional water reuse projects	**10B** Encourage water reuse projects
10D Reach environmental outcomes with non-regulatory alternatives	**10D** Reach environmental outcomes with non-regulatory alternatives
10E Continue the water resources development program	Moved to example action under 13C
10F Provide an adequate presence in the field	**10E** Provide an adequate field presence
10G Strengthen water quantity & water quality permitting programs	**10F** Strengthen and improve water quantity and water quality permitting programs
Critical Issue: Healthy Ecosystems	
11A Improve watershed health, resiliency, and capacity for natural storage	**11A** Improve watershed health, resiliency, and capacity for natural storage
11B Develop additional instream protections	**11B** Develop additional instream protections
11C Prevent and eradicate invasive species	**11C** Prevent and eradicate invasive species
11D Protect and restore instream habitat and habitat access for fish and wildlife	**11D** Protect, restore, and provide access to instream habitat for fish and wildlife
11E Develop additional groundwater protections	**11E** Develop additional groundwater protections
Critical Issue: Public Health	**Critical Issue: Clean Water**

12A Ensure the safety of Oregon's drinking water	**12A** Ensure the safety of Oregon's drinking water
12B Reduce the use of and exposure to toxics and other pollutants	**12B** Reduce the use of and exposure to toxics and other pollutants
12C Implement water quality pollution control plans	**12C** Implement water quality pollution controls
Critical Issue: Funding	
13A Fund development and implementation of Oregon's IWRS	**13A** Fund development and implementation of Oregon's Integrated Water Resources Strategy
13B Fund water resources management activities at state agencies	**13B** Fund water resources management activities by state agencies
13C Invest in local or regional water planning efforts	**13C** Invest in planning, feasibility studies, and water resource project implementation
13D Invest in feasibility studies for water resources projects	
13E Invest in implementation of water resources projects	

Appendix D

Framework and Strategy Action Summary Sheets

Oregon's 2025 Integrated Water Resources Strategy - Draft 2

A framework for improving our understanding of Oregon's water resources and meeting our instream and out-of-stream needs, including water quantity, water quality, and ecosystem needs

(1) Understand Oregon's Water Resources

Further Understand Limited Water Supplies & Systems
(groundwater, surface water, and their interaction)

Improve Water Quality & Quantity Information

Further Understand Our Water Management Institutions

Water Resource / Supply Information

1A [1B] Improve Water Resource Data Collection and Monitoring
1B [1A] Conduct Additional Groundwater Basin Studies
1C Enhance Interagency Data Coordination
1D [5A] Support Basin-Scale Climate Change Research

2017 Action numbers are shown in [brackets]

← Objectives →

← Critical Issues →

← Actions →

(2) Understand Instream & Out-of-Stream Needs

Further Define Instream Needs
(i.e., left-in-place water)

Further Define Out-of-Stream Needs / Demands
(i.e. diverted water)

Instream & Ecosystem Water Needs

2A [3A] Determine Instream Flow Needs (Quality and Quantity)
2B [3B] Determine Needs of Groundwater-Dependent Ecosystems
2C [new] Develop Instream and Ecosystem Water Need Forecasts

Out of Stream Water Needs

3A [2B] Improve Water-Use Measurement and Reporting
3B [2A] Regularly Update Out-of-Stream Water Demand Forecasts
3C [2C] Determine Unadjudicated Water Right Claims
3D [2D] Authorize the Update of Water Right Records with Contact Information

[2E] Regularly update Oregon's water-related permitting guide is now and example action under 10F.

(3) Understand the Pressures that Affect Our Needs and Supplies

Climate Change | **Economic Development** | **Population Change** | **Water & Energy**

Natural Hazards | **Land Use Planning** | **Water Infrastructure** | **Education & Outreach**

Climate Change

Actions are included throughout the Strategy

Economic Development & Population Change

(See Actions 2C and 3B)

Water & Energy

4A Analyze the Effects on Water from Energy Development Projects and Policies
4B Develop Non-Traditional Hydroelectric Power
4C Promote Strategies that Increase/Integrate Energy and Water Savings

Natural Hazards

5A [5.5A] Plan and Prepare for Drought and Wildfire Resiliency
5B [5.5B] Plan and Prepare for Flood Events
5C [5.5C] Plan and Prepare for a Cascadia Earthquake and Tsunami Event

Land Use Planning

6A Improve Integration of Water Information and Land Use Planning
6B [6C] Encourage Low Impact Development Practices and Green Infrastructure

Water Infrastructure

7A Maintain, Upgrade, Decommission Water and Wastewater Infrastructure
7B Encourage Regional (Sub-Basin) Water and Wastewater Systems
7C Support Dam and Levee Safety

Education & Outreach

8A Support Implementation of K-12 Environmental Literacy Plan
8B Provide Career Training for the Next Generation of Water Professionals
8C Promote Community Education and Outreach
8D Identify Water Research Needs and Partnerships

← Objectives →

← Critical Issues →

← Actions →

(4) Meet Oregon's Instream and Out-of-Stream Needs

Water Planning | **Place-Based Efforts** | **Water Use & Management**

Healthy Ecosystems | **Clean Water** | **Public Health** | **Funding**

Water Planning

9A Support Place-Based Integrated Planning and Other Water Planning Efforts
9B Coordinate Implementation of Natural Resource Plans
9C Partner with Tribes, Federal Agencies, and Neighboring States in Long-Term Water Resources Management
9D [6B] Improve State Interagency Coordination
9E [new] Lead Meaningful Community Engagement

Water Use & Management

10A Improve Water-Use Efficiency and Water Conservation
10B [10C] Encourage Water Reuse Projects
10C [10B] Improve Access to Storage
10D Reach Environmental Outcomes with Non-Regulatory Alternatives
10E [10F] Provide an Adequate Field Presence
10F [10G] Strengthen & Improve Water Quantity and Water Quality Permitting Programs

[10E] Continue the water resources development program is now an example action under 13C

Healthy Ecosystems

11A Improve Watershed Health, Resiliency, and Capacity for Natural Storage
11B Develop Additional Instream Protections
11C Prevent and Eradicate Invasive Species
11D Protect, Restore, and Provide Access to Instream Habitat for Fish and Wildlife
11E Develop Additional Groundwater Protections

Clean Water

12A Ensure the Safety of Oregon's Drinking Water
12B Reduce the Use of and Exposure to Toxics and Other Pollutants
12C Implement Water Quality Pollution Controls

Funding

13A Fund Development and Implementation of Oregon's Integrated Water Resources Strategy
13B Fund Water Resources Management Activities by State Agencies
13C [13C-13E] Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Action Summary Sheets

Chapter 1 – Understand Oregon's Water Resources

Chapter 1 Actions At-A-Glance

Critical Issue - Water Resource/Supply Information

Actions 1A – 1D

Chapter 2 – Understand Instream and Out-of-Stream Needs

Chapter 2 Actions At-a-Glance

Critical Issue - Instream and Ecosystem Water Needs

Actions 2A – 2C

Critical Issue - Out-of-Stream Water Needs

Actions 3A – 3D

Chapter 3 – Understand the Pressures that Affect Our Needs and Supplies

Chapter 3 Actions At-a-Glance

Critical Issue – Climate Change

Actions are distributed throughout other Strategy actions

Critical Issue - Water & Energy

Actions 4A – 4C

Critical Issue - Natural Hazards

Actions 5A – 5C

Critical Issue - Land Use Planning

Actions 6A – 6B

Critical Issue - Water Infrastructure

Actions 7A – 7C

Critical Issue – Education & Outreach

Actions 8A-8D

Chapter 4 – Meet Instream and Out-of-Stream Needs

Chapter 4 Actions At-a-Glance

Critical Issue – Water Planning

Actions 9A – 9E

Critical Issue - Water Use & Management

Actions 10A – 10F

Critical Issue - Healthy Ecosystems

Actions 11A – 11E

Critical Issue - Clean Water

Actions 12A – 12C

Critical Issue – Funding

Actions 13A-13C

Descriptions for Headings on Action Summary Sheets

Lead agency – identifies the primary state or federal agency or agencies where this action falls into their mission, current or recent activities, or an existing program. Identification as a lead agency does not indicate obligation to contribute to the action, acknowledging that participation is voluntary and dependent upon agency resources and funding. Agencies are listed in alphabetical order.

Supporting agency – identifies the state or federal agencies that may participate in the action but have less involvement than the lead agencies. This category recognizes agencies that provide support through technical assistance, workgroups, funding, or other contributions. Agencies are listed in alphabetical order.

Possible Partners – any non-federal or state agency entity that has participated in this action, or likely would, given the type of action. Tribes are often listed as a partner to promote partnership and/or consultation when appropriate. This list is not intended to be exhaustive or exclusive but highlights the major interested parties.

Example Actions – specific examples provided to help illustrate how the action relates to agency roles, duties, or programs. Inclusion does not indicate priority or mandate action. Implementation of example actions is subject to regulatory authority and adequate resources.

Resources – includes agency programs, workgroups, websites, and documents to support implementation. Documents often include state agency plans or strategies (e.g., Oregon's Conservation Strategy), helping to show how the Strategy complements and supports other state initiatives. Resources may also include agency work products (reports, studies, etc.) resulting from or supporting action implementation.

Other Definitions

"Instream" water use – identifies water that is left-in-place in the environment, either in surface water (e.g., rivers, streams) or groundwater (e.g., aquifers). Water left instream supports ecological needs and human uses including aquatic habitat, groundwater-dependent ecosystems, fish propagation, recreation, water quality improvement, hydroelectric power generation, navigation, and spiritual and cultural practices.

"Out-of-Stream" water use - Water removed from the ground or diverted from a surface-water source for beneficial use. Common uses include irrigation, and domestic and municipal water supply.

U.S. Geological Survey Water Resources Glossaries

Agency Acronyms

The action summary pages use acronyms for the lead and supporting state and federal agencies. See "Other Acronyms" for common types of partners listed on the action summary pages.

State Agencies

BIZOR	Business Oregon
DAS	Department of Administrative Services
DOGAMI	Department of Geology & Mineral Industries
DLCD	Department of Land Conservation & Development
DSL	Department of State Lands
OCCRI	Oregon Climate Change Research Institute
ODA	Oregon Department of Agriculture
ODEQ	Oregon Department of Environmental Quality
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish & Wildlife
ODHS	Oregon Department of Human Services
ODOE	Oregon Department of Energy
ODOT	Oregon Department of Transportation
OEM	Office of Emergency Management
OHA	Oregon Health Authority
OLCC	Oregon Liquor and Cannabis Commission
OPRD	Oregon Parks and Recreation Department
OSMB	Oregon State Marine Board
OSU	Oregon State University
OWEB	Oregon Watershed Enhancement Board
OWRD	Oregon Water Resources Department

Federal Agencies

BLM	Bureau of Land Management
BPA	Bonneville Power Administration
FEMA	Federal Emergency Management Agency
NFWF	National Fish and Wildlife Fund
NOAA	National Oceanic and Atmospheric Administration
NRCS	U.S. Department of Agriculture, Natural Resources Conservation Service
USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Department of Agriculture, U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

Other Acronyms

CBO	Community-based organization
NGO	Non-governmental organization
WC	Watershed council

"Local governments" (ORS 174.116) includes cities, counties, local service districts (e.g., people's utility districts, domestic water supply districts, irrigation districts, soil and water conservation districts)

Chapter 1 Actions at a Glance

Objective 1: Understand Oregon's Water Resources

Critical Issue - Water Resource/Supply Information

1A Improve Water Resource Data Collection and Monitoring
1B Conduct Additional Groundwater Basin Investigations
1C Enhance Interagency Data Coordination
1D Support Basin-Scale Climate Change Research

Action 1A
Improve Water Resource Data Collection and Monitoring

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, ODFW, OHA, OWEB, OWRD	BLM, BOR, NOAA-NWS, NRCS, ODA, USACE, USEPA, USFS, USGS	Tribes, local governments, WC's

Purpose

Oregon has several water resource data collection and monitoring programs. However, resource constraints limit the geographic scope and frequency of data collection and analysis. On-going statewide groundwater and surface water quantity monitoring supports active management of the resource and establishes long-term data sets to evaluate climatic, seasonal, and water use impacts on rivers and aquifers. Additional resources are needed for surface water monitoring and data analysis to identify impaired waterbodies and measure the effectiveness of actions taken to meet water quality standards. Monitoring data are also pivotal for ensuring that water quality improvement strategies and investments, such as ecological restoration, achieve the desired habitat function or water quality targets and are cost-effective.

Priority Tasks

- P2.2a Complete the Surface Water Information Management System (SWIMS) update to better inform permitting, planning, and management
- P2.2b Expand groundwater and surface water data collection and systems, including smart water use meter technologies
- P2.2c Fund and conduct basin assessments & studies (see 2024 Stewardship & Supply Initiative Rescope Report) to inform updating Administrative Basin Program rules and permitting, planning, management, and future iterations of the Integrated Water Resources Strategy

Example Actions

- Use agencies' monitoring strategies, or similar methods, to design, expand, and maintain real-time monitoring networks for surface water and groundwater quality and quantity
- Prioritize basins for data collection and monitoring by centering the needs of people and ecosystems most affected by water quantity or quality challenges
- Expand gage network associated with monitoring instream water rights
- Improve agency capacity to collect, share, analyze, and report data, bringing records to final form and make them available to the public
- Assure that statewide groundwater quality monitoring programs are responsive to community need
- Update water quality standards and develop additional TMDL's (also see Action 12C)
- Increase the number of stream gages with reportable water temperature data to support water quality programs
- Increase resources to help disadvantaged homeowners and renters access water quality testing in private drinking water wells; update real estate transaction database
- Monitor habitat and watershed conditions and evaluate the effectiveness of restoration efforts (e.g., OWEB restoration inventory)
- Establish methods for measuring ecosystem services (benefits) and incorporate results into planning efforts
- Increase monitoring and evaluate the effectiveness of pollution control plan implementation
- Identify and address gaps in staffing or process that prevent agencies from sharing in the collection of, or already collected, data (e.g., temperature data)
- Work with water distribution partners (BOR, irrigation districts) to develop funding and staffing structures that allow for effective gaging and staffing of storage and irrigation distribution systems
- Work with tribes, state, federal, and local monitoring partners (e.g., USGS) to analyze gage network to identify and address gaps

Resources

Agency Programs

ODEQ Water Quality Programs, ODFW Water Program, OWEB Oregon Watershed Restoration Inventory Program, OWEB Grant Programs, OWRD Technical Services Division

Documents/Websites

OWEB Oregon Watershed Restoration Inventory, OWRD 2016 Monitoring Strategy, OWRD Surface Water Availability Reporting System (WARS), Groundwater Information System (GWIS), Groundwater Administrative Areas/Critical Groundwater Areas, and Realtime Streamflow and Lake Level Data, ODEQ Ambient Water Quality Monitoring System, ODEQ Water Quality Monitoring Strategy, Groundwater Management Areas

Workgroups

Oregon Plan Monitoring Team, Water Quality Pesticide Management Team, Oregon STREAM Team, Oregon Water Data Portal Steering Committee and Oregon Water Data Portal

Action 1B
Conduct Additional Groundwater Basin Investigations

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, OWRD, USGS	DOGAMI, ODA, ODFW, OHA, USEPA, USFS	Tribes, local governments, OSU Extension Service, public and private research institutions

Purpose

Accurate well location and use information, aquifer water-level data, and water quality data are critical for assessing groundwater resources. Oregon has a need for additional basin -scale investigations to further understand the relationship between groundwater and surface water, and their availability. Conducting basin studies is a priority for the state, which typically evaluates groundwater resources through cooperative, cost-share programs with federal agencies.

OWRD needs adequate data to evaluate and assess whether groundwater administrative areas are meeting the goals of groundwater stabilization, groundwater recovery, and protection of existing water rights. The state needs to dedicate resources to determine whether additional areas require groundwater designations. Additionally, ODEQ needs additional resources to support the Statewide Groundwater Monitoring Program, which has seen funding and staffing reductions since 2017.

Example Actions

- Install and maintain dedicated state observation wells in priority basins
- Partner with U.S. Geological Survey to conduct and cost-share additional groundwater basin investigations
- Evaluate existing and potential establishment of new groundwater administrative areas; review time-limited permits more efficiently
- Locate and document water wells, including exempt use wells, permitted wells, and unused wells
- Ensure groundwater level measurements are high-quality; install measuring tubes and make scheduled measurements
- Investigate connections between groundwater and surface water, particularly where groundwater sustains summer low flows and/or discharges cold water
- Support and coordinate with ODEQ's Groundwater Monitoring Program (water quality)
- Incorporate groundwater quality and quantity information into Oregon's Environmental Justice Mapping Tool

Resources

Agency Programs

ODEQ Groundwater Protection Program and Groundwater Monitoring Program, OWRD Groundwater Monitoring Program, Deschutes Groundwater Mitigation Program

Workgroups

ODEQ & OWRD Groundwater Technical Advisory Team

Documents

2021 Oregon Groundwater Resource Concerns Assessment
2021 Review of Deschutes Groundwater Mitigation Program Report
2021 DOGAMI Bulletin 108 - Geology of the North Half of the Lower Crooked River Basin, Crook, Deschutes, Jefferson, and Wheeler Counties, Oregon

Data

OWRD Groundwater Information System (GWIS)

Action 1C
Enhance Interagency Data Coordination

Lead Agencies	Supporting Agencies	Possible Partners
DSL, ODA, ODEQ, ODF, ODFW, OWEB, OWRD	BLM, BPA, DLCD, NRCS, NWS, USACE, USBR, USFS, USGS	Tribes, local governments, WC's, OSU

Purpose

Federal, state, and local governments monitor and study Oregon's waterways. This data collection and analysis is critical to the understanding and management of Oregon's surface water and groundwater resources. The lack of stable resources to coordinate and maintain the state's monitoring networks, to collect and share data, to conduct studies, and to develop modeling tools presents a significant, ongoing challenge. Consistent agency coordination can support efficient use of limited resources. Several years' worth of water quantity and quality data still needs to be processed, analyzed, and shared with the public and other partners.

Priority Tasks

- P2.2d Continue multiagency efforts and seek ongoing funding to develop the Oregon Water Data Portal to integrate interagency data and share with the public

Example Actions

- Improve integration of federal, state, and local government data collection efforts while adhering to quality control standards
- Improve data sharing and availability using on-line platforms and emerging technologies, mobile apps, and open standards
- Develop or update modeling and other decision-support tools
- Encourage inter-agency work among a variety of partners
- Provide resources for interagency data management, including data infrastructure and stewardship, as well as participation in the Oregon Water Data Portal
- Support the development, implementation, and ongoing maintenance of the Oregon Water Data Portal Project
- Provide interagency training to improve data collection standards, including manuals and technical support
- Invest in information technology and modernization of databases and applications
- Improve public access to water data and provide a centralized location to access various types of water data

Resources

Agency Programs & Workgroups

DSL Waterways & Wetlands Program, ODA Agricultural Water Quality Program, ODEQ Water Quality Program, ODF Compliance Monitoring Program, ODFW Water Program, OWEB Effectiveness Monitoring Program, OWRD Surface Water Hydrology Section, OWRD Groundwater Hydrology Section
Conservation Effectiveness Partnership, Oregon Plan Monitoring Team, Water Quality Pesticide Management Team, Oregon STREAM Team, Oregon Water Data Portal Steering Committee and Oregon Water Data Portal

Documents

2017 Monitoring Strategy for Oregon's Waters: An Inter-Agency Approach
Oregon Open Data Portal
ODEQ Water Quality Monitoring Data

Action 1D
Support Basin-Scale Climate Change Research

Lead Agencies	Supporting Agencies	Possible Partners
DLCD, ODA, ODEQ, ODFW, OWRD	DOGAMI, NOAA, NRCS, OWEB, USFWS, USGS	Tribes, local governments, OSU, OCCRI, Oregon Climate Action Commission

Purpose
Many local, state, federal, and tribal governments are conducting, and must continue, climate change research, identifying and assessing risks, and developing actions specific to the Pacific Northwest. Basin-scale research aids water managers and natural resources agencies in developing strategies for addressing climate-related impacts on water quality, water quantity, and ecosystem health.

Example Actions
- Make improvements in surface water and groundwater monitoring, flood and drought frequency projections, and long-range forecasts
- Improve climate change projections at the basin-scale
- Develop reliable projections of basin-scale hydrology and associated impacts on built and natural systems, including aquatic species and habitat
- Analyze how instream and out-of-stream water rights will be met with hydrologic changes
- Investigate potential shifts in the hydrograph, agriculture and irrigation seasons and impacts to fish distribution/life history timing Investigate new crop types suitable to a changing climate
- Develop climate change forecasting for use in water availability analyses and permitting decisions (also see Action 10F)
- Investigate increased risks to ecosystems and water supply and wastewater management infrastructure associated with wildfires, particularly in environmental justice communities
- Finalize and implement ODFW's Aquatic Habitat Prioritization assessment which incorporates climate projections for water quantity and temperature when evaluating future habitat suitability for sensitive aquatic species
- Coordinate data collection into the Oregon Water Data Portal Project
- Include an assessment of vulnerable water supply systems and identify those in environmental justice communities
- Consider the increased risk to water infrastructure by wildfire in environmental justice communities
- Look for equity impacts of climate change (i.e., climate justice) and water management (i.e., water justice)
- Advocate for financial resources to help local basins better understand climate impacts, including partnerships with OCCRI

Resources
Agency Programs

DLCD Natural Hazards, ODA Natural Resources, ODEQ Water Quality, ODFW Water Program, OWRD Field Services and Technical Services Divisions

Policies

ODFW's Climate and Ocean Change Policy

Workgroups

OWEB's Climate and Water Committee, Climate Impacts Research Consortium

Documents/Websites

OWRD 2016 Monitoring Strategy

2023 Final Report: Foundational Elements to Advance the Oregon Global Warming Commission's Natural and Working Lands Proposal

2022 State of Water Justice Report

2021 Oregon's Climate Change Adaptation Framework & Equity Blueprint

South Slough National Estuary Research Reserve (research regarding watershed health and resiliency)

Climate Change Vulnerability Assessment

Objective 2: Understand Instream and Out-of-Stream Needs

Critical Issue - Instream and Ecosystem Water Needs

2A Determine Instream Flow Needs (Quality and Quantity)
2B Determine Needs of Groundwater-Dependent Ecosystems
2C Develop Instream and Ecosystem Water Need Forecasts

Critical Issue - Out-of-Stream Water Needs

3A Improve Water-Use Measurement and Reporting
3B Regularly Update Out-of-Stream Water Demand Forecasts
3C Determine Unadjudicated Water Right Claims
3D Authorize the Update of Water Right Records with Contact Information

Action 2A
Determine Instream Flow Needs (Quality and Quantity)

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, ODFW, OPRD, OWRD	BPA, DSL, NOAA, ODA, ODF, OWEB, USACE, USEPA	Tribes, local governments, WC's, CBO's, NGO's

Purpose
Our rivers and streams, lakes, reservoirs, aquifers, wetlands, and estuaries all contribute greatly to species survival, habitat functionality, and our economy and health. Instream uses and their associated economic and ecological benefits are greatly diminished without adequate water quality and supply. Instream flows are also critical for spiritual and recreational opportunities and supporting Tribes' access to First Foods. To improve instream flow protections (Action 11B), Oregon should prioritize identifying ecological flow criteria (metrics characterizing the full range of flows needed to support ecosystem health). A solid understanding of ecological flow criteria is needed to inform development of environmental flows (metrics that balance human considerations with ecological flow needs) for streams throughout the state.

Priority Tasks
- P2.2e Prioritize and fund instream flow studies

Example Actions
- Prioritize and install gages in additional locations to monitor the status of instream flows and water rights
- Use existing and new data to develop statewide ecological flow criteria for streams
- Prioritize basins and install monitoring equipment to help characterize the full suite of flows through these basins
- Conduct instream needs studies to support future instream water right applications
- Conduct instream needs studies to assess spiritual and cultural needs
- Pursue a consistent, model-based framework for characterizing long-term instream need in the context of climate change to support the development of a long-term instream forecast (Action 2C)
- Review, synthesize, and update models/studies to quantify the ecological, economic, social, and cultural value of instream uses
- Support state agency instream flow efforts and programs (e.g., ODFW, ODEQ, OPRD)
- Support ODFW and ODEQ efforts and collaboration regarding stream temperature monitoring, modeling, and studies
- Support ODFW and OWRD efforts and collaboration regarding monitoring for instream flows and instream water rights
- Fill data gaps regarding fish passage barriers
- Conduct studies to determine if wetland restoration or reconnection to streams could benefit instream flow

Resources
Agency Programs
ODEQ Water Quality Program, ODFW Water Program, OPRD Scenic Waterways, OWRD Water Rights Division, OWRD Technical Services Division
Workgroups
Oregon STREAM Team
Authorities
Oregon's Instream Water Right Act
Documents
Oregon Plan for Salmon and Watersheds
2023 ODFW Guidance for Determining Instream Flow Needs
Tide Gate and Tidal Wetland Monitoring

Action 2B
Determine Needs of Groundwater-Dependent Ecosystems

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, ODFW, OWRD	DLCD, DOGAMI, ODF, USFS, USFWS, USGS	Tribes, local governments, WC's, CBO's, NGO's

Purpose

Groundwater is vital to both ecosystems and human communities, as groundwater discharges and supplies water to wetlands, rivers, and lakes. Groundwater provides late-summer flow for many rivers and creates cool-water upwellings critical for aquatic species during the warmer summer months. Groundwater-dependent ecosystems contain species and habitats that rely on groundwater for some or all of their life cycle. These ecosystems form the interface between groundwater and surface water, and due to their unique hydrology, often harbor many rare species native only to these locations. Groundwater-dependent ecosystems still need to be fully identified and characterized across the state, including their groundwater quantity and quality requirements.

Example Actions

- Identify and characterize groundwater-dependent ecosystems and prioritize systems for long-term study
- Perform an in-depth analysis of accessible springs
- Monitor springs and seeps across the state to understand their contribution (quality and quantity) to streamflows
- Identify the water quantity and water quality needs of groundwater-dependent species and ecosystems
- Conduct seepage studies on priority streams to quantify groundwater exchange
- Evaluate impacts to groundwater ecosystems from human activities (e.g., groundwater pumping, lining canals, fish passage and transportation maintenance projects)

Resources

Agency Programs

ODEQ Water Quality Program, ODFW Water Program, ODFW Technical Services Division

Documents/Websites

Online mapping tool by The Nature Conservancy, Global Groundwater Dependent Ecosystems

Article in Nature Water, "Establishing ecological thresholds and targets for groundwater management" available at https://doi.org/10.1038/s44221-024-00221-w

Action 2C
Develop Instream and Ecosystem Water Need Forecasts

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, ODFW, OWRD	DLCD, DOGAMI, ODA, USGS	Tribes, local governments, WC's, CBO's, NGO's

Purpose

The state has completed two long-term demand studies (2008 and 2015) that focused on forecasting water demands for agricultural, municipal, domestic, and industrial uses (see Action 3B). A parallel statewide analysis is needed to better understand the quality and quantity of instream and ecosystem needs now and into the future. Climate change will continue to affect water quality, timing, availability and use, and balanced solutions are not achievable without understanding the full suite of instream and out –of-stream needs. An instream need forecast must be produced at the appropriate scale and periodically updated to inform water planning and management.

Example Actions

- Develop statewide instream water forecasts
- Periodically update instream forecasts with new climate projections
- Study potential impacts to ecosystems under a changing climate
- Study potential impacts to environmental justice and other frontline communities under a changing climate

Resources

Agency Programs

ODFW's Water Program, OWRD's Planning, Collaboration, & Investment Section, OWRD Technical Services Division

Documents

2015 Statewide Long-Term Water Demand Forecast

Action 3A
Improve Water-Use Measurement and Reporting

Lead Agencies	Supporting Agencies	Possible Partners
OWRD	ODEQ, ODFW, USGS	AgriMet, local governments, water rights holders, OSU Extension Service

Purpose

Objective water management decisions are made possible when they are based on reliable information about water use. Water use data is fundamental to carry out efficient water management, effective water distribution, and to help plan for future water needs. The information is also used to ground-truth demand projections or models. The Water Resources Department has the authority to require new users to measure and report water use and can require existing users who already measure water use to report the resulting data. Water users who keep track of their use are better able to demonstrate the validity of their water rights, to develop water management and conservation plans, and to determine the design and funding needs of their future water systems.

Priority Tasks

- P2.2f Modernize information technology (IT) systems at OWRD to improve data submittal, management, and analyses and support compliance processes

Example Actions

- Continue to work with Information Technology to improve the software and tools used for water-use measurement and reporting
- Implement new authority that allows OWRD to require reporting of water use, where measurement is required, including aligning the reporting with the Water-Use Reporting program
- Update and implement the Water Resources Commission's Strategic Measurement Plan, measuring significant diversions
- Coordinate the Water-Use Reporting Program and Water Resource Commission's Strategic Measurement Plan
- Improve Water Use Reporting Database functionality and public access, including establishing and maintaining quality assurance procedures to verify the accuracy of water use and other data
- Invest in water use measurement devices in priority watersheds
- Invest in evapotranspiration monitoring and programs
- Develop accurate statewide annual water use summaries for water rights using all available water use data sets
- Produce annual values of consumptive use by water right to allow for analysis of trends in water use over time
- Install and monitor groundwater observation wells
- Provide resources to assist with installation of measurement devices; update cost-share program
- Work with USGS to integrate water use data from OWRD into USGS water use products
- Seek authority to require water use reporting in areas of scientific interest in preparation for Serious Water Management Problem Areas (SWMPAs), basin studies, or planning exercises like updates to basin plan rules
- Increase documentation and data collection of decommissioned wells and well construction history
- Include equity considerations for assistance through measurement cost share programs

Resources

Agency Programs & Workgroups

OWRD Water-Use Reporting Program

Funding

OWRD Water Measurement Cost Share Program

Documents

2022 OWRD Legislative Report on Water Use Measurement and Reporting

2000 Oregon Water Resources Department Strategic Measurement Plan

Action 3B
Regularly Update Out-of-Stream Water Demand Forecasts

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, OWRD	DLCD, DOGAMI, ODA, ODFW, USGS	Tribes, local governments, municipal water providers

Purpose

There is a need to understand how the out-of-stream demand for water, across many use sectors, is projected to change over time. This can help inform planning and infrastructure decisions to anticipate these demands and respond to climatic impacts that alter water timing and availability.

Oregon must regularly update its forecasts of out-of-stream water needs and coordinate this effort with understanding instream forecasted needs (See Action 2C). These forecast updates should include identifying trends in water use, economic development, urban-rural population growth/shift, per capita demands, and changing crop water requirements due to a changing climate.

Example Actions

- Periodically update demand projections with new population, per capita water demand, industrial demand, crop water use, and climate projections
- Develop models/studies to quantify the economic, social, and cultural value of consumptive uses of water and publish outcomes
- Employ remote sensing and crop water demand modeling to improve crop water use estimates
- Provide data in a method consistent with needs of the public, and involve water users in the development of demand products
- Study potential impacts to environmental justice and other frontline communities in demand forecasts

Resources

Agency Programs & Workgroups

ODFW's Water Program, OWRD's Planning, Collaboration, & Investment Section, OWRD Technical Services Division

Documents

2015 Statewide Long-Term Water Demand Forecast

Action 3C
Determine Unadjudicated Water Right Claims

Lead Agencies	Supporting Agencies	Possible Partners
OWRD	ODEQ, ODFW, USBR	Tribes

Purpose

In many parts of Oregon, landowners began using water long before the Oregon Water Code was enacted. Passage of the Water Code by the Legislature in 1909 established, for the first time in Oregon, a centralized administrative system for acquiring and recording rights to the use of surface water. These water rights are managed within a prior appropriation system of water allocation that gives priority to senior rights in times of shortage. Similar actions were taken for groundwater in the 1955 Groundwater Act. Court cases over the years have further established federal and tribal "reserved" water rights.

Adjudications may be conducted to determine pre-1909 Water Code surface water rights, and pre-1955 Groundwater Act groundwater rights, as well as federal and tribal reserved water rights. The ability to manage water resources has been greatly facilitated in those areas of the state where adjudications have been concluded. Adjudicating water right claims creates an enforceable system that is protective of senior users in times of shortage. Without the adjudication process, these claims cannot make calls for their water or take advantage of water management tools, such as transfers or leases.

Federal and tribal reserved water rights still have not been determined in many basins that have been adjudicated. The need to resolve tribal and federal rights in Oregon is real and significant.

Example Actions

- Conduct surface water and groundwater adjudications
- Settle federal reserved claims, including tribal claims

Resources

Agency Programs

OWRD's Water Rights Program

Documents

Water Rights in Oregon

Action 3D
Authorize the Update of Water Right Records With Contact Information

Lead Agencies	Supporting Agencies	Possible Partners
OWRD		Legislature

Purpose

There are currently no statutory provisions allowing the name on a water right certificate to be changed or updated, even if the holder of the certificate has passed away or sold off land with its appurtenant water rights. Almost 90,000 certificates are held by water users. The state needs the ability to respond to holders of water rights who are asking to modify the names on these certificates. State authority will enable the Water Resources Department to update ownership information in its records.

Example Actions

- Authorize the Water Resources Department to update the names on water right certificates
- Update related water right records, including databases, and geographic information system (GIS) layers

Resources

Agency Programs

OWRD's Water Rights Program

Documents

Water Rights in Oregon

Objective 3: Understand the Pressures that Affect Our Needs and Supplies

Critical Issue – Climate Change
Actions to mitigate and adapt to climate change are distributed throughout the Strategy
Refer to the Strategy narrative for additional information

Critical Issue - Water & Energy
4A Analyze the Effects on Water from Energy Development Projects and Policies
4B Develop Non-Traditional Hydroelectric Power
4C Promote Strategies that Increase/Integrate Energy and Water Savings

Critical Issue - Natural Hazard Mitigation Planning & Extreme Events
5A Plan and Prepare for Drought and Wildfire Resiliency
5B Plan and Prepare for Flood Events
5C Plan and Prepare for a Cascadia Earthquake and Tsunami Event

Critical Issue - Land Use Planning
6A Improve Integration of Water Information and Land Use Planning
6B Encourage Low Impact Development Practices and Green Infrastructure

Critical Issue - Water Infrastructure
7A Maintain, Upgrade, and Decommission Water and Wastewater Infrastructure
7B Encourage Regional (Sub-Basin) Approaches to Water and Wastewater Systems
7C Support Dam and Levee Safety

Critical Issue – Education & Outreach
8A Support Implementation of K-12 Environmental Literacy Plan
8B Provide Career Training for the Next Generation of Water Professionals
8C Promote Community Education and Outreach
8D Identify Water Research Needs and Partnerships

Action 4A
Analyze the Impacts on Water from Energy Development Projects and Policies

Lead Agencies	Supporting Agencies	Possible Partners
ODOE, ODEQ, ODFW	BPA, DLCD, DOGAMI, NOAA, OWRD, USACOE, USFWS	Tribes, Public Utility Commission, Oregon Climate Action Commission, WC's, CBO's, NGO's

Purpose

Hydropower facilities at dams produce affordable energy, however, dam operations can alter streamflow amounts and timing and oppose needs for fish and other aquatic wildlife and other instream needs. Statewide goals to reduce greenhouse gas emissions while meeting future energy demand elevates the need for improving efficiency of existing facilities and developing alternative energy projects. Proposed energy projects should undergo a thorough scientific analysis to understand potential impacts to instream and ecosystem needs. This information can then provide the basis for decision-making for often conflicting objectives to produce affordable, low emission power and protect aquatic ecosystems and other instream needs.

Example Actions

- Analyze and project the water demand and water quality impacts of current and proposed energy development projects (e.g., hydroelectric, solar, wind, geothermal, bio-energy, nuclear, hydrogen, natural gas) in the context of climate change and greenhouse-gas reduction strategies
- Analyze the siting impacts of proposed energy projects on water quantity, quality, and ecosystems
- Evaluate where impacts to water quantity and quality associated with energy projects have been experienced, including environmental justice communities, and look for opportunities to recognize and avoid or mitigate in future energy projects

Resources

Agency Programs

ODOE Energy Planning & Innovation Division, ODEQ Climate Protection Program, ODEQ Water Quality Program, ODEQ Section 401 Hydropower Program, ODFW Land Resources Program, OWRD Hydroelectric Program

Workgroups

Hydroelectric Application Review Team (ODEQ, ODFW, OWRD)

Documents

ODOE's Biennial Energy Report
Oregon's Energy Strategy (coming fall 2025)
2021 Oregon's Climate Change Adaptation Framework
2024 U.S. Department of the Interiors' Historic and Ongoing Impacts of Federal Dams on the Columbia River Basin Tribes

Action 4B
Develop Non-Traditional Hydroelectric Power

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, ODFW, ODOE, OWRD	BIZOR, BPA, DLCD, DSL, ODA, ODOT, OEM, NRCS, USEPA	Tribes, local governments, WC's, CBO's, NGO's, businesses, individuals

Purpose

Oregon's 2016 Renewable Portfolio Standard (RPS) update requires that 50 percent of the electricity sold by Oregon's large utilities comes from eligible renewable resources by 2040. Oregon's 100 percent clean energy target established by House Bill 2021 (2021) also requires the state's large investor-owned electric utilities to achieve a 100 percent reduction in the greenhouse gas emissions associated with their electricity mixes by 2040. Oregon's RPS specifically promotes certified low-impact hydropower and efficiency upgrades at existing hydropower facilities. These upgrades increase the amount of electricity produced by a dam without increasing the flow rate at the dam.

Additional project types include modifications to existing dams that don't currently generate power, in-conduit (within-a pipe) hydropower systems like those used within irrigation distribution systems, aquifer storage and recovery, and pumped storage systems.

Example Actions

- Utilize the state's expedited application process to develop hydroelectric projects at existing infrastructure
- Invest in alternative energy projects
- Promote modifications to increase the efficiency of existing hydropower turbines (I.e., increase the amount of electricity produced by the same amount of flow – eligible per Renewable Portfolio Standard)
- Offer incentives for low-impact hydropower projects that provide local co-benefits, such as in-conduit micro-turbines installed in irrigation pipes
- Add hydroelectric to non- powered dams using newer fish-friendly hydroelectric turbine designs (will require capital intensive fish screening at intake and/or fish passage)

Resources

Agency Programs

ODEQ Section 401 Hydropower Program, ODFW Hydropower Program, OWRD Hydroelectric Program

Workgroups

Hydroelectric Application Review Team (ODEQ, ODFW, OWRD), River Management Joint Operating Committee (BPA, USACE, USBR)

Documents/Websites

ODOE Biennial Energy Report
Pumped Storage Hydropower | Department of Energy
Low Impact Hydro Certification
BPA/USACE/USBR 2018 Hydroclimate Projections and Analyses

Funding

Energy Trust Irrigation Modernization
Farmers Conservation Alliance
NRCS Environmental Quality Incentives Program

Action 4C

Promote Strategies that Increase / Integrate Energy and Water Savings

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODOE, OWRD	BCBS, BIZOR, BPA, DLCD, USDA, USEPA	Tribes, local governments, WC's, CBO's, NGO's, Oregon Climate Action Commission, Oregon Public Utility Commission, OSU Extension Service

Purpose

Water is critical for energy production, and energy is used to pump, treat, heat, and convey water through pipes for residential, commercial, industrial, and irrigation purposes. Water conservation also conserves energy, and energy conservation reduces the amount of water used in energy production. Across various locations and times of the year, climate change presents the challenge of having reduced availability of both water and energy. To increase water/energy efficiency and conservation, there is a need to increase the sharing of information about efficiency and conservation strategies, along with financial incentives to implement the strategies.

Example Actions

- Move toward energy independence and resiliency for publicly operated treatment works (wastewater treatment)
- Continue to implement and evaluate building codes that encourage water and energy efficiencies
- Encourage individuals, communities, industries, and businesses, including agriculture, to look for and integrate ways to conserve both energy and water
- Encourage cross-sector and cross-agency collaboration to achieve energy and water savings
- Strive to capture and publicly report energy and water savings data
- Promote resources that expand irrigation water and energy efficiency and conservation
- Promote regenerative agriculture and permaculture practices
- Improve availability of cost savings associated with ENERGY STAR and similar programs to low-income or disadvantaged households and businesses
- Explore new or innovative technologies to accomplish energy and water savings
- Consider developing an energy/water nexus efficiency program that could support industrial water and energy intensive uses (e.g., data centers, paper mills)
- Increase interagency and energy/water sector collaboration, to identify co-benefits and opportunities for water efficiency (See Action 10A)

Resources

Agency Programs

ODOE Community Renewable Energy Grant Program, ODOE Energy Planning & Innovation, ODOE Energy Development Services, ODEQ Climate Protection Program, BCBS Building Codes Division Energy Code

Workgroups

Northwest Power and Conservation Council
Oregon Climate Action Commission (formerly Oregon Global Warming Commission before 2023)
Energy Facility Siting Council
Energy Advisory Work Group

Documents/Websites

ODOE Community Renewable Energy Grant Program
Energy Trust of Oregon, programs for residential, commercial, industrial + agricultural, and municipal
Oregon Global Warming Commission 2023 Oregon Climate Action Roadmap to 2030
Oregon Global Warming Commission 2021 Natural & Working Lands Proposal
USDA No -Till Farming for Climate Resilience

Action 5A
Plan and Prepare for Drought and Wildfire Resiliency

Lead Agencies	Supporting Agencies	Possible Partners
DLCD, ODA, ODEQ, ODF, ODFW, OEM, OWRD	DOGAMI, FEMA, NOAA, NRCS, ODHS, OWEB, USBR, USEPA, USFS	Tribes, local governments, OCCRI/Oregon Climate Service, WC's, CBO's, NGO's, businesses, individuals

Purpose

Although there have been individual years of wet conditions over the past two decades, on average the span between 2000-2022 have been drier than any other 22-year period in the past thousand years. Drought conditions impact water supplies, streamflow, agricultural productivity, wildfire danger, and ecosystem health.

The state has developed many resources to respond to drought, the primary source being the Natural Hazards Mitigation Plan (NHMP) and accompanying Drought Vulnerability Assessment. The Strategy supports implementation of the NHMP. Agencies must continue to work together to plan, prepare and respond to drought.

Example Actions

- Implement Oregon's Natural Hazard Mitigation Plan & recommendations from the Drought Vulnerability Assessment
- Identify, assess, and assist those communities and ecosystems most vulnerable to drought and wildfire (e.g., assess water supply systems for vulnerability)
- Develop the appropriate set of indicators that signal and forecast differing stages of drought
- Document the economic, social, and environmental impacts of drought and wildfire, including the frequency, distribution, intensity and duration
- Prepare for, respond to, and mitigate for the impacts of drought and wildfire
- Improve the drought toolbox through education and outreach, drought contingency plans, more efficient water distribution systems, and additional voluntary measures to improve streamflow
- Increase education and outreach efforts to help landowners minimize risk to their property from wildfires
- Invest in built and green/natural infrastructure, (i.e., nature-based solutions), refer to Actions 6B, 7A, 11A-11E
- Provide technical assistance and funding to local governments to evaluate the need and opportunities for inter-tie projects in Local Natural Hazards Mitigation Plans
- Prioritize resources for planning and preparation to those most vulnerable to drought and wildfire impacts
- Explore ways to protect minimum stream flows during drought declarations
- Educate the public about the importance of having an emergency supply of drinking water

Resources

Agency Programs

DLCD Natural Hazard Mitigation Planning Program, OWRD Technical Services Division, ODHS Office of Resilience and Emergency Management

Workgroups

Multihazard Mitigation Council, Drought Readiness Council, Water Supply Availability Committee, State Interagency Hazard Mitigation Team

Documents/Websites

OWRD Drought webpage, OWRD Summary, State Drought Declaration Process and Emergency Tools
Drought.gov
Oregon's Emergency Operations Annex – Drought, Oregon's Emergency Operations Annex – Wildlands Fire
Oregon Emergency Management's list of local (city/county) and tribal emergency managers
Drought and Public Health
Oregon Department of Emergency Management: Local Water Supply Emergency Planning Guidance
Drought Mitigation Policy Aid (fema.gov)
Federal Disaster Declaration Process
Post-Fire Debris Flow Project

Action 5B
Plan and Prepare for Flood Events

Lead Agencies	Supporting Agencies	Partners
DLCD, DOGAMI, ODOT, OEM, OWRD, USACE	FEMA, NOAA, NRCS, ODA, ODEQ, ODF, ODFW, OHA, USEPA	Tribes, local governments, OCCRI/Oregon Climate Service, WC's, CBO's, NGO's, businesses, individuals

Purpose

Flood events pose a risk to public safety, property, and the environment including threats to drinking water supplies and unintended wastewater discharges to our rivers and streams. Floods are one of twelve hazards addressed in Oregon's Natural Hazards Mitigation Plan (NHMP). The Strategy supports implementation of the NHMP. The plan contains mitigation actions, which are meant to reduce or eliminate the long-term risk to people and property from flooding. The NHMP also includes potential funding sources for hazard mitigation activities.

This action focuses on the public safety and emergency nature of flooding and is further supported by several other Strategy Actions. Improvements in stream gaging data are called for in Action 1A. Action 7A supports increasing the resiliency of our infrastructure such as upgrading or decommissioning unsafe or outdated dams and levees and Action 7C supports Oregon's Dam Safety Program and the development of a Levee Safety Program. Floodplain protection and restoration is discussed under Action 11A.

Example Actions

- Implement Oregon's Natural Hazards Mitigation Plan
- Develop indicators of flood emergency stages, using information about meteorologic, hydrologic, hydraulic, and watershed conditions
- Document the economic, social, and environmental impacts of floods
- Evaluate potential for extreme flooding, under atmospheric rivers and climate change scenarios
- Establish early flood and debris-flow warning systems in areas where recent drought and wildfire have affected forests and vegetation
- Complete update of precipitation frequency estimates for Oregon
- Update methods and procedure for determining extreme precipitation and flooding
- Support DLCD to continue to provide assistance and training to local floodplain managers, property owners, surveyors, real estate agents, and other to support compliance with the National Flood Insurance Program
- Increase education and outreach efforts to help landowners minimize risk to their property from floods
- Invest in built and green/natural infrastructure (i.e., nature-based solutions), refer to Actions 6B, 7A, and 11A-11E
- Prioritize resources for planning and preparation to those most vulnerable to flood impact
- Develop an inventory of levees in Oregon and assess their condition and risk (also see Action 7C)
- Educate the public about the importance of having an emergency supply of drinking water

Resources

Agency Programs

DLCD's Natural Hazards Program, DLCD's National Flood Insurance Program, NRCS's Emergency Watershed Protection Program, OWRD's Dam Safety Program

Workgroups

USACE Silver Jackets Flood Risk Program, Flood Core Team, State Interagency Hazard Mitigation Team

Documents/Websites

National Flood Insurance Program

2020 Natural Hazards Mitigation Plan (NHMP)

Oregon's Emergency Operations Annex - Flood

Oregon Emergency Management's list of local (city/county) and tribal emergency managers

Action 5C
Plan and Prepare for a Cascadia Earthquake and Tsunami Event

Lead Agencies	Supporting Agencies	Possible Partners
DLCD, DOGAMI, ODEQ, OEM, OHA, OWRD	USEPA, NRCS, ODF, USFS	Tribes, local governments, OCCRI/Oregon Climate Service, WC's, CBO's, NGO's, businesses, individuals

Purpose

A large earthquake such as the Cascadia Earthquake and an associated tsunami could have widespread impacts on water infrastructure and water quality for years to come. Earthquakes and tsunamis are two of twelve hazards addressed in Oregon's Natural Hazards Mitigation Plan (NHMP). The Strategy supports implementation of the NHMP. The plan contains mitigation actions, which are meant to reduce or eliminate the risk to people and property from earthquakes and tsunamis. The NHMP also includes potential funding sources for hazard mitigation activities.

Example Actions

- Implement Oregon's Natural Hazard Mitigation Plan
- Follow the recommendations provided by the Oregon Seismic Safety Policy Advisory Commission, including in its 2013 Oregon Resilience Plan and 2021 Tsunami Resilience on the Oregon Coast Report
- Incorporate earthquake and tsunami resilience regulations in local land use plans (see model policies developed by DLCD)
- Evaluate and retrofit dams and other water infrastructure to meet new seismic standards (see Action 7C)
- See recommended actions in the infrastructure section of the IWRS (7A – 7C)
- Consult or develop a local Tsunami Evacuation Facilities Improvement Plan
- Prioritize resources for planning and preparation to those most vulnerable to earthquake and tsunami impacts
- Evaluate and mitigate the seismic vulnerability of bulk oils or liquid fuel terminals (SB 1567, 2022) that pose significant pollution risks to critical waterways
- Educate the public about the importance of having an emergency supply of drinking water

Resources

Agency Programs

DLCD Hazard Mitigation Planning Program, DOGAMI Geological Survey and Services Program, OWRD Dam Safety Program

Workgroups

Oregon Seismic Safety Policy Advisory Commission, State Interagency Hazard Mitigation Team

Websites/Documents

DOGAMI clearinghouse of tsunami information
DLCD tsunami land use planning information
2020 Natural Hazards Mitigation Plan
Oregon's Emergency Operations Annex – Earthquake
Oregon's Emergency Operations Annex - Tsunami
Oregon Emergency Management's list of local (city/county) and tribal emergency managers
2020 DOGAMI Oregon Coastal Hospital Resilience Project
2013 Oregon Resilience Plan
2021 Tsunami Resilience on the Oregon Coast
2012 DOGAMI Earthquake Risk Study for Oregon's Critical Energy Infrastructure Hub
Earthquake and Tsunami Community Disaster Cache Planning Guide
Fuel Tanks and Seismic Stability Assessments

Action 6A
Improve Integration of Water Information and Land Use Planning

Lead Agencies	Supporting Agencies	Possible Partners
DLCD, ODEQ, ODFW, OWRD	DAS, DOGAMI, DSL, ODA, ODF	Tribes, local governments, WC's, CBO's, NGO's

Purpose

Local government land use planners do not always have the information they need when making long-term decisions that affect water resources. Oregon can help remedy this issue by improving communication and coordination between state and local governments to improve local comprehensive planning and water resource protections. Local governments need increased access to several types of agency-generated information, including water availability, site suitability for stormwater and wastewater management, and the presence of sensitive natural resources to update and carry out local comprehensive plans. Enhanced coordination and resources also provide opportunities for improved land use protections within the local comprehensive planning process.

Priority Tasks

- P2.4a Provide additional regional representatives to provide land use planning technical assistance and circuit riders for cities, counties, and Tribes
- P2.4b Provide technical assistance and funding to help cities and counties modify their local codes to confirm water availability with OWRD before approving development; includes updates to public facilities planning
- P2.4c Update local jurisdiction Economic Opportunity grant qualification requirements to verify water availability with OWRD
- P2.4d Provide technical assistance and funding to help cities and counties modify their local codes to support the implementation of TMDLs

Example Actions

- Protect natural water bodies in the course of land use decisions, such as wetlands, estuaries, groundwater aquifers, rivers, and lakes
- Update land use protections for water bodies incorporating best available data
- Integrate OHA regulation of water master plans with local comprehensive land use plans to sustainably support municipalities' development
- Make accurate geographic information on water rights and district boundaries available to local governments and DLCD
- Support local governments to perform periodic review of their comprehensive plans
- Update Goal 5 resource inventories in local comprehensive plans (e.g., riparian areas, wetlands)
- Develop and share information with local governments regarding the location, quantity, and quality of water resources for use in land use decisions; consider mechanisms for increasing access to water data such as through the Oregon Water Data Portal
- Improve coordination, technical guidance, and assistance to local governments for land use decisions that rely on water availability or could have negative impacts to water quality
- Take next steps to implement land use goals related to water resources—establish implementing rules, support local governments to update acknowledged plans, and the application of appropriate safeguards during permitting
- Build partnerships with state agencies and local governments to share land use information
- Increase resources for local governments to update their natural hazard inventories (Goal 7)
- Increase resources for local governments to update their facilities plans (Goal 11)
- Work towards achieving a statewide dataset of tax lots (identified as a priority by DAS)
- Update State Agency Coordination Programs and associated rules (see Action 9D)
- Include environmental and social justice information in land use planning

Resources

Agency Programs

DLCD Community Service Division, Rural Planning, Urban Planning, Housing, and Transportation & Growth Management Programs, ODEQ Underground Injection Control Program, ODFW Land Resources and Water Programs, DSL Waterways & Wetlands Program, OWRD Surface Water, Groundwater, and Planning Programs

Documents/Websites

Oregon's Statewide Planning Goals
State Agency Coordination Plans
ODFW Compass: Mapping Oregon's wildlife habitats
Statewide Wetlands Inventory
Essential Salmonid Habitat Mapping
Integrating Water Efficiency into Land Use Planning in the Interior West: A Guidebook for Local Planners

Action 6B
Encourage Low Impact Development Practices and Green Infrastructure

Lead Agencies	Supporting Agencies	Possible Partners
DLCD, ODEQ	BIZOR, DSL, NRCS, ODF, OHA, OWEB, OWRD, USEPA, USFS	Local governments, OSU Extension Service, WC's, CBO's, NGO's, developers, utilities

Purpose
Land development often changes the way water moves across the land, preventing it from soaking into the soil, and creating stormwater runoff that can pollute waterways. Low Impact Development (LID) practices, including environmentally sensitive site design and the use of natural or green infrastructure, helps collect rainfall close to where it falls, reduce pollution, and increase climate resilience. The best LID practices for a project need to be determined early on in project planning. Regulatory benefits include meeting requirements for a Total Maximum Daily Load (TMDL) plan, meeting MS4 permit post-construction requirements, the Safe Drinking Water Act, state land use planning Goals 5 and 6, and reducing impacts on Endangered Species Act listed species.

Also see related Actions 7A, and 11A-11E.

Example Actions
- Continue to compile and provide online information on low impact development best practices
- Support updates to local development codes, improving local capacity to review and permit low impact development and green infrastructure designs
- Encourage communities to consider natural infrastructure in lieu of, or as a complement to, built infrastructure
- Consider how and where co-benefits of natural/green infrastructure will occur, including flood abatement, clean drinking water, lower water/wastewater utility rates, educational opportunities, and climate resilience
- Implement Community Green Infrastructure Grant Program

Resources
Agency Programs

DLCD & ODOT Transportation & Growth Management Program, ODEQ Total Maximum Daily Load Program, ODEQ Nonpoint Source Pollution Program, ODEQ MS4 Program

Websites

ODEQ LID Resources

ODEQ MS4 Resources

EPA – Nonpoint Source Pollution and Low Impact Development

Documents

Low Impact Development in Western Oregon: A Practical Guide for Watershed Health

LID Overview Fact Sheet http://oeconline.org/wp-content/uploads/2014/11/LID_OVERVIEW_FACT_SHEET.pdf

Oregon Smart Guide for Rainwater Harvesting

2016 ODOT Green Infrastructure Study Green Infrastructure Techniques for Resilience of the Oregon Coast Highway

Funding

DLCD Community Green Infrastructure Grant Program

Action 7A
Maintain, Upgrade, or Decommission Water Infrastructure

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, OHA, OWRD	BIZOR, DLCD, DOGAMI, ODFW, ODOE, USACE, USEPA, USFWS	Tribes, local governments, WC's, CBO's, NGO's, businesses, individuals

Purpose

Ensuring that Oregon's water-related built and green infrastructure is maintained and properly functioning is important for a variety of environmental, public health, and safety reasons, but also for meeting our state's economic needs. It takes an extensive system of pumps, pipes, treatment, and storage facilities to deliver water to our homes, businesses, and fields every day. A network of built and green infrastructure is necessary for conveying and treating stormwater and wastewater produced by residences, businesses, and industry. Updating aging infrastructure improves resilience, water security, and may also result in water and energy conservation. In some cases, decommissioning or removing deteriorated infrastructure may be a more cost-effective and environmentally beneficial alternative (e.g., wells, dams, or levees). Protection and restoration of green infrastructure (also see Action 11A) is also critical for maintaining infrastructure benefits such as flood control, stormwater management, water quality improvement, and storage. Safety improvements of dams and levees are covered under this action and Action 7C.

Example Actions

- Provide timely inspection of well construction, review of well logs, and educate drillers and pump installers to ensure construction standards are met
- Inventory, inspect, and make safety improvements to levees, accounting for future conditions associated with climate change
- Properly decommission infrastructure, such as a well, culvert, levee, or dam, at the end of its useful life
- Upgrade infrastructure to improve water and energy efficiency and conservation (e.g., pipe irrigation canals, leak detection and repair in municipal water distribution systems)
- Provide funding for planning, design, and construction of point source and nonpoint source water pollution control projects to upgrade infrastructure systems, protect, restore, and improve water quality
- Provide funding for projects based on USEPA "green" project eligibility
- Incorporate equity and community vulnerability assessments into infrastructure planning to inform strategies for repair, replacement, and funding infrastructure improvements
- Assess additional locations where levee accreditation could help lower floodplain insurance costs for low-income households and improve flood protection for vulnerable communities
- Continue to support the OWRD Well Abandonment, Repair, and Replacement Fund to provide financial assistance to low to moderate income individual households or members of federally recognized tribes in Oregon
- Incorporate environmental justice considerations in targeting funding and resources for water infrastructure improvements in underserved communities
- Support water and wastewater infrastructure investments that prioritize (efficient) infill development, provision of affordable housing, and jobs within walkable service areas

Resources

Agency Programs

ODFW Fish Passage Program, OWRD Well Construction Program and Dam Safety Programs

Funding

BIZOR grant and loan programs, including Community Development Block Grants, Safe Drinking Water Revolving Loan Fund, Special Public Works Fund, Sustainable Infrastructure Planning Projects Forgivable Loan Program, Tidegate Fund, Water/Wastewater Fund, ODEQ Clean Water State Revolving Fund Program, OHA Drinking Water State Revolving Fund Program, OWRD Water Well Abandonment, Repair, and Replacement Fund and Water Projects Grants and Loans

Documents/Websites

Ecological Effects of Tide Gate Upgrade or Removal: A Literature Review and Knowledge Synthesis

ODFW Fish Passage Barrier Inventories

Action 7B
Encourage Regional (Sub-basin) Water and Wastewater Systems

Lead Agencies	Supporting Agencies	Possible Partners
BIZOR, ODEQ, OHA, OWRD	DLCD, ODFW, ODOE	Tribes, local governments, CBO's, NGO's

Purpose

Many Oregon communities, particularly less populated ones, struggle to adequately fund water and wastewater related infrastructure. The high capital costs related to infrastructure, the construction, operation, and maintenance cost of facilities, and the salary and training costs of retaining qualified personnel may be prohibitively expensive to communities with a small ratepayer base. In Oregon, these tend to be rural, coastal, and/or small urban communities.

Developing a regional water and/or wastewater system may be more cost-effective and provide co-benefits such as improved water quality and increased resiliency. A regional system could include physical consolidation, system redundancy, or shared contracts, services, purchases, mutual assistance agreements, interties, and back-up supplies. State and federal agencies often provide incentives such as funding and technical assistance to encourage a regional approach to meeting water needs.

Example Actions

- Make use of shared contracts, services, and purchases
- Develop mutual assistance agreements between neighboring communities and water/wastewater systems
- Establish inter-ties and back-up supplies for water supplies
- Provide incentives to encourage regional approaches to water distribution, efficiency, and wastewater treatment
- Incorporate DLCD equity and community vulnerability assessments into asset management planning to inform strategies for repair, replacement, and funding infrastructure improvements
- Identify transition strategy for providing water and wastewater to urbanizable areas (UGB) consistent with comprehensive land use planning.

Resources

Agency Programs

BIZOR grant and loan programs, including Community Development Block Grant, Safe Drinking Water Fund, Special Public Works Fund, Water/Wastewater Fund

Funding

ODEQ Clean Water State Revolving Fund and Overflow Sewer and Stormwater Municipal Grant Program, USEPA grant funds administered by ODEQ
OWRD's Water Projects Grants & Loans, OWRD's Place-Based Planning Fund
OHA's Drinking Water State Revolving Fund

Documents/Websites

LPRO Approaches and Funding for Low-Income Water Ratepayer Assistance and Household Infrastructure in Oregon

Action 7C
Support Dam & Levee Safety

Lead Agencies	Supporting Agencies	Possible Partners
ODA, OEM, OWRD	BPA, ODEQ, ODFW, USACE	Tribes, local governments, WC's, CBO's, NGO's, businesses, individuals

Purpose

Approximately 1,200 dams in Oregon are at least 10 feet high and store at least 3 million gallons of water (9.2 acre-feet of water), making them subject to Oregon's Dam Safety Program. The largest dams, such as the Bonneville Dam on the Columbia River, are regulated by federal agencies like the Bonneville Power Administration and the United States Army Corps of Engineers. The Water Resources Department is the lead public authority responsible for 950 non-federal dams.

The original focus of Oregon's Dam Safety Program was the review and approval of designs for new dams. Many of Oregon's dams were constructed decades ago, with some more than 100 years old. As a result, the Dam Safety Program now focuses on evaluating the condition of existing dams through regular inspection feedback to owners regarding needed safety improvements. Oregon also needs to establish a Levee Safety Program

Safety improvements and decommissioning of dams and levees is also covered under Action 7A.

Example Actions

- Authorize resources to determine if dams have safety deficiencies; evaluate and retrofit dams to meet new seismic and hydrologic standards
- Implement actions to improve the safety of dams
- Properly decommission dams and levees at the end of their useful life
- Coordinate interagency emergency response regarding dam inspection, communication, and evacuation
- Define the legal responsibilities of dam owners
- Dedicate grant and loan resources for rehabilitation of deficient dams
- Improve clarity of statute and rule regarding enforcement mechanisms to ensure dam owners follow through with Emergency Action Plan exercises and updates
- Map potential impacts to critical infrastructure (e.g. schools, hospitals, water treatment facilities) and demographics of who will be impacted by dam failures

Resources

Agency Programs

OWRD's Dam Safety Program, ODA's CAFO Program (inspects dams on permitted facilities that meet the qualifications)

Workgroups

Association of State Dam Safety Officials

Funding

FEMA High Hazard Potential Dam Grant, FEMA National Dam Safety Program Grant

Action 8A
Support Implementation of K-12 Environmental Literacy Plan

Lead Agencies	Supporting Agencies	Possible Partners
Oregon Department of Education, OSU	BLM, ODEQ, ODFW, OPRD, OWRD, USGS	Local governments, CBO's, NGO's

Purpose

Oregon's Environmental Literacy Plan is aimed at helping students become lifelong stewards of their environment and community. Administered by Oregon State University Extension, the current Environmental Literacy Program website provides resources for teachers and community members. The goals of the plan are to: prepare students to understand and to address the major environmental challenges; contribute to students establishing a healthy lifestyle through outdoor experiences in the school curriculum; and give teachers opportunities for enhanced professional development. Support for implementation of the Plan will encourage environmental literacy among Oregon's young people and prepare them for the management and stewardship challenges ahead.

Example Actions

- Support funding for implementation (e.g., Outdoor School, Children's Clean Water Festival)
- Natural resource agencies, community organizations, and others should engage in education for environmental literacy activities
- Incorporate environmental justice, and culturally specific water stewardship values in environmental literacy programs
- Engage and support culturally specific community-based organizations in the design and implementation of environmental literacy programs

Resources

Agency Programs

Oregon's Environmental Literacy Program, Oregon's Outdoor School Program, Outdoor School Education Fund
ODFW's Salmon and Trout Enhancement Program (Fish Eggs to Fry)

Events

Children's Clean Water Festival, https://www.cleanwaterfestival.org/

Documents

2013 Environmental Literacy Plan
Environmental Literacy Resource Directory

Action 8B
Provide Career Training for the Next Generation of Water Professionals

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODEQ, ODFW, OHA, OWRD	NRCS, NOAA, USEPA	Tribes, utilities, CBO's, NGO's, universities and community colleges

Purpose

In the next ten years, approximately one-third of water and wastewater operators in the U.S. will be eligible for retirement. The water utility workforce has important implications for environmental and public health protections. Challenges posed by climate change, degraded ecosystems, aging infrastructure, and population increases have increased the demand for a wide variety of water professionals. Agencies, utilities, non-governmental organizations, and educational institutions must provide career training opportunities to increase the water workforce.

Example Actions

- Determine whether career training programs are available and equipped to meet the demand for water professionals
- Offer job shadow programs to expose students to careers in water
- Continue funding support for water-related trade and science programs at Oregon community colleges
- Increase coordination between state agencies and universities to develop programs that foster interest in water-related fields and career progression for graduating students
- Offer paid apprenticeship or internship programs to expose BIPOC and underrepresented students and new professionals to careers in water
- Partner with Hispanic Serving Institutions (HSI) to increase support for water-related trade and science programs at Oregon community colleges and universities
- Partner with water/wastewater utilities to promote careers and provide on-the-job training

Resources

Agency Programs

OWRD Certified Water Right Examiner Annual Training, OWRD Well Constructor Continuing Education, OHA Drinking Water Systems Operator Certification

Websites

Oregon Association of Water Utilities
Oregon STEM Hubs
Pacific Northwest Section – American Water Works Association
USEPA's Water Sector Workforce Initiative
Workforwater.org – website promoting career choices in the water sector
Office of Community Colleges and Workforce Development – provides a listing of colleges that offer water-related courses, degrees, and programs throughout Oregon
OSU Traditional Ecological Knowledge Lab, https://tek.forestry.oregonstate.edu/

Funding

NOAA's National Sea Grant College Program, https://seagrant.noaa.gov/
USEPA's Innovative Water Infrastructure Workforce Development Grant Program

Action 8C
Promote Community Education and Outreach

Lead Agencies	Supporting Agencies	Possible Partners
DSL, ODA, ODEQ, ODF, ODFW, ODOE, OHA, OPRD, OSMB, OWEB, OWRD	USDA, USEPA, USFWS, USGS	Tribes, OSU Extension Service, local governments, WC's, CBO's NGO's,

Purpose

Public engagement for the 2024 Strategy revealed a need for more access to information about water. Oregonians want to learn more about water, how it is governed, how they can conserve and protect water resources, and other stewardship practices. State and federal agencies and partners need to increase capacity to provide this education, and partner with utilities, community-based and non-governmental organizations to reach more people. Communications efforts need to be responsive to community language and format needs. Regional partnerships are an important approach to sharing media, marketing, and translation services. See Action 8B for additional educational resources.

Priority Tasks

- P2.1a Increase multi-agency communications and community outreach capacity to provide timely water resource information, including in multiple languages and accessible to a variety of learning styles

Example Actions

- Look for opportunities to keep Oregonians informed about the importance of water resources to people and the environment
- Look for opportunities to provide outreach, including informational materials, about water-related programs (e.g., streamflow restoration, water conservation, transfers)
- Promote technical training for public and private partners
- Promote access to water-related recreational opportunities using state programs
- Develop a centralized location and outreach materials for people to access information about water conservation
- Develop and distribute informational materials related to the suite of tools available to protect instream flow
- Partner with community-based organizations to deliver water education to the public
- Provide resources for interested local organizations to conduct education and outreach to the communities they serve
- Increase outreach and education resources to produce communications in multiple languages and accessible to a variety of learning styles

Resources

Agency Programs

OPRD's Recreation Trails and Scenic Waterways Programs, OSMB's Water Wits and Interactive Boat Oregon Map, Soil and Water Conservation Districts, Watershed Councils, OHA Drinking Water and Domestic Well Safety Programs, ODFW Angler Education Program, OWRD Well Safety Program, Field Services Division, Technical Services Division, and Water Rights Services Division, Interagency Pesticide Stewardship Partnership

Documents/Websites

OHA Drinking Water – links to several videos

OHA Domestic Well Safety Program – visit healthoregon.org/wells

2024 Water Rights in Oregon: An Introduction to Oregon's Water Laws

2015 OWRD Fact Sheets for Strategies to Save Water

Well Owner's Handbook and Well Owner's Handbook (Espanol)

Human Health and Well Water

Water Quality and Pesticides

Agricultural Water Quality Resources

Water Wits

Free online paddling education and promotion of Oregon Water Trails

Aquatic Invasive Species Prevention Program

Clean Marinas and Clean Boaters Programs

Angler Education Program

Water Justice Leadership Institute

Action 8D
Identify Water Research Needs and Partnerships

Lead Agencies	Supporting Agencies	Possible Partners
DLCD, ODA, ODEQ, ODF, ODFW, ODOE, OWRD	DOGAMI, NOAA, NWS, OWEB, USGS	Tribes, local governments, OSU Extension Service, public & private research institutions, Oregon Climate Change Research Institute

Purpose

Partnerships between higher education and both the public and private sectors can result in innovative solutions for addressing water quantity and quality challenges. The water resources sector will need to continue identifying ongoing research needs that could use assistance from undergraduate and graduate students, public and private universities, research institutions, and other partners. Research collaboration between agencies and higher education may be mutually beneficial, as research institutions can bring innovative tools, technology, and other resources to the effort, while agencies can bring expertise in agency data, evidentiary and scientific standards, and management knowledge.

Example Actions

- Continue to identify ongoing research needs at the local and state level
- Support partnerships with state and federal agencies, tribes, public and private institutions to address research needs
- Fund and/or participate in research initiatives
- Consider research initiatives that would address frontline communities' environmental and climate justice challenges

Resources

Agency Programs

ODA Natural Resources Programs, ODEQ Water Quality Program, ODFW Water Program, OWRD Technical Services Division and Field Services Division

Workgroups

Climate Impacts Research Consortium
Oregon Climate Change Research Institute
Oregon Water Futures

Documents

2022 State of Water Justice in Oregon
2022 Water Justice Framework
2021 Oregon Climate Change Adaptation Framework
Oregon Climate Equity Blueprint

Chapter 4 Actions at a Glance

Objective 4: Meet Instream and Out-of-Stream Needs

Critical Issue – Water Planning

9A Support Place-Based Integrated Planning and Other Water Planning Efforts
9B Coordinate Implementation of Natural Resource Plans
9C Partner with Tribes, Federal Agencies, and Neighboring States in Long-Term Water Resources Management
9D Improve State Interagency Coordination
9E Lead Meaningful Community Engagement

Critical Issue - Water Use & Management

10A Improve Water-Use Efficiency and Water Conservation
10B Encourage Water Reuse Projects
10C Improve Access to Storage
10D Reach Environmental Outcomes with Non-Regulatory Alternatives
10E Provide an Adequate Field Presence
10F Strengthen and Improve Oregon's Water Quantity and Water Quality Permitting Programs

Critical Issue - Healthy Ecosystems

11A Improve Watershed Health, Resiliency, and Capacity for Natural Storage
11B Develop Additional Instream Protections
11D Prevent and Eradicate Invasive Species
11B Protect, Restore, and Provide Access to Instream Habitat for Fish and Wildlife
11E Develop Additional Groundwater Protections

Critical Issue - Clean Water

12A Ensure the Safety of Oregon's Drinking Water
12B Reduce the Use of and Exposure to Toxics and Other Pollutants
12C Implement Water Quality Pollution Controls

Critical Issue - Funding

13A Fund Development and Implementation of Oregon's Integrated Water Resources Strategy
13B Fund Water Resources Management Activities by State Agencies
13C Invest in Planning, Feasibility Studies, and Water Resources Project Implementation

Action 9A
Support Integrated Place-Based Planning and Other Water Planning Efforts

Lead Agencies	Supporting Agencies	Possible Partners
OWRD	DLCD, DOGAMI, ODA, ODEQ, ODFW, OHA, OWEB, USGS	Tribes, local governments, WC's, CBO's, NGO's, individuals

Purpose
Place-based integrated planning provides an opportunity to forge partnerships between individuals and organizations representing instream interests (such as fish and wildlife needs and recreation), out-of-stream interests (such as agriculture, municipalities, domestic, and industry), and representatives from local, state, federal, and tribal governments. Place-Based integrated planning groups work to develop an integrated plan, have it recognized by the Water Resources Commission, and secure funding and implement the plans. In 2023 the Oregon Legislature made the Place-Based Integrated Water Resources Planning Program permanent and allocated $2 million to assist communities with engagement and plan development.

Other types of water planning happening in Oregon include administrative basin planning, bi-state planning (e.g., Walla Walla Water 2050 Plan), and water management and conservation planning by irrigation districts and public water suppliers.

Priority Tasks
- P2.3a Fund and engage multiple agencies in place-based water planning
- P2.3b Fund and engage multiple agencies in administrative basin planning

Example Actions
- Promote success by continuing to support the places currently following the draft planning guidelines and as they develop integrated implementation plans
- Continue to provide financial and technical assistance to support collaborative water planning
- Develop or recapitalize funding pathways for plan implementation to achieve instream and out-of-stream objectives
- Promote peer-to-peer learning between communities pursuing collaborative water planning
- Refine planning guidelines, and implement process improvements
- Include public outreach and engagement activities to encourage participation by under-represented populations
- Offer place-based planning training for interested people and community groups
- Support a range of local or regional planning efforts (e.g., OWRD administrative basin plan and rule updates, water management and conservation plans)

Resources
Agency Programs
OWRD's Planning, Collaboration, and Investment Section, OWRD's Place-Based Planning Fund
Workgroups
Harney Community-Based Water Planning Collaborative
Lower John Day Basin Work Group
Mid-Coast Water Planning Partnership
Upper Grande Ronde River Watershed Partnership
Deschutes Basin Water Collaborative
Walla Walla 2050
Partnership for Lake Abert and the Chewaucan
Documents
2015 Draft Planning Guidelines
2022 Report of the Work Group on State-Supported Regional Water Planning & Management
2022 Oregon's Place-Based Integrated Water Resources Planning Program: A Participatory Evaluation

Action 9B
Coordinate Implementation of Natural Resource Plans

Lead Agencies	Supporting Agencies	Possible Partners
DLCD, ODA, ODEQ, ODFW, OWRD	USEPA, USFWS, NOAA, OWEB	Tribes, local governments, WC's, CBO's, NGO's, individuals

Purpose
Existing natural resource plans can provide baseline information, history, and rules to consider and build upon during a place-based or other water planning effort. Multiple planning documents that involve water management, directly or indirectly, may exist within a given planning area. These plans may be complementary, or contradictory and require collaboration to reconcile. Coordinated implementation of these plans can lead to improved benefits for natural resources.

Example Actions
- Dedicate resources to coordinate and reconcile existing planning documents
- Support local governments to update their local comprehensive land use plans with current natural resource information (e.g., Goal 5 natural resources)
- Support water management and conservation plan development in conjunction with local land use planning to achieve sustainable water use
- Dedicate resources for state and local implementation of existing plans
- Support the application of equity and social justice principals in plan reconciliation and updates

Resources
Documents

DLCD – Estuary Management Plans
ODA - Agricultural Water Quality Plans
OWRD - Water Management and Conservation Plans (developed by municipal or irrigation water suppliers)
OWRD Administrative Basin rules and studies
ODFW - Fish Conservation and Recovery Plans
ODEQ - Total Maximum Daily Loads and associated Water Quality Management Plans
Local land use plans
Place-Based Integrated Water Resources Plans
Watershed restoration action plans
Oregon Statewide Strategic Plan for Invasive Species (2017-2027)
Oregon Plan for Salmon and Watersheds
Oregon Conservation Strategy
Oregon Resilience Plan
Oregon Climate Change Adaptation Framework
Oregon Diversity, Equity, and Inclusion Action Plan
Local, Tribal and State Natural Hazards Mitigation Plans

Action 9C
Partner with Tribes, Federal Agencies, and Neighboring States in Long-Term Water Resources Management

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODEQ, ODF, ODFW, ODOE, OWRD	BPA, BLM, FSA, NOAA, USACE, USBR, USEPA, USFWS, USGS, USDA, BIA, US Dept of Interior	Tribes, State of California, State of Idaho, State of Washington, Canada

Purpose
Partnerships with tribes, federal agencies, and neighboring states have and will continue to play an important and necessary role in Oregon's management of water resources. A large percentage of Oregon's landscape is managed by federal agencies, and Oregon shares groundwater and surface water, including three major waterways, with California, Washington, and Idaho. The Columbia Basin drainage basin includes a portion of Canada, large portions of Oregon, Washington, and Idaho, and small portions of Montana, Nevada, Utah, and Wyoming.

Oregon is home to nine federally recognized tribes, all of which have cultural ties to and an interest in water, as well as responsibilities for protecting and managing water resources. The Strategy presents an opportunity to strengthen these government-to-government relationships.

Example Actions
- Protect tribal and state interests in shared bi-state surface water and groundwater basins
- Negotiate agreements such that water protected instream is shepherded across state lines to the mouth of the river
- Partner with neighboring states and tribes to continue or improve managing shared resources
- Carry out actions identified in the 2023 Tribal Water Task Force Report
- Coordinate with tribes on instream flow protection
- Conduct collaborative planning to develop water management approaches to protect species and avoid or minimize impacts to endangered or threatened species
- Identify who may benefit, or be impacted by, long-term water management approaches

Resources
Workgroups
Tribal Consultation Task Force
Tribal Water Task Force
Natural Resources Working Group
Cultural Resources Cluster Group
Legislative Commission on Indian Services
Interstate Workgroups (Walla Walla, Idaho Power)
Klamath River Compact Commission
Klamath River Renewal Corporation
Kaizen pre-application teams

Treaties, Inter-state Agreements
Columbia Basin Fish Accords
Klamath River Compact
U.S. Department of State website: Columbia River Treaty
Summary of Active and Inactive Klamath Basin Agreements

Documents
Walla Walla Groundwater Study
Deschutes Basin Habitat Conservation Plan
USFWS Federal Endangered Species Act species Recovery Plans
NOAA Federal Endangered Species Act species Recovery Plans

Action 9D
Improve State Interagency Coordination

Lead Agencies	Supporting Agencies	Possible Partners
BIZOR, DLCD, DOGAMI, DSL, ODA, ODEQ, ODF, ODFW, ODOE, ODOT, OHA, OPRD, OSMB, OWEB, OWRD, and others	DAS, OEM	Governor's Natural Resources Office

Purpose

Given the distribution of water-related responsibilities across multiple agencies, it is critical that agencies coordinate to support one another's work and implement the Strategy. Agencies should seek to improve coordination to exercise efficient use of state resources and alignment of state law. Currently, coordination occurs through various interagency workgroups and forums. Agencies will need to collaborate on the development and implementation of Strategy biennial interagency workplans.

Priority Tasks

- P1.2b Improve agency coordination by developing new, and updating existing, memoranda of understanding (MOUs) where appropriate, involving agencies with applicable authorities/responsibilities

Example Actions

- Update State Agency Coordination Programs in partnership with the Department of Land Conservation and Development
- Establish efficient procedures for cross-agency coordination and approval of relevant state agency permits
- Coordinate Strategy implementation, develop interagency biennial workplan for implementing Strategy actions
- Develop formal memorandum of agreement/understanding (MOA/MOU) between agencies to establish clear and transparent expectations for interagency cooperation where agencies share affiliated authorities/responsibilities
- Support new and existing interagency review teams or interagency work groups
- Create tools to help tribes, the public, local governments, and community-based organizations navigate state agencies to address complex water issues
- Support the development and use of Oregon's Environmental Justice Mapping Tool
- Support interagency communication around community engagement (also see HB 3293 (2021))
- Support interagency coordination to implement water-related plans (e.g., Oregon's Natural Hazard Mitigation Plan, Oregon Plan for Salmon and Watersheds, etc.)

Resources

Workgroups

Conservation Effectiveness Partnership, Environmental Justice Council, Interagency Review Team, Oregon STREAM Team, Oregon Technical Advisory Committee, Regional Solutions Team, Water Core Team, Water Supply Availability Committee, Climate Change Adaptation Framework Implementation Team, Drought Readiness Council, Technical Review Teams for agency grant programs, Oregon Water Data Portal Steering Committee, Pesticide Stewardship Partnerships, Water Quality Pesticide Management Team, Willamette Action Team for Ecosystem Restoration, Natural Resource Enforcement Team

Documents

State Agency Coordination Plans
ODA-DEQ Nonpoint Source Pollution Memorandum of Agreement

Action 9E
Lead Meaningful Community Engagement

Lead Agencies	Supporting Agencies	Possible Partners
DLCD, ODA, ODEQ, ODF, ODFW, OWEB, OWRD	BIZOR, OHA, OPRD, USEPA	Tribes, local governments, community leaders, CBO's, NGO's, WC's, OSU Extension Service, individuals

Purpose
Meeting instream and out-of-stream needs requires engagement with impacted communities. Tribal communities, communities of color, low-income, and many rural communities have faced years of inequitable governmental policies and exclusionary decision-making practices created and maintained by government institutions. Agencies need to be able to allocate resources for engagement, including to organizations that represent underserved/under-represented populations, as well as providing services necessary to facilitate engagement of members of those populations. Funding and resources to support participation in state-led planning, engagement, policy development, and management activities will help ensure plans and projects meet the needs of those they are intended to serve.

Example Actions
- Provide resources for capacity-building for community-based organizations
- Use accessible and inclusive engagement strategies
- Create opportunities for communities to identify and engage decision-makers
- Conduct outreach to invite underserved/under-represented populations to participate in planning activities
- Provide funding for agencies and organizations to sustain engagement over the life of a project
- Provide resources for facilitation and coordination, and staff experts in outreach and engagement best practices
- Use best practices for engagement as identified in the State of Oregon Diversity, Equity, and Inclusion Action Plan and other documents, including cultural and language-specific needs
- Use Oregon's environmental justice mapping tool and federal EJ Screen to evaluate potential impacted communities for state-led planning, engagement, policy development and management activities

Resources
Authorities

Oregon's Environmental Justice Law, House Bill 4077 (2021), House Bill 3293 (2021)

Workgroups

Environmental Justice Council

Documents

Climate Change Adaptation Vulnerability Assessment Report

State of Oregon Climate Equity Blueprint

State of Oregon Diversity, Equity and Inclusion Action Plan

State of Oregon Environmental Justice Task Force: Environmental Justice: Best Practices for Natural Resources Agencies

Funding

EPA's Community Change Grants

Action 10A
Improve Water-Use Efficiency and Water Conservation

Lead Agencies	Supporting Agencies	Possible Partners
ODA, OWEB, OWRD	BPA, NRCS, ODEQ, ODFW, ODOE, USBR	Tribes, local governments, WC's, CBO's, NGO's, businesses and individuals, OSU Extension

Purpose
Water conservation is one of the more widely recognized approaches to managing water demand and stretching limited water supplies. Water conservation, as defined in state law, is a means of eliminating waste or otherwise improving the efficiency of water use by modifying the technology or method of diverting, transporting, applying, or recovering water. Water conservation can also be accomplished through reuse, addressed in Action 10B. Water conserved through the Allocation of Conserved Water Program can benefit water instream, Action 11B. Additional incentives are needed to expand water conservation in Oregon.

Example Actions
- Establish a comprehensive water-use efficiency and conservation program that provides incentives and technical assistance to water users in all sectors
- Conduct a statewide water conservation potential assessment, considering high priority water management needs
- Prioritize and provide funding for agricultural water-use efficiency and conservation projects (often saving energy and supporting Action 4C)
- Develop or continue municipal incentives (e.g., xeriscaping rebates, metering, tiered rate structures)
- Develop an outreach strategy to expand participation in already-existing water-use efficiency and conservation programs
- Develop outreach materials, a user-friendly website, and online clearinghouse that highlights best practices, funding, and technical resources
- Ensure disadvantaged communities are not overburdened by mandatory or voluntary water conservation measures
- Borrow best practices and experience from energy efficiency programs in implementing water efficiency programs
- Partner with broadly supported well-developed energy efficiency programs that also save water (See Action4C)
- Assess the value of establishing statewide efficiency standards
- Update the state definition of "waste" for enforcement purposes

Resources
Agency Programs

OWRD's Water Management and Conservation Planning Program, OWRD's Allocation of Conserved Water Program

Funding

OWRD's Grants & Loans Program, Statewide Irrigation Modernization Program, OWEB Grant Programs, USBR's Water and Energy Efficiency Grants, Energy Trust of Oregon incentive programs

Resources

Water Conservation Fact Sheets (for residential, farm/ranch, and municipal users)
Allocation of Conserved Water Program
Instream Lease
Instream Transfer
Water Projects Grants and Loans and Irrigation Modernization Funding
Guidebooks Water Management and Conservation Plan: Municipal and Agricultural
Alliance for Water Efficiency
Water Research Foundation

Action 10B
Encourage Water Reuse Projects

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODEQ, OWRD	DCBS, ODFW, OHA	Tribes, local governments, WC's, CBO's, NGO's, businesses, individuals

Purpose

Water reuse is the practice of treating "used" water (or effluent) and making it available for another beneficial use. Examples include treating municipal wastewater effluent for golf course irrigation or treating and reusing water within a closed loop (e.g., industrial data center cooling). When considering water reuse, it is most cost effective to match the correct level of treatment to the planned secondary use of the water.

Reusing water can provide many benefits to both water quantity and quality. It can provide a benefit to water quantity by reducing the demand on municipal drinking water. In general, recycled water places fewer demands on freshwater, leaving more water instream or in the ground. Laws allowing reuse projects take into consideration potential environmental and public health impacts.

Example Actions

- Conduct a statewide assessment of the potential for additional water reuse, considering impacts, costs, and benefits to water quantity and quality, and management of water and wastewater systems
- Ensure that state agencies coordinate and communicate various policies, procedures, and regulations to facilitate reuse projects
- Provide incentives to increase and track water reuse
- Complete evaluation and updates of ODEQ and OWRD water reuse programs (see House Bill 2010 (2023))
- Develop technical assistance capacity to promote and inform water reuse practices and projects
- Develop and maintain adequate staffing to support increased utilization of state reuse programs
- Develop water reuse rules to ensure implementation of an effective and protective reuse program
- Connect reuse actions to the Water Management and Conservation Plan Program
- Explore opportunities for the state, tribes, and other interested parties to partner on water reuse projects
- Evaluate who benefits, or is negatively impacted by, reuse projects

Resources

Agency Programs & Workgroups

ODEQ's Water Reuse Program, OWRD's Reclaimed Water Program, DCBS Building Codes Division

Funding

ODEQ Clean Water State Revolving Fund, OWRD Water Projects Grants and Loans

Websites

Oregon Association of Clean Water Agencies

WateReuse.org

Recode, frequently asked questions about reuse alternatives

Action 10C
Improve Access to Storage

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, OWRD	ODA, ODFW, USFWS, USBR, USACE	Tribes, local governments, WC's, CBO's, NGO's

Purpose

Storage has the potential to extend access to water for both instream and out-of-stream uses during dry summer months and provide resilience in the face of climate change. The Oregon Water Resources Department can authorize storage in reservoirs or ponds through the water right permitting process. Oregon's storage policy acknowledges that both structural and nonstructural methods must be encouraged to enhance watershed storage capacity, with preferences for storage that optimize instream and out-of-stream public benefits and beneficial uses. In 1993, the Oregon Legislature codified the state's policy regarding water storage facilities, declaring it a high priority to develop environmentally acceptable and financially feasible multipurpose storage projects, and to enhance watershed storage capacity through natural processes using non-structural means (e.g., floodplain restoration). Restoration activities, which accomplish many other benefits including natural storage, are outlined in Action 11A.

Example Actions

- Encourage increased use of environmentally acceptable below-ground storage sites and practices
- Assess and make improvements to the Aquifer Storage and Recovery and Artificial Recharge Programs to promote and increase the use of this tool
- Carry out implementation of the Willamette Basin reallocation recommendations
- Investigate potential off-channel sites for environmentally acceptable above-ground storage projects
- Evaluate the status of storage infrastructure, including the maintenance and rehabilitation needs of reservoirs, and potential for expanding existing storage capacity
- Investigate the use of existing reservations of water during planning efforts
- Consider equity, environmental justice, and water insecurity in the prioritization of storage sites

Resources

Agency Programs

BIZOR's Aquifer Recharge Due Diligence Grant and Forgivable Loan Program, OWRD Groundwater Hydrology Section and Water Projects Grants and Loans Program

Documents/Websites

2009 OWRD Inventory of Potential Below Ground Storage Sites
OWRD Artificial Groundwater Recharge (AR)
OWRD Aquifer Storage and Recovery (ASR)

Action 10D
Reach Environmental Outcomes with Non-Regulatory Alternatives

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODEQ, ODF, ODFW, OWEB, OWRD, USDA	DSL, USEPA	Tribes, local governments, WC's, CBO's, NGO's

Purpose
Water conservation, reuse, and storage are a set of traditional tools for meeting water needs (Actions 10A-10C). These traditional water supply tools are used in conjunction with state and federal regulatory tools that protect water resources for future generations. Today, however, we also need to consider forward-looking approaches to meeting our collective and often competing demands for water and consider holistic strategies to meet water quality, water quantity, and ecosystem needs. These alternatives require strong partnerships with senior water users. Potential solutions include voluntary actions by water users that often include technical assistance from agencies. This action overlaps with programs described in Actions 10A, 10C, 11A-11E, and 12A-12B.

Example Actions
- Research and develop voluntary, non-regulatory tools to meet environmental outcomes
- Continue to develop water quality trading programs
- Develop protocols for translating streamflow restoration into credits and accounting strategies
- Investigate and establish incentives for voluntary efforts to achieve positive environmental outcomes
- Make improvements to transfer processes and develop potential adaptive transfer tools, including instream leases and transfers
- Develop an outreach strategy for informing the public about non-regulatory alternatives
- Support agencies to provide technical assistance regarding voluntary efforts
- Develop a voluntary agreement framework (O.R.S. § 537.745) for groundwater right holders
- Partner with federal agencies with Conservation Reserve Enhancement Programs to permanently retire groundwater rights where groundwater resources are overallocated
- Identify community benefits from improved environmental outcomes

Resources
Agency Programs

ODA Strategic Implementation Areas, ODF & ODA Stewardship Agreement Program, ODEQ Water Quality Trading Rules, ODFW Grant and Tax Incentive Programs, OWEB Grant Programs, OWRD Transfer and Conservation Section, OWRD Water Projects Grants and Loans, Pesticide Stewardship Partnership, USDA Farm Services Agency Conservation Reserve Enhancement Program

Documents

Measuring Cost-Effectiveness of Environmental Water Transactions

Action 10E
Provide an Adequate Field Presence

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODEQ, ODF, ODFW, OLCC, OSMB, OWRD	DSL, OHA, OPRD	Tribes, local governments, WC's, CBO's, NGO's, local and state law enforcement

Purpose

Oregon's natural resources agencies have personnel in the field that are responsible for data collection, site inspections, education, permit compliance, conducting enforcement activities, and responding to inquiries, complaints, or emergencies. Communities have strong compliance with rules and laws in areas where field presence is robust and public education is strong and consistent. Areas of the state with a long history of regulation and partnership with the state have higher rates of compliance, resulting in more timely and efficient water management.

Strengthening Oregon's field-based work will require financial investments in staff capacity, communications equipment, information platforms, and outreach materials. It also means a look at more efficient ways to coordinate and partner with other agencies and local governments to carry out our shared responsibilities and modernize and streamline regulatory, compliance, and enforcement processes. Field staff can also benefit from actions to streamline data reporting outlined in Strategy Actions 1C.

Example Actions

- Review and assess agency staff workloads; establish priorities and seek efficiencies
- Improve regulatory tools, including updating laws, modernizing technology and enforcement tools, and providing (cross) training
- Improve the ability for field staff to conduct education and outreach within their districts; develop outreach materials to have on hand when interacting with the public
- Enhance all natural resources agencies capacity to conduct field studies and work directly with water users and conservation interests
- Support cross-agency communication to expedite regulatory enforcement
- Employ staff in rural and remote areas to respond to and assist more communities across the state
- Increase field staff capacity for compliance, restoration consultation, and engagement to build and maintain relationships with communities, community-based organizations, and farmworker advocates
- Provide access to training that addresses equity, environmental justice, and community engagement
- Develop culturally appropriate education materials

Resources

Agency Programs

ODA Natural Resources Program, ODEQ Water Quality Program, ODF Compliance Monitoring Program, ODFW Water Program, ODFW & OSMB Aquatic & Invasive Species Prevention Program, OWRD Dam Safety Program, OWRD Regulation Program, OWRD Enforcement Section, OWRD Well Construction & Compliance Section

Policies

2022 Water Hauling & Cannabis Laws

Websites

Locate your local Watermaster

Action 10F

Strengthen and Improve Water Quantity and Water Quality Permitting Programs

Lead Agencies	Supporting Agencies	Possible Partners
DSL, ODA, ODEQ, OWRD	ODFW, USACE, USEPA	Tribes, local governments, Certified Water Rights Examiners, WC's

Purpose

Several natural resources agencies in Oregon are engaged in water-related permitting. Permit reviewers frequently answer calls or questions from water users, permit holders, and realtors, conduct records research, and process case files. It is imperative that agencies have enough well-trained permitting staff to process requests in a timely and accurate manner.

Water rights permits and certificates, water rights transfers, and well construction special standards are examples of permitting programs through the Water Resources Department. There are many types of water quality permits administered by the Department of Environmental Quality through the National Pollution Discharge Elimination System (NPDES) and Clean Water Act 401 Water Quality Certifications. Other agencies also administer permitting systems, often associated with water quality; for example, the Department of State Lands issue removal/fill permits, while the Oregon Department of Agriculture administers Confined Animal Feeding Operations Permits. Non-regulatory state agencies also provide permit review for other agencies and provide recommendations to regulators.

Priority Tasks

- P1.1a Modernize water rights, including transfer processes
- P1.1b Modernize and create more efficient permitting processes
- P1.2a Seek compliance and enforce on permit conditions

Example Actions

- Expand staff training opportunities, including interagency trainings; provide adequate staffing
- Update technologies, processing manuals, and expand guidance documents for transparency
- Develop outreach materials and follow-up procedures to help water users understand the application process and permit, transfer, or extension requirements
- Develop a statewide mitigation strategy in coordination with relevant agencies (DEQ, ODFW, OPRD, OWRD)
- Create stronger linkages among partner agencies
- Develop and implement a workplan to improve the quality and timeliness of individual National Pollutant Discharge Elimination System permits
- Regularly update Oregon's water-related permitting guide (formerly 2017 Strategy Action 2E)
- Improve the timeliness of water right transactions and reduce backlogs
- Modernize and create more efficient and user-friendly permitting processes while maintaining protections for public process and the environment
- Incorporate climate change forecasting into water availability analyses and permitting decisions (also see Action 1D)
- Develop programs and resources to support BIPOC farmers and business owners, as well as farmers and business owners for whom English is not a primary language, in obtaining and managing permits and other authorizations
- Improve resources for NPDES monitoring and permitting to help attain water quality that aligns with fish consumption standards for Oregon Tribes
- Support continued development of the Oregon Water Data Portal to provide interagency access to accurate, high quality water data for permits

Resources

Agency Programs

DSL Removal-Fill Permits, ODA Water Quality Program, ODEQ Water Quality Program, ODEQ 401 Hydropower Program, ODFW Aquatic Invasive Species Prevention Program, ODFW Water Program, OWRD Water Rights Program, OWRD Well Construction & Compliance Program

Documents/Websites

2012 State Water-Related Permits User Guide, and OWRD Certified Water Rights Examiner (CWRE) training materials

Action 11A

Improve Watershed Health, Resiliency, and Capacity for Natural Storage

Lead Agencies	Supporting Agencies	Possible Partners
DSL, ODA, ODEQ, ODF, ODFW, OWEB	BLM, BPA, DLCD, NOAA, NRCS, OPRD, OWRD, USBR, USFS, USFWS	Tribes, local governments, private landowners, WC's, CBO's, NGO's, forest collaboratives

Purpose

Protecting and restoring ecological function to Oregon's watersheds supports adaptation to disturbance and climate change, provides habitat for fish and wildlife, protects water quantity and quality for humans and the environment, and supports Tribal access to First Foods. Many riparian areas, floodplains, wetlands, estuaries, and uplands have been significantly modified by human activities over the last 150-200 years. Restoration of Oregon's green infrastructure provides many human and environmental co-benefits and can be a more cost-effective solution to constructing built infrastructure to accomplish things like water storage, flood control, and temperature regulation.

Example Actions

- Protect and restore instream habitats and watersheds to build climate change resiliency
- Improve and protect riparian conditions to create a healthy buffer between aquatic ecosystems and adjacent land use and development to provide fish and wildlife habitat and protect water quality
- Restore meadows, wetlands, and hydraulic connectivity to side channels and floodplains to maintain critical functions like processing nutrients, providing habitat, and natural storage
- Protect and restore estuarine conditions to maintain the natural mixing of freshwater and marine systems and allow for safe tidal inundation to build resiliency for sea level change and flooding
- Protect and restore beavers, beaver habitat, and beaver-modified habitat
- Protect and restore floodplains and native riparian-floodplain vegetative communities
- Identify and implement actions to protect and maintain drinking water source areas quality and quantity in upland and forested areas
- Collaborate with Tribes and the state to prioritize locations targeted for protection and restoration and restore access to First Foods
- Invest in restoration projects led by Tribes, low-income communities, and communities of color to discover new approaches and best management practices that meet community goals for clean water
- Strengthen protections under Oregon Statewide Land Use Planning Goal 4 which limits development on non-federal forestlands
- Implement climate-smart agricultural practices to improve soil and watershed health

Resources

Agency Programs

BPA's Fish and Wildlife Program, Private Forest Accord Grant Program, OWEB Grant Programs, Oregon Conservation and Recreation Fund, ODFW Private Forest Accord Mitigation Program, OWRD Water Projects Grants and Loans, ODF's Forest Resources and Urban and Community Forest Programs, USFWS Partners for Fish and Wildlife Program and National Fish Passage Program

Documents/Websites

Oregon Plan for Salmon and Watersheds
Oregon's Conservation Strategy
Oregon Forest Practices Act (January 2024)
Oregon's Agriculture Water Quality Management Plans (38 total)
Oregon Removal/Fill Guide
The Beaver Restoration Guidebook
ODFW's 3-Year Action Plan for Beaver-Modified Landscapes August 2022 – 2025
South Slough National Estuary Research Reserve (research regarding watershed health and resiliency)

Action 11B
Develop Additional Instream Protections

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, ODFW, OPRD, OWRD	BPA, DSL, NFWF, NOAA, OWEB, USGS	Tribes, local governments, WC's, CBO's, NGO's, individuals

Purpose

Oregon's original Water Code formalized a system of water allocation that did not consider water for instream uses, causing Oregon's freshwater habitats to quickly become degraded. The Instream Water Right Act was not enacted until 1987, causing most instream water rights to be junior compared to existing out-of-stream water rights, some of which date back to the 1800s.

In many areas of Oregon, streamflows are very low or even non-existent during late summer months, largely due to human causes like diversions for irrigation or other beneficial water uses. Low streamflow conditions are made worse by periods of intensive water use or drought. Low streamflows often mean higher water temperatures and increased nutrient concentrations, contributing to poorer water quality for fish, wildlife and humans. During the winter, high flows are necessary to maintain aquatic habitat and trigger migration. Oregon needs to conserve and protect streams by developing additional instream flow protections and seek opportunities for enhancing and restoring streamflow.

Priority Tasks

- P1.3a Prioritize locations for cold water refugia protection and identify tools for protection
- P1.3b Prioritize and apply for instream water rights to protect ecosystem needs and public uses

Example Actions

- Designate Scenic Waterways where needed to protect recreation, fish, and wildlife uses
- Designate Outstanding Resource Waters where needed to protect extraordinary water quality or ecological values
- Establish additional instream water rights where needed to protect the full suite of flows for fish and wildlife, water quality, recreation, and scenic attraction
- Promote utilization of voluntary OWRD programs including Allocation of Conserved Water and instream transfers and leases to restore flow instream
- Expand education, funding opportunities, and use of voluntary programs to protect and restore streamflow, lake levels, and cold water refugia
- Increase resources and capacity to expand the geographic range and increase effectiveness of flow restoration efforts by identifying flow restoration priorities and focusing resources to priority areas
- Update ODFW Rules (OAR 635-400; last modified in 1989) to incorporate a broader range of techniques to determine flow amounts to protect ecosystem needs, including consideration of temperature-based flows
- Increase compliance with water rights laws (Also See Actions 10E and 10F)

Resources

Agency Programs

ODEQ's Outstanding Resource Waters, ODFW Water Program, OPRD Scenic Waterways, OWRD's Water Rights Services Division

Authorities/Policies

Allocation of Conserved Water Act, Instream Water Rights Act, Scenic Waterway Act, ODEQ's Antidegradation Policy, Outstanding Resource Waters Policy

Funding

OWEB Grant Programs, OWRD Water Projects Grants and Loans, BPA & NFWF Columbia Basin Water Transaction Program

Documents/Websites

OWRD Allocation of Conserved Water Program
OWRD Instream Transfer Program
OWRD Instream Leasing Program

Oregon Plan for Salmon and Watersheds

Action 11C
Prevent and Eradicate Invasive Species

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODEQ, ODF, ODFW, OSMB	OWEB, USDA, USFS	Tribes, local governments, OSU Extension Service, WC's, CBO's, NGO's, individuals

Purpose
The Oregon Invasive Species Council defines an invasive species as a non-native species that can cause economic or environmental harm or cause harm to human health. It can be a plant, animal, or any other microorganism that enters an ecosystem beyond its native range. Invasive species disrupt the natural function of an ecosystem by competing and replacing native species and disrupting the natural habitat. Preventing and removing invasive species helps support watershed health and resiliency.

Example Actions
- Support and continue funding for the Aquatic Invasive Species Prevention Program
- Support and continue funding for the Oregon Invasive Species Council
- Identify and implement projects to support the Oregon Conservation Strategy's seven statewide actions to prevent new introductions, and decrease the scale and spread of infestations
- Continue to implement and enforce ballast water management regulations
- Provide technical assistance and landowner education for invasive species detection and potential control and management actions on agricultural and forestlands
- Couple invasive species eradication with native species restoration efforts (see 11A)
- Support protection of culturally significant plants, animals, and ecosystems from invasive species
- Promote the propagation, growth, and sale of native plants

Resources
Agency Programs
ODA's Insect Pest Prevention and Management Program, ODFW & OSMB's Aquatic Invasive Species (AIS) Prevention Program, ODF Forest Health Unit, OWEB Grant Programs

Workgroups
Oregon Invasive Species Council

Laws/Policies
Oregon Invasive Species Council ORS 570.755(1)
Aquatic Invasive Species Program ORS 830.560(a)

Documents/Websites
Oregon Statewide Strategic Plan for Invasive Species (2017-2027)
Oregon Conservation Strategy
ODA Noxious Weed Profiles
ODA Insect Pest Alerts
USDA National Invasive Species Information Center
ODF Forest Health Unit

Action 11D

Protect, Restore, and Provide Access to Instream Habitat for Fish and Wildlife

Lead Agencies	Supporting Agencies	Possible Partners
DSL, ODEQ, ODF, ODFW, ODOT, OWEB, OWRD	BPA, BLM, NFWF, NRCS, NOAA, USBR, USEPA, USFS, USFWS	Tribes, local governments, private landowners, WC's, CBO's, NGO's

Purpose

Instream habitat quality has been degraded by modifications to rivers and streams including construction of fish passage barriers, floodplain development, channelization, large woody debris and riparian vegetation removal, and bank instability worsened by livestock access. Changes in hydrology and flow patterns, older culverts, and many dams or other impassible barriers have greatly reduced historically accessible habitat for many aquatic species. Appropriate fish screening and fish passage barrier removal should be coupled with stream channel restoration efforts when possible, to improve habitat conditions.

Example Actions

- Implement Oregon's fish screening and passage laws
- Continue to update the inventory of fish passage barriers and priority unscreened diversions
- Address and/or remove barriers, particularly at high-priority sites identified on the Department of Fish and Wildlife's Statewide Fish Passage Barrier Priority List
- Support fish screening efforts
- Build upon existing ecological planning and restoration efforts by incorporating fish screening and passage needs and enhancing instream habitat conditions (e.g., water quality, channel complexity)
- Update streamflow restoration priority areas using new species distribution, climate change projections, hydrologic data, and water quality impairments related to streamflow
- Couple stream restoration projects with voluntary flow restoration projects (see Action 11B)
- Restrict livestock access to riparian areas and streambeds through regulatory compliance where applicable and support cooperative fencing programs/efforts
- Provide financial and technical assistance, when applicable, to landowners and other interested parties to implement projects that improve fish habitat and mitigate risks to natural resources (e.g., road construction with fish-friendly culverts, large wood placement)
- Ensure fish screening and fish passage laws are addressed in FERC hydroelectric project relicensing or when adding hydroelectric generation to an unpowered dam

Resources

Agency Programs

DSL's Waterways & Wetlands, ODFW Fish Screening and Passage Program, ODFW Hydro Program, ODFW Water Program, ODFW Western Oregon Stream Restoration Program, OWRD Dam Safety Program, ODOT Environmental Program

Funding

ODFW's Oregon's Fish Screening and Passage Cost Sharing Program, OWEB's Grant Programs, ODF Small Forestland Investment in Stream Habitat (SFISH) Program, USFWS National Fish Passage Program
Many Federal Sources: BPA, BLM, USDA-NRCS, NFWF, USEPA, USFS, USFWS, NOAA

Documents

Oregon Plan for Salmon and Watersheds
Oregon Conservation Strategy
NOAA Fisheries West Coast Fish Passage Guidelines
Pacific Lamprey Conservation Initiative, Lamprey Technical Workgroup Publications
Northwest Power and Conservation Council's Strategy for Salmon
2020 ODOT's Routine Road Maintenance: Water Quality and Habitat Guide Best Management Practices
Ecological Effects of Tide Gate Upgrade or Removal: A Literature Review and Knowledge Synthesis

Actions 11E
Develop Additional Groundwater Protections

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, OWRD	DLCD, DOGAMI, ODFW	Tribes, local governments, WC's, CBO's, NGO's, well owners

Purpose

Groundwater discharge contributes to springs, wetlands, and streamflow throughout the state. Contributions from groundwater support ecosystems and human systems alike. Protecting groundwater from over-use or contamination benefits groundwater-dependent ecosystems as well as existing water users. This action acknowledges the need for additional voluntary, incentive-based, and regulatory approaches to achieve sustainable groundwater management.

Related Actions 12A-12C, and 7A address specific ways to prevent sources of groundwater contamination.

Priority Tasks

- P1.1c Update Oregon's Groundwater Quality Act

Example Actions

- Implement actions for sustainable groundwater management through voluntary, incentive-based, and regulatory means
- Develop clear objectives and metrics for defining sustainable groundwater management
- Designate groundwater limited areas
- Protect groundwater through proper well construction (also see Actions 7A, 12A)
- Identify and protect and/or restore springs, cold water discharge to surface water, and wetlands (also see Action 11A)
- Prioritize resources where frontline communities are experiencing unsafe drinking water, with potentially serious health consequences (also see Action 12A)

Resources

Agency Programs

ODEQ Water Quality Program, OWRD Technical Services Division, OWRD Policy Section

Authorities

The Groundwater Act of 1955, The Groundwater Quality Act of 1989, Areas of Groundwater Concern, Groundwater Management Areas

Documents/Websites

2019 ODEQ Groundwater Quality Protection in Oregon

Online mapping tool by The Nature Conservancy, Global Groundwater Dependent Ecosystems

Action 12A
Ensure the Safety of Oregon's Drinking Water

Lead Agencies	Supporting Agencies	Possible Partners
ODEQ, OHA, OWRD	ODA, ODF, USEPA, USFS, OWEB	Tribes, local governments, WC's, CBO's, NGO's, domestic well owners, individuals

Purpose
Whether people obtain their drinking water from a private well, a small community system, or a large municipal system, the original source of that water is from groundwater, surface water, or a combination of the two. Oregon must protect those sources and the safety of drinking water through thoughtful land use planning, land use management, ecological restoration, land acquisition, proper well construction, wellhead protection, and implementation of a drinking water protection plan.

Climate change may contribute to variabilities in supply, increases in contaminant concentrations and harmful algal blooms (HABs), and decreases in access and affordability of drinking water. Municipalities, utilities, and small/very small water systems that deliver drinking water need adequate resources to address the increasing challenges associated with climate change and changing regulatory environment. Upgrading and maintaining infrastructure (Action 7A) also contributes to protecting Oregon's drinking water.

Priority Tasks
- P2.3c Fund capacity for technical assistance to help public water systems and communities develop drinking water source protection plans

Example Actions
- Assist drinking water systems of all sizes; increase technical, administrative, and funding resources for small and very small water systems (less than 15 connections)
- Protect drinking water sources (e.g., proper well construction, onsite septic system maintenance, responsible land management, nutrient reduction, riparian/upland/forest restoration, watershed land acquisition and conservation)
- Increase understanding of occurrence and health implications of contaminants of emerging concern (e.g. pharmaceuticals, personal care products, microplastics, perfluoroalkyl and polyfluoroalkyl substances (PFAS))
- Encourage water providers to join the Oregon Water/Wastewater Agency Response Network
- Increase domestic well testing and provide updated support materials and education (including translations, when needed) (Also see Action 1A)
- Amend Domestic Well Testing Act to require laboratories to electronically report domestic well testing results associated with real estate transactions to the state
- Increase resources for education, outreach, monitoring, and treatment for disadvantaged/underserved domestic well users
- Support resiliency efforts for maintaining operation of drinking water systems during emergencies (e.g., solar/renewable energy, battery storage)
- Seek alternative to EPA's definition of "disadvantaged communities" to increase eligibility for funding drinking water improvements in underserved communities in urban areas

Resources
Agency Programs

ODA's Agriculture Water Quality Program, ODF Water Quality Program, OHA/ODEQ Drinking Water Protection Program, ODEQ's Underground Injection Control Program, OHA's Drinking Water State Revolving Fund, OWEB Drinking Water Source Protection Grant Program

Workgroups - Drinking Water Advisory Committee

Documents

LPRO Approaches and Funding for Low-Income Water Ratepayer Assistance and Household Infrastructure in Oregon

Action 12B
Reduce the Use of and Exposure to Toxins and Other Pollutants

Lead Agencies	Supporting Agencies	Possible Partners
DSL, ODA, ODEQ, ODF, OHA	DAS, ODFW, ODOT, OWEB, USEPA	Tribes, OSU, PSU, local governments, WC's, CBO's, NGO's, farmers and farmworkers

Purpose

Protecting public health and the environment from the impacts of toxic pollutants in the air, water, and land is a top priority for ODEQ and OHA. Thousands of toxic chemicals are in products that individuals and businesses use daily. Old chemicals that may not be sold today but are stored in homes, schools, farms, and businesses also pose risks, including herbicides, pesticides, and fertilizers. Whether used in their raw form or in products, these chemicals can be released into Oregon's air, water, and land. Once in the environment, toxic pollutants can adversely affect the health of people and other living organisms. The accumulation of toxins in fish is a major concern for high fish consuming populations including many tribal members. Actions are need to both reduce the use of toxics and adequately notify the public when health risks are present.

Example Actions

- Update and implement the Department of Environmental Quality's 2018 Toxics Reduction Strategy
- Implement green chemistry executive order, including revising purchasing practices related to toxic chemicals
- Update and implement Water Quality Pesticide Management Plan
- Support Pesticide Stewardship Partnerships and enhance program to focus on environmental justice communities
- Continue "take back programs" and develop partnerships with community-based organizations and tribes to facilitate culturally relevant "take back programs"
- Continue to identify and address hazardous or contaminated sites (e.g., Lower Umatilla Basin nitrate contamination, brownfields, abandoned/derelict vessels)
- Prevent blue-green algae (including Harmful Algal Blooms or HABs) from forming beyond natural background levels and support advisory/notification efforts
- Support implementation of the 2023 ODEQ Freshwater Cyanobacteria Harmful Algal Bloom Strategy
- Monitor recreational waters and inform the public when contaminants are present, including communications to reach non-English speaking, low-income, tribal, and rural residents and businesses
- Update Oregon's water quality criteria for toxic pollutants to protect aquatic life and human health based on the latest science
- Support programs and organizations to help communities and utilities prevent, prepare for, and respond to chemical spills
- Support no-till, organic, and regenerative agricultural practices that reduce herbicide, pesticide, and fertilizer use
- Engage historically or currently impacted communities in design of toxics source reduction and clean-up efforts so that they can experience the benefits of the effort, such as utilizing Community Benefits Agreements

Resources

Agency Programs

ODA Agricultural Water Quality Management Program, Pesticide Stewardship Partnership, ODEQ Air, Land, and Water Programs, ODOT's Spill Prevention, Control and Countermeasure Program, DSL's Abandoned and Derelict Vessels Program, OHA's Safe Drinking Water Program and fish consumption/HABs advisory programs, DEQ's drinking water source water protection program, OWEB Grant Programs

Laws/Policies

Executive Order No. 12-05 ("Environmentally Friendly Purchasing and Product Design"), Forest Practices Act

Workgroups

Abandoned and Derelict Vessels Workgroup, ODEQ Team Toxics, Water Quality Pesticide Management Team, Legislative Policy & Research Office Harmful Algal Bloom Workgroup, Coordinated Streamside Management

Documents

2018 ODEQ Toxics Reduction Strategy, 2023 ODEQ Freshwater Cyanobacteria Harmful Algal Blooms Strategy, 2011 Oregon's Water Quality Pesticide Management Plan for Water Quality Protection

Action 12C
Implement Water Quality Pollution Controls

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODEQ, ODF	BLM, DSL, ODFW, ODOT, NRCS, USACE, USEPA, USFS	Tribes, local governments, WC's, CBO's, NGO's, businesses, private landowners

Purpose
Land management activities and their associated point and nonpoint sources of pollutants must be managed to protect water quality for humans and the environment. The Clean Water Act, administered by the Oregon Department of Environmental Quality, provides the regulatory structure for addressing point and nonpoint sources of pollution in the state. The Oregon Department of Agriculture and Department of Forestry play important supporting roles.

Oregon must continue developing and implementing Total Maximum Daily Loads (TMDLs), or pollutant reduction plans, for waterbodies that do not meet Oregon water quality standards and use its enforcement authorities to compel related permit condition compliance. This includes developing TMDLs for the remaining waterbodies and pollutants on Oregon's 303(d) impaired waters list and for those added in the future. It also includes reviewing and updating existing TMDLs and providing oversight to ensure that implementation measures by permit holders and designated management agencies are effective.

Priority Tasks
- P2.3d Seek staff capacity to co-create Agricultural Water Quality Management Area and Total Maximum Daily Load implementation plans with agricultural producers to improve water quality

Example Actions
- Continue to develop and implement TMDLs for water bodies that do not meet water quality standards
- Continue to address nonpoint sources of pollution across all land uses
- Ensure effective management and oversight of stormwater in urbanized areas
- Assist communities with septic system challenges, including technical and funding resources for underserved communities
- Continue to update and revise TMDLs to conform with current temperature standards
- Continue to work with Designated Management Agencies, as defined in each TMDL, to achieve water quality standards
- Develop more programmatic implementation plans for common TMDL issues
- Continue to meaningfully engage with communities within the hydrologic boundaries of new and updated TMDL's
- Review TMDL prioritization process to ensure geographic equity among places with a completed and approved TMDL
- Recognize role of water management and water withdrawals in meeting TMDL objectives

Resources
Agency Programs
ODA Natural Resources Program, ODEQ Total Maximum Daily Load, Nonpoint Source Pollution, Water Quality Permitting, and Onsite Wastewater Management Programs
Funding
Clean Water State Revolving Fund
Laws/Policies
Clean Water Act, Forest Practices Act
Documents
Agricultural Water Quality Area Plans (38 total)
Water Quality Management Plans (and implementation plans for an approved TMDL)
2020 ODOT's Routine Road Maintenance: Water Quality and Habitat Guide Best Management Practices

Action 13A

Fund Development and Implementation of Oregon's Integrated Water Resources Strategy

Lead Agencies	Supporting Agencies	Possible Partners
ODA, ODEQ, ODFW, OWEB, OWRD	BIZOR, DLCD, DOGAMI, DSL, ODF, ODOE, OHA, OPRD, OSMB, Many federal agencies	Tribes, Legislature, local governments, individuals, WC's, NGO's

Purpose

State agencies need funding to guide Strategy development, updates, and implementation. Oregon Revised Statute (ORS 536.220) states that "the Water Resources Department shall work in close cooperation with the Department of Environmental Quality, the Oregon Watershed Enhancement Board, the State Department of Agriculture and the State Department of Fish and Wildlife to develop the integrated state water resources strategy, in consultation with other state, local and federal agencies, with other states, with Indian tribes, with stakeholders and with the public."

Example Actions

- Fund implementation of the Integrated Water Resources Strategy
- Fund the development and implementation of biennial Strategy workplans
- Fund the required Integrated Water Resources Strategy updates, including support from partner agencies
- Fund communication resources regarding the Strategy including web-based information and translations
- Fund the development of biennial progress reports to communicate progress on Strategy implementation

Resources

Agency Programs

Refer to state agency programs listed on Strategy Action Summaries for Actions 1A through 13C

Workgroups

Interagency IWRS Project Team, OWRD IWRS Team, Federal Liaison Team, Water Core Team, Tribal Water Task Force

Laws

Oregon Revised Statute, ORS 536.220

Action 13B
Fund Water Resources Management Activities by State Agencies

Lead	Supporting Agencies	Possible Partners
Legislature	BIZOR, DLCD, DOGAMI, DSL, ODA, ODEQ, ODF, ODFW, ODOE, OHA, OPRD, OSMB, OWEB, OWRD, Many federal agencies	Tribes, local governments, WC's, CBO's, NGO's, individuals

Purpose
The state's core responsibilities related to water, including those described throughout the Integrated Water Resources Strategy, must continue to receive funding to protect the public's water resources. State agencies lead the budget development process, working with interested parties, local governments, tribes, and others to understand resource needs for the next biennium. Agencies must communicate the importance of investing in water to the Oregon Legislature.

Priority Tasks
- P1.1d Evaluate potential water right fee models to adequately fund natural resource agency work
- P3.1c Provide coordinated technical assistance for reuse projects

Example Actions
- Fund those water management activities for which the state has responsibility
- Ensure increased and adequate funding from the General Fund
- Seek additional funding sources
- Provide funding for agency operations and equipment (e.g., administration, information technologies, interagency coordination, data acquisition, and management)
- Allow agencies to adjust fees to ensure that their programs protecting water resources are sustainably funded
- Evaluate and implement opportunities to improve equitable delivery of services by state agencies
- Support agency capacity to carry out the Strategy
- Provide ongoing support for the Oregon Water Data Portal to provide a platform for state agencies and partners to share data and information with the public to support water-related decision making
- Provide equitable access to technical assistance (e.g., state and federal agencies, SWCD's) for communities

Resources
State agency biennial budgets

Action 13C
Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Lead Agencies	Supporting Agencies	Possible Partners
BIZOR, DLCD, ODA, ODEQ, ODF, ODFW, OPRD, OWEB, OWRD	DOGAMI, DSL, ODOE, OHA, OSMB	Legislature, Tribes, local governments, WC's, CBO's, NGO's, individuals

Purpose
Investing in planning, feasibility studies and water resources-related project implementation is critical to ensuring communities and the environment can adequately meet their future instream and out-of-stream water needs. Planning is done successfully by ensuring that resources exist to help organize people, apply for and administer funds, and facilitate the conversation. It also takes resources to gather water resources information and to develop new data that fill key knowledge gaps. Feasibility studies help determine the environmental, engineering, economic, and social implications of proposed projects, such as conservation, reuse, or storage projects prior to significant investment. Finally, reliable and sufficient funds are needed to implement a wide range of water resource projects aimed at meeting Oregon's instream and out-of-stream needs.

Priority Tasks
- P3.1a Increase financial incentives and support agricultural innovation, irrigation modernization, and water conservation on farms
- P3.1b Increase funding and support for water infrastructure projects that conserve water
- P3.2a Identify strategies to better align existing funding and funding programs to address priority watershed restoration and protection actions that advance long-term water quantity and quality protection
- P3.2b Fund agency's grant programs that support instream flow restoration (e.g., water right acquisition and instream leases) and habitat improvement efforts in priority basins
- P3.2c Provide incentives and support to protect existing resources on agricultural lands
- P3.3a Increase incentives and support for drinking water source water protection projects

Example Actions
- Continue to authorize and fund public and private investments in efforts such as Place-Based Integrated Water Resources Planning, including plan implementation
- Provide funding to assist small water systems to develop and implement water management and conservation plans
- Provide funding to support hazard mitigation planning (e.g. droughts, floods) at the local level
- Support OWRD administrative Basin Program updates (basin planning, assessments, and program rules)
- Authorize bonds to finance investments in instream and out-of-stream projects
- Ensure that basic water infrastructure maintenance needs continue to be eligible for grant and loan funding
- Advocate for continued state and federal funding for water and wastewater-related infrastructure
- Develop funding and technical support for low-income, small communities, and districts to maintain, upgrade, and operate water and wastewater-related infrastructure
- Continue funding and support for watershed restoration and OWEB Focused Investment Partnerships
- Continue to fund OWRD Feasibility Study Grants, Water Project Grants and Loans, and Water Well Abandonment, Repair, and Replacement funding opportunities
- Continue to provide BIZOR and OWEB administered grants that cover feasibility studies
- Support water project community engagement, including participation by representatives of disproportionately impacted communities (See HB 3293 (2021) that applies to BIZOR, ODEQ, ODFW, OHA, OWEB, and OWRD)
- Target investments so that project benefits are distributed to frontline communities equitably
- Look for ways to support the federal Justice40 Initiative, a goal that 40 percent of benefits of specific federal investments are directed toward those marginalized, underserved, and overburdened by pollution
- Develop a centralized funding platform to help link people with project-appropriate funding programs

Resources
Agency Funding Programs

BIZOR grant, loan, and tax incentive programs, DLCD Housing Technical Assistance Grants (for public facilities feasibilities studies in support of housing production), OWEB Grant Programs, OWRD Place-based Water Planning Fund (under development), Feasibility Study Grants, Water Projects Grants and Loans, ODEQ Clean Water State Revolving Fund

Many additional agency funding programs exist for project implementation

Appendix E
Agency Priorities 2025-2031

Each priority area includes tasks that require implementing one or more of the 48 Strategy actions. When tasks require multiple Strategy actions, the most relevant action is listed in **bold**. The task has been listed on that action's summary sheet (see Appendix D) as a "Priority Task."

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Priority Area One

Act with Urgency

Prevent things from getting worse: protect water quantity, water quality, and ecosystem needs

Oregon's water resources are at a tipping point. In some areas of the state, groundwater resources are declining, streams lack the clean water needed to support species and ecosystems, and communities face contaminated drinking water. With droughts becoming more frequent and severe, the time to act is now. State agencies need to take immediate, coordinated steps to address these challenges and prevent further harm. Agencies have identified targeted actions with the greatest potential for near-term improvement to change the trajectory and secure a healthier water future for Oregon, including updating water laws, improving permitting processes, increasing resources towards compliance, and protecting priority areas.

	Priority Area 1: Act with Urgency			
Priority	**P1.1 Modernize Oregon's water laws and permitting processes to protect Oregon's water resources, including meeting sovereign tribal governments' treaty rights**			
Task	P1.1a Modernize water rights, including transfer processes	P1.1b Modernize and create more efficient permitting processes	P1.1c Update Oregon's Groundwater Quality Act	P1.1d Evaluate potential water right fee models to adequately fund natural resource agency work
IWRS Actions	**10F**, 13B	**10F**, 13B	**11E**, 12A, 13B	**13B**
Measurable Outcome	Build upon previous workgroup held to identify modernization needs. Pursue legislative concepts. Conduct rulemaking.	Convene interagency workgroup to identify opportunities to streamline and improve permitting processes. Identify and address barriers regarding water conservation/efficiency, reuse, and AR/ASR. Request legislative budgetary support. Reduce time from application to decision.	Make improvements around framework for groundwater quality management that more clearly: identifies mechanisms for early identification of areas of concern; roles/responsibilities for state and local entities; and coordination and resource efforts necessary to remediate GWMAs.	Develop a scope to commission a study to evaluate fee models. Seek legislative budgetary support for a study. Complete the study.
Agency(ies)	OWRD	ODA, ODEQ, ODFW, OWRD	ODEQ	OWRD
2025-27 Milestone				
2027-29 Milestone				
2029-31 Milestone				

Priority	**P1.2 – Increase compliance with existing laws to protect and prevent water quality, water quantity, and habitat degradation and water level declines that negatively impact public and ecosystem health**	
Task	P1.2a Seek compliance and enforce on permit conditions	P1.2b Improve agency coordination by developing new, and updating existing, memoranda of understanding (MOUs) where appropriate, involving agencies with applicable authorities/responsibilities
IWRS Actions	**10F**, 13B	**9D**
Measurable Outcome	Identify compliance issues and notify permit holders. Seek legislative budgetary support to meet information technology, education, and staffing needs. Pursue compliance through increased compliance checks. Develop metrics for tracking compliance.	Convene interagency workgroup to identify needed new or updated MOUs. Develop MOUs for effective implementation of the actions identified in the Integrated Water Resources Strategy.
Agency(ies)	ODA, ODEQ, ODFW, OWRD	DLCD, ODA, ODEQ, ODFW, OWRD
2025-27 Milestone		
2027-29 Milestone		
2029-31 Milestone		
Priority	**P1.3 – Protect and preserve priority areas using existing agency programs**	
Task	P1.3a Prioritize locations for cold water refugia protection and identify tools for protection	P1.3b Prioritize and apply for instream water rights to protect ecosystem needs and public uses
IWRS Actions	**11B**, 13B	**11B**, 13B
Measurable Outcome	Convene workgroup. Complete a prioritization list. Apply for instream water rights and implement other protections suitable for cold water refugia.	Complete a prioritization list. Apply for and process instream water rights.
Agency(ies)	ODEQ, OWRD	ODEQ, OWRD
2025-27 Milestone		
2027-29 Milestone		
2029-31 Milestone		

Priority Area Two

Assist Community Preparedness Efforts

Help communities and ecosystems prepare and adapt to water and climate changes

Collaborating on water solutions is no longer optional—it's essential. As Oregon faces increasing challenges like water scarcity, declining quality, and climate-driven flooding, we must improve communication between agencies and the public. Reliable and accessible data is the backbone of this priority area. By modernizing and harmonizing water data systems across agencies —and advancing the Oregon Water Data Portal — we can provide the information needed for place-based and administrative basin-scale planning and effective, transparent decision-making. Data can take a long time to develop, but the state can leverage the data we already have to support near-term planning and decision-making. To succeed, existing relationships must be strengthened, and new relationships forged to respond to cultural, economic, social, and ecosystem needs.

	Priority Area 2: Assist Communities with Preparedness Efforts			
Priority	**P2.1 - Increase and improve communication between agencies and the public to share critical information about water scarcity, water quality, and ecosystem needs**		**P2.2 – Improve the availability of enterprise water data to support planning and decision-making**	
Task	P2.1a Increase multi-agency communications and community outreach capacity to provide timely water resource information, including in multiple languages and accessible to a variety of learning styles		P2.2a Complete the Surface Water Information Management System (SWIMS) update to better inform permitting, planning, and management	P2.2b Expand groundwater and surface water data collection and systems, including smart water use meter technologies
IWRS Actions	**8C**, 13B		**1A**, 13B	**1A**, 3A, 13B
Measurable Outcome	Establish an interagency workgroup. Share resources. Develop statewide website. Seek legislative budgetary support, as needed.		Complete SWIMS update by 2030.	Develop a list of priority locations and parameters. Seek legislative budgetary support.
Agency(ies)	ODA, ODEQ, ODFW, OWRD		OWRD	ODEQ, ODFW, OWRD
2025-27 Milestone				
2027-29 Milestone				
2029-31 Milestone				
Priority	**P2.2 (continued)**			
Task	P2.2c Fund and conduct basin assessments & studies (see 2024 Stewardship & Supply Initiative Rescope Report) to inform updating Administrative Basin Program rules and permitting, planning, management, and future iterations of the Integrated Water Resources Strategy	P2.2d Continue multagency efforts and seek ongoing funding to develop the Oregon Water Data Portal to integrate interagency data and share with the public	P2.2e Prioritize and fund instream flow studies	P2.2f Modernize information technology (IT) systems at OWRD to improve data submittal, management, and analyses and support compliance processes
IWRS Actions	**1A**, 1B, 1C, 1D, 13B	**1C**, 13B	**2A**, 13B	**3A**, 13B
Measurable Outcome	Complete ongoing and start new basin studies. Seek legislative budgetary support to conduct additional basin assessments and studies where needed. Complete basin assessments and studies.	Continue efforts to establish the Oregon Water Data Portal and seek legislative budgetary support.	Finalize and publish updated flow restoration priorities. Seek legislative budgetary support for funding stream studies to develop/refine instream flow targets, including water quality considerations.	Scope IT needs. Seek legislative budgetary support.
Agency(ies)	ODEQ, ODFW, OWRD	DLCD, ODA, ODEQ, ODFW, OWEB, OWRD	ODEQ, ODFW, OWRD	OWRD
2025-27 Milestone				
2027-29 Milestone				
2029-31 Milestone				

Priority	**P2.3 – Increase engagement and technical assistance capacity to support coordinated planning efforts**			
Task	P2.3a Fund and engage multiple agencies in place-based water planning	P2.3b Fund and engage multiple agencies in administrative basin planning	P2.3c Provide funding and capacity for technical assistance to help public water systems and communities develop drinking water source protection plans	P2.3d Seek staff capacity to co-create Agricultural Water Quality Management Area and Total Maximum Daily Load implementation plans with agricultural producers to improve water quality
IWRS Actions	**9A**, 9E, 13B	**9A**, 9E, 13B	**12A**, 13B	9A, 12B, **12C**, 13B
Measurable Outcome	Published updated program guidance. Seek legislative budgetary support, where needed.	Seek legislative budgetary support. Update basin plans. Update administrative basin program rules.	Seek legislative budgetary support to increase funding to public water systems and local partners to develop protection plans and integrate drinking water protection planning into other water quality planning activities.	Seek legislative budgetary support. Engage with agricultural producers and develop implementation plans.
Agency(ies)	DLCD, ODA, ODEQ, ODFW, OWEB, OWRD	DLCD, ODA, ODEQ, ODFW, OWEB, OWRD	ODEQ	ODA, ODEQ
2025-27 Milestone				
2027-29 Milestone				
2029-31 Milestone				
Priority	**P2.4 – Provide technical assistance to Tribes and local governments to help promote sustainable land use planning and protect water resources**			
Task	P2.4a Provide additional regional representatives to provide land use planning technical assistance and circuit riders for cities, counties, and Tribes	P2.4b Provide technical assistance and funding to help cities and counties modify their local codes to confirm water availability with OWRD before approving development; includes updates to public facilities planning	P2.4c Make one of the conditions to qualify for local jurisdiction Economic Opportunity grants to involve OWRD	P2.4d Provide technical assistance and funding to help cities and counties modify their local codes to support implementation of TMDLs
IWRS Actions	**6A**, 13B	**6A**, 13B, 13C	**6A**, 13B	**6A**, 12C, 13B
Measurable Outcome	Seek legislative budgetary support to provide technical assistance.	Seek legislative budgetary support for engagement and technical assistance.	Update Economic Opportunity grant qualifications. Provide water availability information to grantees.	Seek legislative budgetary support for engagement and technical assistance. Support code updates.
Agency(ies)	DLCD	DLCD, OWRD	DLCD, OWRD	DLCD, ODEQ
2025-27 Milestone				
2027-29 Milestone				
2029-31 Milestone				

Priority Area Three

Adapt to Doing More with Less Water

Optimize how we share scarce water resources among different instream and out-of-stream uses

Climate change projections show an increase in summer temperatures and an increase in frequency and severity of drought. Oregon's water future depends on smarter solutions and stronger collaboration. Practical tools like water conservation, reuse, and transfers already exist, but funding and agency or partner capacity can limit the scale of their impact. To unlock their full potential, state agencies must work alongside tribal, federal, and local governments, partners, and the public to increase the pace and scale of multi-benefit solutions for people and ecosystems. This will require significant investments, including increases in incentives for voluntary efforts that address water quantity, water quality, and ecosystem needs.

	Priority Area 3: Adapt to Doing More with Less Water		
Priority	**P3.1 - Better incentivize and support water conservation and efficiency practices across rural and urban communities to reduce water scarcity**		
Task	P3.1a Increase financial incentives and support agricultural innovation, irrigation modernization, and water conservation on farms	P3.1b Increase funding and support for water infrastructure projects that conserve water	P3.1c Provide coordinated technical assistance for reuse projects
IWRS Actions	10A, **13C**	7A, 10A, **13C**	10B, **13B**
Measurable Outcome	Seek legislative budgetary support for agencies, SWCD's, and watershed councils to provide technical assistance for projects. Increase funding for incentive programs.	Seek legislative budgetary support for agencies to provide coordinated technical assistance for projects. Increase funding for relevant grant/loan programs.	Seek legislative budgetary support for agencies to provide coordinated technical assistance for reuse projects.
Agency(ies)	ODA, OWEB, OWRD	ODEQ, OWEB, OWRD	ODEQ, ODFW, OWRD
2025-27 Milestone			
2027-29 Milestone			
2029-31 Milestone			

Priority	**P3.2 – Focus multiple agencies' resources to support instream needs, watershed restoration, and ecosystem and species recovery**		
Task	P3.2a Identify strategies to better align existing funding and funding programs to address priority watershed restoration and protection actions that advance long-term water quantity and quality protection	P3.2b Fund agency's grant programs that support instream flow restoration (e.g., water right acquisition and instream leases) and habitat improvement efforts in priority basins	P3.2c Provide incentives and support to protect existing resources on agricultural lands
IWRS Actions	11A-11E, 13B, **13C**	11A-11E, 13B, **13C**	10A-10E, 11A, 13B, **13C**
Measurable Outcome	Develop multi-agency restoration priorities. Identify funding gaps. Seek legislative budgetary support to address identified funding gaps.	Seek a permanent, stable, and elevated level of General Funds investment in water acquisition grant programs, and for the technical assistance and the building of local partner expertise necessary for these complex transactions.	Seek legislative budgetary support for agencies to provide technical assistance. Seek permanent, stable, and elevated level of General Funds investment in natural and working lands (e.g., Wildlife Habitat Conservation and Management Program, Natural and Working Lands Fund).
Agency(ies)	ODEQ, ODFW, OWEB, OWRD	ODEQ, ODFW, OWEB, OWRD	DLCD, ODA, ODFW, OWEB
2025-27 Milestone			
2027-29 Milestone			
2029-31 Milestone			

Priority	**P3.3 – Increase investment in source water protection and watershed restoration to secure long-term water quantity and quality protection for drinking water sources**
Task	P3.3a Increase incentives and support for drinking water source water protection projects
IWRS Actions	12A, **13C**
Measurable Outcome	Seek legislative budgetary support for agencies to provide technical assistance. Increase funding for source water protection projects.
Agency(ies)	ODEQ, OWEB
2025-27 Milestone	
2027-29 Milestone	
2029-31 Milestone	

Acronyms:

DLCD - Oregon Department of Land Conservation and Development
ODA - Oregon Department of Agriculture
ODEQ - Oregon Department of Environmental Quality
ODFW - Oregon Department of Fish and Wildlife
OWEB - Oregon Watershed Enhancement Board
OWRD - Oregon Water Resources Department

IWRS Actions that are **bold** will include the task desciption on that action's summary sheet (Appendix D)

Appendix F

Cross-walk of 100-Year Water Vision and 2025 Draft 2 Strategy

What is the 100-Year Water Vision?

In 2019, former Governor Brown initiated the 100-Year Water Vision, a community engagement process to elevate water concerns of Oregonians and call for strategic investments to address these challenges. Completed in 2020, the Vision called for Oregonians to "invest strategically in infrastructure and ecosystems across all regions to support resilient communities, vibrant local economies, and a healthy environment for all who live here." Following the release of the Vision, the 2021 Oregon Legislature made historic investments in Oregon's water resources by passing a $538 million water package.

Participants in the Vision process requested that public engagement input be used for the next Integrated Water Resources Strategy. The summary below shows how Vision Water System and Management Challenges relate to the 2025 Strategy actions.

Water System Challenges

Water Availability

System challenge: Many of Oregon's water delivery systems are outdated and inefficient, increasing the chance that water will not be available for communities when it is most needed.

System opportunity: We can incentivize water conservation and reuse, and invest in modern water delivery systems statewide. Efficiency gains and updated systems will help improve water reliability for cities and counties, tribes, ecosystems, and the many aspects of a thriving economy that depend on water.

2025 Strategy Actions:

Critical Issue: Infrastructure
- 7A Maintain, Upgrade, Decommission Water and Wastewater Infrastructure

Critical Issue: Water Use & Management
- 10A Improve Water-Use Efficiency and Water Conservation
- 10B Encourage Water Reuse Projects

Critical Issue: Funding
- 13C Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Clean Water

System Challenge: Not all parts of Oregon have reliable access to clean water, resulting in increased health risks for those who live here.

System Opportunity: We can invest in resilient built and natural water infrastructure, and reduce pollutants to provide clean water for all Oregon communities.

2025 Strategy Actions

Critical Issue: Infrastructure
- 7A Maintain, Upgrade, Decommission Water and Wastewater Infrastructure

Critical Issue: Healthy Ecosystems
- 11A Improve Watershed Health, Resiliency, and Capacity for Natural Storage

Critical Issue: Clean Water
- 12A Ensure the Safety of Oregon's Drinking Water
- 12B Reduce the Use of and Exposure to Toxics and Other Pollutants
- 12C Implement Water Quality Pollution Controls

Critical Issue: Funding
- 13C Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Ecosystems

System Challenge: Not all watersheds provide cool, clean water and habitat for fish and wildlife, threatening the sustainability of those species in Oregon.

System opportunity: We can increase investments in watersheds to store, filter, and deliver water for fish and wildlife.

2025 Strategy Actions

Critical Issue: Healthy Ecosystems
- 11A Improve Watershed Health, Resiliency, and Capacity for Natural Storage

Critical Issue: Funding
- 13C Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Community Security

System challenge: Too much of Oregon's built infrastructure is neglected and not keeping communities safe, while we have not fully realized the benefits of natural infrastructure and ecosystems to protect communities from harmful floods and provide resilience to drought.

System opportunity: We can modernize our flood protection infrastructure where appropriate, while fully incorporating the benefits of natural infrastructure and ecosystems. Combined, these will help mitigate impacts of increased flooding and drought, while reducing the impacts of sea level rise to coastal communities.

2025 Strategy Actions

Critical Issue: Natural Hazards
- 5B Plan and Prepare for Flood Events

Critical Issue: Infrastructure
- 7A Maintain, Upgrade, Decommission Water and Wastewater Infrastructure

Critical Issue: Healthy Ecosystems
- 11A Improve Watershed Health, Resiliency, and Capacity for Natural Storage

Critical Issue: Funding
- 13C Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Management Challenges

Data & Information Services

Management Challenge: Communities across Oregon lack basic data and information to make strategic, long-term decisions about water investments and water management.

Management Opportunity: Good data is the foundation of wise and coordinated decisions. We can work across agencies at all levels, with tribes, and with the private sector to improve access to accurate, relevant, trusted, and current water data and infrastructure condition. We can also use science and information to anticipate future trends. Access to quality information will help communities strategically plan for and invest in their water future.

2025 Strategy Actions

Critical Issue: Water Resource/Supply Information

- 1A Improve Water Resource Data Collection and Monitoring
- 1B Conduct Additional Groundwater Basin Investigation
- 1C Enhance Interagency Data Coordination
- 1D Support Basin-Scale Climate Change Research

Community Capacity

Management Challenge: Communities with fewer resources are challenged to strategically plan for and invest in their water future and need access to a skilled workforce to implement, manage, and monitor water projects.

Management Opportunity: We can begin investing now in strong community capacity and a skilled water workforce in every region across Oregon.

2025 Strategy Actions

Critical Issue: Education & Outreach

- 8C Provide Career Training for the Next Generation of Water Professionals

Investments in Water

Management Challenge: We have underinvested in our built and natural water infrastructure, and our ecosystems. Investments in water planning and projects are not fully coordinated at the community, regional or state levels, and there has not been a concerted conversation about how Oregon will fund its future water needs.

Management Opportunity: We can coordinate our current investments and seek new sustainable, dedicated public and private funding for restoration of ecosystems, and built and natural infrastructure. Coordinated and new investments will ensure communities – including Oregon's federally recognized tribes and those people living in disproportionately impacted and rural communities - can afford and access adequate clean water, and return it to our rivers for downstream users, fish, and wildlife.

2025 Strategy Actions

Critical Issue: Funding

- 13C Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Water Investment Decision-Making

Management challenge: Oregon lacks a cohesive governance system to strategically prioritize water investments at the local and regional levels, leaving those decisions to a wide array of individuals, governments, and other interests with overlapping priorities and investment needs.

Management Opportunity: Learning from other successful models, Oregon can implement best approaches to ensure water planning and investment decisions are strategic and coordinated across jurisdictions, and with public and private partners. This system can successfully combine a state-level framework with local and regional planning and flexibility.

2025 Strategy Actions

Critical Issue: Water Planning

9A Support Place-Based Integrated Planning and Other Water Planning Efforts

Critical Issue: Funding

13C Invest in Planning, Feasibility Studies, and Water Resource Project Implementation

Education & Culture

Management Challenge: Community leaders across Oregon have limited awareness of Oregon's water challenges, the urgency to act now, and potential water solutions.

Management Opportunity: We can work with communities to build a culture and leadership that prioritizes water at the local, regional, and statewide levels.

2025 Strategy Actions

Critical Issue: Water Planning

9D Lead Meaningful Community Engagement