Oregon's Mid-Coast Water Planning Partnership Water Action Plan

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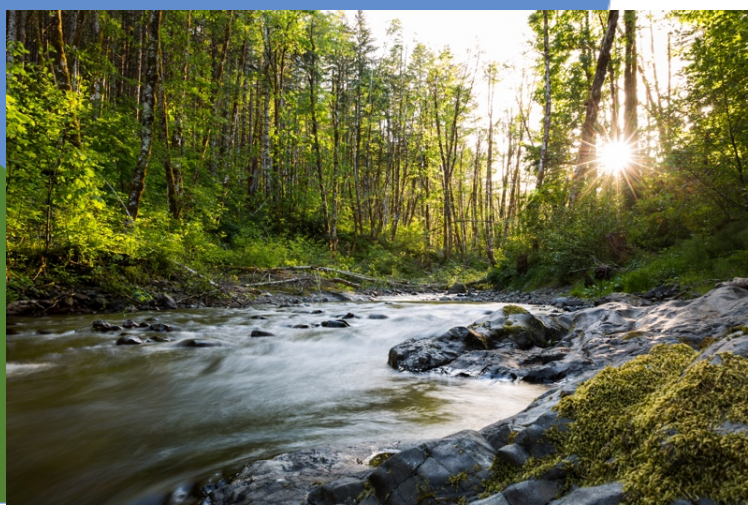

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Acknowledgements

The Mid-Coast Water Planning Partnership would like to express our appreciation to our planning partners for their expertise and assistance throughout all aspects of our planning process and for their help in writing the Mid-Coast Water Action Plan. After five years and thousands of volunteer hours, we are excited to present this plan to you.

We are grateful for the passion and dedication that Mid-Coast Water Planning Partners have brought to this planning process. Since 2016, we have had partners come and go as with any organization doing long-term water planning, but regardless of the amount of time spent in our organization, we value every minute dedicated by our volunteers.

Water planning processes such as this one would not be possible without financial support and the donation of meeting spaces. We have been very fortunate to have support from the following organizations over the years: the Confederated Tribes of Siletz Indians, Oregon Water Resources Department, Meyer Memorial Trust, Collins Foundation, Oregon Community Foundation, Ford Family Foundation, Seal Rock Water District, Gibson Farms, Lincoln County Farm Bureau, Samaritan Health, City of Lincoln City, City of Toledo, City of Newport, City of Yachats, and Lincoln County.

Place-based integrated water resource planning is a new and innovative approach, and we have learned so much along the way. We hope that future planning groups can take what we have learned and build upon on it as we all work to create a more secure and sustainable water future around the state.

Executive Summary

The purpose of the Oregon Mid-Coast Water Action Plan is to provide a framework and pathway forward to address water supply and use challenges in the Mid-Coast region, and sustainably balance water needs for people and native fish and wildlife. This plan provides direction to meet the collaborative goals of the Mid-Coast Water Planning Partnership.

The plan describes the six-year history of the planning process, and the major steps leading to plan implementation, including public participation and engagement from a diversity of individuals and organizations. Members of the partnership agreed to a suite of guiding principles highlighting common ground, innovation, commitment, flexibility, action, and clarity.

Although this plan is intended to achieve water resource protection objectives critical to the watersheds of the Mid-Coast as well as the people who live, work, and recreate in the Mid-Coast, it also supplements, complements, and supports numerous other federal, state, and local planning efforts currently underway in the region that address, or have a nexus with, water issues.

Foundational to the development of this plan were the technical reports and information developed during Steps 2 and 3 of the planning process that describe regional water quality, water quantity, ecology, and built infrastructure issues as well as current and future instream and out-of-stream water uses and needs.

Water Quantity: Streams in the Mid-Coast have high natural streamflow during the winter months (January-March) and low natural streamflow during the summer/Fall months (August-October) as a result of seasonal precipitation patterns. Streams are rain-dominated and responsive to precipitation, reaching high flows during rainstorms. Groundwater inputs contribute base flows in streams during late summer and Fall months. There are eight active real-time streamflow gage locations which produce information to inform water rights administration. Mid-Coast groundwater is not very productive because of low permeability and low storage capacity of the regional geology.

Water Quality: Water quality affects the extent to which water bodies can support beneficial uses, such as drinking water, industrial, agricultural, fish and aquatic life, and wildlife. Oregon's 2018/2020 Integrated Report and Assessment Database identifies Mid-Coast water bodies that are water quality limited for not meeting one or more water quality parameters, such as temperature, dissolved oxygen, or *E. coli*. Surface water is the primary source of drinking water for nearly all of the municipal and community water providers in the Mid-Coast. Several water providers in the Mid-Coast use groundwater. Common groundwater contaminants that are monitored include arsenic, lead, nitrates, and fecal coliform bacteria. Several organizations and various private entities conduct periodic water quality monitoring activities in the Mid-Coast.

Ecology: The Mid-Coast supports a variety of habitats, which include streams and springs, lakes, riparian areas, wetlands, and estuaries. There are 12 streams or estuary habitats designated as areas of ecological importance in the Mid-Coast because of the diverse habitats and species they support. Aquatic species of interest and concern in the Mid-Coast include seven species of anadromous salmonids, two species of sturgeon, beaver, and three species of lamprey. Oregon Coast Coho Salmon are listed as threatened under the Endangered Species Act, and large portions of the Mid-Coast are designated as critical habitat for coho. Green Sturgeon also are listed as threatened within the Southern Distinct Population Segment, which includes Yaquina Bay. Sources of habitat degradation include stream channel simplification and incision, warm stream temperatures, altered streamflow timing and watershed function, fine sediment and turbidity related to peak streamflow, and toxic and non-toxic pollutants. Aquatic habitat restoration efforts occur in the Mid-Coast to increase stream channel complexity and off-channel habitat, reduce fine sediment inputs and summer water temperature, address fish passage barriers, and encourage beaver dams, or similar structures.

Built Infrastructure: The Mid-Coast has 52 potable water providers (cities, water districts, RV and mobile home parks, and state parks), 31 of which are required to have certified water treatment plant (WTP) operators. Few interconnections exist between water providers. Many cities and water districts implement water conservation measures, and nine have developed Water Management and Conservation Plans (WMCPs). The Mid-Coast has 14 entities (cities, resorts/hotels, and industries) with National Pollutant Discharge Elimination System (NPDES) permits to discharge treated wastewater. Discharge locations are the Pacific Ocean, Yaquina River and Bay, Siletz River and Bay, Schooner Creek, and Lint Slough. The discharge locations on streams are all downstream of potable water intakes. Information about wastewater systems and, particularly stormwater systems, is lacking. Cities are likely the only water providers managing stormwater systems. The Mid-Coast, like much of the rest of the United States, has aging infrastructure and insufficient revenue to address many needed upgrades. Consequently, water systems in the Mid-Coast must be managed for resiliency and recovery.

Out-of-stream water use and rights. There are about 1,637 water rights in the Mid-Coast planning area allocated to 29 different uses. Domestic use has the most number of water rights (n=703) followed by irrigation (n=419), instream (n=110), and municipal (n=82). The largest water use category in the planning area is for self-supplied industrial use, followed by water used by hatcheries and water for domestic and industrial use provided by community water systems. The largest water users in the region draw water from the Siletz River and have water rights that are senior to the instream water right.

Instream water needs and rights. Forty-two streams have existing instream water rights, but these instream rights inadequately capture the full range of flows needed to protect current instream ecosystems. Summer streamflows are insufficient in some areas of the Mid-Coast to meet the instream water needs of fish and wildlife. Low streamflows contribute to water quality impairments

(e.g., high temperatures and reduced dissolved oxygen) that negatively affect fish and wildlife. Climate change impacts and increased demand from municipal and rural water users are expected to further limit available water in the summer for all uses.

During Step 3 of the planning process, the Partnership achieved consensus on a total of 18 key issues in eight categories—water conservation; natural hazards, vulnerabilities, and emergency preparedness; climate change impacts; local capacity and regional collaboration; water quantity for instream and out-of-stream uses, watershed health, water quality for instream and out-of-stream uses, and infrastructure. Action-oriented imperatives were created to organize and synthesize the key watershed strategies stakeholders described during the planning process to address the priority issues. In addition, cross-cutting imperatives are essential to the success of each of the action-oriented imperatives.

A key component of this plan is implementation table that describes a suite of actions to initiate water objectives and priorities in the Mid-Coast region of Oregon in three phases during the next 10 years. The 59 actions in the implementation table represent the highest priority strategies designated by charter signatories in eight imperatives and the estimated costs to implement the strategies ranges from $133,750,000 to $12,032,400,000.

- Public awareness and support $1.65 million
- Regional capacity and collaboration $2.89 million
- Monitoring and data sharing $4.725 million
- Water conservation, efficiency, and reuse $2.025 million
- Resilient water infrastructure $7.25 million
- Source water protection $15.5 million
- Water supply development $200,000
- Ecosystem protection and enhancement $99.5 – $1,169 million

The Mid-Coast Water Planning Partnership recognizes it may not be possible to initiate, or complete, all of the actions in this plan during the next decade. As with any volunteer partnership, actions will be completed as opportunities for funding, collaboration, and resources become available. Regardless, the Mid-Coast Water Planning Partnership believes it is important to highlight and take aggressive action to implement the issues and actions in this plan to ensure a sustainable water future for the Mid-Coast of Oregon and enhance the resilience of the Mid-Coast to climate change stressors.

The Mid-Coast Water Planning Partnership

The Mid-Coast region of Oregon is one of four areas[1] that began piloting a new approach to water planning in 2016 with the Oregon Water Resources Department (OWRD). The purpose of the place-based integrated water resources planning efforts was to implement the Oregon's 2012 *Integrated Water Resources Strategy*, which directs OWRD to help communities collaboratively develop and implement integrated solutions to address instream and out-of-stream water challenges and needs within a geographic scope defined by stakeholders. This regional plan will inform updates to the statewide Integrated Water Resources Strategy.

This plan – *Mid-Coast Water Planning Partnership Water Action Plan* – synthesizes the cumulative work of the Mid-Coast Water Planning Partnership (MCWPP), or the Partnership, and serves as a living document to provide the Partnership the ability to amend its actions to achieve its goals as time and circumstances change. Definitions fundamental to this plan are in Appendix A.

Mission, Vision, and Goals of the Partnership

Mission

The purpose of the Mid-Coast Water Planning Partnership is to develop an inclusive community forum that examines water use in the region, identifies current and potential water challenges, and creates a unified plan to balance water needs.

Vision

Regional partners ensuring balanced water resources for the environment, the economy, and coastal communities.

Goals

Work collaboratively to develop an Integrated Water Resources Plan for the Mid-Coast Region:

- Develop a sustainable water supply for consumptive uses that also protects the environment, supports healthy watersheds, and is resilient to climate change stressors and natural hazards.
- Balance the needs of our ecosystems, our economies, and our communities.
- Develop cross-boundary solutions that help neighbors work together to achieve additive effects.
- Develop and implement integrated regional water management strategies for improved water quality and quantity as well as provide fair access.
- Increase awareness about regional water needs, challenges, and opportunities.

[1] The other three areas include the Lower John Day Sub-basin, Upper Grande Ronde Sub-basin, and Harney Basin.

- Improve the resilience of water management infrastructure by identifying emergency water sources and taking steps to access those water resources when needed, and repair water system infrastructure.

History and Drivers of the Planning Process

The Mid-Coast water planning initiative launched in 2016 with a grant from OWRD to the City of Newport to co-convene a collaboration of stakeholders and develop strategies that would address the following key drivers:

- Address aging infrastructure, improve water conservation efforts, enhance regional water supply options, and more effectively share water among uses and users;
- Relieve late season pressure on rivers, streams, and tributaries while meeting water needs for and coastal communities and local industry;
- Create redundancies to enhance resilience during drought, storms, and other natural vulnerabilities; and
- Create a learning and action network for small water providers vulnerable to environmental and regulatory challenges.

During its first meeting, the Mid-Coast water planning initiative became the Mid-Coast Water Planning Partnership. The Partnership is a voluntary association that actively seeks to include diverse perspectives, interests, and expertise regarding water issues on the Mid-Coast. Organizations or individuals may join the Partnership at any time by agreeing to the terms of the Charter. The Partnership includes, but is not limited to, representation and input from municipal water providers; special districts/water districts; industrial water users; local businesses and economic development organizations; coastal residents, rural homeowners, and landowners; conservation/environmental organizations; timber/forestry groups; agricultural groups; fishing groups; recreation groups, academic/scientific community; city and county governments; state and federal agencies; tribes; and elected officials. For an updated list of members, see https://www.midcoastwaterpartners.com.

During the September 2016 MCWPP kickoff meeting, stakeholders articulated desired outcomes for their planning process. The outcomes included:

Key Water Supply Challenges

Some water providers currently face water shortages. Future shortages are projected due to decreasing supplies and increasing demand, especially during peak tourist season.

Low summer stream flows and limited water storage create water shortages for both communities and stream flows critical for fish, recreation, and industry.

Regional communities need to be better prepared to address natural hazards, vulnerabilities, and emergency preparedness.

- Increased awareness about regional water needs, challenges, and opportunities.
- Development of cross-boundary solutions that help neighbors work together to achieve additive effects.
- Integrated regional water management strategies that are planned and implemented to improve water quality and quantity, ensuring fair access.
- Sustainable water supply for consumptive uses while protecting ecological needs.
- Improved resilience of built infrastructure and watersheds.
- Flow management to store more winter water and raise the water table to alleviate summer low-flow conditions.
- Incentives for water conservation.
- Enhanced understanding of the role of existing rules, regulations, and resources associated with water management and use.
- Water rights that benefit everyone.
- A process that is timely, is multi-decadal in its vision, and is foundational to obtaining additional sources of funding for implementation.

From the outset, the Partnership approached this initiative as a long-term vision that incorporates timely and implementable strategies, and creates a strong foundational plan for obtaining additional sources of funding for implementation. The Partnership determined it would realize its vision for the Action Plan in five steps, in accordance with OWRD guidelines. The Partnership added a sixth step in 2020 b to ensure this Action Plan acknowledges the importance of incorporating adaptive management principles as the plan is implemented. All steps are summarized in Figure 1.

Step 1 (September 2016–May 2017): Partners convened to initiate the planning process, developed a work plan and schedule, and created an inclusive process. The partnership charter, which defines the purpose and goals of the Partnership, and documents how members agree to work together, was adopted on March 29, 2017.

Step 2 (May 2017–February 2018): Partners formed four study groups and worked with a consultant team to produce four technical reports (Appendix B) characterizing the Mid-Coast's water quantity, water quality, ecology, and built systems.

Step 3 (February 2018 – September 2020): Partners self-organized into three separate working groups to better understand the current and future instream/ecological water needs and challenges as well as the water needs and challenges of municipalities/special districts, self-supplied water users (rural domestic, agricultural, industrial). The groups spent time learning about the issues together and received technical assistance from multiple agency partners. The working groups produced an agreed upon set of critical issues that formed the basis for strategy development.

Step 4 (September 2020–June 2021): Partners developed and launched a new website and drafted the plan. Specific strategies that address each key issue were identified and prioritized, and performance metrics were developed to assess progress in implementing strategies.

Step 5 (June 2021–October 2021): Stakeholders reviewed the plan and edits were incorporated.

Step 6 (November 2021 onward): Plan implementation, monitoring of progress, and adjustments to the plan based on emerging issues and learning that occurs during implementation.

Partnership Structure and Participation – Balanced Representation

This plan was developed with a diversity of entities and individuals living and working in the mid-coast of Oregon. This includes representatives of municipal water providers, special districts and water districts, industrial water users, local businesses, economic development organizations, coastal residents, rural homeowners, landowners, conservation organizations, academic entities, local governments, state and federal agencies, tribes, elected officials, and entities representing agricultural, forestry, fishing, and recreation interests. Mid-Coast Water Planning Partnership charter signatories played a key role in the development of the plan. A list of MCWPP partners can be found here.

In addition, extensive outreach has occurred throughout the six-year process to develop the plan, including:

- Presentations to city councils within the geographic scope of the partnership;
- Press releases to regional media;
- Recorded webinars describing planning steps and outcomes (while creating opportunities for feedback and guidance);
- Surveys to obtain feedback on specific elements of plan development;
- Monthly newsletters to share progress on plan development;
- The creation of a website to capture each step of the planning process and key outcomes; such as storymaps, and compiled information and data;
- Welcome sessions for new partners interested in joining and engaging with the partnership during the development of the plan;
- Public meetings; and
- Targeted outreach to tribes, non-English speaking community members, and small local businesses and industry

The Partnership is guided in its work by co-conveners and a Coordinating Committee and is supported by a dedicated Partnership Coordinator as well as a team of consultants. The co-conveners have changed during the course of the planning process, but are committed to providing a neutral and balanced forum that ensures diverse partners learn together and work cooperatively on plan development and implementation. The Coordinating Committee meets monthly and advises on overall process design. The Partnership is the decision-making body

and operates consistent with the terms of the Charter. The Partnership Coordinator oversees the work of the Partnership and keeps partners connected to the process and to each other. The planning process has been supported by various consultants over time in the development of various technical products and the plan.

- The Partnership strived for a balanced representation of interests in the composition of the Partnership, Coordinating Committee, and sub-groups for each planning step. A list of participants in each step, along with their affiliation, is provided in Appendix C.

- The global COVID-19 pandemic required the Partnership to conduct all of its meetings remotely from March 2020 until plan adoption. Prior to the pandemic, meetings with the full Partnership were held 2-4 times per year in-person, with an opportunity to learn from each other and build networks around water issues. Sub-groups were convened and met as needed to accomplish work in between Partnership meetings. Attendance at Partnership meetings ranged from 20 to 70 participants.

Plan Adoption and State Recognition

The plan will be reviewed and approved by consensus, as defined in the Charter, by all those who signed the Charter and reaffirmed their commitment at the beginning of the strategy development phase. Where appropriate, partners and their organizations will be asked to develop a declaration of cooperation affirming their commitment to implementation. This may require individuals working within their organizations to discuss and clarify the organization's level of support. A draft resolution will be provided to local governments for their consideration. Prior to submitting the plan to the state for recognition, the Planning group will undertake a self-assessment to determine whether the plan is likely to satisfy the criteria set forth by the state.

Figure 1. The six-step planning process to complete an integrated water management plan for Oregon's Mid-Coast.

Public Participation

All meetings of the Partnership were advertised via emails and press releases and were open to the public. Meetings were held in the evenings with food provided for all participants. Prior to the pandemic, meetings were held throughout the Mid-Coast (in Newport, Yachats, Siletz, and Gleneden Beach) to encourage participation from different parts of the region.

The Partnership maintains an email list that anyone can join. As of plan adoption the list has XXX subscribers. All meeting materials of the Partnership are maintained online for easy access. Anyone is invited to join the Partnership at any time by signing the charter. The only condition for participation is that they act in accordance with the charter.

The Partnership organized four separate field tours (two in 2017, one in 2018, and one in 2019) to learn about water conditions and challenges from partners. Each of the field tours were open to the public and had high participation. The field tours were recorded, and the recordings were shared online, in email blasts, and via the Facebook page.

A public event was held at the Hatfield Marine Science Center in partnership with the Center and the Surfrider organization. The event was comprised of a panel of Partners representing different water interests who talked about how balance could be achieved. Agency partners were on hand both before and after the panel with information on water quantity, water quality, and ecology.

Presentations have been delivered to the County, to cities, and to partner organizations throughout the planning process. There has been coverage of the effort in the newspaper and the co-conveners and Partnership Coordinator have been interviewed on the radio.

The Partnership, its members, and consultants supporting the Partnership have produced numerous technical products to describe water conditions in the Mid-Coast. There was a recognition that many of these documents, sometimes exceeding 100 pages, were not accessible to the general public. As a result, these technical products were translated into interactive StoryMaps with visual elements and accessible narrative with both an English and a Spanish version. The StoryMaps were launched in early 2021. In addition, an information-rich website was created.

In late 2018 the Partnership launched a community survey and listening sessions with the help of Oregon's Kitchen Table (see results below). A second round of engagement with Oregon's Kitchen Table is planned for late 2021 to gather public input on strategies being considered.

Planning Area

The Lincoln County administrative boundary comprised the original geographic scope of this initiative in 2016 when the Partnership was first formed. Since then, the geographic scope was refined to include the following two USGS cataloging units: 17100204 – Siletz-Yaquina subbasin (Salmon River, Siletz Bay-Ocean Tributaries, Siletz River, Depoe Bay-Ocean Tributaries, and Yaquina River) and 17100205 – Alsea subbasin (Beaver Creek-Ocean Tributaries, Alsea River, and Yachats River) (Figure 2). The southern portion of the Alsea subbasin that includes coastal tributaries extending into Lane County is not included in the planning area. Appendix D provides an ecological snapshot summary of each of these subbasins.

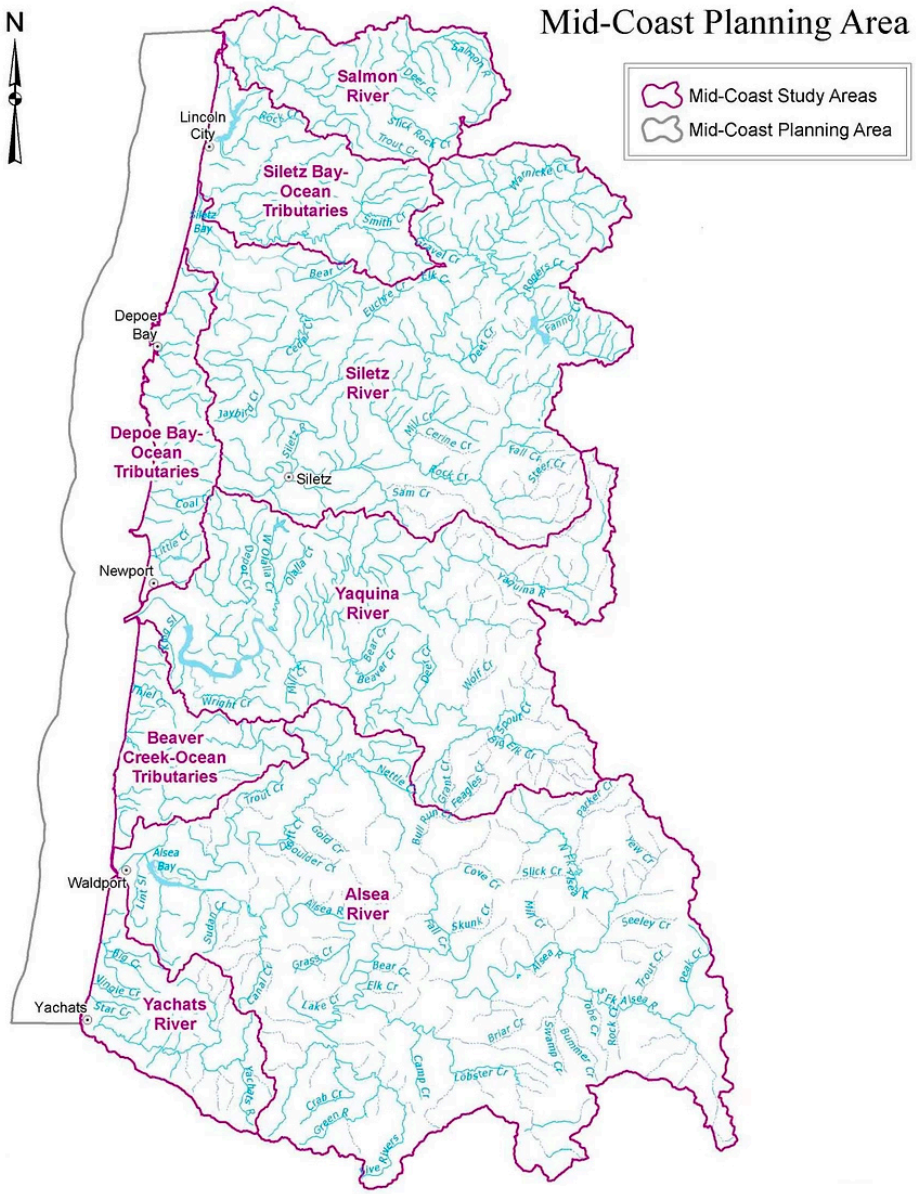

Figure 2. Subbasins comprising the Mid-Coast Planning Area.

Guiding Principles

The Partnership followed the guiding principles in the Integrated Water Resources Strategy and also identified the following key values to guide how its members would work together as a partnership to achieve goals.

- **Partnership.** We recognize different perspectives and seek common ground to develop strategies that meet our collective needs.
- **Transparency.** We create an inclusive process to openly share information and interests, invite curiosity, and encourage dialogue.
- **Innovation.** We bring our best ideas and information to the table and explore innovative, out-of-the-box solutions.
- **Commitment.** We act in good faith to support the success of the Partnership in developing strategies that are in the best interests of the region.
- **Flexibility.** We are open to new ideas and approaches that will adapt our process or approach to fit the needs of the Partners.
- **Action.** We seek practical near-term actions as well as longer term strategies consistent with our goals.
- **Clarity.** We commit to expressing all of our findings in the simplest and clearest form possible.

Figure 3 illustrates some of the common elements of a successful strategic planning process.

Figure 3. Word graphic illustrating the elements of a successful planning process based on sound guidance principles.

How this plan intersects with other regional planning efforts

This action plan is intended to achieve water resource protection objectives critical to the watersheds of the Mid-Coast as well as the people who live, work, and recreate in the Mid-Coast. It is also intended to supplement, complement, and support numerous other planning efforts currently underway in the region, especially those that address water issues foundational to the Mid-Coast Water Planning Partnership (see Appendix E for a crosswalk of these efforts with this plan) (Figure 4). These regional planning efforts include, but are not limited to, the following:

- **Final Endangered Species Act Recovery Plan for Oregon Coast Coho Salmon (2016)** (*Oncorhynchus kisutch*)[2]**.** The goal of this plan is to improve the viability of Oregon Coast Coho, and the ecosystems upon which it depends, to the point that they no longer require Endangered Species Action protection. The recovery direction for Oregon Coast Coho Salmon is to protect and restore the freshwater and estuarine rearing habitats that support juvenile survival and overall productivity.

- **Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan (2015, revised 2017)**[3]**.** This plan describes priority natural hazards of concern to the Mid-Coast region, including coastal erosion, drought, earthquakes, floods, landslides, tsunamis, wildfire, windstorms, and winter ice. Although there is no direct relationship to the actions within the Mid-Coast Water Planning Partnership Water Action Plan, any efforts that reconnect floodplains, restore stream flow, and restore riparian areas will enhance resilience of the Mid-Coast region to climate change stressors and several natural hazards. In addition, three actions within this plan have a nexus with natural hazards.

- **Lincoln County Climate Action Plan (2020).** This plan emphasizes water supply resiliency measures that reduce water use by developing focused, interrelated water conservation measures, regulations, education, and incentives.

- **Oregon Coast Coho Conservation Plan for the State of Oregon (2007).** This plan is intended to conserve and enhance Oregon Coast Coho and other native fish and wildlife species through on-the-ground, non-regulatory work by community-based entities and individuals.

- **Oregon Coast Coho Business Plan (Siletz; ongoing).** This plan intends to conserve Oregon Coast Coho by working with local communities for voluntary habitat protection and restoration projects that will help recover threatened and endangered coho populations.

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[2] NMFS (National Marine Fisheries Service). 2016. Recovery Plan for Oregon Coast Coho Salmon Evolutionarily Significant Unit. National Marine Fisheries Service, West Coast Region, Portland, Oregon.

[3] https://www.co.lincoln.or.us/planning/page/natural-hazards-mitigation-plan

- **Coastal Multispecies Conservation and Management Plan.** This plan describes the fish management needs for the conservation and use of anadromous salmonids along much of the Oregon coast.

- **Lincoln County Comprehensive Land Use Plan.**

- **Community Water System Plans (including Water System Master Plans, Capital Improvement Plans, Water Management and Conservation Plans, Emergency Response Plans).**

- **Oregon Department of Agriculture Water Quality Management Plan.** The Oregon Legislature passed the Agricultural Water Quality Management Act in 1993, which requires the Oregon Department of Agriculture to prevent and control water pollution from agricultural activities. ODA worked with local advisory committees to develop Water Quality Management Plans and Rules throughout the state.

- **Oregon's Nonpoint Source Program Plan** (2014): Oregon's Nonpoint Source pollution control and drinking water protection programs are based on a wide range of tools (planning, voluntary actions, prevention, restoration, etc.) including other government agencies' programs to address water quality issues associated with multiple land uses or legacy conditions. These issues require the participation of multiple Sectors to protect or improve water quality and restore watershed ecological function (e.g., through WA Section 319 watershed-based plans).

- **Oregon's Coastal Nonpoint Pollution Control Plan (CNPCP)**[4,5] Many Actions in this Plan support achieving the objectives of Oregon's CNPCP, including implementation of several "management measures" that have not yet received federal approval.

- **Newport's Long-Range Water Supply Report** (2001).

- **Rocky Creek Regional Water Supply Project** (2001).

- **Rocky Creek Report** (1999).

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[4] https://www.oregon.gov/lcd/OCMP/Pages/Water-Quality.aspx

[5] https://www.oregon.gov/deq/wq/programs/Pages/Nonpoint.aspx

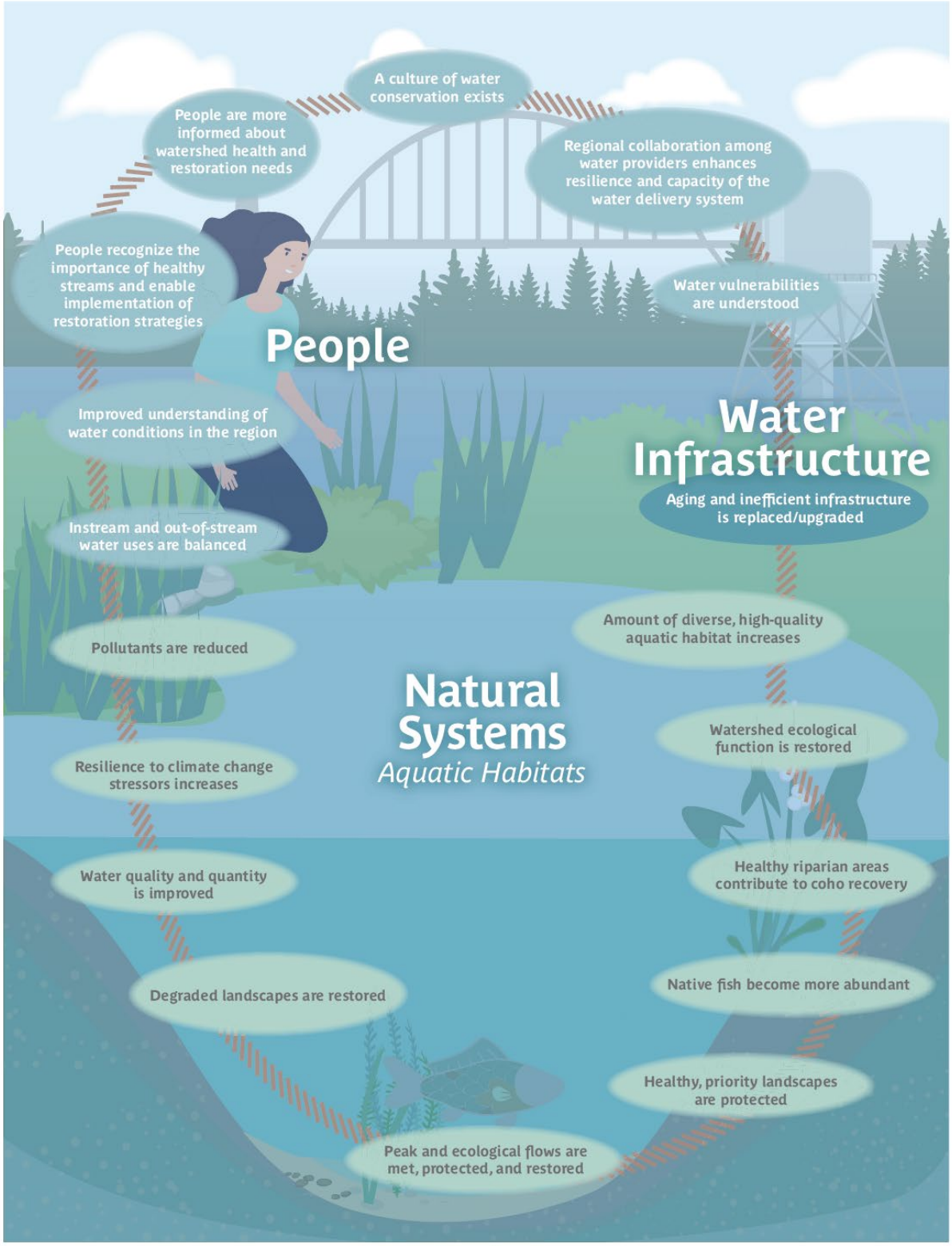


Figure 4. Graphic illustrating key outcomes of the Oregon Mid-Coast Water Action Plan and the interconnectedness of people, water infrastructure, and natural systems.

Perceptions and Values of Mid-Coast Regional Stakeholders

During 2018, Oregon's Kitchen Table, a program of the National Policy Consensus Center in the College of Urban and Public Affairs at Portland State University, engaged 680 people that frequently visit, or work, live, or own a business in the Mid-Coast in a project to better understand Mid-Coast Basin perceptions and values. Participants were asked about their knowledge and values, interests, or concerns, about the future of water in the region, and tradeoffs to consider as the MCWPP develops strategies to address key water issues and priorities (Oregon's Kitchen Table 2019). Engagement strategies consisted of an online and a paper-based survey (in both Spanish and English), as well as direct mailings to Confederated Tribes of Siletz Indians households. A series of listening sessions were held with non-English speakers (both Spanish and Mam). A total of 505 people completed the online survey, 112 responded using the paper survey, 89% of participants self-identified as English speaking, and 11% self-identified as Spanish speaking. A total of 38 individuals identifying as members of the Confederated Tribes of Siletz Indians participated in the survey.

The following commonly held values and beliefs were derived across all engagement strategies (Figure 5):

- The majority of participants listed health as the issue they think about either most, or next to most. A total of 43% of participants listed water as the issue they think about most, or next to most, and 41% listed environment or ecology. The other issues lagged behind those three.
- Most participants obtain their water from either a city or a water district.
- A total of 95% of participants use water for personal or home use (such as drinking, cleaning, and more).
- A total of 78% of participants indicated that they enjoy water "in a scenic way," and 73% use it to grow food or plants. Far fewer participants reported that they use it for business or industrial use (13%).
- A majority (57 %) of participants said their water costs are "about right". About a third of participants believed that their water costs too much (26%), or far too much (7%).
- The people who responded to the survey frequently thought about water use across the region. More than 40% thought about water use most of the time, whereas 17% thought of it all of the time. By contrast, less than 10% of respondents thought about it rarely or never. A total of 44% of respondents knew nothing about the Partnership, or very little (32%) about it before the survey.
- If survey participants could give 100 gallons of water to various uses, they said they would give the most water (32.6 gallons) to residential water supply for year-round residents. Water for fish and wildlife was listed second (23.7 gallons). Water for tourist lodging and tourist attractions would receive 7.6 gallons.
- When asked about ensuring if there is enough water for people, business, and nature, the results were split across concern for household use, infrastructure, and fish and wildlife. A

total of 28% of respondents reported that their primary concern is making sure there is enough safe water to drink and use for cleaning, whereas 23% reported their greatest concern was making sure that the region's water structures (pipes, pumps, etc.) are in good condition to withstand time and a major event, such as an earthquake or tsunami. A total of 22% said their greatest concern was making sure there is enough water to support fish and wildlife. Far fewer people (1%) are most concerned about having enough water to support business and industry. Likewise, very few (1%) feel the biggest concern is that the water be safe for recreation.

- When asked to evaluate ways to help ensure that there is enough water for all needs, participants assigned points to various solutions. Watershed restoration or protection (protecting or improving the forests and lands the region's water flows through) received the most points (19.8 points out of 100 possible points). Water storage systems (such as reservoirs) received 18.3 points, and conservation received 16 points. Sharing water among communities received the fewest points (7.2 points).

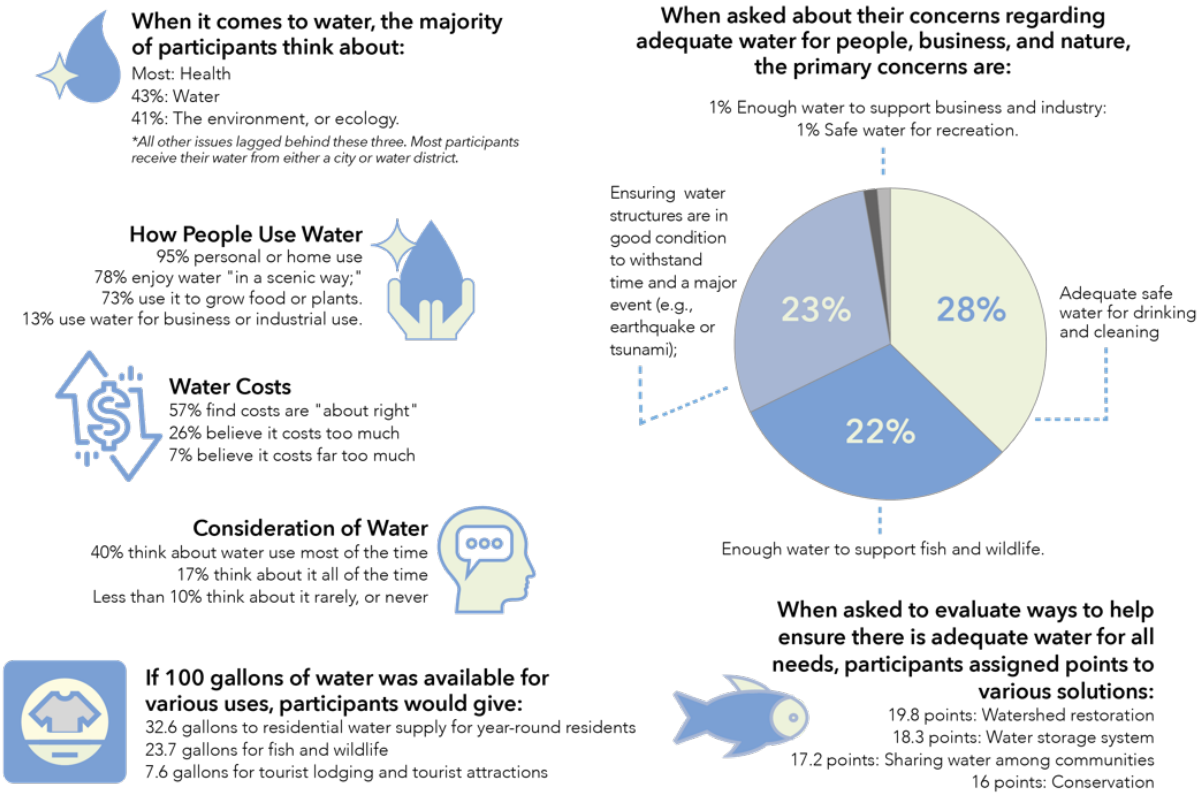


Figure 5. Key values and perspectives of Mid-Coast stakeholders in 2018 survey.

Environment, Natural Resources, and Economy of Oregon's Mid-Coast

(Note: This section is a summary from Step 2 of the planning process. For citations, please refer to the actual technical reports produced in 2018 (Appendix B). All statistics provided in this section originate from these 2018 reports unless more recent numbers are available).

General Overview

About 50,000 people currently live within the Mid-Coast Planning Area of Oregon. Population projections indicate that the region will grow by almost 10,000 people during the next 40 years. The projected demographic shift is slowly toward an older population.

Land use is primarily private, state, and federal forests (87%). Other land uses include agriculture (primarily livestock grazing), rural residential development, industrial, commercial, and urban development, primarily along the Highway 101 corridor.

Tribal Nations. The Confederated Tribes of Siletz Indians[6] has its population, governmental, and cultural center in the City of Siletz, Oregon. The Lincoln County population has a higher percent Non-Hispanic Indian or Alaskan Native than the state average (OHA, 2018).

The economy is comprised of personal income, pensions, investments, tourism, and natural resources. The natural resources economy consists of commercial fishing (40%), tourism (33%), commercial timber (26%), and to a lesser extent agriculture (1%).

Demographics. Ethnicity, income, education. Based on OHA data[7], Lincoln County residents are currently older, more Caucasian, represent a higher percentage on social security/retirement income, and there is a slightly higher overall poverty rate than the state average.

Stream flows are rain-dominated and are fed by shallow groundwater when it is not raining. Most precipitation occurs November–March, and dry conditions occur in the summer, often extending into late October. Most groundwater aquifers generally have low yield and poor storage capacity. Groundwater is recharged by rain during the wet season and groundwater levels and spring discharge generally declines during the dry season.

Out-of-stream water use and rights. There are about 1,637 water rights in the Mid-Coast planning area allocated to 29 different uses. Domestic use has the most number of water rights (n=703) followed by irrigation (n=419), instream (n=110), and municipal (n=82). Figure 2 displays the estimated number of water rights by type. The largest water use category in the planning area is for self-supplied industrial use, followed by water used by hatcheries and water for domestic and

[6] https://www.ctsi.nsn.us/tribal-services/

[7] https://www.oregon.gov/dhs/ABOUTDHS/DataDocuments/County-Quick-Facts-2018.pdf

industrial use provided by community water systems. The largest water users in the region all draw water from the Siletz River and have water rights that are senior to the instream water right.

Instream water needs and rights. Forty-two streams have existing instream water rights, but these instream rights inadequately capture the full range of flows needed to protect current instream ecosystems. Summer streamflows are insufficient in some areas of the Mid-Coast (see Water Quantity report from Step 2 of the planning process – Appendix B) to meet the instream water needs of fish and wildlife. Low streamflows contribute to water quality impairments (e.g., high temperatures and reduced dissolved oxygen) that negatively affect fish and wildlife. Climate change impacts and increased demand from municipal and rural water users are expected to further limit available water in the summer for all uses.

Conservation Opportunity Areas. Of the 206 designated Conservation Opportunity Areas (COAs) in Oregon, seven of them are within Oregon's Mid-Coast region: Siletz Bay-Ocean COA, Siletz River COA, Depoe Bay Area COA, Yaquina Bay COA, Beaver Creek COA, Alsea Estuary-Alsea River COA, and Yachats River Area COA (Oregon Department of Fish and Wildlife 2020). Conservation Opportunity Areas are places where broad fish and wildlife conservation goals can best be met. Focusing investments in these areas can increase the likelihood of long-term success, maximize effectiveness over larger landscapes, improve funding efficiency, and promote cooperative efforts across ownership boundaries.

Estuaries. There are five estuaries classified as major estuaries by the Oregon Department of Land Conservation and Development in the Mid-Coast Planning Area: Salmon River, Siletz Bay, Yaquina Bay, Alsea Bay, and Depoe Bay. Big Creek is classified as a "natural" estuary, whereas Beaver Creek and Yachats are classified as conservation estuaries (DLCD).[8]

Figure 6 provides a snapshot of the environment, natural resources, and economy of Oregon's Mid-Coast Planning Area.

[8] https://www.oregon.gov/lcd/Publications/TheOregonEstuaryPlanBook_1987.pdf

Oregon Mid-Coast Region: Environment, Natural Resources, and Economy

Environment

The Coast Range averages 1,500 feet in elevation. Steep slopes and high rainfall increase the potential for soil erosion.

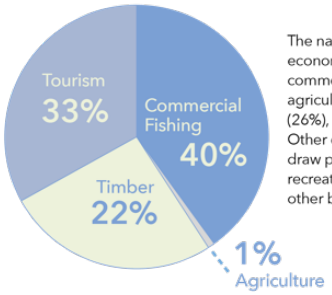
The region has been uplifted by tectonic plates converging. The geology does not support large quantities of groundwater. Aquifers have low water yields and poor water storage capacity.

The region has one of the wettest and mildest climates in Oregon. High precipitation (>97 inches) occurs in the NE portions of the Siletz and Alsea watersheds. Most precipitation is rain that falls between November and March. Dry conditions, including drought, occur during the summer. Weather is influenced by ocean currents and atmospheric conditions.

Economy

Income is derived primarily from commercial fishing, agriculture, timber, and tourism as well as small businesses, real estate, and public sector employment.

The number of retirees in the region has increased, and the population is aging as births have declined. Lincoln County's population is expected to increase from 46,560 in 2010 to 56, 245 in 2050. Lincoln County 2nd homeowners accounted for 25% of housing in 2010. Occupancy of 2nd homes is greatest during the summer months, when tourism also peaks.



The natural resource economy includes commercial fishing (40%), agriculture (1%), timber (26%), and tourism (33%). Other ecosystem services draw people to the region for recreation, scenic values, and other benefits.

People and Natural Resources

Mid-Coast ecosystems include estuaries, beaches, steep mountain slopes, and lowland riparian areas. The nearshore environment is affected by water quality and quantity of streams draining into the ocean. Estuaries provide habitat for fish and wildlife and are an important transition zone for anadromous species (e.g., Salmon) which spend a portion of their life in freshwater and saltwater. Land use management and changes as well as invasive species affect environmental conditions and species in the Mid-Coast.

Federally listed species that spend at least a portion of their life cycle in fresh water include 2 fish–Oregon Coast ESU Coho Salmon, Southern DPS American Green Sturgeon–and one plant–Water howellia. In addition , Essential Fish Habitat, which is necessary for spawning, breeding, feeding, or growth, exists for Chinook and Coho Salmon.

There are four federally recognized tribes in the region, including the:
- Confederated Tribes of Siletz Indians
- Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians
- Confederated Tribes of Grand Ronde
- Coquille Indian Tribe

Major land uses include:
- private, state, federal and tribal forests
- livestock grazing
- rural residential development
- urban development along Highway 101

The majority of land is zoned for Timber Conservation. 71% of private forestland is industrial forest owned. There are 518 farms, of which 65% are less than 50 acres.

Historic land uses include harvest of common food sources, such as whales and sea lions, shellfish, seaweed, huckleberries, venison, eels, and salmon. Salmon remains key int eh spiritual and cultural life of the Mid-Coast tribes.

Water uses include municipal, domestic, commercial, agriculture, and instream uses (for recreation and fish and wildlife). Permitted groundwater use in the region is minimal and is for municipal use, which occurs primarily along the coast and in coastal towns that support natural resource industries and tourism. Tourism and 2nd home ownership affects water use and water demand during weekends and summer months.

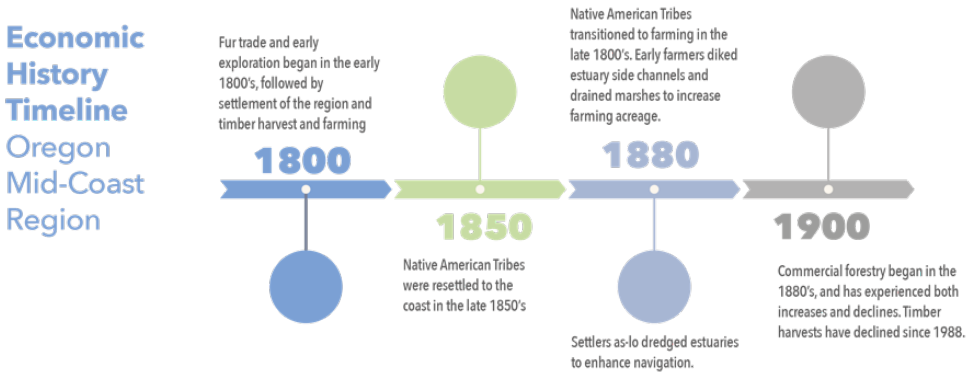


Figure 6. A snapshot of the environment, natural resources, and economy of Oregon's Mid-Coast.

Understanding Water Resources Quantity, Quality, and Ecological Issues

During Step 2 of the planning process, a series of reports were developed characterizing water quantity, water quality, and ecology of the Mid-Coast region (see Appendix B). This section of the document summarizes the information presented in those reports.

Water Quantity

Water resources (Figure 7) in the Mid-Coast support multiple uses, including providing drinking water, supporting fisheries and wildlife, supporting industry and commercial operations, providing recreational opportunities, and supporting estuaries that provide habitat for a diversity of native fish and wildlife species. Water uses have changed through time. Today, water resources in the Mid-Coast are increasingly valued for providing recreational opportunities and habitat for aquatic species.

All of the major river drainages in the Mid-Coast planning area, with the exception of the Yachats River, originate at the crest of the Coast Range in Polk and Benton Counties and extend to the coast. The planning area is divided into eight different sub-areas, which encompass the following waterways: Salmon River, Siletz Bay-Ocean Tributaries, Siletz River, Depoe Bay-Ocean Tributaries, Yaquina River, Beaver Creek-Ocean Tributaries, Alsea River, and Yachats River (Figure 7). Many streams in the Mid-Coast are tidally influenced ocean tributaries, meaning that they drain directly into the ocean rather than draining to a river. The zone of tidal influence in these streams depends on the discharge of the stream and the tidal stage.

Water quantity and its management in the Mid-Coast region was summarized during Step 2 of the planning process as shown in the bulleted list below. The entire report on water quantity can be accessed in Appendix B.

- Streams in the Mid-Coast have high natural streamflow during the winter months (January-March) and low natural streamflow during the summer/Fall months (August-October) as a result of seasonal precipitation patterns.
- Streams in the Mid-Coast are rain-dominated and responsive to precipitation, reaching high flows during rainstorms. Groundwater inputs contribute base flows in streams during late summer and Fall months.
- The Mid-Coast has eight active real-time streamflow gage locations (Salmon River below Slick Rock Creek, Siletz River at Siletz, Sunshine Creek near Valsetz, Yaquina River near Chitwood, Alsea River near Tidewater, Drift Creek near Waldport, East Fork Lobster Creek, and Yachats River above Clear Creek).
- Information from river gages and water availability models help the Oregon Water Resources Department determine whether to issue new water rights. The water availability models consider estimates of supply and demand, and account for both instream and out-of-stream water rights to determine if water is available for new out-of-stream uses.

- Generally, Mid-Coast groundwater is not very productive because of low permeability and low storage capacity of the regional geology.

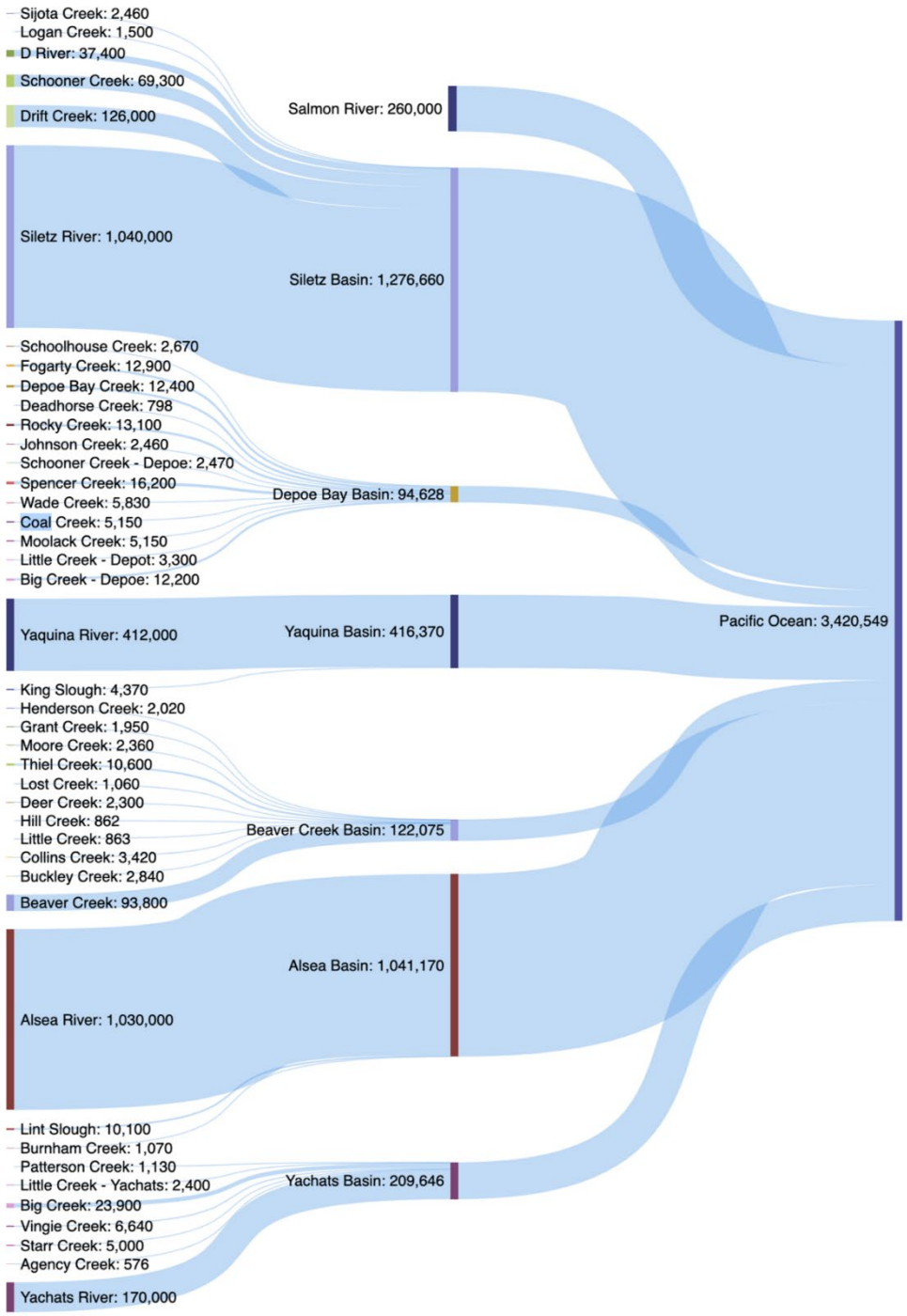


Figure 7. Total estimated average annual natural streamflow volume (in acre-feet) of surface water in streams and rivers in the Mid-Coast based on a 1958-1987 period of record. Note that these volumes do not reflect diversions for out-of-stream uses (e.g., municipal, domestic, irrigation uses).

Water Quality

Water quality status and regulation in the Mid-Coast region was summarized during Step 2 of the planning process as shown in the bulleted list below. The entire report on water quality can be accessed in Appendix B. However, some of the water quality status information is outdated.

- Water quality affects the extent to which water bodies can support beneficial uses, such as drinking water, industrial, agricultural, fish and aquatic life, and wildlife.
- Numerous government agencies manage water protection programs in the region (within the parameters established by the 1972 Clean Water Act), including:
    - Oregon Department of Environmental Quality, which establishes water quality standards for Oregon's surface waters in accordance with the Clean Water Act, issues discharge permits, and develops TMDLs, or watershed plans for controlling nonpoint source pollution.
    - Oregon Department of Agriculture regulates agricultural practices to prevent water pollution and meet water quality standards in accordance with the Agricultural Water Quality Management Act.
    - Oregon Department of Forestry regulates forestry operations to prevent water pollution and meet water quality standards in accordance with the Forest Practices Act.
    - Oregon State Parks manages potable water supply in state parks.
    - Oregon Health Authority implements regulations to ensure drinking water standards are met in accordance with the Safe Drinking Water Act.
    - Oregon Department of State Lands manages the removal-fill program and coordinates in-water work permitting with the U.S. Army Corps of Engineers and Oregon Department of Environmental Quality's water quality certification program.
    - US Forest Service and US Bureau of Land Management implement the aquatic conservation strategy of the Northwest Forest Plan[9].
    - Lincoln County manages the onsite wastewater (septic) permitting program for most of the planning area.
    - Lincoln County has a riparian protection ordinance to reduce impacts of rural residential development and certain other land uses on near-stream conditions.
- Oregon's 2018/2020 Integrated Report and Assessment Database identifies Mid-Coast water bodies that are water quality limited for not meeting one or more water quality parameters, such as temperature, dissolved oxygen, or *E. coli*.
- The Oregon Health Authority issues health advisories for multiple beaches in the Mid-Coast during the past decade for elevated enterococcus levels, which can cause illness from contact recreation, such as swimming.

[9] https://www.fs.fed.us/r6/reo/acs/

- Surface water is the primary source of drinking water for nearly all of the municipal and community water providers in the Mid-Coast.
- Several water providers in the Mid-Coast use groundwater. Common groundwater contaminants that are monitored include arsenic, lead, nitrates, and fecal coliform bacteria.
- Several organizations and various private entities conduct periodic water quality monitoring activities in the Mid-Coast.

As shown above, a combination of state and federal statutes and implementing regulations direct the management of water quality in Oregon (see Appendix I). Oregon Department of Environmental Quality administers the following water quality: Oregon's Groundwater Quality Protection Rules, Underground Injection Control Rules, National Pollutant Discharge Elimination System (NPDES) and Water Pollution Control Facility (WPCF) Permits Program Rules, Reclaimed Water Program Rules, Hazardous Waste Management Program, Underground Storage Tank Program, Municipal Solid Waste Program, the Oregon Groundwater Quality Protection Act of 1989, and Biosolids.

Water Quality Monitoring

The Mid-Coast Watersheds Council, Siletz Watershed Council, and the Yaquina Watershed Council collaborate with the Lincoln County SWCD, which periodically conducts water quality monitoring in the Mid-Coast. The Siletz Tribes has an established water quality monitoring program. Also, the Alsea Watershed Study[10] is a paired watershed study that assessed the impacts of private forest practices on water quality, aquatic habitat, and salmon.

The Oregon Department of Environmental Quality monitors and evaluates water quality via the Ambient Monitoring Network and Oregon Water Quality Index, watershed monitoring Total Maximum Daily Loads (TMDLs), toxics monitoring, biomonitoring, Oregon Beach Monitoring Program, Volunteer Water Quality Monitoring, Groundwater Monitoring, and National Aquatic Resource Surveys. Information about all of these programs and the water quality database can be found here. Water Quality Assessment/303d list information from DEQ can be found here. And a collection of DEQ's ambient water quality, watershed and groundwater monitoring project reports can be accessed here.

[10] http://watershedsresearch.org/alsea-study

Water Quality Impaired Streams in the Mid-Coast

Oregon's 2018/2020 Integrated Report and Assessment Database[11] identifies the following classes of Assessment Units (AUs) for categorizing water quality status, including impaired waters not consistently meeting state standards for a specific water quality parameter:

1.) Rivers and Streams Assessment Units: The AUs for river/stream segments are 5th order and above streams. Impaired segments are summarized in Table 1 (below) by drainage basin.

- 50 river/stream AU segments are categorized as impaired for one or more parameters and/or pollutants and beneficial uses (366 stream miles);
- 46 river/stream AU segments are categorized as temperature impaired (357 stream miles)

2.) Watershed Assessment Units: AUs based on USGS 12-digit HUCs that include 1st through 4th order streams.

- 24 of 35 Watershed AUs within the Mid-Coast planning area exhibit one or more impairments;
- 21 Watershed AUs are categorized as temperature impaired

3.) Waterbody Assessment Units: Estuaries, lakes, and reservoirs with area > 20 hectares.

- 14 of 19 Waterbody AUs within the Mid-Coast planning area exhibit one or more impairments.

4.) Coastline Assessment Units: These AUs are linear features along the coast (beaches, rocky shorelines). 29 Coastline AUs are categorized as impaired based on shellfish consumption or recreational contact advisories issued by the Oregon Health Authority.

DEQ's interactive mapping application is the most effective method to search and view water quality status for areas of interest. Detailed AU definitions are found in DEQ's Integrated Report Assessment Methodology (DEQ, 2018):
https://www.oregon.gov/deq/wq/Documents/irMethodologyF1820.pdf

The Clean Water Act requires that Total Maximum Daily Loads (TMDLs) (or alternate pollution control plans) be developed for all water quality-limited waters. TMDLs set specific criteria for pollutant amounts in stream reaches that are water quality limited. DEQ is currently preparing the 2022 Integrated Report and will release that information for public review when it is ready. That Report will supersede the information in this Section.

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[11] Source: Oregon's 2018/2020 Integrated Report and Assessment Database
https://www.oregon.gov/deq/wq/Pages/epaApprovedIR.aspx

Table 1. Summary of water quality limited streams by drainage basin.

Location	Limitation
Salmon River Drainage Area	20.9 miles of water quality limited streams
Siletz River Drainage Area	84.4 miles of water quality limited streams
Yaquina River Drainage Area	62.2 miles of water quality limited streams
Beaver Creek-Ocean Tributaries	17.1 miles of water quality limited streams
Alsea River Drainage Area	165.3 miles of water quality limited streams
Yachats River Drainage Area	15.2 miles of water quality limited streams
Beaches	1.7 miles (based on health advisories for water contact recreation)
Coastline, lower estuaries	73.9 miles (based on shellfish consumption advisories for toxins/inorganic arsenic)

Groundwater Quality

Several public water providers and multiple private residents in the Mid-Coast use groundwater as domestic water supply (see Water Quantity report from Step 2 of the planning process – Appendix E). Many residents on private wells, or springs, have septic systems to manage wastewater. According to the Oregon Department of Environmental Quality, statewide studies of groundwater during the past 20 years have found that nitrate is the most commonly detected groundwater contaminant, followed by pesticides, volatile organic compounds, and bacteria. Owners of residential domestic wells are not required to conduct routine water quality testing or to treat contaminants. Testing is only required by owners during real estate transactions (e.g., the sale of a property) and is limited to arsenic, bacteria, and nitrate. There is limited understanding of groundwater quality in the Mid-Coast, which represents a data gap. Oregon's Domestic Well Safety Program (DWSP) partners with local health departments and water providers to promote proper maintenance and safety of domestic wells and improve local and state capacity to assess and manage risks associated with private wells. Lincoln County recently used a DWSP grant to perform well water testing.

Ecology

The ecology in the Mid-Coast was summarized in a report (Appendix B) as part of Step 2 of the planning process and was described as follows:

- The Mid-Coast supports a variety of habitats, with aquatic habitats being of particular interest because of their connection to human population water supply needs. Aquatic habitats include streams and springs, lakes, riparian areas, wetlands, and estuaries.
- The Oregon Conservation Strategy (OCS) identifies species of interest and areas of ecological importance in the different regions of the state. The Strategy identified 12 streams or estuary habitats as areas of ecological importance in the Mid-Coast because of the diverse habitats and species they support. For example, the Siletz Watershed has the only coastal origin population of summer Steelhead in Oregon.
- Aquatic species of interest and concern in the Mid-Coast include seven species of anadromous salmonids ((coho, Chum, Chinook (fall-run and spring-run), Steelhead (winter-

run and summer run); sea-run Cutthroat Trout)), Green and White sturgeon, beaver, and three species of Lamprey (Pacific, Western River, and Western Brook). Oregon Coast Coho Salmon are listed as threatened under the Endangered Species Act, and large portions of the Mid-Coast are designated as critical habitat for coho. Green Sturgeon also are listed as threatened within the Southern Distinct Population Segment, which includes Yaquina Bay.

- Salmon are a keystone species in the Mid-Coast because of their influence on other plant and animal species. Salmon are an indicator species for habitat health because they require diverse quality habitats throughout their lifecycle that other species also require.
- Sources of habitat degradation include stream channel simplification and incision, warm stream temperatures, altered streamflow timing and watershed function, fine sediment and turbidity related to peak streamflow, and toxic and non-toxic pollutants.
  Aquatic habitat restoration efforts occur in the Mid-Coast to increase stream channel complexity and off-channel habitat, reduce fine sediment inputs and summer water temperature, address fish passage barriers, and encourage beaver dams, or similar structures.

Species and Habitat Needs

The Mid-Coast has many species that spend at least part of their life cycle in freshwater and are listed by state or federal agencies for protection or monitoring and/or are identified by the Oregon Conservation Strategy (OCS) as a "species of interest." Salmonids require unimpeded access to adequate amounts of cold water, large woody debris, deep pools, and spawning gravels to adequately support the various stages of their life cycle. Factors negatively impacting salmonids are low water availability (particularly in late summer and fall), impaired water quality (e.g., elevated stream temperatures), reduced stream complexity, and fish passage barriers (e.g., undersized culverts). Green and White Sturgeon are also species of interest in the Mid-Coast. Sturgeon are especially sensitive to estuary conditions, where they congregate during summer and fall.

Several species of lamprey (Pacific, Western River, and Western Brook) are also species of interest and require many of the same habitat characteristics as salmonids, yet have a very different life history.

Beavers are a species of interest because of their ability to build dams and create ponds that can store water, provide habitat for other wildlife, promote nutrient cycling, moderate flows, and recharge shallow alluvial aquifers, among other benefits. Beavers are also considered pests by many landowners, and beavers are a constant topic of dispute. Consequently, the Oregon Department of Fish and Wildlife convened a beaver management workgroup.[12]

[12] https://www.dfw.state.or.us/wildlife/working_group/beaver_management.asp

Other species of interest are invasive species, which are non-native species that have a disproportionate effect on the ecosystem that is typically negative, such as outcompeting and displacing native species and reducing species diversity.

Aquatic Habitats

Streams

Healthy stream habitats have adequate streamflow throughout the year, cool temperatures, high dissolved oxygen, low turbidity, riparian vegetation, and stream channel complexity. Stream health benefits from watersheds that store precipitation in springs, wetlands, beaver ponds, and in the streambanks/floodplains. In healthy streams, streamflow often overtops streambanks during flood events. When this occurs, floodwaters are slowed by streamside vegetation, providing refuge for aquatic species from high flows. Finer sediments, larger cobble, and boulders suspended in floodwaters are deposited in floodplains and store water that is later released into the stream channel. Stream health also benefits from a diversity of disturbances in the watershed, such as fire, debris slides, windstorms, and floods that increase habitat diversity. Floods move large substrate and large woody debris from upper reaches and tributaries to lower reaches within the watershed.

Stream temperature affects water chemistry and species survival. Shade, cool groundwater discharges into the stream, and water quantity moderate stream temperatures. Temperature and dissolved oxygen concentration are linked, and both parameters are critical to the reproduction and survival of resident and anadromous fish. Stream temperature affects biological triggers for salmon migration, spawning, and egg hatching. High stream temperatures and low dissolved oxygen as well as high turbidity can threaten fish survival at various life stages.

Riparian Habitats

Riparian habitat is at the interface between land and a river or stream. Plant and animal species may use all riparian habitats, or may specialize on a particular geomorphic surface within the riparian area. Rivers are constantly changing, eroding surfaces, and depositing material to create new surfaces. Similarly, vegetation communities in riparian areas change as they become inundated by floodwater, dried out because of a shift in channel location, or fall into the stream channel from bank erosion. Riparian habitat influences instream health, and upstream health influences downstream characteristics.

Estuary Habitats

Although the focus of this plan is on fresh water, the connection between freshwater and estuary habitats is critical to the life history of many fish and wildlife species in Oregon's Mid-Coast.

The Mid-Coast has two types of estuaries: (1) drowned river mouth estuaries—river valleys that flooded about 10,000 years ago from sea level rise; and (2) tidally restricted coastal creek estuaries—streams that discharge directly into the ocean and experience inputs of ocean water during high tides. Mid-Coast estuaries, with the exception of the Depoe Bay Estuary and Yachats

Estuary (which are small), are moderate in size and have large areas of salt marsh, eelgrass, and tidal flat habitat.

Estuaries provide a transition zone between freshwater and saltwater, and contain unique habitats that support a diversity of plants and animals adapted to a balance of saltwater and freshwater. Estuaries also filter pollutants, stabilize shorelines, and buffer human communities from storm surges. Estuaries are especially important for salmon during key points in their lifecycle. Estuary habitats are influenced by watershed size, geology, ocean tides, and freshwater-saltwater mixing. Although estuaries are dynamic systems that change with high tide and low tide, they are also sensitive to changes. Plant and animal communities in each estuary are adapted to a specific range of salinity. Changes to sea level, ocean currents, or freshwater inputs from streamflow can alter the balance of saltwater and freshwater and sediment dynamics, impacting plant and animal communities.

For more information about different types of estuaries, click here and here. The Coastal Atlas Estuary Data Viewer can be accessed here. For more information about individual estuary management plans, click here. During the initial development of this plan, several of Oregon's estuary management plans were being updated. Appendix J has additional information on individual estuaries in Oregon.

Wetland Habitats

The main types of wetlands in the Mid-Coast are aquatic beds, marshes, peatlands, wet prairies, scrub swamps, and forested swamps. One of the most important benefits that wetlands provide is their capacity to maintain and improve water quality. Water quality is supplied to downstream environments in several ways. By spreading out and slowing down flows, wetlands reduce erosion and prevent sediment being transported downstream where it might affect the ecology and productivity of other environments, in particular estuaries, seagrasses, and reefs. When healthy, wetland soils and vegetation can capture, process, and store nutrients and/or contaminants, and if the natural rhythms and flows of the wetland are undisturbed, the release of potential stressors, such as sediments, nutrients, acids, and/or metals from the soil can be prevented. Healthy wetlands can assist in removing harmful bacteria, and wetlands can also be important in the management of urban stormwater and effluent by improving the removal of nutrients, suspended material, and pathogens from water prior to its return to the environment.[13]

There are only several natural lakes in the Mid-Coast Planning Area. Devil's Lake (a natural lake near Lincoln City), Olalla Reservoir (formed by Olalla Dam on Olalla Creek), and Big Creek Reservoir

[13] https://www.environment.gov.au/system/files/resources/b7cd579b-89b0-4602-9ba8-118b4f55ab84/files/factsheet-wetlands-water-quality.pdf

(formed by Big Creek Dam on Big Creek). Valsetz Lake, which was formed by Valsetz Dam, was removed in 2012 on the South Fork Siletz River[14].

Wetlands are areas where water covers the soil, or is present either at or near the surface of the soil all year or for varying periods during the year, including during the growing season. Wetlands can be influenced by local geologic conditions that provide the parent material for soils, influence groundwater chemistry, and affect wetland vegetation. Wetlands in the Mid-Coast have either organic soils (muck, mucky peats, fibrous peats, or combinations of these) that are saturated perennially or mineral soils (sand, silt, and silty loams, sandy loams, or clay loams) that may be flooded in the winter and moist or dry in the summer. The main types of wetlands in the Mid-Coast, each with unique soils and vegetation communities, are aquatic beds, marshes, peatlands, wet prairies, shrub swamps, and forested swamps.

Mid-Coast Areas of Ecological Importance

ODFW established the Oregon Conservation Strategy (OCS), which identifies areas of ecological importance, or Conservation Opportunity Areas, where broad fish and wildlife conservation goals would best be met. The areas of ecological importance in the Mid-Coast, including the important habitat that exists in each location, are shown in Table 2.

Table 2. Areas of ecological importance.

Location	Important habitat
Alsea Estuary-Alsea River	Overwintering habitat for migrating waterfowl and rearing habitat for coastal salmonids
Beaver Creek	Diverse habitat from beach to old-growth forests
Depoe Bay Area	Productive rocky shore for fish and wildlife use
Devil's Lake	Peat marsh near mouth of Rock Creek, an important coho rearing stream
Salmon River Estuary-Cascade Head	Diverse habitats; includes Cascade Head Scenic Research Area; Habitat for three threatened and endangered species
Siletz Bay	Siletz estuary provides diverse and complex habitat
Siletz River	Sandstone/basalt river system with flashy winter river flow and private forestland
Yachats River Area	Narrow river channel with wide shallow mouth at ocean; steep coastal mountains
Yaquina Bay	Eelgrass beds, intertidal and subtidal shellfish beds, native oyster beds, and nesting eagles and ospreys along estuary

In addition to Conservation Opportunity Areas, ODFW is currently pursuing the development of a system of prioritization for streamflow protection and restoration. The assessment involves classifying stream reaches and watersheds based on current and future instream flows, summer

[14] https://www.americanrivers.org/wp-content/uploads/2020/02/DamsRemoved_1999-2019.pdf

water temperatures, degree of human impact, and species use. The prioritization system is expected to be completed in late 2021 and can be utilized to refine flow restoration and protection actions.

Effects of Land Use Activities on Aquatic Habitat

Human-induced factors, such as habitat degradation, water diversions, and land use practices have contributed to the decline of Coho Salmon as well as other species. Salmon populations in streams with water quantity or water quality limitations, or simplified stream channels, are more sensitive to further habitat degradations that result in additional stress. Factors influencing regional habitat quality and salmon abundance include fluctuating ocean conditions, periodic droughts and floods, land use practices, and landslides. Land management practices can affect the rate at which fine sediments from the landscape are transported via runoff to streams and also can affect the magnitude of peak flows, which may combine to increase turbidity to levels that negatively affect aquatic species and impair water treatment for human consumption. The main effects to aquatic habitats from past land use activities in the Mid-Coast include:

- Reductions in stream complexity (e.g., channel simplification and incision from historically channelizing streams or removing riparian vegetation and large woody debris);
- Impairments or barriers to fish passage;
- Sedimentation (e.g., excess turbidity at periods of peak streamflow);
- Reduced water quality (e.g., warm stream temperatures from lack of riparian vegetation, reduced streamflow, and stream channel simplification); and
- Reduced water quantity or alterations in streamflow (e.g., altered timing and watershed function resulting from land management practices and streamflow withdrawals, both of which affect how water moves through the landscape).

The uncertainty that there is an adequate combination of voluntary and regulatory mechanisms to ensure success is limiting recovery of aquatic habitats. However, habitat and flow restoration projects are occurring throughout the Mid-Coast to improve habitat conditions and reduce further degradation. These projects include adding large woody debris into streams, increasing fish rearing areas off the main channel, supporting gravel substrate used for spawning and deep pools, increasing streamflow during key times of the year for fish species and in the summer to reduce settling of fine sediment inputs, maintaining riparian vegetation for shading (avoiding solar heat gain) and filtering, improving roads to reduce sediment inputs, and encouraging beaver dam formation.

Appendix D provides information on key locations and issues within each of the eight drainage basins in the Mid-Coast region.

Built Infrastructure in the Mid-Coast

Potable (drinking) water, wastewater, and stormwater systems are critical for the health of humans and the economy. Built Systems in the Mid-Coast region was summarized during Step 2 of the planning process. The entire report on water quality can be accessed here.

- The Mid-Coast has 52 potable water providers, 31 of which are required to have certified water treatment plant (WTP) operators. These 52 water providers include cities, water districts, RV and mobile home parks, and state parks.
- Few interconnections exist between water providers.
- Many cities and water districts implement water conservation measures, and nine have developed Water Management and Conservation Plans (WMCPs).
- The Mid-Coast has 14 entities (cities, resorts/hotels, and industries) with National Pollutant Discharge Elimination System (NPDES) permits to discharge treated wastewater.
- Discharge locations are the Pacific Ocean, Yaquina River and Bay, Siletz River and Bay, Schooner Creek, and Lint Slough. The discharge locations on streams are all downstream of potable water intakes.
- Information about wastewater systems and, particularly stormwater systems, is lacking.
- Cities are likely the only water providers managing stormwater systems.
- The Mid-Coast, like much of the rest of the United States, has aging infrastructure and insufficient revenue to address many needed upgrades. Consequently, water systems in the Mid-Coast must be managed for resiliency and recovery.
- Self-supplied water users across the planning area utilize a diverse range of supply, treatment, and distribution systems for handling domestic, agricultural, and industrial uses. Characterizing Self-Supplied infrastructure status and needs in the planning area is difficult because of the diversity of systems. Each of these systems is variably vulnerable to supply or treatment disruption, either through infrastructure failure, lack of maintenance, hydrologic extremes, or natural disasters. Residents and service providers in the region indicate a wide range of water infrastructure challenges for local residents, agriculture, and industry.

Water Uses and Needs in the Mid-Coast

Note: This section is a summary from Step 3 of the planning process. Please refer to Appendix K for ODFW letter re: instream demand.

During Step 3 of the planning process, three working groups learned about current and future water needs and challenges of three categories of water users and uses: instream/ecological water needs, municipal and special district water providers, and self-supplied water users (self-supplied rural residents, agricultural producers, and industries). Agency partners provided presentations, technical memos, and other information to inform the Step 3 proceedings. This section of the document summarizes the information assembled to support Step 3. All materials developed in support of Step 3 can be accessed in an online folder.

Water Law and Water Rights

Under Oregon law, all water belongs to the public. With some exceptions, cities, irrigators, businesses, and other water users must obtain a permit or license from the Water Resources Department to use water from any source—whether it is underground, or from lakes or streams. Generally speaking, landowners with water flowing past, through, or under their property do not automatically have the right to use that water without authorization from the Department.

Oregon's water laws are based on the doctrine of prior appropriation—the first person to obtain a water right on a stream is the last to be shut off in times of low streamflows. In water-short times, the water right holder with the oldest date of priority can demand the water specified in their water right without regard for the needs of junior users. Generally, Oregon law does not provide a preference for one kind of use over another. If there is a conflict between users, the date of priority determines who may use the available water.

You can find more information on Oregon's water laws and water rights in a primer developed and maintained by the Oregon Water Resources Department.

Overview of Instream Water Uses and Needs

Instream water—water left in rivers and in the ground—provides immense value to the Mid-Coast region by supporting natural watershed processes, water quality, habitat and water needs of fish and wildlife, recreational opportunities, navigation, and aquaculture (e.g., oyster hatcheries). Instream water provides cultural, spiritual, and aesthetic values. Instream water is vital to maintaining healthy commercial, recreational, and tribal fisheries, which are socially, culturally, and economically important to the region. Instream resources are of significance to the Confederated Tribes of the Siletz Indians. A public survey conducted by Oregon's Kitchen Table also identified that residents and visitors place a high value on water needed to support Mid-Coast ecosystems.

The Partnership prioritizes the sustainability of healthy ecosystems that support the economy and cultural values of the Mid-Coast region. Supporting healthy freshwater ecosystems provides benefits beyond those important to fish and wildlife. Therefore, an integrated approach to managing water resources must include the flows necessary to protect all these benefits, and consider impaired flows, reduced water quality, and diminished fish and wildlife as early warning signs of potential impacts to public benefits.

Ecological Values and Instream Water Rights

Instream flows are critical for maintaining many ecological functions and supporting aquatic species. Aquatic species evolved in response to the natural variability in stream systems and rely on the full range of flows represented by a natural hydrograph to meet their needs. "Streamflow quantity and timing are critical components of water supply, water quality and the ecological integrity of river systems. Indeed, streamflow, which is strongly correlated with many critical physiochemical characteristics of rivers, such as water temperature, channel geomorphology, and habitat diversity, can be considered a 'master variable' that limits the distribution and abundance of riverine species and regulates the ecological integrity of flowing water systems" (Poff et al., 1997).

NOAA-NMFS's 2016 Final ESA Recovery Plan for Oregon Coast Coho identified reduced streamflows as one of many interrelated factors affecting the health and viability of Oregon Coast Coho, which will likely be exacerbated by climate change. Reduced streamflows also result in increased water temperature, which is a significant limiting factor for fish and wildlife. According to the Recovery Plan, "in freshwater habitats, lower summer flows, higher summer stream temperatures, and increased winter floods, would affect Coho salmon by reducing available summer rearing habitat, increasing potential scour and egg loss in spawning habitat, increasing thermal stress, and increasing predation risk (NMFS, 2016, 3-32)."

Under Oregon water law, rivers, streams, and springs do not have a legal right to their own water. Instream water rights are needed to protect instream values and are subject to the system of prior appropriation. This means that, similar to all water rights, they are subject to curtailment to meet senior out-of-stream water rights. Allocations for instream water cannot take away or impair any legally established water right having an earlier priority date.

In Oregon, three agencies (the Oregon Department of Fish and Wildlife, Department of Environmental Quality, and Oregon Parks and Recreation Department) are legally allowed to apply for instream water rights that are then held by the Oregon Water Resources Department in trust to support public uses such as recreation, pollution abatement, navigation, and maintenance and enhancement of fish and wildlife and their habitats.

There are 110 instream water rights in the Mid-Coast planning area covering XX percent of river miles in the planning area, or approximately XXX of XXX miles. The instream water rights have priority dates in 1966, 1974, 1976, 1983, 1991, 1992, and 2018. There are XXX river miles without instream water rights, which includes most, if not all, of the ocean tributaries. You can explore

the instream water rights by sub-area in the Mid-Coast StoryMap (under "Is There Enough Water For All?").

The amount of water specified in instream water rights varies by month and by reach. Many of the earlier instream water rights were minimum perennial streamflows that were converted to instream rights by the Oregon Water Resources Department. All of the other instream water rights were filed by the Department of Fish and Wildlife to support fish and wildlife and their habitats. No instream rights have been filed to support pollution abatement, recreation, or navigation.

The natural flow of rivers has been altered through time through diversions for out-of-stream uses, climate, groundwater pumping, infrastructure, land development, and various management practices. Water diverted from streams for municipal, agricultural, industrial, and domestic uses reduces the water available instream for fish and wildlife and other instream values. This is most evident in areas with significant out-of-stream water use relative to natural streamflows. According to the 2001 Mid-Coast Watersheds Council Sixth Field Watershed Assessment (Garono and Brophy, 2001, 14), "stream flow restoration is a high priority for 6th field watersheds in the Schooner/Drift Creek sub basin, and in the lower Yachats basin."

In the Siletz River watershed, there are multiple out-of-basin diversions that divert water from the Siletz River to other basins. It is an increasingly common occurrence for Siletz River flows to dip below the instream water right, triggering curtailment of junior users. Some of the largest water users, including the City of Newport, City of Toledo, and Georgia Pacific have rights that are senior to the instream water right, which may limit the effectiveness of the instream water right.

The Partnership recognizes that current instream water rights neither fully represent nor protect ecological values or other instream values, and there is a need to develop a more comprehensive understanding and approach to protecting and restoring these values, especially in light of climate change impacts. When water is not legally protected instream in important reaches and flow targets are not established using ecologically based methods, there are many possible consequences to streams, including:

- Water may be allocated to out-of-stream uses, leaving limited water instream during times of water shortage.
- Flow targets established by instream water rights inadequately capture the full range of flows needed to protect current instream ecosystems, especially for flows during winter months.
- Without ecologically based flow targets, it is difficult for collaborative efforts to act in the interest of the stream.

Current and Future Instream Water Needs for Fish and Wildlife

All aquatic species have water needs related to the timing, amount, and quality of water that provide habitat and support different life stages. In the Step 3 discussions, the Partnership

requested assistance from ODFW in performing a preliminary analysis of instream needs. The analysis included a summary of existing instream water rights in the Mid-Coast Planning Area, along with an analysis of how often existing instream water rights are likely to be met. However, additional data was needed for a more complete understanding of instream needs. Using instream water rights as a proxy for instream need has limitations because they do not represent the actual water needed by aquatic species, or the full range of ecological flows, and do not consider the important relationship between flows and water temperatures needed to sustain healthy fisheries.

The Partnership recognizes the value of instream flows and is committed to acquiring information to fill data gaps identified in Step 3, including a more comprehensive understanding or ecological water needs. That information can be used to plan, implement, and monitor projects in high-priority areas as advised by ODFW and other agencies with instream values. The Partnership is interested in taking an ecosystem-based approach to increasing water supply, meeting the needs of fish and wildlife, and improving water quality for all users.

Critical Issues

The working group that examined instream and ecological water needs identified the following key issues for strategy development:

- The need to develop a more comprehensive understanding of instream needs that considers the full range of ecological flows, with the intent of establishing more legal protections and developing flow targets to guide restoration efforts;
- The need to restore and protect riparian vegetation that shades streams and provides other ecological benefits;
- The need to restore and protect beavers and their habitat to support reestablishment of natural processes in watersheds;
- The need to address water quality impairments that negatively impact instream values, with a focus on addressing elevated water temperature and low dissolved oxygen levels associated with low flows and high turbidity associated with high flows;
- The need to promote and encourage management activities on public and private lands that provide multiple ecological benefits;
- The need to prepare for and mitigate the impacts of climate change on streamflows, water temperature, and other ecological functions;
- The need to improve streamflow monitoring efforts to track streamflow conditions and protect instream water rights and instream values.

The working group identified the need to limit future out-of-stream allocations on rivers and stream with high ecological values and where out-of-stream uses are significant, partner with those users to reduce out-of-stream uses and restore streamflows to protect aquatic species and ecological functions.

Overview Out-of-Stream Water Uses and Needs

Table 3 provides an overview of the out-of-stream water uses in the Mid-Coast planning area.

Table 2. Estimated quantity of use by type of use for Lincoln County based on the 2015 water use estimates produced by the US Geological Survey in gallons per day.

Type of Use	Estimated Amount Diverted (gpd)	Percent of Water Diverted
Self-Supplied Industrial	10,960,000	34%
Self-Supplied Aquaculture	9,390,000	29%
Public Supplied Domestic	6,010,000	19%
Public Supplied Industrial	2,640,000	8%
Self-Supplied Agriculture	2,010,000	6%
Self-Supplied Domestic	790,000	3%
Self-Supplied Golf Courses	200,000	<1%
Self-Supplied Mining	40,000	<1%
Self-Supplied Livestock	40,000	<1%
Total	**31,810,000**	

Self-supplied industrial water use represents 34% of water use in the planning area, which is the largest water use category. The Georgia Pacific pulp mill in Toledo represents the single largest water use in the planning area. During the winter, this water is provided from Olalla Creek and Olalla Reservoir. During the summer months when streamflow in Olalla Creek is low, water for the mill is provided from the Siletz River and Olalla Reservoir. In addition to providing water to the mill, Olalla Reservoir, which is managed and maintained by Georgia Pacific, is an important recreational site in the Mid-Coast. Water diverted from Olalla Creek and the Siletz River are discharged to the Pacific Ocean and are not returned to the system for instream or out-of-stream uses.

Water for hatcheries represents 29% of water use in the planning area, which is the second largest use category. Although hatcheries divert a significant amount of water, this water use is considered to be non-consumptive because diverted water is assumed to be returned to the system without being depleted. The Oregon Department of Fish and Wildlife maintains two hatcheries, one in the Salmon River sub-area and one in the Alsea River sub-area. The Confederated Tribes of the Siletz maintains a hatchery on in the Siletz River sub-area.

Public supplied water represents 27% of water use in the planning area. A total of 19% of the water is used for domestic purposes and 8% is used for industrial purposes. The three largest municipal community water systems are the City of Newport, City of Toledo, and the City of Lincoln City. The City of Newport has the largest public supplied industrial water use, primarily for fish processing plants. The three largest non-municipal community water systems are Kernville-Gleneden-Lincoln Beach Water District, Seal Rock Water District, and Southwest Lincoln County PUD.

Self-supplied agricultural use represents a relatively small amount of water use in the Mid-Coast region (6%) as well as self-supplied domestic use (3%).

Water use for all water user groups increases during the summer months due to increased industrial production as well as increased demand from tourists.

The distribution of water uses varies considerably among sub-areas. You can explore the major water uses in each sub-area in the Mid-Coast Storymap (under "Is There Enough Water for All") or via an interactive online graphic.

All of the largest water users—Georgia Pacific, City of Newport, and City of Toledo—rely on water from the Siletz River during the summer months and discharge water to the ocean, thus the water is not available for other instream and out-of-stream users downstream. The water rights for each of these users is senior to the instream water right on the Siletz River, though Georgia Pacific agrees to cease pumping when flows reach 75 cfs at the above stream gage. The instream water right on the Siletz River at the gage is 100 cfs and flows are increasingly dipping below the instream water right. Each of these water users draws water from a different source during the winter months and has a reservoir to help meet its water needs. View this interactive online graphic to see the competing demands on the Siletz River.

Overview of Water Uses, Needs, and Challenges of Community Water Systems

There are seven municipal community water systems serving an estimated 16,188 connections and an estimated population of 40,313. There are 22 non-municipal community water systems serving 7,901 connections and an estimated population of 17,407.

Governmental organizations, including municipal water systems and public non-municipal water systems, are required to measure and report monthly water use to the Oregon Water Resources Department on an annual basis. The water use reported by these entities is represented in Figures 8 and 9. As shown in these graphics, water use generally increases in the summer months in response to increased industrial production as well as increased use by residents and visitors. Private or cooperatively owned non-municipal community water systems are not required to measure and report their water use to the state, therefore their actual water use is not known for purposes of this planning effort.

Municipal and large non-municipal community water systems customarily develop estimates of current water use and projected future demands as a part of their water planning efforts. These estimates may be contained in Water Management Conservation Plans, Water System Master Plans, or other planning documents. Smaller non-municipal water systems (e.g., smaller water districts and water corporations) may not develop and maintain estimates of current water use or future demand projections.

The only water system currently reporting insufficient supply to meet demand is the City of Yachats. Most other water providers report having sufficient water rights to meet 20-year demands. Some community water systems indicate that demands beyond the 20-year planning

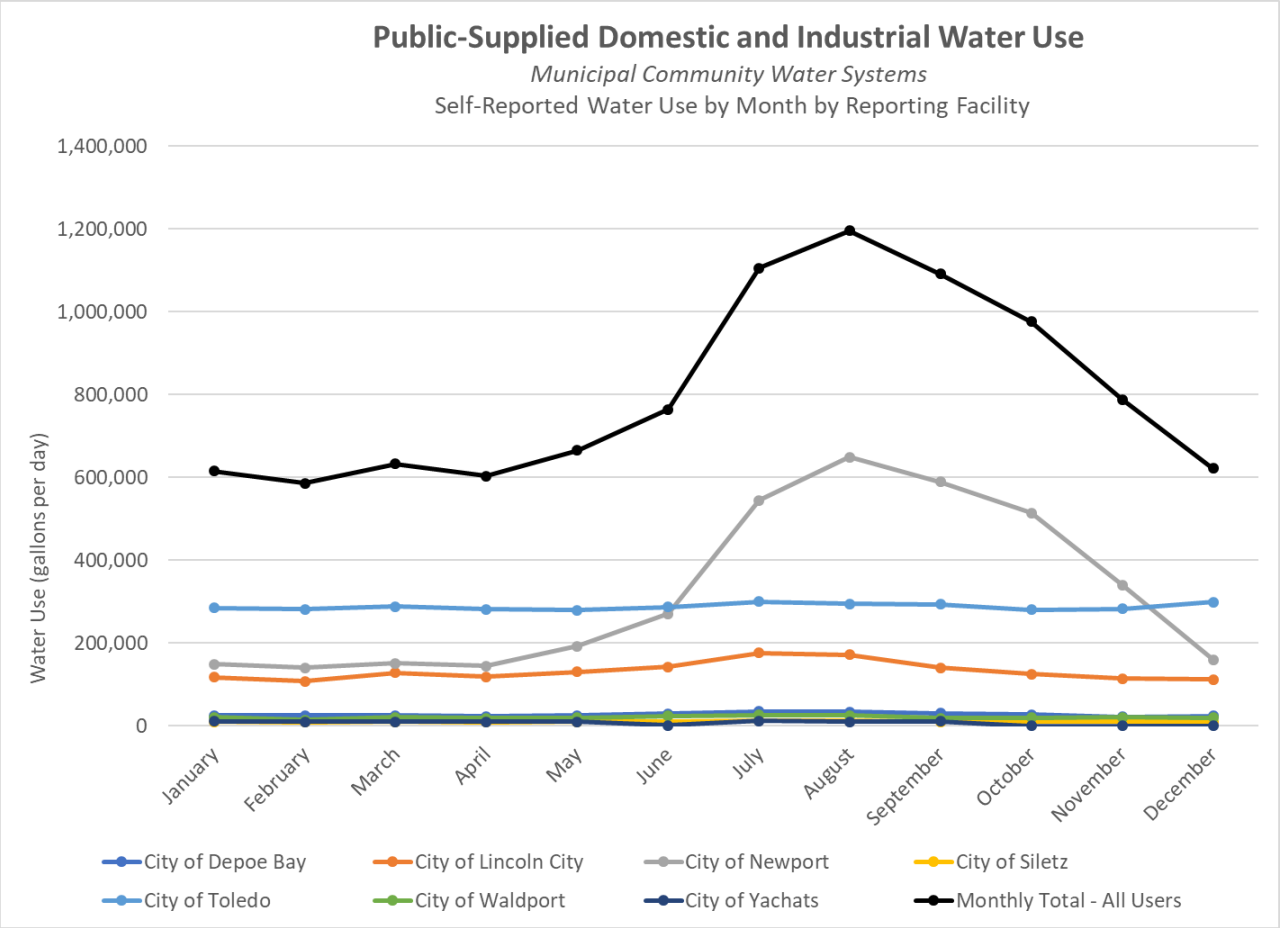

Figure 8. Monthly diverted water used by municipal community water systems in the Mid-Coast.

horizon may not be met with current water rights and there is a need to think about and plan for long-term water supply solutions beyond existing water rights and sources.

Two regional supply and demand projections have been completed, though the projections vary considerably from each other and differ from projected future use reported in Water Management Conservation Plans. The demands from these older reports are nearly two to four times what is reported in the Water Management Conservation Plans and may not represent accurate projections of future water needs in the region.

There is a need to develop an updated defensible projected future demand for community water systems in the region, along with an assessment of their ability to meet those demands with current sources and potential future deficits. The analysis should account for the potential for reductions in water supply resulting from climate change impacts. Understanding projected future supplies, demands, and deficits will help community water systems determine actions to meet water needs for their individual service areas as well as the region as a whole.

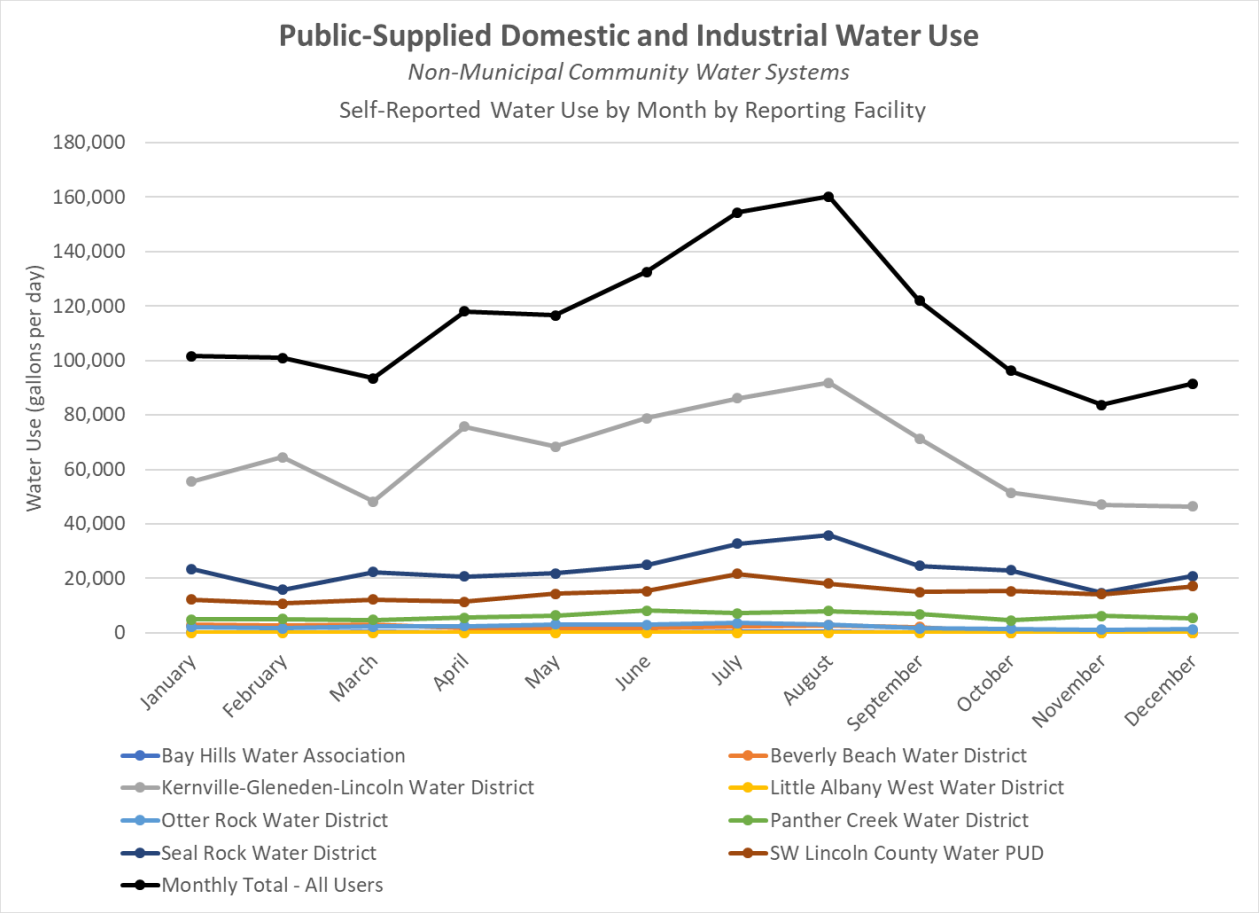

Figure 9. Monthly diverted water used by non-municipal community water systems in the Mid-Coast.

Small community water systems lack the capacity to engage in lengthy planning processes. As a result, the specific needs and challenges of these water users is not sufficiently captured in this plan. Lincoln County did an assessment of the water needs of small community water systems in 1997. It would be beneficial to update this assessment and identify the specific needs of these small, but important water users.

Critical Issues

The working group that examined the water needs and challenges of municipal and non-municipal community water systems identified the following key issues for strategy development:

- The need for increased access to funding to address current and legacy infrastructure issues and invest in resilient infrastructure that can withstand natural hazards and help communities adapt to climate change impacts;
- The need to coordinate conservation efforts between community water systems;

- The need to develop water supply redundancies and interconnections that would allow communities to access quality water in case of emergencies or shortages;
- The need to sustain efforts that increase coordination and collaboration between community water systems;
- The need to better understand and address the water needs and challenges of small community water systems that were not able to participate in planning;
- The need to address current and potential future water shortages by implementing water conservation measures and exploring future water supply options;
- The need to address water quality limitations posed by low streamflows in the summer and high turbidity in the winter;
- The need to improve coordination on shared water systems like the Siletz River in order to minimize ecological impacts.

Overview of Water Uses, Needs, and Challenges of Self-Supplied Water Uses

Rural Residents

A significant number of people in Lincoln County supply their own water for use in and around their home. It is estimated that 13,075 people, or about 30% of the population in Lincoln County, supply their own water from groundwater, springs, or streams. This is a very important water use for the region, even though the estimated water use is relatively small when compared to other uses.

It is difficult to estimate current water use and future water needs of rural residents. See Table 4 for a breakdown of wells and water rights by sub-area as well as estimated water use. Based on this information, rural domestic water users are distributed throughout Lincoln County. The majority of self-supplied domestic water users are concentrated in the Alsea and Yaquina River Basins.

Table 4. Estimated self-supplied rural domestic water users and demand by sub-area.

Sub-Area	Estimated Water Rights	Estimated Wells	Estimated Population Served	Estimated Use (gpd) based on 76-145 per capita per day	Estimated Consumptive Use (gpd)
Salmon River	78	548	1,402	106,552–203,290	21,310–40,658
Siletz Bay – Ocean Tribs	46	511	1,248	94,848–180,960	18,970–36,192
Siletz River	129	532	1,480	112,480–214,600	22,496–42,920
Depoe Bay – Ocean Tribs	55	552	1,360	103,360–197,200	20,672–39,440
Yaquina River	143	1,754	4,249	322,924–616,105	64,585–123,221
Beaver Creek – Ocean Tribs	37	224	585	44,460–84,825	8,892–16,965
Alsea River	178	892	2,397	182,172–347,565	36,434–69,513
Yachats River – Ocean Tribs	37	121	354	26,904–51,330	5,380–10,266
Total	**703**	**5,134**	**13,075**	**993,700–1,895,875**	**198,740–379,175**

Rural residents that supply their own water for domestic use are responsible for testing their water to ensure it is safe for drinking. Anecdotal reports from residents and survey results from Oregon's Kitchen Table survey indicate that there is considerable concern about the drinking water quality for those who obtain their domestic water from streams, springs, and wells. There is generally insufficient data to determine the quality of source water for self-supplied users.

Water use of rural residents responsible for supplying their own water was estimated for this report, but is not well known. The current water use and water security of self-supplied rural residents is not well understood and should be further assessed. Anecdotal reports from pump installers, well drillers, the watermaster, and rural residents indicate that late in the dry season, rural residents experience declining water quantity from their springs or wells, especially during drought years. Water providers report increasing demands for bulk water from rural residents, and have begun to track demands.

As the population in Lincoln County increases, especially from people seeking refuge from hotter climates, there may be increased pressure on water resources in unincorporated areas.

The potential for increased development in unincorporated areas that are not served by community water systems is not well known. Proactively identifying the potential impact of increased development on localized streams, springs, and groundwater would be beneficial.

Irrigated Agriculture

The 2017 US Department of Agriculture estimates 2,818 actively harvested cropland acres, and 441 irrigated acres. The Oregon Water Resources Department reports that 6,141 acres have irrigation water rights. Estimates of water use for irrigated agriculture vary significantly, and there is not a standardized approach to estimate water use (Table 5).

It is expected that irrigators in the Mid-Coast region have had much of their crop needs met by precipitation. As the dry season extends in length and as temperatures increase, more landowners in the Mid-Coast may rely on irrigation to meet their crop water needs. Farmers who are junior to instream water rights may also have an increasingly difficult time meeting their water needs. The future needs and vulnerabilities of irrigators are not well understood in this region.

Current irrigation water use is not well understood in the Mid-Coast, and estimates vary greatly. Because of the limited data, it is difficult to know how water use trends are changing over time. Satellite-based monitoring of evapotranspiration using tools such as OpenET may be able to help fill this data gap, though data may be limited due to a limited number of clear, cloudless days on the coast.

Few farmers and landowners were involved in the planning effort. Effort should be made to better understand how the water needs of farmers are changing over time.

Table 5. Estimated irrigation water users and amount of water use by sub-area.				
Sub-Area	**Estimated Number of Water Rights (Irrigation/Livestock)**	**Estimated Irrigated Acres**	**Estimated Irrigation Diversions[15] (gpd)**	**Estimated Consumptive Use[16] (gpd)**
Salmon River	45 (40/5)	156	348,170 gpd	174,085 gpd
Siletz Bay – Ocean Tribs	23 (18/5)	359	801,683 gpd	400,841 gpd
Siletz River	94 (76/18)	1,187	2,649,659 gpd	1,324,830 gpd
Depoe Bay – Ocean Tribs	11 (11/0)	52	116,057 gpd	58,028 gpd
Yaquina River	87 (77/10)	1,177	2,627,341 gpd	1,313,224 gpd
Beaver Creek – Ocean Tribs	14 (14/0)	82	183,012 gpd	91,953 gpd
Alsea River	176 (159/17)	2,964	6,615,221 gpd	3,307,610 gpd
Yachats River – Ocean Tribs	26 (24/2)	164	366,024 gpd	183,012 gpd
Total	**703**	**6,141**	**13,705,380 gpd**	**6,852,690 gpd**

Industry

There are very few self-supplied industrial water users throughout the planning area and self-supplied industrial water use generally accounts for a small amount of the authorized water use in most of the sub-areas. The major exception to this is Georgia Pacific's pulp mill in Toledo, which has the largest authorized withdrawals in the entire planning area (totaling 35 cfs).

The projected future needs or demands of self-supplied industrial users has not been estimated. The largest industrial water users (both self-supplied and public-supplied industrial water use) in the planning region represent a significant source of jobs and economic development. Most industrial water use in the region relies on flows in the Siletz River as well as storage (Olalla Reservoir and Big Creek Reservoirs). Drought conditions in 2015, 2018, and 2021 have likely revealed water insecurities for self-supplied industrial users. A 1997 study of Newport's water supply and the potential for future regionalization of water supplies noted that "Georgia Pacific's water supply is generally adequate to meet the needs of the mill at its present capacity to produce paper. However, to avoid shutting down in past water short years the mill had to practice water conservation measures that are detrimental to equipment and are economically acceptable for short period. A study was made in 1990 to investigate alternatives for increasing their water supply. The study concluded that a 10 foot, 420,000,000 gallon addition to Olalla Dam would be the preferred alternative to expand their supply" (Fuller and Morris, 1997).

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[15] The per acre duty is derived from the OWRD WRIS database that shows the general maximum allowed duty for irrigation water rights is generally 2.5-acre feet per year per acre. Estimated diversions are derived by multiplying acres by a 2.5-acre foot per year per acre duty.

[16] The Oregon Water Resources Department Water Availability Reporting System estimates that 50% of irrigation water use is consumed.

Industrial water users did not participate in the planning effort and their specific needs and vulnerabilities are not known. Effort should be made to better understand their water use, their projected future needs, and vulnerabilities and find ways to support them in efforts to increase their water security and increase efficiency in their operations.

Critical Issues

The working group that examined the water needs and challenges of self-supplied water users identified the following critical issues for strategy development:

- The need to better understand the status of water infrastructure used by self-supplied water resources as well as provide resources to upgrade and maintain this infrastructure;
- The need to better understand water quality and ensure safe drinking water for self-supplied rural residents;
- The need to better track water shortages faced by all self-supplied water users and increase water security;
- The need to connect self-supplied water users with information to increase water conservation and efficiency in and around the home and on the farm;
- The need to assess opportunities for water conservation and efficiency and water security for self-supplied industrial water users.

Water Availability

The Water Availability Reporting System maintained by the Oregon Water Resources Department illustrates that there is limited water available for new out-of-stream appropriations, primarily in the summer months. Areas where some water may be available generally encompass ocean tributaries, or streams lower in river drainages. These systems generally have very limited summertime flows and may also be tidally influenced, which could prevent them from being used for most out-of-stream uses. Ocean tributaries also generally do not have instream water rights protecting instream values. The ecological value of ocean tributaries should be considered in any future allocation decisions.

Generally speaking, water is over appropriated, fully appropriated, or nearing full appropriation for instream and out-of-stream uses during the summer months, especially as conditions become drier and warmer during the late spring, summer, and early fall resulting in more limited supplies. The status of allocation can be viewed in the Mid-Coast Storymap (under "Is There Enough Water For All?"). Generally speaking, additional water is not available to meet new out-of-stream needs and new uses will need to be met via water rights transfers, water conservation, water reuse, storage, or other water supply strategies.

The Water Availability Reporting system is based on a period of record from 1958 to 1987.[17] Because three of the most significant drought years occurred in the past decade, the period of record for the Water Availability Reporting System may not accurately represent current streamflow conditions and may overestimate water supply and availability. There is a need to update the period of record to get a better understanding of water use and availability relative to available supply.

[17] For more information on how the Water Availability Reporting System was developed, see: https://www.oregon.gov/owrd/WRDPublications1/DeterminingSurfaceWaterAvailabilityInOregon.pdf.

Climate Vulnerability in the Mid-Coast

The Oregon Climate Change Research Institute (2019) produced a report describing future climate conditions for the Mid-Coast relative to temperature, precipitation, snowpack, floods, droughts, wildfire, sea level, and coastal ocean conditions. Future projected conditions were based on at least 10 global climate models and numerous scenarios of global greenhouse gas emissions, and were made locally relevant by combining the outputs from the global models to historical observations, achieving a resolution of 2.5 miles x 2.5 miles on the landscape. Projections were made for mid-21st century, the 2050s, late 21st century, and the 2080s.

The report authors considered both lower and higher emissions scenarios based on available data and published literature. Lower emissions scenarios represent modest efforts to reduce global greenhouse gas emissions by mid-21st century whereas the higher emissions scenarios represent "business-as-usual" practices, i.e., greenhouse gas emissions continuing to increase through the 21st century (Oregon Climate Change Research Institute 2019).

The following are a few highlights (Figure 10) from that report that describe the likelihood of projected changes in environmental parameters important to the Mid-Coast region.[18]

Climate change will exacerbate challenges that the Mid-Coast region already experiences. As a result of these changes, the Mid-Coast region needs to prepare for the following climate change impacts:

- Decreasing summertime streamflows and increased frequency of drought conditions will impact fish and wildlife, recreational opportunities, and the ability for cities and industry to meet their summertime water needs (which is generally when demand is highest).
- Increasing drinking water insecurity for community water systems and rural residents who draw water from streams, groundwater, and springs, as water supplies decrease with a hotter and longer dry season.
- Increasing stressors on fish and wildlife as they adapt to a changing hydrograph (more water in the winter and less water in the summer), elevated water temperatures and decreasing water quality conditions linked to low streamflows and elevated temperatures.
- Increasing impacts of extreme storms and flooding on community infrastructure.
- Increasing turbidity of drinking water during the winter months due to increased storms and erosion caused by higher precipitation events.
- Increasing potential for wildfire to affect water quality and water infrastructure.
- Increasing reliance on irrigation water to grow crops since crop water needs are less likely to be met by precipitation.

[18] Note: Not all model runs resulted in the projected changes shown in the graphic; there were differences in model outputs for these parameters. However, this graphic illustrates likely Mid-Coast trends.

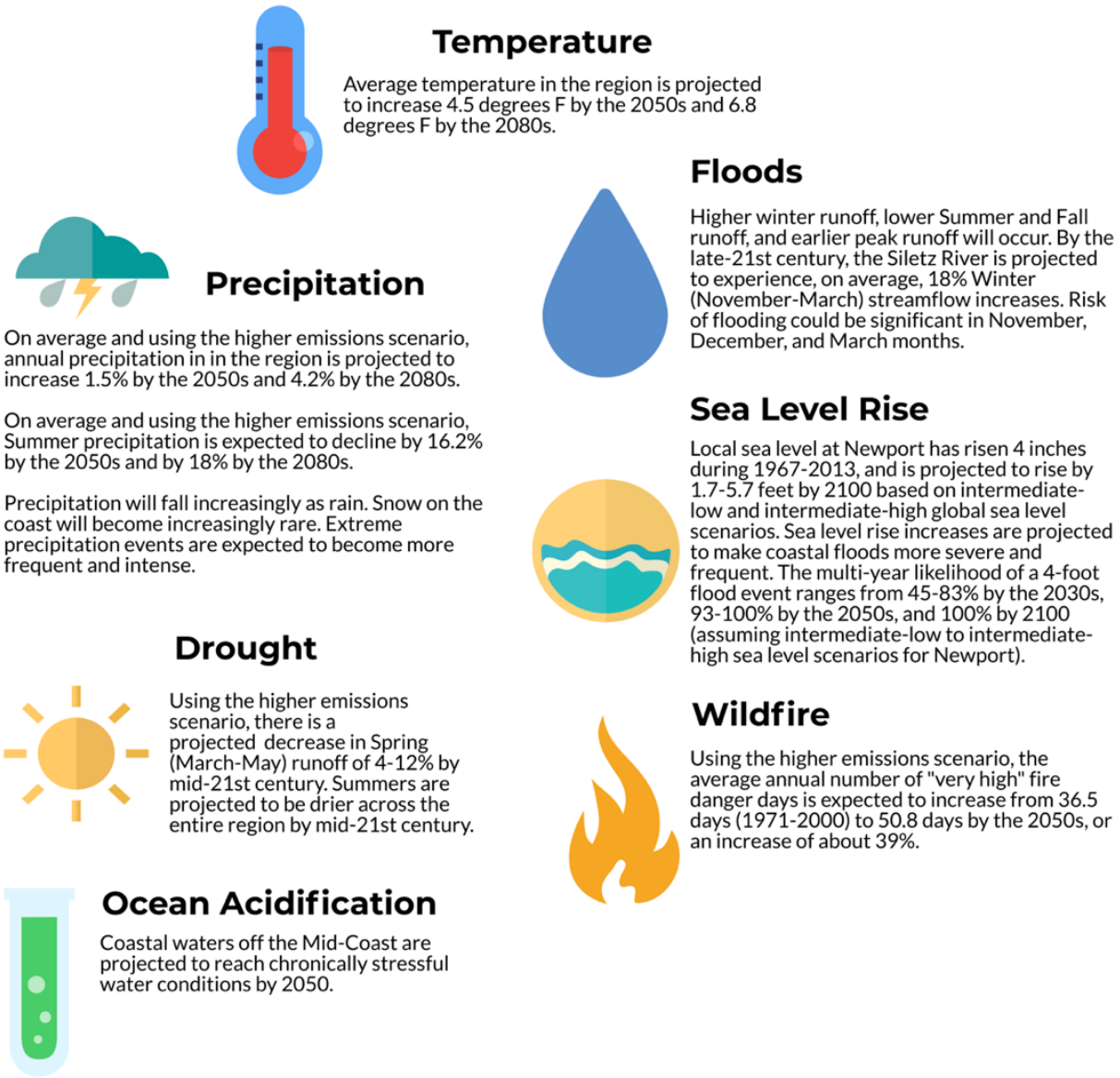

Figure 10. Projected changes in environmental parameters important to the Mid-Coast region.

Action Plan

Action Plan Development

The development of the action plan was guided by key water issues and drivers.

Critical Water Issues

During Step 3 of the planning process, the Partnership achieved consensus on a total of 18 key issues in eight categories:

Water Conservation

- The Mid-Coast needs a coordinated water conservation initiative/strategy that focuses on reducing water use, educating stakeholders, promoting incentives, and effectively using limited water supplies, especially in times of water shortage.
- Rural residents and businesses need improved access to information, incentives, funding, and resources to help them implement water conservation measures.

Natural Hazards, Vulnerabilities, and Emergency Preparedness

- The majority of water providers need redundancy, water system interconnections, and alternative sources to ensure access to safe drinking water in case of emergencies or shortages. Natural hazards that can impact systems include earthquakes, wildfire, landslides, debris flows, and others.

Climate Change Impacts

- Climate change is having profound impacts on the ecosystem, which affects the health and well-being of coastal communities. Although we may not fully understand nor be able to accurately predict climate change effects, we can and should proactively adapt to climate change impacts at a regional scale.

Local Capacity and Regional Collaboration

- Mid-Coast water providers share the need for system resilience and reliable source water quantity and quality. Regular coordination and collaboration among water providers can improve access to resources and funding to support this need.

Water Quantity for Instream and Out-of-Stream Uses

- Summer streamflows are insufficient in some areas of the Mid-Coast (see Water Quantity report from Step 2 of the planning process – Appendix B) to meet the instream water needs of fish and wildlife. Low streamflows contribute to water quality impairments (e.g., high temperatures and reduced dissolved oxygen) that negatively affect fish and wildlife.

- Many streams in the Mid-Coast lack: 1) legal protections (e.g., instream water rights) to protect streamflows for the full range of ecological flows, and 2) streamflow targets to guide instream flow restoration efforts where there are already significant out-of-stream uses.
- Some municipal and special district water providers are currently facing water shortages late in the summer into the fall and during dry years.
- Rural residents and landowners, agricultural irrigators, and industrial water users currently experience chronic seasonal water scarcity due to limited water availability.
- Some watershed systems, such as the Siletz, have insufficient water to meet the needs of all uses (both instream and out-of-stream) (see Water Quantity Report from Step 2 of the planning process – Appendix B) leading to ecological impacts on the rivers, insecurity for water users, and the potential for conflict.

Watershed Health

- Opportunities exist in the Mid-Coast for enhancing beaver habitat and management to increase water storage, improve stream health, and support the recovery of key native fish species.
- Degraded riparian areas throughout the Mid-Coast negatively affect water quality, wildlife habitat, and overall watershed health. Opportunities exist to improve these areas.

Water Quality for Instream and Out-of-Stream Uses

- Multiple river and stream segments consistently do not meet Oregon and federal water quality standards (see Water Quality report from Step 2 of the planning process – Appendix B): high temperature and low dissolved oxygen threaten fish, and elevated turbidity affects the ability to treat and use water.
- Low stream flow and high temperatures in the summer months, and high turbidity due to winter storms, pose challenges for drinking water suppliers to meet state and federal regulations to provide safe drinking water. In addition, these conditions pose challenges for native fish populations.
- Self-supplied rural residents are increasingly concerned about drinking water quality and seek adequate and timely data to assess regional, local, or site-specific water quality contamination issues that may pose a health risk.

Infrastructure

- The degradation of aging public water infrastructure used to divert, store, treat, and convey water can lead to water loss and water quality issues, and poses a threat to the health and safety of communities.
- Infrastructure to manage water for self-supplied uses (rural residences and agricultural operations) is oftentimes undocumented, old, inefficient, and may fail to meet current construction and quality standards, which negatively affects water security and source water quality throughout the region.

- Multiple sources of funding are needed to address current and legacy infrastructure issues and to design and build resilient infrastructure that can withstand natural hazards and help communities adapt to climate change.

Overview of the Strategic Action Imperatives

Action-oriented imperatives were created to organize and synthesize the key watershed strategies stakeholders described during the planning process to address the key issues. In addition, cross-cutting imperatives are essential to the success of each of the action-oriented imperatives — **Regional Capacity, Coordination, and Collaboration**, **Public Awareness and Support**, and **Monitoring and Data Sharing, and Funding and Investments.**

Cross-Cutting Imperatives

Regional Capacity, Coordination, and Collaboration. All strategies and actions will benefit from increased regional capacity, coordination, and collaboration. Each strategy and action will also have specific needs regarding capacity, coordination, and collaboration.

Public Awareness and Support. All strategies and actions will benefit from an improved understanding throughout the region about water conditions and challenges, with communication and outreach tailored to the interests and values of different audiences. All strategies/actions will also need various levels of public awareness and support, especially where the success of the action is contingent upon public support. A well-informed and engaged public will be more connected to water providers, water and watershed managers, and each other and will be better prepared for a changing climate, natural hazards, and other emergencies.

Monitoring and Data Sharing. All strategies and actions will benefit from improved monitoring, data collection and sharing. Specific strategies and actions will benefit from more specific data collection and monitoring efforts to track progress and impacts. The scale of data collection and monitoring efforts will be informed by the desired goal. Data collection and monitoring efforts will generally benefit from increased Capacity, and improved coordination and collaboration. Implementation of the Water Action Plan will generally benefit from increased transparency and accessibility of data for all partners. Recognizing resource constraints, recommendations to improve and enhance data collection and monitoring will need to be prioritized to focus on the highest needs identified in the plan (finding a balance between tracking status and trends of water-related conditions and monitoring the impacts of actions).

Funding and Investments. All strategies and actions will benefit from increased funding and improved access to funding. Each strategy and action will have specific needs regarding funding. Federal funding in water has decreased over time, leading to historic under-investments in watersheds and water infrastructure, as well as the communities that steward them. There is a patchwork of funding from public and private entities that can be difficult to access and piece together, especially for partners with limited capacity. Furthermore, some issues lack a sustainable source of funding altogether, such as specific data collection and monitoring efforts.

Action Oriented Imperatives

Water Conservation, Efficiency, and Reuse. Due to limited water availability for new out-of-stream uses across the Mid-Coast region as well as the need to restore and protect instream values, water conservation may be one of the most cost-effective ways to meet future water needs of the region while increasing water security and resiliency for all users. All conservation and reuse actions will assist with preparing for and adapting to reduced summer supplies resulting from climate change and increasing summer demand due to population and tourism and industrial water needs. All conservation and reuse actions are assumed to help with water quality issues associated with run-off/discharge. All conservation and reuse actions will help stretch limited supplies which may prevent or prolong the need to secure/develop additional supplies of water. Conservation and reuse actions should seek to target the biggest water users first and/or water users in the most ecologically significant places. There are three major strategies for achieving water conservation and efficiency:

- Maintaining and upgrading infrastructure to prevent leaks, rapidly identify and address leaks, and/or maximize efficient use of water.
- Training water technicians, managers, and water users to improve and optimize operations in their water systems so that no water diverted is wasted.
- Reducing demands and consumption of the end users/consumers via incentives, pricing of water, and encouraging the use of more efficient appliances and practices (e.g., xeriscaping, installing low flow toilets).

All water conservation, efficiency, and reuse actions should consider equitable access to water for disadvantaged community members (including considerations of the cost of water), near-term and long-term water security for the users, and how water savings will provide instream or ecological benefits.

Ecosystem Protection and Enhancement. Watershed ecological processes are complex and interconnected. Investments in ecological restoration and protection can have benefits for multiple other imperatives, including source water protection (drinking water quality), resilient infrastructure, water supply and storage, and preparing for natural hazards and emergencies. These functions, or benefits, are referred to as "ecosystem services." Whenever possible, watershed ecological restoration and protection should be focused on the areas that have the highest potential to yield ecological benefits and are identified in existing assessments or plans, such as the Coho Recovery Plan or Coho Business Plan. Creative partnerships that link downstream beneficiaries (e.g., cities, residents, businesses) to the benefits of a healthy watershed should be explored, including consideration of creative funding mechanisms. Ecosystem-based management is critical to the restoration, enhancement, and maintenance of aquatic systems in the Mid-Coast.

Resilient Water Infrastructure. Sustaining and planning for adequate collection and distribution systems, treatment plants, and other associated critical infrastructure requires strategies that address aging infrastructure, support resiliency, ensure future water demands are met, and advance training and professional development to ensure the availability of skilled water technicians. Investments in water

infrastructure should seek to provide multiple benefits whenever possible and mitigate impacts to the ecosystem. Infrastructure design should take into consideration opportunities for conservation, efficiency and reuse and also "green infrastructure" or ecosystem services that reduce the need for, increase the effectiveness of, or prolong the life of built or "grey infrastructure." New or upgraded infrastructure should seek to be as resilient as possible, by accounting for natural hazards and emergencies (e.g., floods, earthquakes, fires, drought, etc.). For now, this imperative focuses on infrastructure associated with individual water providers and users. Depending on analyses performed to explore regional water supply options, this imperative may be modified to account for regional water infrastructure.

Source Water Protection. Source water includes the rivers, streams, lakes, reservoirs, springs, and groundwater that deliver water to public drinking water supplies and private wells. Protecting source water reduces treatment costs, protects water quality for fish, wildlife, and human uses, and helps ensure the availability of water. Strategies to protect source water depend on the source, and include protection of riparian habitats, stream bank stabilization, land protection/easements, best management practices for agricultural, forestry, and other activities, local ordinances to limit activities in source water or wellhead protection areas, emergency response plans, and outreach and education. Source: Environmental Protection Agency[19].

Water Supply Development. Water conservation is the highest priority action for stretching limited water supplies and improving water security, but the Partnership also recognizes the current and future need for additional supplies, which may come from storage, water reuse, or other novel water supply options. The City of Yachats is currently facing water shortages, especially during drought years. There are also increasing reports of current water insecurity for self-supplied water users, which includes water for rural residents, irrigators, livestock, and self-supplied industry. This includes increasing anecdotal reports of wells going dry earlier in the summer and increased demand for bulk water and water deliveries. Georgia Pacific is the largest single water user in the region, and they are beginning to experience shortages, especially during drought years. Within the next 50 years, it is projected that municipalities may experience future water shortages due to decreasing summer supplies and increasing summer demand.

Performance Metrics

Developing performance metrics, or indicators, to assess progress made implementing any plan is critical to success. The first key step in the development of metrics was establishing criteria used to inform the metrics. Relevance to management goals and objectives, sensitivity to stressors, high "signal-to-noise" ratios (i.e., significant changes to an indicator are caused by changes in stressors versus stochastic variability), quantifiability, accuracy, precision, ability to monitor, cost-effectiveness of monitoring, and measurements that can be interpreted unambiguously, are key criteria that have been used to indicate watershed health (City of Portland Bureau of Environmental Services 2019), and are foundational to all of the imperatives and their associated actions in this plan. Because all actions identify potential lead

[19] https://www.epa.gov/sourcewaterprotection/basic-information-about-source-water-protection

organizations, it will be incumbent on those leads to ensure that appropriate performance and tracking metrics are developed and used.

Implementing the Water Action Plan

The next portion of the Mid-Coast Water Planning Partnership Water Action Plan includes implementation tables that describe a suite of actions to achieve the water objectives and priorities in the Mid-Coast region of Oregon in phases during the next 10 years, from 2022–2032. This plan should be reviewed and updated every five years given emerging issues and changes in demographics and other factors likely to occur in the Mid-Coast. The specifics for the implementation table within this plan focus on the highest priority actions that should be initiated within the next 10 years to achieve a secure water future for people and fish and wildlife in the Mid-Coast.

Prioritizing Actions

There is no intended order to the categories of actions, as all of the actions are considered Tier 1, or high priority actions by the Partnership. Tier 2 and Tier 3 actions, which are lower priority actions, were not incorporated into the tables. Charter signatories established criteria to prioritize actions:

- **High (Tier 1)**: A critical action without which the objective(s) is not achievable. An action that absolutely must be completed to fully achieve the objective.
- **Medium (Tier 2)**: A necessary, but deferrable, action that makes the plan/objective less workable, but functional. An action that is necessary, but potentially deferrable.
- **Low (Tier 3)**: A productive action to implement if the resources exist, but the plan/objectives can be achieved without implementing. An action that adds value and would be completed under ideal circumstances, but is not essential to achieve the objective(s).

Initially 150 "raw" draft actions were created by charter signatories to address the 18 key issues. The signatories then volunteered to rank the actions per agreed upon criteria, followed by all partners being given the opportunity to comment on priority rankings. Any redundancies across actions were eliminated, and language associated with each action was refined. The set of tables in this plan represents all of the high priority actions identified by charter signatories.

The strategies listed in the implementation table are a result of a prioritization exercise conducted by charter signatories, which resulted in all Tier 1, or high priority strategies, being included in the table. The Tier 2 and Tier 3 strategies, which were not incorporated, can be reviewed on the Partnership website on the Action Plan page. No additional prioritization occurred during the planning process other than describing the phase (1, 2, or 3) in which a specific strategy could likely be implemented.

It is anticipated that each of the entities involved in the development of this plan and actions can identify the role they may play in implementing one or more of the actions in the table, and that all will continue to work collaboratively to assess progress made implementing the actions.

Water Action Teams (Figure 9) will be formed to maintain communication and coordination around the six action-oriented imperatives. The Partnership will, at a minimum, meet on a quarterly basis to support coordination of work between partners. The Partnership will focus its efforts on increasing regional capacity, coordination, and collaboration, building public awareness and support, increasing funding and access to funding, and improving monitoring and data sharing to more effectively implement each of the six action-oriented imperatives. The Partnership will also strive on an annual or bi-annual basis to convene a Regional Water Summit to track and report progress on plan implementation and celebrate success.

This plan is intended to be used by the many partners, organizations, and individuals that live and work in the Mid-Coast Planning Area to achieve the goals, objectives, and actions described herein. In some instances, a watershed council could use the plan to justify funding for an aquatic habitat restoration project. In other instances, a municipal water district could use the plan to identify high priority infrastructure projects, and seek funding to support a specific action. It is anticipated that many of the actions in each phase of this plan will be implemented simultaneously, as resources and capacity exist.

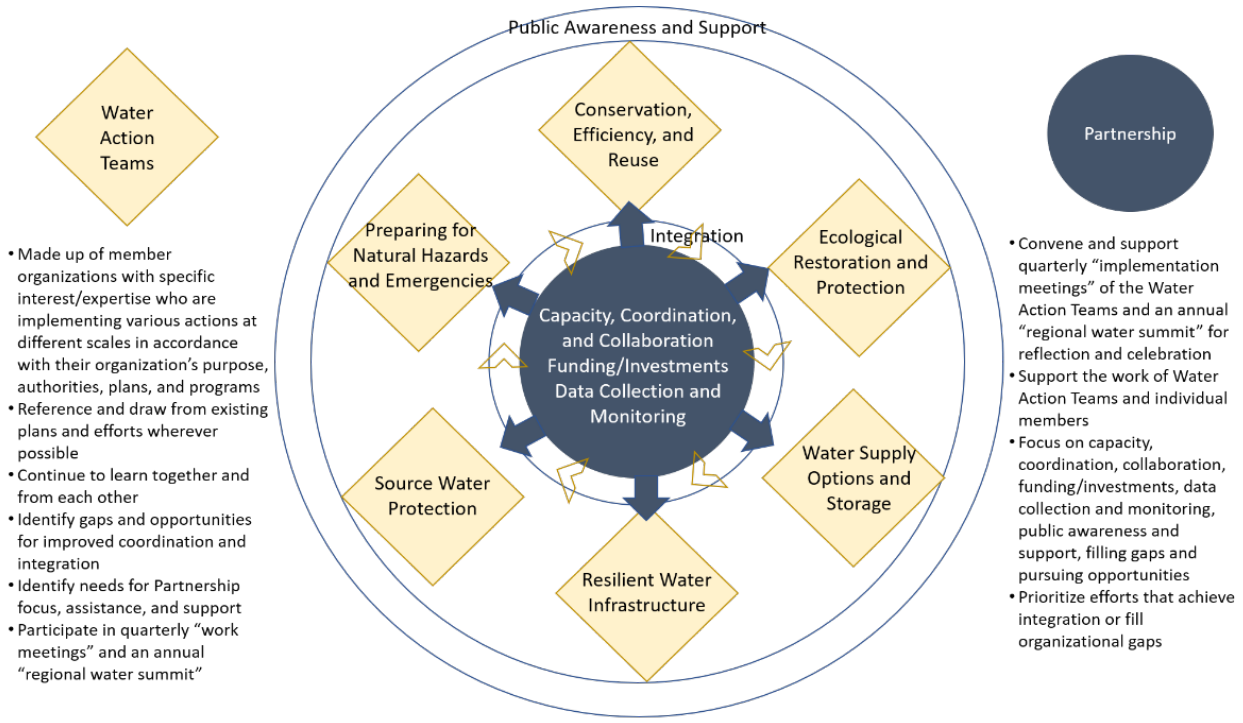

Figure 11. The nexus among water action teams and the Partnership, with the water action teams focusing on the action-oriented imperatives, and the Partnership focusing on the crossing-cutting imperatives.

Anatomy of the Mid-Coast Water Action Plan Implementation Table

Imperatives: Categories that address key water issues in the Mid-Coast region.

Objectives: High-level statements that outline what the Partnership seeks to achieve.

Actions: Specific activities that help achieve objectives.

Desired Outcomes: Specific changes that will occur as a result of implementing an action.

Potential Lead and Participants[20]

> **Potential Lead:** List of potential entities responsible for implementing actions.
> **Potential Participants:** List of potential participants that will collaborate with the leads to implement actions.

Timeline:

- **Phase 1** = Action is expected to begin implementation within1-3 years.
- **Phase 2** = Action is expected to begin implementation within 3-5 years.
- **Phase 3** = Action is expected to begin implementation within 5-10 years.

Budget: Estimated cost to implement the action.[21]

Performance Metrics: How the actions will be measured to track progress and determine if the action has been successfully implemented.

Metric Methodologies: Ways in which the performance metrics can be calculated.

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[20] Potential lead and partners have been identified for most of the actions. The entities listed in the table have not yet confirmed their roles as of the development of this plan. If and when they confirm interest in leading that action, the table will be modified to signal that intent.
Two-year work plans will be developed by the Partnership to highlight specific actions that will be implemented during that time frame.
[21] Budget estimates were based on partner input and reviewing other plans, and should be further validated during implementation.

Imperative 1. Public Awareness and Support

Public awareness of water issues in the Mid-Coast region of Oregon is critical to achieving the long-term goals the region has for delivering water sustainably for people and native fish and wildlife.

Objectives

- Promote tools and information for water conservation.
- Foster a culture of water conservation.
- Build capacity of constituents to advocate for state and federal resources and funding.
- Support training and professional development to ensure the availability of skilled water technicians.

Action Details

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
1.	**Develop and implement a public awareness and engagement campaign aimed at supporting the imperatives and actions in the Mid-Coast Water Action Plan, including raising awareness and understanding of regional water issues. Includes the following:**	Mid-Coast Planning Area residents, industries, and visitors are aware of and practicing water conservation measures. Public and private water suppliers are participating in water management and conservation planning and outreach to communities. There is uniform region-wide messaging about water use and conservation.	**Lead:** Education (all levels), interpretive facilities (Oregon Coast Aquarium, Hatfield Marine Science Center), regional water providers (private and public), Oregon Water Resources Department, Oregon State University Extension Service, Mid-Coast Watershed Council, Lincoln County Soil and Water Conservation District **Participants:** Water use industries, tourism industry, water rights holders	PHASES 1-2	$250,000	▪ Oregon Health Authority Drinking Water Source Protection Grants & Loans.[22] ▪ Oregon Community Foundation's Oregon Natural Resources Education Fund.[23] ▪ Autzen Foundation.[24] ▪ OWEB Partnership Stakeholder Outreach Grant. Georgia-Pacific Environment Grant Program. ▪ U.S. Economic Development Administration (EDA). ▪ EPA's Environmental Education (EE) Grants. ▪ Siletz Tribal Charitable Contribution Fund. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation.
	Conservation: a. Promote water conservation at local events, on the Mid-Coast Water Planning Partnership website and the websites of regional partners and entities, in news articles, in water bills, via social media, and through outreach materials to businesses, particularly in the hospitality industry. b. Develop drought declaration and audience-specific (e.g., self-supplied industrial water users) water conservation and curtailment messages.	a. and b. Consistent messaging throughout the Planning Area associated with drought and water curtailment is developed and distributed.	**Lead:** Mid-Coast water providers (e.g., Mid-Coast Water Conservation Consortium), Lincoln County Board of Commissioners **Participants:** OWRD, regional colleges and universities	PHASE 1	a. $50,000 b. $40,000	a) ▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ U.S. Economic Development Administration (EDA). ▪ EPA's Environmental Education (EE) Grants. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation. b) ▪ OWEB Partnership Stakeholder Outreach Grant. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ U.S. Economic Development Administration (EDA).

[22] (Eligible projects include but are not limited to outreach/education, monitoring efforts (outside of what is required by the state), restoration design and implementation, groundwater risk assessments. Publicly and privately-owned community and nonprofit non-community water systems are eligible to apply for DWSPF funding.

[23] Invites proposals from high school organizations providing natural resources education. Funding is available for natural resource related tools, equipment, technology, and other educational resources.

[24] Grants are awarded to smaller non-profit organizations; most often to groups with social service, arts, and culture, educational, environmental and/or youth-centered missions.

Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
Regional Collaboration: c. Coordinate watershed and water system tours to increase awareness and understanding of regional and local water issues.	c. Increased understanding of regional and local water issues.	**Lead:** Mid-Coast Water Planning Partnership	PHASES 1-3	$100,000	▪ Meyer Memorial Trust Grant. ▪ OWEB Partnership Stakeholder Outreach Grant. ▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ National Communication Association Advancing the Discipline Grants. ▪ EPA's Environmental Education (EE) Grants. ▪ NFWF Five Star and Urban Waters Restoration Grant Program (Watershed only). ▪ U.S. Department of Housing and Urban Development Sustainable Communities Regional Planning Grant. ▪ Gray Family Foundation Environmental Education Grant. ▪ Siletz Tribal Charitable Contribution Fund. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation. ▪ Oregon Health Authority Source Water Protection Grants
Infrastructure: d. Develop a regional initiative/training to improve coordination and provide education to water providers on infrastructure financing and funding.	d. Water providers receive information on infrastructure financing and funding.	**Lead:** Water providers, Mid-Coast Water Conservation Consortium, Fund Managers **Participants:** Business Oregon, Rural Community Assistance Corporation, Oregon Association of Water Utilities	PHASE 1	$50,000	▪ Meyer Memorial Trust ▪ Oregon Community Credit Union (OCCU) Foundation. ▪ Georgia-Pacific Environment Grant Program. ▪ National Communication Association Advancing the Discipline Grants. ▪ U.S. Economic Development Administration (EDA). ▪ U.S. Department of Housing and Urban Development Sustainable Communities Regional Planning Grant. ▪ Siletz Tribal Charitable Contribution Fund. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. Three Rivers Foundation.
Education: e. Provide an internship program, hands-on training, and certification training for water technicians, which includes technician training on updating and implementing water management.	e. Each water provider has an updated water management and conservation plan that they are implementing.	**Lead:** Water providers, Oregon Coast Community College (OCCC) **Participants:** Samaritan Hospital	PHASE 2	$250,000	▪ Meyer Memorial Trust ▪ Oregon Community Credit Union (OCCU) Foundation. ▪ Georgia-Pacific Environment Grant Program. ▪ National Communication Association Advancing the Discipline Grants. ▪ U.S. Economic Development Administration (EDA). ▪ U.S. Department of Housing and Urban Development Sustainable Communities Regional Planning Grant. ▪ Siletz Tribal Charitable Contribution Fund. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation.
f. Identify or develop curriculum and materials/information for students and the public (community education) about their water sources, water management, and water conservation.	f. Students are learning about their water supply and the importance of water conservation, and they share that information with family members.	**Lead:** Mid-Coast Water Conservation Consortium, Lincoln County School District education (all levels), interpretive facilities (Oregon Coast Aquarium, Hatfield Marine Science Center), water providers, Oregon Water Resources Department, Oregon Coast	PHASE 2	$75,000	▪ Georgia-Pacific Environment Grant Program. ▪ National Communication Association Advancing the Discipline Grants. ▪ EPA's Environmental Education (EE) Grants. ▪ Gray Family Foundation Environmental Education Grant. ▪ Siletz Tribal Charitable Contribution Fund.

Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
		Community College Community Education, Lincoln County Department of Health **Participants:** Educators and students, Lincoln County schools, general public			▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation.
Voluntary actions: g. Conduct outreach to encourage implementation of voluntary, incentive-based actions throughout the region, consistent with existing plans, such as the Mid-Coast Agricultural Water Quality Management Area Plan.	g. Voluntary, incentive-based actions effectively help to deliver on the goals on regional plans, including the Mid-Coast Agricultural Water Quality Management Area Plan.	**Lead:** Lincoln SWCD, OSU Extension, Mid-Coast Water Conservation Coalition, Oregon Water Resources Department, Self-supplied water users, MidCoast Watersheds Council **Participants:** All water users	PHASES 1-3	$50,000	▪ EPA's Environmental Education (EE) Grants.
Source Water Protection and Development: h. Inform self-supplied and public water users and residents and businesses within public water supply areas about water supplies and water protection measures, including proper well construction and maintenance, septic system maintenance, and proper use of landscape and other chemicals.	h. Self-supplied and public water users can access available water quality information concerning source water, implement measures to reduce impacts on source water quality, conduct regular inspection, maintenance, and repairs (as needed) of septic systems, and understand how to access and use available water quality data.	**Lead:** Oregon Health Authority, Oregon State University Extension, County, Oregon Department of Environmental Quality (for public water users and self-supplied users within public water supply areas), water providers DRAFT	PHASES 1-3	$50,000	▪ Business Oregon Drinking Water Source Protection Fund. ▪ U.S. Economic Development Administration (EDA). ▪ EPA's Environmental Education (EE) Grants. ▪ Siletz Tribal Charitable Contribution Fund. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation.
i. Work with partners and agencies (e.g., Oregon State University Extension Service) to deliver information on safe pesticide application practices and vegetation management practices that reduce or eliminate pesticide use. Provide outreach on water quality impacts of pesticides and fertilizers associated with lawn management near streams and ponds. Share methods that reduce impacts and identify alternatives.	i. Pesticides are applied minimally and safely throughout the region. Options are developed that reduce impacts and provide alternatives to pesticides.	**Lead:** Oregon Department of Agriculture, Oregon Health Authority **Participants:** Organizations and individuals dedicated to reducing impacts from pesticides on soil and water resources.	PHASES 1-3	$50,000	▪ OWEB Partnership Technical Assistance Grant. ▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ U.S. Economic Development Administration (EDA). ▪ EPA's Environmental Education (EE) Grants. ▪ Siletz Tribal Charitable Contribution Fund. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation. ▪ OSU Extensive Service and Oregon Integrated Pest Management Center at OSU.
j. Conduct education in source water areas (including to those that may not be customers of the water provider) about drinking water sources, risks, choices, and strategies.	j. The public is aware of and supports source water protection measures.	**Lead:** Education (all levels), interpretive facilities (Oregon Coast Aquarium, Hatfield Marine Science Center), regional water providers (private and public), Oregon State University Extension Service, Oregon Department of Environmental Quality, Oregon Health Authority Drinking Water Programs **Participants:** 4-H programs, Samaritan Health Education	PHASES 1-3	$50,000	▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ National Communication Association Advancing the Discipline Grants. ▪ U.S. Economic Development Administration (EDA). ▪ EPA's Environmental Education (EE) Grants. ▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ Siletz Tribal Charitable Contribution Fund. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation.

Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
k. Connect private landowners with resources and information about best management practices to improve water quality and quantity.	k. Landowners are connected with resources and information about BMPs to improve water quality and quantity.	**Lead:** Local stewardship foresters, local Soil and Water Conservation District staff, and USDA Natural Resources Conservation Service, Oregon State University Extension Service, Oregon Department of Forestry **Participants:** All interested landowners	PHASE 1	$50,000	▪ Business Oregon Drinking Water Source Protection Fund. ▪ National Communication Association Advancing the Discipline Grants. ▪ EPA's Environmental Education (EE) Grants. ▪ Siletz Tribal Charitable Contribution Fund. ▪ Spirit Mountain Community Fund. ▪ Starker Forests Grant. ▪ Three Rivers Foundation.
			TOTAL	**$1.65M**	

Performance Metrics

- Annual increase in engagement with residents, visitors, water providers, and industry about water resources.
- Residents, visitors, and industries are aware of and are practicing a culture of water conservation and efficient use.
- Public and private water suppliers are participating in water resources outreach to communities.
- There is uniform region-wide messaging about water use and conservation and efficient use.

Metric Methodology

- Determine baseline data by assessing 1) existing outreach and engagement with the public on water-related issues 2) the effort of water suppliers to engage in outreach with the public, and 3) the uniformity of messaging about water use and conservation. A follow-up assessment is conducted 3-5 years later to determine increase in public engagement efforts and uniformity of messaging.
- Baseline data is determined by conducting a social survey with members of the public to assess their awareness and practices relative to water conservation.

Imperative 2. Regional Capacity and Collaboration

Regional collaboration enhances the resilience and capacity of the water delivery system and helps ensure reliable source water quality and quantity. Strategies to enhance regional collaboration may include pooling regional resources, providing technical information to landowners, and improving access to resources and funding.

Objectives

- Cultivate active coordination and collaboration among all regional water providers to improve access to resources and funding that enhance system resilience and reliable source water quantity and quality.
- Expand water conservation planning programs and initiatives.

Action Details

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
2	**Regional Collaboration: Support the creation of a feasible 50-year county-wide water supply plan. Incorporate regionally integrated plans that improve water system resiliency and adequately plan for future water supply development in the face of natural and human-caused disasters.**	Conduct an updated analysis of supply and demand (use OSU Study), evaluating both instream and out-of-stream needs, coupled with an alternatives analysis of potential strategies to reduce demand and/or increase supply (conservation, pricing, storage, reuse, new sources, etc.). Water providers collaborate to develop risk and resilience assessments and emergency response plans that are inter-connected where feasible.	**Lead:** Lincoln County, Regional Solutions, Lincoln County Water Systems Alliance (LCWSA), OHA regional engineers, water providers **Participants:** All Lincoln County water suppliers, regional stakeholders, OWRD and other state agencies), EPA, Rural Community Assistance Corporation	PHASES 1-3	$200,000	▪ Business Oregon/Infrastructure Finance
3	**Regional Collaboration: Support the development of organizational procedures for the Mid-Coast Water Conservation Consortium (MCWCC) and the Lincoln County Water Systems Alliance (LCWSA) that will facilitate the prioritization and funding of projects throughout the region.**	Explore organizational options for Mid-Coast Water Conservation Consortium that would enable entity to prioritize and fund projects throughout the region on behalf of members.	**Lead:** Mid-Coast Water Conservation Consortium, Lincoln County Water Systems Alliance **Participants:** Independent, governmental, and industrial water suppliers and users	PHASE 2	$50,000	▪ Meyer Memorial Trust Capacity Building Grant. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ Special Public Works Fund (SPWF). ▪ U.S. Economic Development Administration (EDA).
4	**Regional Collaboration: Strengthen/support the Mid-Coast Water Conservation Consortium to enhance water conservation, increase resiliency during shortages and emergencies, and pool resources of multiple water providers. Support enhanced coordination with state and federal entities outside of the Mid-Coast.**	Water suppliers have a strengthened ability to address water conservation issues, increase resiliency, and pool resources.	**Lead:** Mid-Coast Water Conservation Consortium, Lincoln County Water Systems Alliance **Participants:** Water providers	PHASE 1	$50,000	▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ U.S. Economic Development Administration (EDA).
5	**Regional Collaboration: Support and advocate for planning and development that minimizes impacts to floodplains and riparian areas, promoting Green Infrastructure (GI) methods and Low Impact Development (LID) practices.**	Natural storage (e.g., beaver protection) is supported, and open zoning regulations that promote marshland migration are encouraged. Planning and development minimize impacts to floodplains and riparian areas through the implementation of GIM and LID practices.	**Lead:** County planners, Department of Land and Conservation Development, municipal planning departments **Participants:** US Forest Service, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, Oregon Department of Forestry	PHASES 1-2	$50,000	▪ Bureau of Reclamation Cooperative Watershed Management Grant (Phase I). ▪ OWEB Stakeholder Outreach and/or Technical Assistance Grant.
6	**Conservation: Develop and update water management and conservation plans for the Mid-Coast regional municipal and self-supplied direct water systems.**	Each water provider on the Mid-Coast has a recently updated water management and conservation plan appropriate in scale for the size of their customer accounts and demand.	**Lead:** Water providers and water users, all municipalities	PHASE 2	$100,000	▪ Business Oregon Drinking Water Source Protection Fund.
7	**Conservation: Coordinate water curtailment plans among water providers.**	Water providers coordinate water curtailment plans and messaging to the extent practicable, particularly those sharing water systems and sources.	**Lead:** Entities with shared water systems/sources, Mid-Coast Water Conservation Consortium **Participants:** Oregon Water Resources Department	PHASES 1-2	$15,000	▪ U.S. Economic Development Administration (EDA).
8	**Ecosystem Protection and Enhancement: Encourage municipalities to update/complete required stormwater management control plans to incorporate GI/LID practices, using statewide LID technical design guide, and update codes and ordinances that are barriers to implementing these practices. Assist smaller**	Municipal stormwater management control plans are updated and completed.	**Lead:** Municipalities	PHASE 3	$100,000	▪ U.S. Economic Development Administration (EDA). ▪ U.S. Department of Housing and Urban Development Sustainable Communities Regional Planning Grant. ▪ OWRD Water Projects Grants and Loans.

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
	communities, that are not currently required, in voluntarily developing similar stormwater management plans and technical design guides.					▪ ODEQ grants and technical assistance.
9	**Natural Hazards: Advocate for Emergency Response Plans (required for public water systems) address water system needs and specific vulnerabilities, and are interconnected to create a regional network during emergency situations.**	Public water system suppliers develop comprehensive plans that address the full suite of emergency measures needed locally and regionally.	**Lead:** Oregon Health Authority, Lincoln County, Oregon Department of Environmental Quality, water providers	PHASE 2	$50,000	▪ ODEQ Supplemental Environmental Projects (SEP) Program. ▪ USDA Rural Development Emergency Community Water Assistance Grant. ▪ NOAA Coastal Resilience Grants Program.
10	**Natural Hazards: Collaborate with emergency operations planners to identify highest priority water needs and develop alternative systems and plans. Identify opportunities and access for shared water available for addressing emergency interconnections.**	Water vulnerabilities are clearly articulated in updates to the Natural Hazard Mitigation Plan.	**Lead:** Water providers, Mid-Coast Water Conservation Consortium	PHASE 1	$125,000	▪ ODEQ Supplemental Environmental Projects (SEP) Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ Special Public Works Fund (SPWF). ▪ USDA Rural Development Emergency Community Water Assistance Grant.
11	**Natural Hazards: Support the development tiered communication trees to address: a) typical support needs b) response to localized emergencies affecting one or multiple Public Water Systems; and c) Cascadia Subduction Zone quake, volcanic eruption, regional wildfire. Provide communication alternatives for inoperable phone/internet (HAM resources; meeting locations and days/times).**	Ensure a mutual aid network exists on the coast to communicate and respond effectively during emergencies.	**Lead:** Lincoln County, water providers, MCWCC	PHASE 2	$50,000	▪ ODEQ Supplemental Environmental Projects (SEP) Program. ▪ Georgia-Pacific Environment Grant Program. ▪ USDA Rural Development Emergency Community Water Assistance Grant. ▪ NOAA Coastal Resilience Grants Program.
12	**Source Water Protection and Development: Develop regionally integrated Drinking Water Protection Plans to ensure that strategies and implementation plans are in place to minimize threats to water supply sources throughout the Mid-Coast. Advocate for funding to support the development and plan implementation.**	Drinking Water Protection Plans are developed to minimize contaminants from entering source waters.	**Lead:** Water providers, Lincoln County, water districts, municipalities, Oregon Department of Environmental Quality, Oregon Health Authority	PHASES 1-3	$100,000	▪ ODEQ clean water drinking/source water protection program. ▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ OHA Safe Drinking Water Act Loans/Grant Funds.
13	**Source Water Protection and Development: Create a Source Water Protection Plan, or multiple source-specific plans, to reduce, or minimize contaminants from entering source waters. Advocate for funding to support the development and implementation of these plans.**	A source water protection plan, or multiple plans, include actions that minimize contaminants entering source waters.	**Lead:** Lincoln County, water districts, city, Oregon Department of Environmental Quality, Oregon Health Authority	PHASE 2	$2,000,000	▪ ODEQ clean water drinking/source water protection program. ▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ OHA Safe Drinking Water Act Loans and Grant Funds.
			TOTAL		**$2.89M**	

Performance Metrics

- Water conservation projects are implemented and have measurable outcomes that aim to achieve the greatest return on investments.
- Updates to the Natural Hazard Mitigation plan clearly articulate water vulnerabilities.
- A mutual aid network is created along the coast, and water providers sign up for ORWARN.
- A 50-year county-wide water supply plan is created.
- Mid-Coast public water providers have up-to-date drinking water protection plans that are regionally integrated.

Metric Methodology

- A social survey is conducted to assess the extent to which Mid-Coast land managers understand and are applying Ecosystem Best Management Principles and Practices. A social survey is conducted 3-5 years later to assess increases in awareness, understanding, and implementation.
- Spatial analyses are conducted, and locations on the landscape are identified to implement conservation projects that achieve the greatest return on investment
- A mutual aid network is created and tested, confirming its capacity to respond effectively during emergencies.

Imperative 3. Monitoring and Data Sharing

Objectives

- Improve our baseline understanding of water conditions in the region. Improve the coordination and effectiveness of water quality, quantity, and habitat monitoring programs throughout the region.
- Assess the levels and presence/absence of contaminants in Mid-Coast waters and describe negative effects to human health or aquatic life.
- Sample throughout the Mid-Coast to accurately identify the quantity and type of toxics entering source waters to assess potential risks to both drinking water quality and aquatic life.
- Provide self-supplied water users with adequate and timely data to determine regional, local, or site-specific water quality contamination issues that may pose a health risk.

Action Details

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
14	**Implement more efficient advanced metering infrastructure to enable faster identification of leaks and shortages, and support best practices for water providers to meet industry standards for documenting water loss.**	Real-time information on water use and water loss is documented to better manage water and engage everyone in water conservation.	**Lead:** Water providers, Mid-Coast Water Conservation Consortium Participants: Oregon Water Resources Department	PHASES 1-3	$3,000,000	▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program.
15	**Recommend installation and use of flow meters to gain a more accurate estimate of water use in the region.**	Installation of flow meters on withdrawals is prioritized using an established set of criteria.	**Lead:** Local Soil and Water Conservation District (with resources), Oregon Water Resources Department		$100,000	▪ OWEB Monitoring Grant.[25] ▪ OWRD Water Measurement Cost Share Program
16	**Fully fund, install, and monitor real-time stream gauging stations throughout region in priority locations and times of year when they are needed most to accurately assess source water and enable innovative demand-reduction actions during periods of critical ecological need.**	Identify sites for highest priority gages. Funding and staff secured to maintain monitoring network. An updated basin study that addresses water uncertainties in the Mid-Coast region (improved granularity of measurements). Exploration of newer AI technologies is supported by the partnership. Real-time river monitoring/gauging is conducted in priority locations.	**Lead:** US Geological Survey, Oregon Water Resources Department, private landowners, Oregon Watershed Enhancement Board, watershed councils, organizations, water providers, municipalities, Lincoln County **Participants:** Oregon Department of Fish and Wildlife	PHASE 1	$200,000	▪ OWEB Monitoring Grant.[26] ▪ USGS National Streamflow Information Program (NSIP). ▪ OWRD (General Funds: Water Measurement Cost Share Program)
17	**Develop and implement a coordinated long-term water quality monitoring program throughout the region (e.g., source water, streams, estuaries) to improve understanding of current conditions and event-caused conditions (i.e., storm, low-flow) for nutrients, bacteria, temperature, dissolved oxygen, pH, turbidity and other specific contaminants identified by DEQ, including those that contribute to harmful algal blooms (HAB)s. Collect water samples to identify pollutant sources (location, source, practices influencing input, transport and fate of pollutants). Advocate for additional sampling in headwaters (where herbicides and pesticides are applied) and at municipality intakes.**	A coordinated long-term water quality monitoring program is developed for the region that meets the objectives described. Real time data sharing occurs among municipalities, and there is frequent testing of source waters. Samples are taken in headwaters and public drinking water intakes at the frequency needed to track source water quality status. Outreach and incentive programs reach landowners who then modify practices and implement best management practices.	**Lead:** Oregon Department of Environmental Quality, Oregon Health Authority, US Forest Service, Oregon Water Resources Department, Counties, cities, Mid-Coast Water Conservation Consortium, Lincoln County Water Systems Alliance, state and private forestry sector (Oregon Department of Forestry), Agricultural sector (Oregon Department of Agriculture lead), Oregon Department of Fish and Wildlife, Mid-Coast Watershed Council	PHASES 1-2	$1,000,000	▪ Oregon Health Authority Drinking Water Source Protection Grants & Loans.[27] ▪ ODEQ Supplemental Environmental Projects (SEP) Program. ▪ ODA water quality funds provided to SWCD. ▪ OWEB Monitoring Grant. U.S. Economic Development Administration (EDA). ▪ Oregon Watershed Enhancement Board

[25] Must be tied to existing or potential future project.

[26] Must be tied to existing or potential future project.

[27] Eligible projects include but are not limited to outreach/education, monitoring efforts (outside of what is required by the state), restoration design and implementation, groundwater risk assessments. Publicly and privately-owned community and nonprofit non-community water systems are eligible to apply for DWSPF funding.

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
18	**Conduct comprehensive and ongoing water testing, and use results to guide best management practice implementation, restoration, etc. to address water quality impairments.**	Ongoing and comprehensive water testing is conducted, and the results are used to guide land and resource management activities. Education and outreach and testing are conducted on private wells on a regular basis.	**Lead:** Oregon Department of Environmental Quality, Oregon Health Authority, US Forest Service, Lincoln Soil and Water Conservation District, Lincoln County	PHASES 1-3	$100,000	▪ ODA water quality funds provided to SWCD. ▪ ODEQ Supplemental Environmental Projects (SEP) Program. ▪ U.S. Economic Development Administration (EDA).
19	**Develop a coordinated network of people conducting stream flow monitoring and water quality monitoring to share resources and data. Explore cost-effective ways to incorporate volunteers in data collection to complement gauging network.**	A robust coordinated network of volunteers is conducting stream flow and water quality monitoring and sharing that information via a Mid-Coast network.	**Lead:** Lincoln County **Participants:** Mid-Coast Water Conservation Consortium, Soil and Water Conservation District, Oregon Water Resources Department, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, Oregon Watershed Enhancement Board, Salmon-Drift Creek Watershed Council, US Forest Service	PHASE 2	$100,000	▪ ODA funding to SWCD. ▪ OWEB Monitoring Grant. ▪ U.S. Economic Development Administration (EDA).
20	**Support the aggregation and update of current self-supplied water system databases, including system description, system status, and system needs. Determine what exists from current databases. Track wells going dry via self-reporting. NOTE: Oregon Explorer database group will be discussing.**	There is comprehensive regional knowledge of self-supplied water system information in the Mid-Coast Region.	**Lead:** Lincoln County **Participants:** Private well drillers, private septic companies, Oregon Water Resources Department well log database	PHASE 1	$125,000	▪ Oregon Health Authority Domestic Well Safety Program (DWSP)
21	**Develop a water monitoring database for data entry and access by multiple entities.**	A water monitoring tool that consolidates water data for the public and water managers to access and use. The Mid-Coast serves as a pilot to demonstrate water quality and quantity database sharing.	**Lead:** Inter-agency Stream Team **Participants:** Local, State, and Federal agencies, and private citizens DRAFT	PHASE 1	$100,000	▪ OWEB Monitoring Grant. ▪ U.S. Economic Development Administration (EDA).
				TOTAL	**$4.725M**	

Performance Metrics

- 75% of municipal connections in the Mid-Coast region have meters/associated infrastructure (apps, online platform) within 5 years.
- Water providers are reporting unaccountable water loss on an annual basis as well as progress made.
- By 2030, all water providers in the Mid-Coast region demonstrate systems have 10% or less unaccountable water loss.

Metric Methodology

- Percent of connections in the region that have meters. Five years later, the percent of connections is reassessed.
- Baseline data is collected to ensure water providers are documenting unaccountable water loss. Ten years later, an assessment is conducted to ensure all water providers in the region has 10% or less unaccountable water loss.
- Baseline data is created by conducting a social survey to assess awareness and understanding of water information by the public. A follow-up survey is conducted 3-5 years later to monitor changes in awareness and understanding.

Imperative 4. Water Conservation, Efficiency and Reuse

Water conservation is the beneficial reduction in water loss, waste and/or use that results in businesses and people changing behaviors by conserving, recycling and re-using water. Water efficiency minimizes the amount of water used to accomplish a function, task, or result, and relies on water rates that reflect the true value of water. Water conservation incorporates water treatment, recycling, and well-engineering products, and fixtures (Source: Water Footprint Calculator[28]). Indoor water conservation actions may include turning off running water while brushing teeth and operating washing machines and dishwashers only when loads are full. Outdoor water conservation actions may include watering lawns only when necessary, watering lawns during the cool part of the day, mulching trees, and rainwater catchment for non-potable uses. Examples of water efficient actions include using metering faucets and low-flow showerheads and toilets. Due to limited water availability for new out-of-stream uses across the Mid-Coast region as well as the need to restore and protect instream values, water conservation may be one of the most cost-effective ways to meet future water needs of the region while increasing water security and resiliency for all users. The ultimate goal of Imperative 4 is to provide water users with improved access to information, incentives, funding, audits, and resources to help them appreciate the value of water, make conservation a part of everyday life, and to create an ethic that embraces the value of the conservation of water.

Objectives

- Effectively use limited water supplies, especially during times of water shortage. Reduce water use.

Action Details

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
22	**Improve understanding of Oregon's existing water reuse regulations[29], and the opportunities and barriers (e.g., health issues) to using recycled and gray water for all allowed uses.** **Encourage development of comprehensive water reuse programs at appropriate scales.**	Local stakeholders evaluate current water reuse regulatory programs and options; identify local issues and barriers, and develop pilot/model projects or programs to assess and implement realistic, safe local or regional options for the use of recycled water.	**Lead:** Oregon Department of Environmental Quality, Oregon Water Resources Department, Oregon Health Authority, water providers, Lincoln County **Participants:** Homeowners and businesses, potentially other state agencies, Oregon Department of Fish and Wildlife	PHASE 2	$150,000	▪ Business Oregon Drinking Water Source Protection Fund. ▪ OWRD Water Projects Grants and Loans.
23	**Investigate and share information on methods of reusing treated sewage plant water and water at water treatment plants (e.g., backwash) and regional industries for potable, agricultural, and industrial uses.**	Potable and industrial water users receive information on successfully implemented innovative strategies to meet water needs through reuse. Lower levels of solids are achieved in pre-treatment programs (e.g., side stream; potential energy sources) to maintain infrastructure longer. Reuse of backwash water is encouraged.	**Lead:** Mid-Coast Water Conservation Consortium, Water providers **Participants:** OR DEQ, OHA, OWRD, Clean Water Services (Hillsboro, Oregon - cleanwaterservices.org), WateReuse (https://watereuse.org)	PHASE 1	$100,000	▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ OWRD Water Projects Grants and Loans.
24	**a) Incentivize commercial and industrial facilities to conduct water audits, identifying water loss and implementing conservation, recycling, and re-use strategies and technologies.** **b) Evaluate and potentially revise water pricing strategies commensurate with actual delivery costs as well as other strategies to stimulate water conservation and re-use while raising revenue for water conservation**	24a: Commercial and industrial water users complete water audits resulting in improved efficiency and reduced water use. Where possible, these users implement water reuse approaches. 24b: Completion of a comprehensive rate study that considers tiered rate methodology tied to achieving the actual value of investments in water conservation, recycling, and re-use compared to the cost of developing new water sources. Assure a fair allocation of costs between residents and businesses. Results of analysis/study are shared with the public.	**Lead:** Water providers, commercial and industrial water users **Participants:** Oregon Water Resources Department, Oregon State University	PHASE 1	$150,000	▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ Special Public Works Fund (SPWF). ▪ U.S. Economic Development Administration (EDA). ▪ U.S. Department of Housing and Urban Development Sustainable Communities Regional Planning Grant.

[29] https://www.oregon.gov/deq/wq/programs/Pages/Water-Reuse.aspx

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
	investments (e.g., improved efficiency at commercial facilities).					
25	**Work with the NRCS to develop a Conservation Implementation Strategy to provide incentives and technical support to agricultural irrigators interested in making improvements, such as increased efficiencies to minimize evaporation losses.**	Agricultural irrigators that are able to access incentives and other cost-share opportunities to conserve water, enhance efficiencies, and replace aging systems.	**Lead:** Natural Resources Conservation Service, Lincoln Soil and Water Conservation District, Oregon Department of Agriculture **Participants:** Agricultural irrigators (engage in development and implementation of strategy), McKenzie River Trust	PHASES 1-2	$1,500,000	▪ USDA NRCS CIG Grant. ▪ OWRD Water Projects Grants and Loans. ▪ Clean Water State Revolving Fund (CWSRF).[30] ▪ USDA SEARCH - Special Evaluation Assistance for Rural Communities and Households Program. ▪ OHA's Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ Business Oregon Community Development Block Grant (CDBG) Program. ▪ USDA Rural Development Water & Waste Disposal Direct Loan & Grant Program. ▪ EPA Nonpoint Source Section 319 Grants. ▪ USDA Home and Waste Water Loan and Grant Programs (Septic Systems Repair/ Replacement). ▪ WaterSMART Water and Energy Efficiency Grants.
26	**Identify and develop voluntary incentives for water conservation.**	Develop and implement incentives (rebates on equipment, tax breaks, monthly water bills, free water-saving items, recognition (awards or labels) for businesses to stimulate voluntary water conservation.	**Lead:** Oregon Health Authority, Water providers **Participants:** Oregon Water Resources Department, water users, Oregon Department of Environmental Quality, US EPA	PHASES 2-3	$100,000	▪ Georgia-Pacific Environment Grant Program.
27	**Using the Water Management Economic Assessment Model[31], develop a suite of adaptation measures (e.g., storage investments, conservation rebate programs, and new pricing models) to address existing and predicted water shortages in the region.**	Updated analysis of supply and demand (use OSU Study) coupled with an alternatives analysis of potential strategies to reduce demand and/or increase supply (conservation, pricing, storage, reuse, etc.). Watershed Management Plans are developed that incorporate water source strategies. Document updated supply and demand projections for individual users and the region as a whole, including an analysis of alternatives and costs/benefits to meet current and future needs.	**Lead:** Oregon State University, Oregon Water Resources Department **Participants:** Mid-Coast Water Planning Partnership	PHASES 1-2	$25,000	▪ OWRD Feasibility Study Grants. ▪ BOR WaterSMART Basin Studies. ▪ Business Oregon Drinking Source Protection Fund. ▪ Special Public Works Fund (SPWF). ▪ Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ EPA Drinking Water State Revolving Fund (DWSRF).
			TOTAL		**$2.025M**	▪

Performance Metrics

- Measurable increase in the amount of recycled water derived from domestic and industrial sources for beneficial purposes and gray water used by water consumers in the Mid-Coast region.
- Increase in the availability and use of water conservation incentives among all stakeholders.

[30] Will fund irrigation modernization projects for water efficiency if it benefits water quality.

[31] (Oregon State University, Oregon Water Resources Department, and MCWPP are developing a Water Management Economic Assessment Model using existing water supply, pricing, and consumption data integrated with climate change projections to simulate the impact of future water shortages and illustrate trade-offs among potential adaptation measures.)

- A culture of water conservation is furthered through developers as well as municipal water providers (planning and public works departments/committees) embracing and incorporating water saving technologies and design strategies.
- By 2023, an RCPP (RCPP – Regional Conservation Partnership Program) is established in the region, incorporating existing global technologies to enhance irrigation efficiencies.

Metric Methodology

- Baseline data is collected via a survey and assessment to determine levels of gray water and recycled water produced and used by consumers, to document existing water conservation incentives, and to assess understanding and implementation of water saving technologies and design strategies by water providers. In 3–5 years, the assessment and survey are repeated to track progress.

Imperative 5. Resilient Water Infrastructure

Sustaining the collection and distribution systems, treatment plants, and other infrastructure that collects, treats, and delivers water requires strategies that address aging infrastructure, support a more resilient infrastructure, and advance training and professional development to ensure the availability of skilled water technicians.

Objectives

- Create more resilient infrastructure.
- Replace and upgrade aging infrastructure with more resilient infrastructure.
- Create redundancy, water system interconnections, and alternative sources of water to ensure access to safe drinking water in case of emergencies.
- Build capacity of partners to advocate for and secure state and federal resources and funding for infrastructure.

Action Details

Action		Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
28	**Support upgrading and maintaining water metering system infrastructure, where possible. Note: Automated read systems (not SMART) can be installed at reduced cost.**	Install smart water grid systems in Mid-Coast communities. Achieve water balance in community systems (Stream to Tap).	**Lead:** Water providers, MCWCC	PHASE 2	$1,500,000	▪ OWRD Water Projects Grants and Loans. ▪ OHA's Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ Business Oregon Community Development Block Grant (CDBG) Program. ▪ Business Oregon Special Public Works Fund (SPWF). ▪ Business Oregon Water/Wastewater Funding Program. ▪ Rural Community Assistance Corp. (RCAC) Loan Fund. ▪ USDA Rural Development Water & Waste Disposal Direct Loan & Grant Program. ▪ WaterSMART Water and Energy Efficiency Grants.
29	**Use the latest technologies (e.g., In system monitoring and controls, pumping efficiency, automating, and controlling potential zone isolations) available when retrofitting, or replacing, water infrastructure.**	Isolations are implemented in emergencies.	**Lead:** Water providers	PHASE 3	$200,000	▪ OWRD Water Projects Grants and Loans. ▪ Business Oregon's Community Development Block Grant (CDBG) Program. ▪ Business Oregon Special Public Works Fund. ▪ Business Oregon Water/Wastewater Funding Program. ▪ USDA Rural Development Water & Waste Disposal Direct Loan & Grant Program. ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program. ▪ WaterSMART Water and Energy Efficiency Grants.

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
30	**Address distribution system failures by installing earthquake valves in water tanks to retain water even if distribution system fails.**	Expanded water system monitoring and controls are in place.	**Lead:** Water providers	PHASE 2	$1,000,000	▪ OWRD Water Projects Grants and Loans. ▪ Business Oregon's Community Development Block Grant (CDBG) Program. ▪ Business Oregon Special Public Works Fund. ▪ Business Oregon Water/Wastewater Funding Program. Special Public Works Fund (SPWF). ▪ Rural Community Assistance Corp. (RCAC) Loan Fund. ▪ USDA Rural Development Water & Waste Disposal Direct Loan & Grant Program. ▪ WaterSMART Water and Energy Efficiency Grants.
31	**Evaluate alternatives for both natural and built (human-made) water storage with the planning area.** **For built systems, identify and perform feasibility studies needed to assess whether projects are viable using established and agreed-upon criteria (economic, environmental, regulatory, etc.).** **For natural storage "systems", identify feasibility studies needed to assess project viability using established and agreed-upon criteria. For those that appear viable, developed estimates of seasonal water storage and release.**	**Feasibility studies are conducted to identify viable natural and built storage projects in the planning area.** **For Projects that meet agreed-upon criteria (economic, environmental, regulatory, etc.), funding proposals are developed and submitted for design, engineering, and implementation.** A combination of feasible natural and built storage systems increase in the region.	**Lead:** Mid-Coast Watersheds Council **Participants:** US Geological Survey, state and federal agencies	PHASE 1	$150,000	▪ Business Oregon Drinking Water Source Protection Fund. ▪ Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ EPA Drinking Water State Revolving Fund (DWSRF). ▪ EPA Drinking Water State Revolving Fund (DWSRF). ▪ OWRD Water Projects Grants and Loans ▪ BOR WaterSMART Basin Studies. ▪ OWRD Water Projects Grants and Loans. ▪ OWEB Technical Assistance.
32	**Support the expansion of the state-supported revolving fund (including developing a new fund for self-suppliers) to accelerate water infrastructure improvements. Improve access to funding by enhancing coordination and collaboration with communities).**	Funding options for individual providers and the region are well understood, and a strategy exists to upgrade and maintain critical infrastructure. Mid-Coast water providers have capital improvement plans.	**Lead:** Business Oregon (1-stop program) (Infrastructure Finance Authority) **Participants:** Mid-Coast Water Conservation Consortium (educational role for municipalities), Oregon Water Resources Department, and other funding agencies	PHASE 3	$4,000,000	▪ OWRD Water Projects Grants and Loans. ▪ USDA Rural Development Circuit Rider Program. ▪ OWRD has a $14-20M biennial revolving fund. ▪ Business Oregon Community Development Block Grant (CDBG) Program. ▪ Business Oregon Water/Wastewater Funding Program. ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program. ▪ WaterSMART Water and Energy Efficiency Grants. Safe Drinking Water Revolving Loan Fund (SDWRLF). Special Public Works Fund (SPWF).
33	**Identify funding programs to support infrastructure enhancements that advance sustainable and secure water solutions for the region. Study how other cities and**	Lincoln SWCD has a stable funding source to work with agricultural and other landowners.	**Lead:** Water providers	PHASE 2	$200,000	▪ OWRD Water Projects Grants and Loans.

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
	counties have funded their infrastructure improvements through time and manage water infrastructure assets.					▪ OHA's Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ Business Oregon Water/Wastewater Funding Program. ▪ USDA NRCS CIG Grant. ▪ Special Public Works Fund (SPWF). ▪ Rural Community Assistance Corp. (RCAC) Loan Fund. ▪ USDA Rural Development Water & Waste Disposal Direct Loan & Grant Program. ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program. ▪ WaterSMART Water and Energy Efficiency Grants.
34	**Establish a community revolving loan program for infrastructure improvements for septic systems.**	Low interest loans are available to individual property owners on a consistent basis.	**Lead:** Lincoln County, Craft3, OSU Extension Well Stewardship Program **Participants:** Oregon Department of Environmental Quality, Natural Resources Conservation Service, special districts and other small water providers, Lincoln Soil and Water Conservation District, Devil's Lake Water Improvement District, Oregon Water Resources Department	PHASE 2	$200,000	▪ Craft3 Loan Program; ▪ DEQ CWSRF community loans
			TOTAL		**$7.25M**	

Performance Metrics

- Annual increases in the percent of aging and inefficient water infrastructure that is replaced and enhanced.

Metric Methodology

- Baseline data is collected by conducting an assessment and surveying municipalities and water providers to compile and document aging infrastructure that needs to be replaced, to assess the scope and cost of installing smart water grid systems throughout the region, to ensure water providers can isolate during emergencies, to document how other cities and counties fund their infrastructure projects, to assess the existence and extent of funding available to support infrastructure enhancements. In 3-5 years, conduct assessment/survey to evaluate progress made in creating a resilient water infrastructure.

Imperative 6. Source Water Protection

The 1972 Clean Water Act specifies three categories for protection of all water sources: The physical connectivity, the biological health, and chemicals introduced from point, or non-point sources. Source water includes the rivers, streams, lakes, reservoirs, springs, and groundwater that deliver water to public drinking water supplies and private wells. Protecting source water reduces treatment costs, protects water quality for wildlife and human uses, and helps ensure the availability of water. Strategies to protect source water depend on the source, and include protection of riparian habitats, stream bank stabilization, land protection/easements, best management practices for agricultural and forestry activities, local ordinances to limit activities in source water or wellhead protection areas, emergency response plans, and outreach and education. Source: Environmental Protection Agency[32].

Objectives

- Assess the levels and presence/absence of contaminants in Mid-Coast waters and describe negative effects to human health.
- Sample throughout the Mid-Coast to accurately identify the quantity and type of toxics entering source waters to assess potential risks to both drinking water quality and aquatic life.
- Provide self-supplied water users with adequate and timely data to determine regional, local, or site-specific water quality contamination issues that may pose a health risk.
- Assess the levels and presence/absence of contaminants in Mid-Coast waters and describe negative effects to human health.
- Consistently attain water quality standards that protect drinking water and other beneficial uses.
- Anticipate and prepare for the effects of climate change stressors, which are predicted to influence precipitation, temperature, coastal inundation, ecosystem function, and water quality.
- Prioritize restoration work and support land management practices that reduce contaminants of concern to drinking water.

Action Details

	Actions	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
35	**Identify, fund, and implement high priority regional source water protection activities.**	Explore and implement mechanisms for regional source water protection (e.g., carbon credits, carbon exchange, tax credits, and acquisition opportunities) are explored and implemented.	**Lead:** Water providers **Participants:** Mid-Coast Water Planning Partnership, Oregon Department of Environmental Quality	PHASES 1-2		▪ BOR WaterSMART Basin Studies. ▪ Georgia-Pacific Environment Grant Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ EPA Drinking Water State Revolving Fund (DWSRF). ▪ Starker Forests Grant.
36	**Support the reduction of nutrient, turbidity, and bacteria inputs and emerging contaminants of concern (e.g., PFAS, PFOA, PFOS, pharmaceuticals, etc.) to source water from all sectors using the latest technology.**	Link property owners and residents to existing programs (e.g., Craft3 for septic system replacement/repair loans, OSU Extension Service, land management workshops, etc.). Homeowners improve practices, reduced nutrient contributions from all Sectors/land uses.	**Lead:** Oregon Department of Environmental Quality, Oregon Health Authority (Step a). Oregon Health Authority, Oregon State University Extension Services, Lincoln County Soil and Water Conservation District, Oregon Department of Agriculture (Step b).	PHASES 1-3	$1,000,000	▪ Business Oregon Drinking Water Source Protection Fund. ▪ EPA Clean Water State Revolving Fund.
37	**Enhance contamination prevention measures for reservoirs, surface water intakes, springs, and/or wellheads.**	Water reservoirs in the Mid-Coast region are secure.	**Lead:** Water providers, Mid-Coast Water Conservation Consortium	PHASE 1	$250,000	▪ OWRD Feasibility Study Grants. ▪ OHA's Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ BOR WaterSMART Basin Studies. ▪ Business Oregon Community Development Block Grant (CDBG) Program. ▪ Business Oregon Water/Wastewater Funding Program. ▪ Business Oregon Drinking Water Source Protection Fund.

[32] https://www.epa.gov/sourcewaterprotection/basic-information-about-source-water-protection

	Actions	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
						▪ OWRD Water Projects Grants and Loans.
38	**Assess and evaluate harmful algal bloom events that affect source water to identify potential contributing sources, and educate and support the reduction of nutrient inputs to source water from all sectors to prevent algal blooms (e.g., promote agricultural nutrient management plans, grants to reduce inputs, well water nitrate screening, well water and septic system education, low-input gardening).**	The causes of harmful algal blooms affecting source water are investigated, and projects to education and/or reduce contributing sources are implemented.	**Lead:** Water providers **Participants:** Land managers	PHASES 1-3	$100,000	▪ ODEQ Supplemental Environmental Projects (SEP) Program. ▪ Clean Water State Revolving Fund. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ EPA Environmental Justice Small Grants Program. ▪ For agriculture land, ODA funds to SWCD.
39	**Advocate for integrated pest management (e.g., minimize aerial spraying in watersheds adjacent to source water; promote hand clearing in riparian zones (versus hand spraying); support notification of all water treatment facilities when and where spraying will occur), as well as notification of downstream water users who are not on municipal water systems and rely on source water for domestic use.**	Agencies and OSU deliver education on safe pesticide application practices; possible formation of a Pesticide Stewardship Partnership; reduction and/or elimination of pesticide use.	**Lead:** Pesticide Stewardship Partnership **Participants:** Oregon Department of Agriculture, Oregon Department of Forestry, Oregon State University Extension Service, Oregon Department of Environmental Quality, Oregon Health Authority, Oregon Water Resources Department US Forest Service, Lincoln County, water providers	PHASES 1-3	$100,000	▪ OWEB Stakeholder Engagement Grant. ▪ Georgia-Pacific Environment Grant Program. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ ODFW Access and Habitat Program. ▪ Oregon Integrated Pest Management Center at OSU.
40	**Furthering a working lands concept, advocate for incentives, and other strategies, that promote silvicultural practices that support restoration of watershed ecological function and protect drinking water source areas.**	Incentives and other strategies are developed that support watershed ecological function and protection of source drinking water.	**Lead:** Mid-Coast Water Planning Partnership, Oregon Department of Forestry, US Forest Service, Bureau of Land Management, and any other federal land management agencies	PHASES 1-3	$100,000	▪ Oregon Watershed Enhancement Board Conservation Reserve Enhancement (CREP) TA Program. ▪ OWEB Small Grant Program. ▪ OWEB Operating Capacity Grant. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Restoration Grant. ▪ Georgia-Pacific Environment Grant Program. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ Clean Water State Revolving Fund. ▪ USDA NRCS Emergency Watershed Protection Program. ▪ USFWS Landowner Incentive Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ ODFW Access and Habitat Program. ▪ ODFW Wildlife Habitat Conservation and Management Program. ▪ ODFW Riparian Lands Tax Incentive Program.
41	**Protect critical lands within drinking water source areas through acquisition, conservation easements, or other tools that prevent degradation and/or impacts to source water quality.**	Critical lands within drinking water source areas are adequately managed for water quality protection.	**Lead:** McKenzie River Trust, Wetlands, Conservancy, The Nature Conservancy **Participants:** Mid-Coast Watersheds Council, municipalities, Mid-Coast Water Planning Partnership		$10,000,000	▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase I or Phase II Implementation). ▪ Meyer Memorial Trust Healthy Environment Program. ▪ Business Oregon Drinking Water Source Protection Fund.

Actions		Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
						▪ Business Oregon Drinking Water Source Protection Fund. ▪ USDA NRCS Emergency Watershed Protection Program. ▪ Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program. ▪ ODFW Access and Habitat Program.
			TOTAL		**$15.5M**	

Performance Metrics

- Source (raw) water contains decreasing levels of nutrients, fine sediment/turbidity and bacteria, toxics (e.g., pesticides and emerging contaminants of concern) are not detected.
- Measures are taken to enhance reservoir security to protect from contamination.
- Incentives are created and promoted to restore watershed ecological function and promote protection of source drinking water areas.
- An increasing percentage of acreage in drinking water source areas is protected from land-use activities that could negatively impact water quality and natural hydrology.

Metric Methodology

- Baseline information is summarized on existing water available for summer withdrawals (accounting for instream demand/needs), current range of levels (concentration and load) of nutrients, turbidity, bacteria, and other contaminants in raw source water. Comparisons are made within 3-5 years later to assess changes in these levels.
- Municipal water providers document enhancements to reservoir security.
- Baseline information and changes are tracked through time to assess protection from contamination for reservoirs, intakes, springs, and wellheads.
- Baseline data is collected on existing incentives. Comparisons are made 3-5 years later via an assessment to document progress in creating incentives.

Imperative 7. Planning for Water Supply Development Needs (including assessment)

Streams in the Mid-Coast Planning area have high streamflow during the winter months (January-March) and low streamflow during the summer/fall months (August-October) as a result of seasonal precipitation patterns. Generally, Mid-Coast groundwater is not very productive because of low permeability and low storage capacity of the regional rock formations. Developing additional sources of water supply and storage, both human-made and natural, will create a sustainable water supply that meets the needs of people and native fish and wildlife.

Objective

- Develop a sustainable water supply for consumptive uses that also protects the environment, supports healthy watersheds, and is resilient to climate change stressors and natural hazards.

Action Details

Actions		Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
42	**Seek additional and alternative sources of water for development in the region.**[33]	Additional sources of water that are available for development are identified in the region.	**Lead:** Lincoln County, Department of Land and Conservation Development, Lincoln County Water Systems Alliance **Participants:** Mid-Coast Water Conservation Consortium, Oregon Water Resources Department DRAFT	PHASE 1	$100,000	▪ OWRD Feasibility Study Grants. ▪ BOR WaterSMART Basin Studies. ▪ Business Oregon Drinking Source Protection Fund. ▪ Special Public Works Fund (SPWF). ▪ Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ EPA Drinking Water State Revolving Fund (DWSRF).
43	**Using the Water Management Economic Assessment Model[34], develop a suite of adaptation measures (e.g., storage investments, conservation rebate programs, and new pricing models) to address existing and predicted water shortages in the region.**	Updated analysis of supply and demand (use OSU Study) coupled with an alternatives analysis of potential strategies to reduce demand and/or increase supply (conservation, pricing, storage, reuse, etc.). Watershed Management Plans are developed that incorporate water source strategies. Document updated supply and demand projections for individual users and the region as a whole, including an analysis of alternatives and costs/benefits to meet current and future needs.	**Lead:** Oregon State University **Participants:** Mid-Coast Water Planning Partnership, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife (OAR 690 Division 33 rules), Oregon Water Resources Department, water providers	PHASES 1-2	$100,000	▪ OWRD Feasibility Study Grants. ▪ BOR WaterSMART Basin Studies. ▪ Business Oregon Drinking Source Protection Fund. ▪ Special Public Works Fund (SPWF). ▪ Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ EPA Drinking Water State Revolving Fund (DWSRF).
			TOTAL		**$200,000**	

Performance Metrics

- A suite of adaptation measures is developed and implemented to address water shortages.
- Measurable increase in the amount of water stored during high flow periods (natural and built storage) for summer use.
- Reduce municipal water shortages in late summer-early fall and during declared drought periods.
- Reduce intensity and duration of streamflow shortages in late summer-early fall and during declared drought periods.
- A suite of adaptation measures is developed to address water shortages.

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[33] Consider existing studies for additional water sources, such as the 2001 CH2MHill Report on the Rocky Creek Regional Water Supply Project and Preliminary Water Management Plan, and conduct an updated analysis of supply and demand (considering the Multi-jurisdictional Natural Hazard Mitigation Plan and other risks, e.g., cyber security).

[34] (Oregon State University, Oregon Water Resources Department, and MCWPP are developing a Water Management Economic Assessment Model using existing water supply, pricing, and consumption data integrated with climate change projections to simulate the impact of future water shortages and illustrate trade-offs among potential adaptation measures.)

Metric Methodology

- The amount of water stored (natural and built storage) and available for all beneficial uses (instream and out-of-stream) on an average annual basis increases in the Mid-Coast planning area.

Imperative 8. Ecosystem Protection and Enhancement

Ensuring the health of watershed ecosystems through protection and enhancement actions helps the sustainable delivery of ecosystem services, including adequate water quality and quantity, reduced drinking water treatment and infrastructure costs, reduced flood mitigation costs, increased resilience to climate change stressors and natural hazards, opportunities to recover listed species and provide habitat for native fish and wildlife, and reduced risk for invasive species introductions and establishment.

Objectives

- Restore watershed ecological function (ridgetop to ocean approach), including restoring riparian areas and instream flow and habitat functions, values, and benefits; re-establishing hydrologic and sediment transport regimes to a more natural state; restoring natural channel morphology; protecting, maintaining, and improving water quality in the region for all beneficial uses; and implementing watershed restoration projects that (a) cool streams and improve summertime flows for sensitive species and water quality impairments, and (b) identify, meet, protect, and restore peak and ecological flows.
- Balance instream and out-of-stream water uses.
- Ensure year-round summer stream flows are sufficient to meet the instream water needs of fish and wildlife.
- Waterbodies consistently attain water quality standards that protect drinking water and other beneficial uses.
- Anticipate and prepare for the effects of climate change stressors, which are predicted to influence precipitation, temperature, coastal inundation, ecosystem function, and water quality.
- Prioritize restoration work and support land practices that reduce drinking water contaminants.
- Identify, meet, protect, and restore peak and ecological flows.
- Promote natural water storage using beavers, wetlands, and green infrastructure.

Action Details

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
44	**Riparian Restoration; Restore Channels; Floodplain Reconnection; Restore Stream Flow: Support restoration projects that involve diverse landowners and land management goals in locations that will achieve the greatest ecological returns on investment (e.g., cooler streams and improved summertime flows for sensitive species and to address water quality impairments).**	A diversity of landowners participates in the implementation of restoration projects that enhance ecological function in the region.	**Lead:** Mid-Coast Watersheds Council, Salmon-Drift Creek Watershed Council, US Forest Service, Bureau of Land Management **Participants:** Private landowners, Soil and Water Conservation Districts, Salmon Safe, Mid-Coast Watersheds Council, Oregon Department of Fish and Wildlife, Oregon Department of Forestry, Oregon Department of Environmental Quality, volunteers, Lincoln County Department of Community Development, NOAA Fisheries, US Geological Survey, Tribal nations, Oregon Watershed Enhancement Board	PHASES 1-3	The estimated cost to implement the full suite of restoration and improvement projects to address actions in this section and support ecological functions: $70M to $1.1.27M[35]	▪ National Fish and Wildlife Foundation Resilient Communities[36]. ▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase I or Phase II Implementation). ▪ OWEB Partnership Technical Assistance Grant. OWEB Small Grant Program. ▪ OWEB Operating Capacity Grants. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Restoration Grant. ▪ Jubitz Family Foundation Environmental Grant. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS Coastal Program. ▪ USFWS Landowner Incentive Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.

[35] Source: Oregon Forest Resources Institute: https://oregonforests.org/sites/default/files/2019-01/OFRI_2019-20_ForestFacts_WEB.pdf

[36] Community demonstration & capacity-building projects that help communities understand environmental risks and opportunities and organize and take actions to improve local resiliency by enhancing natural buffers and system functions.

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
						▪ Starker Forests Grant. ▪ ODFW Access and Habitat Program. ▪ ODFW Wildlife Habitat Conservation and Management Program.
45	**Riparian Restoration; Restore Channels; Floodplain Reconnection; Restore Stream Flow: Use established methods (e.g., field assessment, remote sensing, and physical models, such as Heat Source) and local knowledge to prioritize stream reaches for riparian buffer restoration projects. Advocate for increasing wooded buffer zones associated with intermittent and non-fish bearing streams that feed source water as well as perennial streams that are not currently regulated (e.g., rural residential, urban, legacy agricultural areas).**	Healthy riparian areas in priority stream reaches. Achieve a clear understanding of locations/stream reaches where preservation of existing functional buffers would result in greatest protection against degradation of existing water quality.	**Lead:** US Forest Service, private landowners, Oregon Department of Forestry, Oregon Department of Environmental Quality, Oregon Department of Agriculture, Mid-Coast Watersheds Council, Salmon-Drift Creek Watershed Council **Participants:** Tribal nations, private landowners, Oregon Department of Fish and Wildlife	PHASE 2	$250,000	▪ National Fish and Wildlife Foundation Resilient Communities. ▪ OWEB Operating Capacity Grant. ▪ OWEB Restoration Grant. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.
46	**Riparian Restoration; Restore Channels: Advocate for the restoration and conservation of native riparian vegetation to facilitate large natural wood recruitment, maintain water quality, ensure ecological function, and produce habitat for aquatic species, including beavers.**	Native riparian vegetation is restored and conserved to support and enhance ecological function in the region. Woody buffer zones associated with all stream sizes, including intermittent and non-fish bearing streams, are increased. Riparian zones, including intermittent flow stream zones, are expanded and/or restored, to levels that provide adequate ecological functions.	**Lead:** Oregon Department of Environmental Quality, Mid-Coast Watersheds Council, Oregon Department of Agriculture, Oregon Department of Forestry **Participants:** Oregon Department of Fish and Wildlife, watershed councils, US Forest Service, Lincoln County Soil and Water Conservation District, Tribal nations, private landowners	PHASE 1	Riparian Restoration to provide ecological functions[37] on 357 miles of impaired streams: Low estimate (Min CREP buffer on 1518 acres) = $7,131,746 $7M Median (partially functioning buffer on 2818 acres) = $13,244,671 $13M High Estimate (fully functioning buffer on 4,335 acres) = $20,376,418 $20M	▪ National Fish and Wildlife Foundation Resilient Communities. ▪ OWEB Small Grant Program. ▪ OWEB Operating Capacity Grant. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Restoration Grant. ▪ Jubitz Family Foundation Environmental Grant. ▪ OWEB Forest Collaboratives Grants (federal lands). ▪ Meyer Memorial Trust Healthy Environment Program. ▪ USDA NRCS Emergency Watershed Protection Program. ▪ USDA NRCS Healthy Forests Reserve Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS Coastal Program. ▪ USFWS Landowner Incentive Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ ODFW Access and Habitat Program. ▪ ODFW Wildlife Habitat Conservation and Management Program. ▪ ODFW Riparian Lands Tax Incentive Program.

[37] Methods based on *Cost Estimate to Restore Riparian Forest Buffers and Improve Stream Habitat in the Willamette Basin, Oregon* (DEQ, 2010): ftp://deqftp2.deq.state.or.us/dwaltz/MCWPP/WillametteRipCost030310_V2.pdf

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
47	**Watershed Function and Ecosystem Services: Encourage longer forest rotations and implement more erosion control practices.**	Reduced sediment delivery to regional streams. Private forests are managed for multiple benefits, including ecological function and values (i.e., mimic natural watershed hydrology, sediment and nutrient processes and carbon storage). Larger proportion of road network is hydrologically disconnected from streams. Private forest operations widely implement Oregon Plan voluntary measures and report project data to the Oregon Watershed Restoration Inventory (OWRI)[38] or other databases, to track improvements.	**Lead:** US Forest Service, Bureau of Land Management, private industrial forestry, Oregon Department of Forestry, private small woodland landowners **Participants:** Watershed councils, Lincoln Soil and Water Conservation District, Oregon Department of Environmental Quality, Oregon Water Resources Department, Oregon Department of Fish and Wildlife	PHASE 2		▪ OWEB Operating Capacity Grant. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Forest Collaboratives Grants (federal lands). ▪ Business Oregon Drinking Water Source Protection Fund. ▪ Clean Water State Revolving Fund. ▪ USDA NRCS Healthy Forests Reserve Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS Landowner Incentive Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ ODFW Access and Habitat Program. ▪ ODFW Wildlife Habitat Conservation and Management Program. ▪ ODFW Riparian Lands Tax Incentive Program.
48	**Sediment Processes: Evaluate anthropogenic sources of fine sediment from all land uses, including mass wasting and unsurfaced roads.** **Prevention, Upgrades, and Repair: Seek funding opportunities to reduce shallow landslide risk and other sediment delivery hazards (e.g., undersized culverts, outdated road maintenance, legacy roads) and perform road upgrades, repair, and decommissioning.**	Mass wasting (shallow landslides and debris flows), surface and hillslope erosion and road sediment are reduced from all land uses. Natural sediment processes are restored to extent possible. A reduction in anthropogenic causes of mass wasting, culvert failures, and road sediment delivery to Mid-Coast region streams Private forest operations widely implement Oregon Plan voluntary measures and report project data to OWRI or other database to track improvements.	**Lead:** US Forest Service, Bureau of Land Management, Oregon Department of Forestry, private industrial forestry, private small woodland landowners **Participants:** Watershed councils, Lincoln SWCD, Oregon Department of Environmental Quality, Oregon Water Resources Department, Oregon Department of Fish and Wildlife, Lincoln County, private landowners	PHASES 1-3	$150,000	▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase II Implementation). ▪ OWEB Restoration Grants. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ USDA NRCS Emergency Watershed Protection Program. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program.
49	**Floodplain Reconnection and Wetlands: Protect beaver populations and encourage beaver pond creation, especially in critical areas with low summer flows.**	A measurable increase in wetland habitat and the amount of naturally stored water in critical areas where summer flows are low.	**Lead:** US Forest Service, Bureau of Land Management, Oregon Department of Fish and Wildlife, Mid-Coast Watersheds Council **Participants:** Oregon Department of Forestry, Oregon Department of Agriculture, Lincoln County, private landowners	PHASE 1	$150,000	▪ Bureau of Reclamation Cooperative Watershed Management Grant (Phase I). ▪ OWEB Operating Capacity Grant. ▪ Jubitz Family Foundation Environmental Grant.
50	**Riparian Restoration; Restore Channels; Restore Stream Flow: Design and implement restoration projects with partners to directly address impairments and improve conditions (e.g., erosion prevention and control, riparian and wetland buffers, urban tree protection).**	Restoration projects are collaboratively implemented to address limiting factors and improve ecological function.	**Lead:** Watershed councils, US Forest Service, Bureau of Land Management, Lincoln Soil and Water Conservation District **Participants:** Oregon Department of Agriculture, Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, OSU Extension Service, Oregon Department of Forestry Oregon Watershed Enhancement Board, water providers	PHASE 3	$250,000	▪ National Fish and Wildlife Foundation Resilient Communities. ▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase II Implementation). ▪ OWEB Partnership Technical Assistance Grant. OWEB Small Grant Program. ▪ OWEB Operating Capacity Grant. ▪ OWEB Stakeholder Engagement Grant. ▪ OWEB Restoration Grant.

[38] Oregon Watershed Restoration Inventory (OWRI)

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
						▪ ODEQ Supplemental Environmental Projects (SEP) Program. ▪ Georgia-Pacific Environment Grant Program. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ EPA Clean Water State Revolving Fund. ▪ USDA NRCS Emergency Watershed Protection Program. ▪ USDA NRCS Healthy Forests Reserve Program. ▪ EPA Nonpoint Source Section 319 Grants. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS Coastal Program. ▪ USFWS Landowner Incentive Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program. ▪ ODFW Access and Habitat Program. ▪ ODFW Riparian Lands Tax Incentive Program.
51	**Restore Stream Flow: Evaluate the mechanisms and conditions for restoring hyporheic flows (the transport of surface water through sediments in flow paths that return to surface water) in the Mid-Coast using a suite of strategies (articulated in the Oregon Plan and other plans).**	Channel conditions (morphology) and watershed mechanisms exist for restoring hyporheic flows. Mechanisms, conditions, and locations for restoring hyporheic flows are identified. Projects to restore hyporheic flows are developed and implemented.	**Lead:** Mid-Coast Watersheds Council, Salmon-Drift Creek Watershed Council, US Forest Service, Bureau of Land Management **Participants:** Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, US Geological Survey, Tribal nations		$150,000	▪ OWEB Technical Assistance Grant. ▪ OWEB Restoration Grant. ▪ Meyer Memorial Trust Healthy Environment Program. ▪ OWRD Water Projects Grants and Loans. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.
52	**Protect Stream Flow: Recommend limits on further appropriation of water on high priority streams where water available for meeting aquatic life needs.**	Further appropriation of water on high priority streams is limited to protect native fish and wildlife. The criteria for high priority streams is identified (e.g., streams which lack adequate summertime flow).	**Lead:** Oregon Department of Fish and Wildlife, Oregon Water Resources Department, Oregon Department of Environmental Quality (OAR 690-Div 33 review)[39] **Participants:** Mid-Coast Watersheds Council, Salmon-Drift Creek WC, Confederated Tribes of Siletz Indians of Oregon, water providers and municipalities, Wild Salmon Center	PHASE 2	$150,000	▪ Charlotte Martin Foundation Wildlife and Habitat Grant. ▪ OWEB Water Acquisition Grant. Business Oregon Drinking Water Source Protection Fund. ▪ OWRD Water Projects Grants and Loans. ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program.
53	**Restore Stream Flow: Support projects that result in increased water retention capacity in channels, floodplains, and adjacent uplands and wetlands using a variety of strategies.**	Review proposed restoration and enhancement projects with this objective as one outcome. Strategies and projects are implemented that increase water retention capacity in Mid-Coast channels, floodplains, uplands, and wetlands.	**Lead:** US Forest Service, Bureau of Land Management, MidCoast Watersheds Council, Salmon-Drift Creek Watershed Council, local planners **Participants:** Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Oregon Department of Forestry, Oregon Department of Agriculture, Oregon Department of State Lands, Oregon Water Resources Department, US Geological survey, Tribal nations	PHASES 1-3	Cost estimates included in actions 44 and 46	▪ OWEB Focused Investment Partnership (FIPs). ▪ Bureau of Reclamation Cooperative Watershed Management Grant (Phase I or Phase II Implementation). ▪ OWEB Small Grant Program. ▪ OWEB Restoration Grant. ▪ USDA NRCS Agricultural Conservation Easement Program. ▪ OWRD Water Projects Grants and Loans.

[39] https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=3153

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
						▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ USFWS National Coastal Wetlands Conservation Grant Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.
54	**Restore Stream Flow: Determine ecological flows (seasonally varying flow targets and temperature-based flow targets), and identify basin-wide in-stream demands. Support development of additional instream water rights. Implement flow restoration efforts in high priority areas as determined by Instream Water Right Monitoring and other means (e.g., ODFW's Aquatic Habitat Prioritization).**	Ecological flows are identified for the highest priority waterways. Projects are identified to protect and restore instream flow.	**Lead:** Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Oregon Water Resources Department, Oregon Parks and Recreation Department **Participants:** Mid-Coast Watersheds Council, Salmon-Drift Creek Watershed Council, water users, Oregon Department of State Lands, local planners	PHASE 1	$250,000	▪ OWEB Partnership Technical Assistance Grant. ▪ OWRD Water Projects Grants and Loans. ▪ U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program. ▪ NFWF Five Star and Urban Waters Restoration Grant Program.
55	**Restore Stream Flow: Use established voluntary programs, or other tools, to convert existing water rights (e.g., irrigation, commercial use, other out-of-stream uses) to instream uses that protect critical flows needed to support fish and wildlife, water quality, recreation, and scenic attraction.**	An analysis is conducted in Mid-Coast watershed basins to prioritize locations in need of instream water rights. In-stream water rights are established that protect the full suite of flows for a diversity of uses.	**Lead:** Oregon Department of Environmental Quality, Oregon Water Resources Department, Oregon Parks and Recreation Department (state agencies for new rights), Oregon Department of State Lands, water providers and municipalities **Participants:** Oregon Department of Fish and Wildlife, Mid-Coast Watersheds Council, Oregon Water Resources Department, Oregon Watershed Enhancement Board (nonprofits for existing rights), water rights holders	PHASE 1 for analysis PHASE 2 to obtain or transfer rights	$250,000	▪ OWEB Water Acquisition Grant. ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program.
56	**Control Invasive Weeds: Identify priority invasive species in each watershed, and seek funding to support control and management of invasives in streams and along stream corridors while encouraging establishment of native vegetation.**	Priority invasive species are identified, controlled, and managed. Prevent new invasive species introductions and decrease the scale and spread of current infestations.	**Lead:** Mid-Coast Watersheds Council, Oregon Department of Agriculture, Soil and Water Conservation Districts **Participants:** Oregon Invasive Species Council, local watershed groups, Oregon Department of Forestry, Oregon Department of Fish and Wildlife	PHASES 1-3	$250,000	▪ Oregon Invasive Species Council (OISC) Invasive Species Education and Outreach Grant. ▪ OWEB Operating Capacity Grant. ▪ OWEB Restoration Grant. ▪ Georgia-Pacific Environment Grant Program. ▪ ODA Noxious Weed Grant Program. ▪ ODFW's Wildlife Integrity Program. ▪ USFWS Coastal Program.
57	**Protect Existing Complex Forest; Strategic Thinning; Prescribed Fire; Promote Native Understory Vegetation: Advocate for implementation of the Lincoln County Multi-Jurisdictional Natural Hazard Mitigation Plan, especially as it relates to wildfire mitigation in the Mid-Coast.**	Implementation of the Lincoln County Multi-Jurisdictional Natural Hazard Mitigation Plan, especially as it relates to wildfires, is supported throughout the Mid-Coast Region.	**Lead:** Lincoln County, US Forest Service, Oregon Department of Forestry	PHASE 1	$150,000	
58	**Easements and acquisitions: Acquire land, or obtain conservation easements, to protect critical land areas managed for water quality protection.**	Critical lands are in drinking water source areas/watersheds are protected. Key areas are publicly owned and managed, or managed for conservation. An increasing proportion of acreage in drinking water source areas is protected.	**Lead:** Counties, water providers and municipalities, US Forest Service, Bureau of Land Management, watershed councils, non-governmental organizations, Natural Resources Conservation Service, corporations, McKenzie River Trust **Participants:** private landowners, Oregon Watershed Enhancement Board	PHASES 1-2	$10,000,000	▪ Bureau of Reclamation WaterSMART Cooperative Watershed Management Program (Phase I or Phase II Implementation). ▪ Meyer Memorial Trust Healthy Environment Program. ▪ Business Oregon Drinking Water Source Protection Fund. ▪ USDA NRCS Emergency Watershed Protection Program. Safe Drinking Water Revolving Loan Fund (SDWRLF). ▪ USDA Rural Development Water and Waste Disposal Loan and Grant Program. ▪ ODFW Access and Habitat Program.

	Action	Desired Outcomes	Potential Lead & Participants	Timeline	Budget	Potential Funding Sources
						▪ OWEB land acquisition funds.
59	**Support and advocate for the compilation of a hierarchy of necessary spatial analyses and modeling to determine which conservation strategies, and locations on the landscape, will result in the greatest environmental returns on investment (ROI) (e.g., ecological function) and achieve the highest priorities in existing species recovery plans (e.g., improving winter and summer rearing habitats). Advocate for implementation of strategies in federal Coho recovery plan and Oregon coast Coho Conservation Plan (OWEB FIP Framework).**	Spatial analyses are conducted/compiled to identify strategies, and locations on the landscape, to achieve the greatest environmental returns on investment (ROI) (e.g., ecological function) and actions support existing recovery plans.	**Lead:** Mid-Coast Watershed Council, Oregon Watershed Enhancement Board, Oregon Department of Environmental Quality, US Forest Service, Lincoln County Soil and Water Conservation District, Oregon Water Resources Department, Lincoln County **Participants:** Environmental Protection Agency (Bob McKane/Visualizing Ecosystem Land Management Assessments (VELMA) modeling), US Geological Survey, Tribal nations, non-governmental organizations, Oregon Watershed Enhancement Board, Oregon Department of Fish and Wildlife	PHASE 2	$250,000	▪ OWEB technical assistance grants.
			TOTAL		**$99.5M–$1,169M**	

Performance Metrics

- Ecological function (i.e., natural watershed hydrology, sediment, nutrient and carbon processes) is enhanced throughout Mid-Coast watersheds.
- Stream habitat projects are implemented to address key limiting factors.
- Native trees and shrubs are planted in riparian areas and on floodplains.
- Invasive species are eradicated, or controlled, to desired levels.
- Lateral side-channels and floodplains are reconnected to stream channels.
- Measurable improvement in aquatic habitat condition and trends for all primary land uses in the Mid-Coast strata based on ODFW aquatic habitat inventory and Oregon Plan Habitat Monitoring methodology.[40]
- Water rights transactions keep more water in streams and incorporate conservation and water efficiency strategies.
- No net loss in working lands acreage in the Mid-Coast region of Oregon.
- Net increase in land acquisition and easements that protect water quality.
- Natural storage (e.g., beavers, wetlands) projects are implemented.
- Land is preserved in priority areas.

Metric Methodology

- The Mid-Coast adopts a tool to assess ecosystem recovery (e.g., 5-Star Recovery System in Action), and evaluates progress in protecting and enhancing Mid-Coast ecosystems through time.
- ODFW aquatic habitat inventory & Oregon Plan Habitat Monitoring methodology is utilized and widely supported[41].

[40] Oregon Plan Habitat Monitoring: https://odfw.forestry.oregonstate.edu/freshwater/inventory/op_reports.htm.

[41] ODFW Aquatic Inventories Project: https://odfw.forestry.oregonstate.edu/freshwater/inventory/methods.html.

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Appendices

A. Definitions.

B. Mid-Coast Water Planning Partnership Step 2 reports.

C: Individuals that participated in steps two through four of the planning process.

D. Snapshot summary of the major drainage basins in the Mid-Coast.

E. Crosswalk of the Mid-Coast Water Planning Partnership Plan actions with other important regional conservation initiatives.

F. Water providers by population served and connections.

G. User's Guide for interactive and mapping features on Oregon Explorer.

H. Issues identified during collaborative planning but not carried forward.

I. Federal and state policies and programs pertaining to Mid-Coast water management.

J. Oregon's Mid-Coast estuaries.

Appendix A: Definitions

Adaptive Capacity. The ability of systems, organizations, and individuals to (1) adjust to actual, or potential, adverse changes and events; (2) take advantage of existing and emerging opportunities that support essential functions or relationships; or (3) cope with adverse consequences, mitigate damages, and recover from system failures. Adaptive capacity is an indicator of how well a system will adjust to, or recover from, external changes, or large perturbations (e.g., severe floods or droughts). See also "resilience."

Agricultural water use efficiency. The ratio of the amount of water required to sustain agricultural productivity to the total applied water. Efficiency is increased through the application of less water to achieve the same beneficial productivity, or by achieving more productivity while applying the same amount of water.

Annual Peak Flow. The maximum instantaneous discharge from a stream. It is the highest annual discharge and includes both groundwater contributions and direct runoff.

Anthropogenic. Of human origin or resulting from human activity.

Aquifer. A geologic formation, group of formations, or part of a formation, that contains saturated and permeable material capable of transmitting water in sufficient quantity to supply wells, or springs, and that contains water that is similar throughout in characteristics, such as potentiometric head, chemistry, and temperature.

Available groundwater storage capacity. The volume of a groundwater basin that is unsaturated and capable of storing groundwater.

Average annual runoff. The average value of total annual runoff volume calculated for a selected period of record, at a specified location, or area.

Beneficial use. As part of the nine regional water quality control boards' basin planning efforts, up to 25 water-quality beneficial use categories for water have been identified for human and instream uses.

Biosolids. Wastewater treatment residuals, not including material removed during preliminary treatment, treated to levels that allow agronomic use in accordance with federal law.

Catchment. The area of land that catches and collects water above a reservoir, or other storage structure.

Climate change. Changes in long-term average temperature, precipitation, wind, or other variables in a specific region.

Consumed Water. Water that does not return to the system for other uses.

Contaminant. Any substance, or property, preventing the use of, or reducing the usability of, water for ordinary purposes, such as drinking, preparing food, bathing, washing, recreation, and cooling. Any solute or cause of change in physical properties that renders water unfit for a given use. (Generally considered synonymous with pollutant.)

Domestic Well. A water supply well used to serve no more than three residences for the purpose of supplying water for drinking, culinary, or household uses, and which is not used as a public water supply.

Green Infrastructure. A subset of natural infrastructure. It mimics natural systems at the neighborhood, or site scale, and can be part of an integrated approach to addressing water management challenges in residential, municipal, and industrial developments. Examples of green infrastructure include eco-roofs, green street swales, and neighborhood natural areas that filter sediment and other pollutants carried by stormwater runoff.

Hydrologic Cycle. The general pattern of water movement by evaporation from sea to atmosphere, by precipitation onto land, and by return to sea under influence of gravity.

Integrated. To make whole by bringing all parts together.

Integrated Pest Management. Integrated Pest Management (IPM) is a sustainable, science-based, decision-making process that combines biological, cultural, physical, and chemical tools to identify, manage, and reduce risk from pests and pest management tools and strategies in a way that minimizes overall economic, health and environmental risks (National IPM Roadmap Definition, updated in 2018).

Integrated Water Resource Management (a.k.a. One Water)**.** An approach, or process, to managing water that holistically assesses the planning and management of water supply, wastewater, and stormwater systems, focusing on the water cycle as a single connected system while promoting coordinated development and management of water, land, and related resources to maximize the economic and social benefits while minimizing impacts to the environment (American Planning Association 2020).

Natural Infrastructure. The strategic use of natural lands, such as forests and wetlands, and working lands, such as farms and ranches, to meet infrastructure needs. Natural infrastructure can also mimic natural systems to achieve outcomes. Natural infrastructure can be more cost-effective than built infrastructure, and frequently provide a broader suite of environmental, economic, and community benefits.

Permeability. The ability of material to transmit fluid, usually described in units of gallons per day per square foot of cross-section area. It is related to the effectiveness with which pore spaces transmit fluids.

Prior Appropriation Doctrine. A method of allocating water rights whereby the first person to divert a quantity of water from a water source for a beneficial use has the right to continue to

use the appropriate quantity of water for that beneficial use. Subsequent persons can appropriate the remaining water for their own beneficial purposes, provided they do not interfere with the rights of prior appropriators. Oregon's Water Code is built on the prior appropriation doctrine and has been adapted to recognize instream rights that do not divert water.

Public Water System. A system for the provision to the public of piped water for human consumption, if such system has more than three service connections, or supplies water to a public or commercial establishment that operates a total of at least 60 days per year, and that is used by 10 or more individuals per day. Public water system also means a system for the provision to the public of water through constructed conveyances other than pipes to at least 15 service connections, or regularly serves at least 25 individuals daily at least 60 days of the year. A public water system is either a "Community Water System," a "Transient Non-Community Water System," a "Non-Transient Non-Community Water System" or a "State Regulated Water System."

Resilience. The capacity of a resource/natural or constructed system to adapt to and recover from changed conditions after a disturbance.

Senior Water Right. Under the prior appropriation doctrine, during times of shortage, older water rights are fulfilled before more recent (junior) rights are fulfilled.

Stormwater. Stormwater runoff is generated from rain and snowmelt events that flow over land or impervious surfaces, such as paved streets, parking lots, and building rooftops, and does not soak into the ground. The runoff picks up pollutants, such as trash, chemicals, oils, and dirt/sediment that can harm our rivers, streams, lakes, and coastal waters (EPA 2020). Stormwater systems include traditional gray infrastructure, such as storm sewers, as well as green, or nature-based infrastructure.

Surface Water. Water that collects on the surface of the ground in a stream, river, lake, or wetland.

Wastewater. Wastewater is water that has been used and must be treated before it is released into another body of water so that it does not pollute water sources. Wastewater comes from a variety of sources, including home use (toilets and drains), rainwater and runoff, and agricultural and industrial sources (Safe Drinking Water Foundation 2020).

Water Conservation. Water conservation includes strategies, policies, incentives, outreach, and regulations implemented to efficiently manage water resources to ensure sustainable water supplies for current and future demand. It addresses both indoor and outdoor water usage.

Water Cycle. The hydrologic cycle that describes the continuous movement of water on, above, and below the surface of the Earth.

Water Right. A right to the beneficial use of water that travels or collects in streams, rivers, lakes, ponds, or underground, including the allocation of the water to storage for future use. Water rights are property rights, but water right holders do not own the water itself, they possess the right to use it. Depending on the type of water law doctrine, they may be attached to ownership of the land, or they may exist as a separate property right. Water rights are restricted to use at a specific place, for a specific purpose, and in a specific quantity. Water rights are recognized for out-of-stream uses and instream uses.

Water Supply. Water for human use comes from two primary sources—surface water and groundwater. Water supply systems convey, store, treat, and distribute water. Understanding water use helps to evaluate the effects of future development on water supply sources, which also support ecosystem needs.

Well. Any artificial opening or artificially altered natural opening, however made, by which groundwater is sought, or through which groundwater flows under natural pressure, or is artificially withdrawn or injected. This definition shall not include a natural spring, or wells drilled for the purpose of exploration, or production of oil or gas. Prospecting, or exploration for geothermal resources as defined in ORS 522.005, or production of geothermal resources derived from a depth greater than 2,000 feet as defined in 522.055, is regulated by the Department of Geology and Mineral Industries.

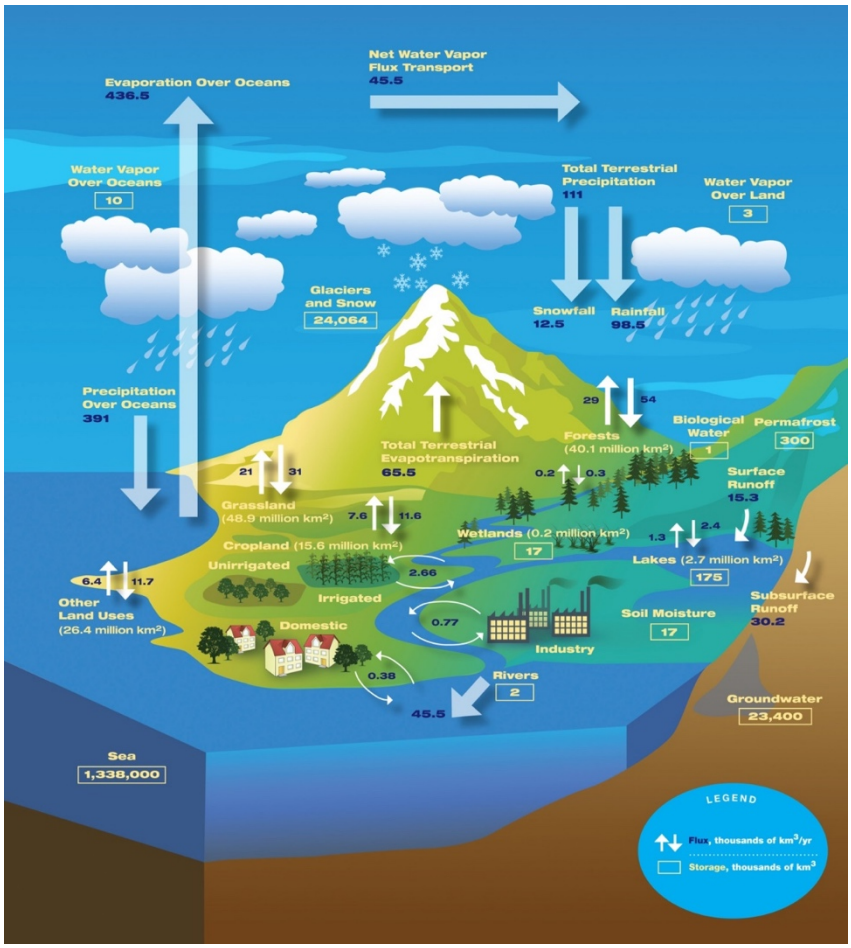


Figure A-1. Water cycle diagram. NASA/JPL Flickr (CC BY 2.0).

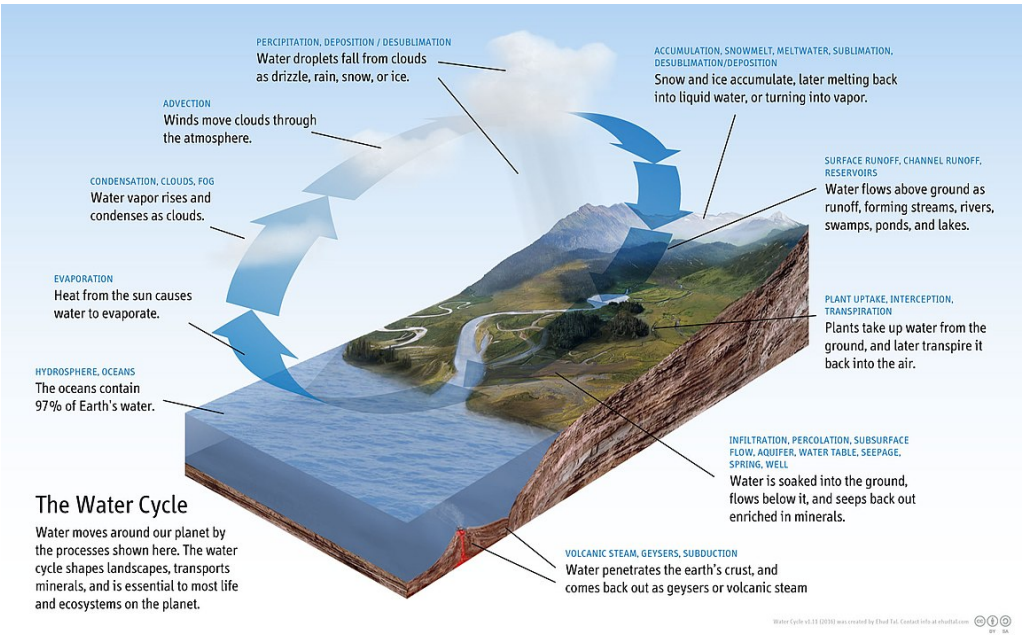


Figure A-2. *Water Cycle diagram.* Ehud Tal - Own work, CC BY-SA 4.0, https://creativecommons.org/licenses/by-sa/4.0.

Appendix B: Mid-Coast Water Planning Partnership Step 2 Reports

Mid-Coast Water Resources Characteristics – Water Quality (February 2018)

Mid-Coast Water Resources Characteristics – Water Quantity (February 2018)

Mid-Coast Water Resources Characteristics – Built Systems (February 2018)

Mid-Coast Water Resources Characteristics – Ecology (February 2018)

Appendix C: Individuals that participated inSteps Two Through Four of the Planning Process

Step Two

Water Quality Study Group

Jo Morgan, Oregon Department of Agriculture
David Westgate, Lincoln Soil and Water Conservation District
Tim Gross, City of Newport
Cyndi Karp, Ecosystem Advocate
Stephanie Reid, Lincoln City Public Works
Lila Bradley, Lincoln City Public Works
David White, Rogue Brewery
Matt Thomas, Oregon Department of Forestry
Leon Nelson, Beverly Beach Water District
Martin Klinger, Panther Creek Water District
Tyler Alexander, Oregon Farm Bureau
Tim Miller, Oregon Farm Bureau
Seth Barnes, Oregon Forest Industries Council
Harmony Burright, Oregon Water Resources Department

Ecology Study Group

John Spangler, Oregon Department of Fish and Wildlife
Mark Saelens, Lincoln County
Wayne Hoffman, MidCoast Watersheds Council
Joyce Sherman, RiverGraphics
Jeanne Anstine, Newport Community Gardens
Harmony Burright, Oregon Water Resources Department
Martin Klinger, Panther Creek Water District
Cyndi Karp, Ecosystem Advocate
John Stevenson, OSU, Oregon Climate Change Research

Step Three

Self-supplied water users (rural residents, agricultural water users, industrial users)

Alan Fujishin, Gibson Farms
Nikki Hendricks, Oregon Water Resources Department
Paul Robertson, Robertson Environmental
Audrey Sweet, Lincoln Soil and Water Conservation District
Jo Morgan, Oregon Department of Agriculture
Amy Chapman, Lincoln County Public Health

Don and June Larson, Siletz Watershed Council
Cyndi Karp, Ecosystem Advocate
Harmony Burright, Oregon Water Resources Department

Municipal water providers and special districts (municipalities or districts that provide water to residents, businesses, and industries in their service area)

Adam Denlinger, Seal Rock Water District
Tim Gross, City of Newport Public Works
Stephanie Reid, City of Lincoln City Public Works
Bradley Wynn, Seal Rock Water District
Jim Tooke, City of Yachats City Councilor
Ricky McClung, City of Yachats Public Works
Scott Andry, City of Waldport Public Works
Rod Cross, Mayor of Toledo
Jay Macpherson, Oregon Health Authority
Suzanne DeSzoeke, GSI Water Solutions
Cyndi Karp, Ecosystem Advocate
Harmony Burright, Oregon Water Resources Department

Instream/ecology (water for rivers, fish and wildlife, and other instream values)

Emily Bell Dinan, Lincoln Soil and Water Conservation District
Leo Williamson, Oregon Department of Forestry
Don Andre, Oregon Coast Community Forest Association
Evan Hayduk and Wayne Hoffman, Mid-Coast Watersheds Council
Joyce Sherman, Stewards of Rocky Creek
Bill Montgomery, Coastal Resident
Mark Saelens, Lincoln County
Penelope Kaczmarek, Coastal Resident
Vince Mastropietro, Coastal Resident
Paul Englemeyer, Coastal Resident
Mike Broili, Coastal Resident
Mark River and Maryanne Reiter, Weyerhaeuser
John Spangler, Oregon Department of Fish and Wildlife
Cyndi Karp, Ecosystem Advocate
Rachel Lovellford, Oregon Department of Fish and Wildlife
Harmony Burright, Oregon Water Resources Department

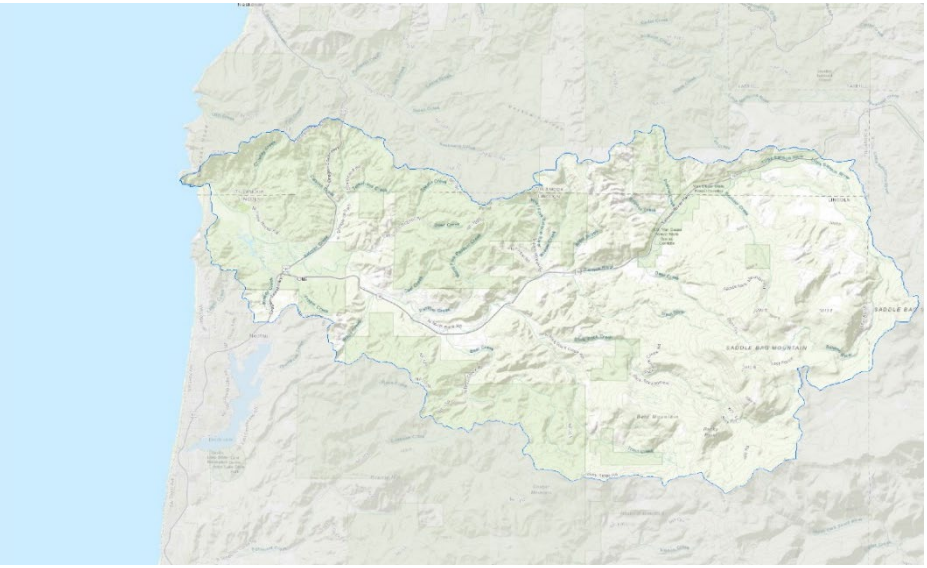
Step Four

Don, Andre, Oregon Coast Community Forest Association
Jeanne Anstine, Newport Community Gardens
Caylin Barter, Wild Salmon Center
David Bayus, Johnson Creek Water Services Company
Jennifer Beathe, Starker Forests, Inc.
Shannon Beaucaire, City of Yachats
Mike Broili, MidCoast Watersheds Council
Harmony Burright, OWRD
Suzanne de Szoeke, GSI Water Solutions, Inc.
Jacquie Fern, Oregon DEQ
Alan Fujishin, Gibson Farms
Timothy Gross, Civil West Engineering Services, Inc.
Evan Hayduk, MidCoast Watersheds Council
Jen Hayduk, Lincoln Soil and Water Conservation District
Chris Janigo, City of Newport
Penelope Kaczmarek, Interested citizen
Jay MacPherson, Oegon Health Authority
Tim Miller, Lincoln County Farm Bureau
Bill Montgomery, Interested citizen
Clare Paul, City of Newport
Lisa Phipps, DLCD
Paul Robertson, Robertson Environmental LLC
Mark Saelens, Saelwood LLC
Greg Scott, City of Yachats
Billie Jo Smith, Interested citizen (Former Toledo Mayor)
Matt Thomas, Oregon Department of Forestry
David Waltz, Oregon DEQ, Nonpoint Source and Drinking Water Protection Programs
Geoffrey Wilkie, Interested citizen

APPENDIX D IS A TEMPLATE – INFO IN THIS APPENDIX IS OUTDATED – WILL BE UPDATED IN OCTOBER.

Appendix D: Snapshot summary of the major sub-areas in the Mid-Coast

Salmon River Ocean Drainage Area



Key Sub Areas

Small water provider vulnerabilities –Panther Creek Watershed District, Guptil subdivision

Aging septic systems in Panther Creek Watershed.

Instream flow deficits.

Water quality limited streams that do not meet beneficial use criteria.

Key Sub-Area States

Pollution in Panther Creek (PC Water District Source Water Assessment); Salmon River water quality listed for fecal coliform; Panther Creek has E. coli spikes (Salmon Drift Creek Watershed Council)

Coastal Cutthroat Trout, Fall Chinook, and Winter Steelhead are OCS strategy species; Chum are sensitive critical (ODFW); Coho federally threatened (ESA); Pacific Lamprey are sensitive (ODFW)

Salmon River estuary and watershed are within Salmon River Estuary-Cascade Head Conservation Opportunity Area; State-recognized Important Bird Area

Key diversions/users

- Panther Creek Water District (700)—Source: Panther Creek, then GW 3
- Salmon River Mobile Village (75)—Source: GW
- Salmon River RV Park (69)—Source: GW
- Hiland WC Westwood (120)—Source: GW
- Hiland WC-Riverbend Park Water System (172)—Source: Duncan and Noname Creeks
- Hiland WC-Echo Mountain Park (362)—Source: GW
- Hiland WC-Boulder Creek (350)—Source: GW
- Hiland WC-Bear Creek (275)—Source: GW, Callow Creek
- Guptil Subdivision (28)—Source: GW (runs out of water in summer; looking for new source)

***Instream flow stream deficits* (ODFW)**

Salmon River, Deer Creek, Salmon Creek, Bear Creek, Sulphur Creek, Panther Creek, and portions of Slick Rock Creek and Salmon River

High priority WABs for streamflow

- Salmon Creek at Mouth (WAB 01010)
- Panther Creek at Mouth (WAB 010310)
- Bear Creek at Mouth (WAB 010320)
- Salmon River above Slick Rock Creek (WAB 010340)
- Sulphur Creek at Mouth (WAB 010341)

Water quality limited streams that do not meet beneficial use criteria (ODEQ)

- Crowley Creek (Temperature)
- Deer Creek (Biological criteria)
- Salmon River (Dissolved oxygen, fecal coliform, temperature.

Siletz Bay Ocean Drainage Area

Key Sub Areas

- Water quality in Devil's Lake watershed.
- Aging infrastructure in Devil's Lake.
- Lack of interconnections and Kernville- Gleneden Beach- Lincoln Beach Water District has insufficient water treatment plant capacity.
- Diversion and turbidity issues on Schooner Creek.
- Diversions on Drift Creek.
- Lincoln City WWTP Discharge Location—Schooner Creek RM 1.1.

Key Sub-Area States

- Unnamed stream, tributary to Devil's Lake listed as water quality limited for aquatic weeds or algae, chlorophyll a, and pH; Algal blooms in Devil's Lake.
- Coho federally threatened (ESA); Fall Chinook, Winter Steelhead, and Pacific, Brook, and River Lamprey listed as sensitive (ODFW); Green Sturgeon Southern Distinct Population Segment listed as threatened (ESA); White Sturgeon (OCS)
- Devil's Lake Watershed is a part of the Devil's Lake Conservation Opportunity Area (ODFW); Drift Creek Area is a part of the Siletz River Conservation Opportunity Area, Moolack Frontal is an area of ecological importance (OCS).

Key diversions/users

- Lincoln City's sole source of water is Schooner Creek (water rights for up to 16.5 cfs). A 2nd water intake occurs on Drift Creek – City has 1.0 cfs of certified water rights, which it can use only when withdrawals from Schooner Creek cannot meet demand.
- Kernville-Gleneden-Lincoln Beach Water District has water rights for up to 5.5 cfs on Drift Creek and up to 2.0 cfs on an unnamed tributary to Drift Creek (which it can use only in lieu of the district's other rights during high turbidity events on Drift Creek and only from October 15 to May 15).

Instream flow deficits

- Schooner Creek, Drift Creek, and Rock Creek (ODFW) where instream rights occur
- Erickson Creek, Schooner Creek, Drift Creek, and D-River, where proposed instream water rights occur.

High Priority WABs for Streamflow

Schooner Creek at Mouth (WAB-030) and Drift Creek at Mouth (WAB-040) are highest, followed by D-River at Mouth (WAB 020)—high.

Water quality limited streams that do not meet beneficial use criteria (ODEQ)

- Unnamed Stream / Devils Lake-Aquatic Weeds or Algae; Chlorophyll a; pH.
- Rock Creek—Temperature
- Thompson Creek—Fecal Coliform
- Schooner Creek (near Lincoln City)—E. Coli; Temperature
- South Fork Schooner Creek—Temperature
- Drift Creek-Temperature; Biological Criteria
- Pacific Ocean—D River: Enterococcus

Siletz River Ocean Drainage Area

Key Sub Areas

Reduced water quality in the Siletz River
City of Newport:
Water loss in city systems.
Public safety concern—Big Creek Dam (high hazard earthen dam).
WWTP produces Class A biosolids that can be sold, or land applied without restriction
City of Toledo:
A percentage of non-revenue water in city systems
Wastewater treatment plant deficiencies
Mill Creek: Excess temperatures, Diversion and conveyance infrastructure needs to be repaired and replaced.

Key Sub-Area States

A. Coho federally threatened (ESA); Fall Chinook, Spring Chinook, Chum, Summer Steelhead, Winter Steelhead, Cutthroat Trout, Pacific Lamprey.

B. Siletz River, Middle Siletz, and Lower Siletz are critical habitat for Oregon Coast Coho Salmon (NMFS). A large portion of the Siletz River watershed is a Conservation Opportunity Area (COA) (ODFW).

C. High turbidity during winter months (the City of Newport to shift water sources from the Siletz River to Big Creek).

- Annual water loss in the City of Newport (19.88% in 2006).
- Annual non-revenue water in the City of Toledo (21.9% in 2015).
- Sanitary sewage overflows during heavy rainfall (Nov-Feb) caused by high levels of inflow and infiltration within the collection system.
- Algal blooms in Mill Creek Reservoir during the summer and Fall prevent the City of Toledo from using water.
- Diversion and conveyance infrastructure in the Mill Creek watershed need to be repaired and replaced.

Key Diversions/Users

- City of Newport (sources of water are Siletz River [6 cfs water rights] and Big Creek [10 cfs water rights])
- Seal Rock Water District (source of water is the City of Toledo – Siletz River). A 12-inch water line connects the District to the City of Newport to provide the city water in an emergency. SRWD also has water rights in the Beaver Creek-Ocean Tributaries drainage area on Henderson Creek, Hill Creek, and Beaver Creek.
- City of Siletz (source of water is the Siletz River). Sends water to Seal Rock Water District through one pipeline.
- City of Toledo (sources of water are the Siletz River and Mill Creek watershed [except in summer and Fall – algae]). Treats water for Seal Rock Water District.

- Georgia Pacific Mill (source of water is Olalla Reservoir on West Fork of Olalla Creek – stores water from Siletz River for plant in Toledo. Maintains tidegate at RM 0.8 on Olalla Creek to prevent upstream flow of salt water from Yaquina River.
- Lower Siletz Water System
- Carmel Beach Water District

D1. Interconnections:12-inch water line connects SRWD to City of Newport for emergency water. Booster station at intertie allows Newport to feed all of SRWD; only south of Yaquina Bay can be fed from SRWD.

Instream flow deficits occur streams with existing water rights: Bear Creek, Cedar Creek, Euchre Creek, Gravel Creek, Mill Creek, Rock Creek, South Fork Siletz River, Sam Creek, Siletz River #1, North Fork Siletz River, Little Rock Creek (ODFW). Proposed instream water rights occur on streams with instream flow deficits (ODFW): bold above and Siletz River #2, Buck Creek, Sunshine Creek, Gravel Creek.

High Priority WABs for Streamflow

Siletz River at mouth (WAB 050), Mill Creek at mouth (WAB 04043.

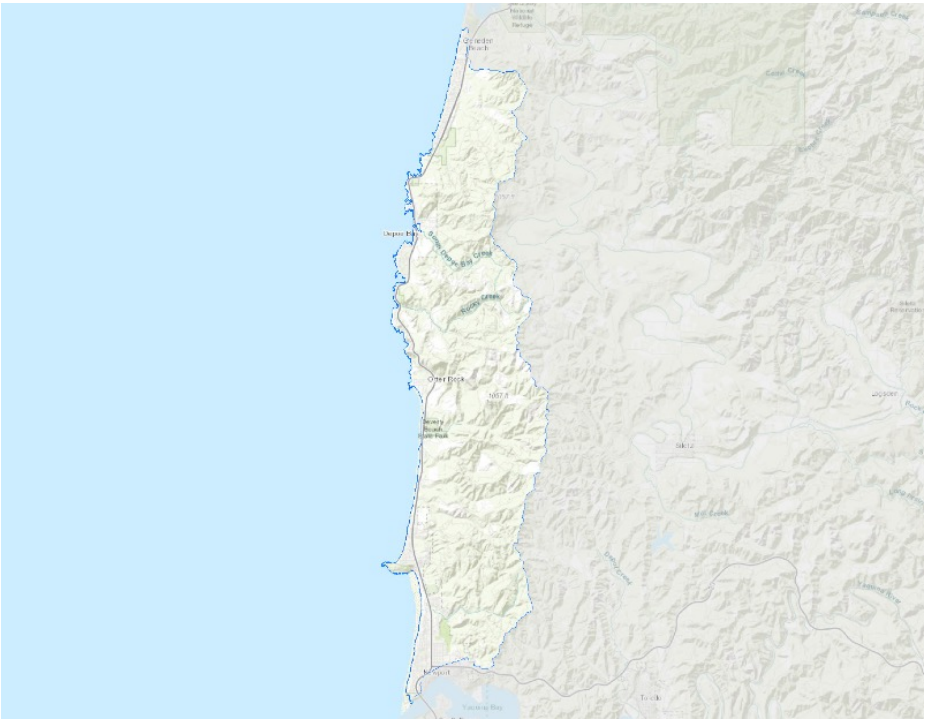
Water quality limited streams that do not meet beneficial use criteria (ODEQ)

- Cerine Creek—temperature
- Mill Creek—temperature
- North Creek—temperature
- Anderson Creek—temperature, biological criteria
- Siletz River—DO, temperature, turbidity
- South Fork Siletz River—biological criteria, temperature

Infrastructure Issues

- City of Newport Big Creek Dam is a high hazard earthen dam.
- City of Toledo wastewater treatment plant not operating as designed and has reduced capacity during winter months, affecting Yaquina River.
- City of Toledo needs to rebuild Mill Creek pump station and transmission piping; refurbish storage tanks; replace station force main; repair pipelines; rehabilitate manhole.
- City of Siletz—wastewater overflow events during winter heavy rainfalls.

Depoe Bay Ocean Drainage Area



Key Sub-Area States

Key Diversions

Bay Hills Water Association (near Newport): source water is intermittent stream dam and improved springs. No additional taps permitted; insufficient water source in summer. Water association run by volunteers.

Beverly Beach Water District (near Newport)—source water is Wade Creek—need qualified plant operator and treatment staff.

City of Depoe Bay: source water is South Depoe Bay Creek, North Depoe Bay Creek, and Rocky Creek. When WTP capacity is insufficient to meet demands, the City meets the shortfall by relying on water from the recently built North Reservoir on North Depoe Bay Creek.

Inn at Otter Crest: source water is Johnson Creek. System is on septic.

Johnson Creek Water Service: source water is Johnson Creek. Water is sold to Sea Crest. System is on septic.

Otter Rock Water District: source water is 2 permanent springs and 1 seasonal spring. System is on septic.

Sea Crest: Purchases water supply from Johnson Creek Water Service, which uses Johnson Creek as a source.

High Priority WABs for Stream Flow
Depoe Creek at mouth (WAB 220)

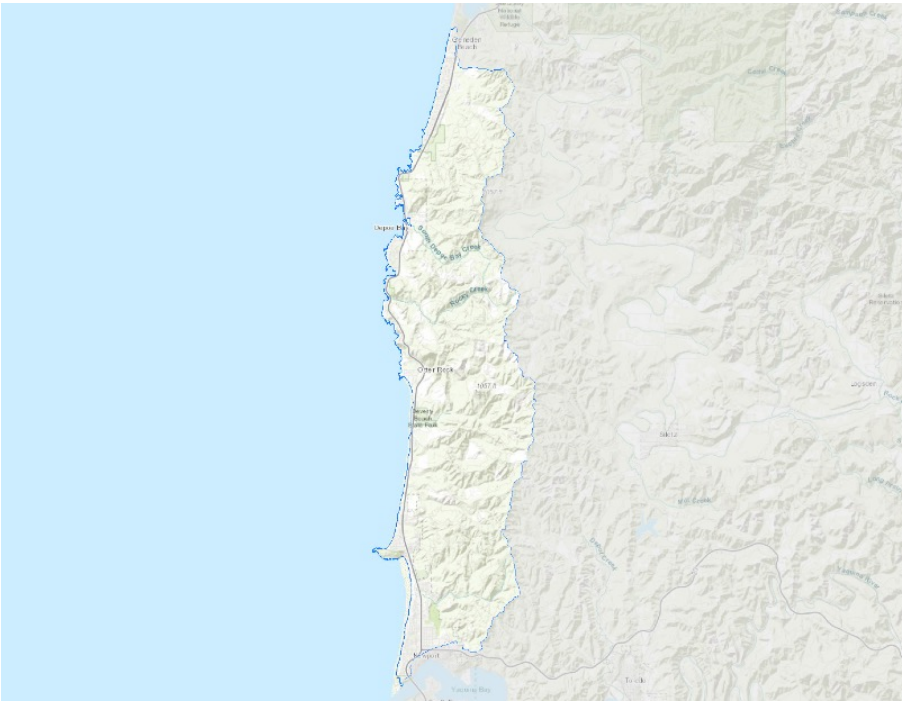
Water quality impairments

- Beverly Beach—Enterococcus
- Agate Beach—Enterococcus

Key infrastructure issues

- City of Depoe Bay's WWTP operates at 47% capacity (treats water from Gleneden Sanitary District); no sanitary sewer overflows since permit renewal in 2003.
- City of Depoe Bay's WTP cannot produce enough finished water to meet MDD.
- New North Reservoir has alleviated issue in short-term.

Yaquina River Ocean Drainage Area



Key diversions/users
Bay Hills Water Association system is on septic, reservoir intercepts intermittent stream (unnamed stream, tributary to Yaquina River).

Instream flow deficits on streams with existing instream water rights
Elk Creek, Little Elk Creek, Simpson Creek, Yaquina River, Grant Creek, Feagles Creek, Deer Creek, Bear Creek, Mill Creek, and Olalla Creek. Instream flow deficits on streams with proposed instream water rights: Olalla Creek, Simpson Creek, Bear Creek, Big Elk Creek, Deer Creek, and Little Elk Creek.

High Priority WABs for Streamflow
Olalla Creek at mouth (WAB 0601); Mill Creek at mouth (WAB 0602); Elk Creek above Grant Creek (WAB 060323); Feagles Creek at mouth (WAB 0603231); Yaquina River above Elk Creek

Key Sub-Areas
Deficiencies in City of Toledo Wastewater Treatment Plan

Insufficient water source for Bay Hills Water Association

Fecal coliform in Yaquina River Drainage Area, including 42 miles of Yaquina River having insufficient water treatment plant capacity.

Key Sub-Area States
A. WWTP discharges into the Yaquina River at River Mile 13.7. The WWTPO is not operating as designed (has diminished capacity in the winter) and the outfall pipe to the Yaquina River does not have sufficient capacity. The wastewater system has excessive inflow and infiltration. No additional taps permitted for Bay Hills Water Association. A total of 50.6 miles of streams are listed for fecal coliform in the Yaquina River drainage area.

B. Fall Chinook, Chum, Coho, Pacific Lamprey, Winter Steelhead, White Sturgeon, Green Sturgeon, Coastal Cutthroat Trout

C. Yaquina Bay, Big Elk Creek, and Yaquina River are critical habitat for Coho. Mill Creek has the most southern, stable populations of Chum salmon on the coast.

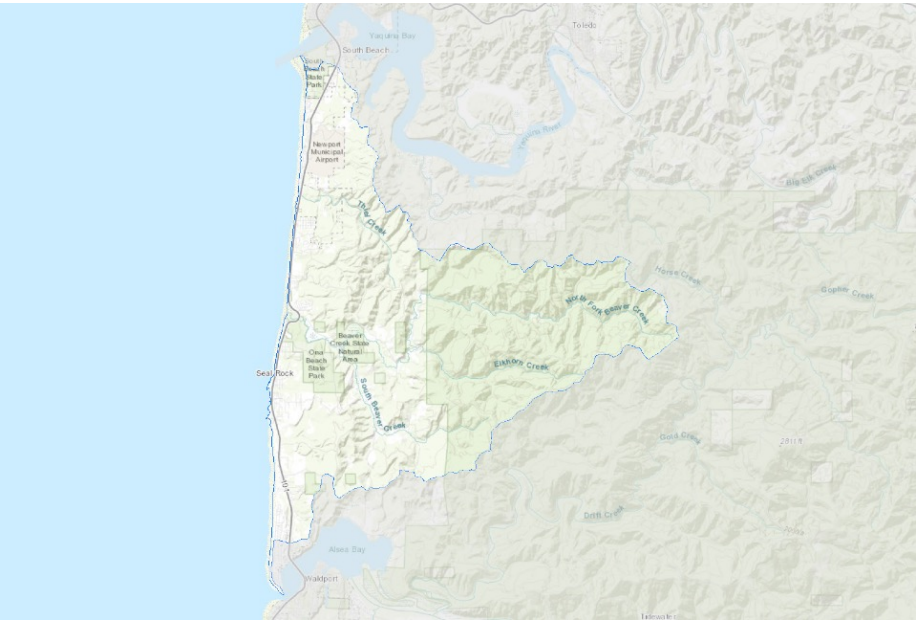
High Priority WABs for Streamflow

(WAB 0604); Simpson Creek at mouth (WAB 06041); Little Elk Creek at mouth (WAB 0604211); Yaquina River above Bales Creek (WAB 0604212)

Water quality limited streams that do not meet beneficial use criteria

- Big Elk Creek—Dissolved oxygen, E. coli
- Boone Slough—Aquatic weeds or algae
- Depot Creek—DO
- Depot Slough—Fecal coliform
- Feagles Creek—E. coli, temperature
- Nute Slough —aquatic weeds or algae; fecal coliform
- Olalla Creek—Fecal coliform
- Poole Slough—Fecal coliform
- Spout Creek—temperature
- West Olalla Creek—temperature
- Yaquina River—DO, E. coli, Fecal coliform, temperature
- Montgomery Creek—Biological criteria
- Nye Beach—Enterococcus

Beaver Creek Ocean Drainage Area



Key Sub-Area States

A. Coho federally threatened (ESA); Fall Chinook (sensitive—ODFW), Pacific Lamprey (sensitive—ODFW), Winter Steelhead (sensitive—ODFW).

B. Entire watershed is within Beaver Creek Conservation Opportunity Area (ODFW). Protected areas include Beaver Creek State Natural Area, Drift Creek Wilderness, Estella Matilda Happ Preserve, Ona Beach State Park, Seal Rock Wetland Preserve, and Siuslaw National Forest.

Key diversions/users

Riverside Mobile Park – source is a well. Wastewater system infrastructure unknown.

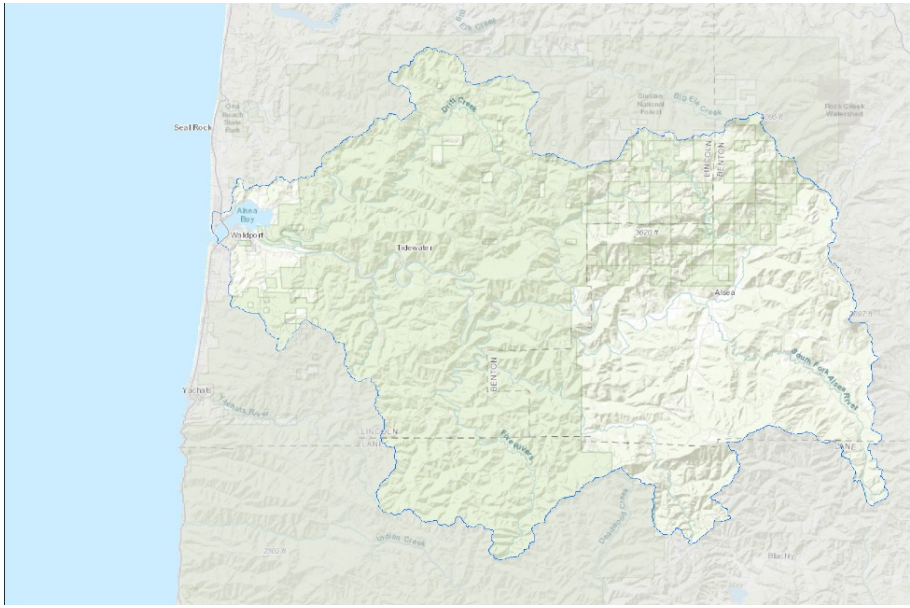
No existing instream water rights.

Proposed instream water rights occur on streams with instream flow deficits (ODFW): North Fork Beaver Creek

Water quality limited streams that do not meet beneficial use criteria (ODEQ)

- Oliver Creek-Biological Criteria
- North Fork Beaver Creek-Biological Criteria; E. Coli; Temperature; Dissolved Oxygen
- South Fork Beaver Creek-Temperature; pH; E. Coli; Dissolved Oxygen
- Beaver Creek-Dissolved Oxygen

Alsea River Ocean Drainage Area



Key Sub-Area

- Excess temperatures in streams in Alsea River drainage.
- Water quality impairments on Alsea River.

Key Sub-Area States

A. 216.9 miles of Alsea River Drainage area streams are listed for temperature impairments. Water quality impairments on the Alsea River include DO, fecal coliform, and temperature.

B. Coho; Fall Chinook, Spring Chinook, Chum, Summer Steelhead, Winter Steelhead, Coastal Cutthroat Trout, Pacific Lamprey, Green Sturgeon.

C. Alsea Bay is a Conservation Opportunity Area (COA) (ODFW).

Key diversions/users

- Eddyville Charter School has a well; lead and copper rule violation.
- Fall Creek Water district has 3 source wells; system on septic; groundwater is for household use only; District has water right on Alsea River for lawn irrigation.
- Kozy Acres Water System has 2 source wells; system is on septic.

Instream flow deficits

on streams with existing instream water rights: Alsea River, Bummer Creek, Drift Creek, Fall Creek, Five Rivers, Green River, Lobster Creek, North Fork Alsea River, South Fork Alsea River. Proposed instream water rights occur on streams with instream flow deficits (ODFW): Drift Creek, Mill Creek, Canal Creek, Scott Creek, Grass Creek, Fall Creek, Cascade Creek, Buck Creek, Green River, Five Rivers #1, Five Rivers #2, Five Rivers #3, Lobster Creek #1, Lobster Creek #2, Little Lobster Creek, Little Lobster Creek #2, Preacher Creek, Fall Creek, North Fork Alsea River, South Fork Alsea River, Alsea River, Crooked Creek, Honey Grove Creek, Bummer Creek.

High Priority WABs for Streamflow

Lobster Creek at mouth (WAB 08021111), Five Rivers above Green River (WAB 080211121), Bummer Creek at mouth (WAB 08021221)

Water quality limited streams that do not meet beneficial use criteria (ODEQ)

- Alsea River-Dissolved Oxygen; Fecal Coliform; Temperature
- Preacher Creek-Temperature
- South Fork Alsea River-Temperature
- South Fork Lobster Creek-Temperature
- North Fork Alsea River-Temperature
- Lobster Creek-Temperature
- Little Lobster Creek-Temperature
- Bummer Creek-Temperature
- Buck Creek-Temperature
- Green River-Temperature
- East Fork Green River-Temperature

- Five Rivers-Temperature
- Fall Creek-Temperature
- Drift Creek-Temperature
- Fall Creek-Temperature
- Bailey Creek-Habitat Modification
- Flynn Creek-Biological Criteria; Temperature
- Meadow Creek-Temperature
- Gopher Creek-Temperature
- Cascade Creek-Temperature
- Canal Creek-Fecal Coliform
- Camp Creek-Temperature
- Peak Creek-Temperature
- Phillips Creek-Temperature
- North Fork Cascade Creek-Temperature

Yachats River Ocean Drainage Area

Key Sub-Areas

- Yachats River streamflow insufficient
- Yachats River instream temperature excessive for salmon and steelhead
- City of Yachats water demand fluctuates significantly
- Non-revenue water is 40% for City of Yachats (1997-2000 average)

Key Sub-Area States

A. City of Yachats water service area population of 600 can reach peak of 2,500 in summer.

B. Coho; Fall Chinook, Steelhead, Coastal Cutthroat Trout, Pacific Lamprey.

C. Yachats River Watershed is designated as the Yachats River Conservation Opportunity Area (COA) (ODFW).

Key diversions/users:

- SW Lincoln County Water PUD water sources are Big Creek, Vingie Creek, Starr Creek (90% of water supply), and Dicks Fork Creek (10% of water supply)
- City of Waldport water sources are North and South Weist Creeks and Eckman Creek (also can receive/send water to/from SW Lincoln County Water PUD).
- City of Yachats source water is Reedy Creek and Salmon Creek (backup to Reedy). City has water rights on Yachats River and Cape Creek, but does not divert. Reedy and Salmon Creeks have insufficient flows during late summer to supply City's water needs. Can receive/send water to/from SW Lincoln County Water PUD.

SW Lincoln County Water PUD can send/receive water to/from City of Waldport and City of Yachats.

Instream flow deficits

on streams with existing instream water rights: Yachats River, North Fork Yachats River, Williamson Creek, School Fork.

High Priority WABs for Streamflow

Yachats River at mouth (WAB 090), Yachats River above North Fork (WAB09011), and Yachats River above Beamer Creek (WAB 0901)

Water quality limited streams that do not meet beneficial use criteria (ODEQ)

- North Fork Yachats River—E. Coli; Temperature; Dissolved Oxygen
- Williamson Creek—Dissolved Oxygen; Temperature
- Yachats River—Temperature
- Alder Creek—Temperature
- Carson Creek—Temperature
- Beamer Creek—Dissolved Oxygen
- Stump Creek—Temperature; E. Coli; Dissolved Oxygen
- Keller Creek—Dissolved Oxygen; E. Coli; Temperature
- Depew Creek—Temperature
- Grass Creek—Temperature
- School Fork—Dissolved Oxygen; E. Coli; Temperature

Key Infrastructure Issues

- City of Waldport's wastewater collection system is old - Inflow and infiltration problems.
- City of Waldport's pipelines are older galvanized iron, steel, and asbestos cement in sections—Frequently replaced due to poor condition (leakage, corrosion, loss of capacity).
- City of Yachats AC piping in poor condition—frequently replaced due to poor condition.
- WWTP required maintenance; new WWTP experienced loss of electrical power to one of the pump stations—Resulted in overflow events

Appendix E: Crosswalk of the Mid-Coast Water Planning Partnership Plan actions with other important regional conservation initiatives

- **Final Endangered Species Act Recovery Plan for Oregon Coast Coho Salmon (2016)** (*Oncorhynchus kisutch*)[42]**.** The goal of this plan is to improve the viability of Oregon Coast Coho, and the ecosystems upon which it depends, to the point that they no longer require Endangered Species Action protection. The recovery direction for Oregon Coast Coho Salmon is to protect and restore the freshwater and estuarine rearing habitats that support juvenile survival and overall productivity.

- **Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan (2015, revised 2017)**[43]**.** This plan describes priority natural hazards of concern to the Mid-Coast region, including coastal erosion, drought, earthquakes, floods, landslides, tsunamis, wildfire, windstorms, and winter ice. Although there is no direct relationship to the actions within the Mid-Coast Water Planning Partnership Water Action Plan, any efforts that reconnect floodplains, restore stream flow, and restore riparian areas will enhance resilience of the Mid-Coast region to climate change stressors and several natural hazards. In addition, three actions within this plan have a nexus with natural hazards.

- **Lincoln County Climate Action Plan (2020).** This plan emphasizes water supply resiliency measures that reduce water use by developing focused, interrelated water conservation measures, regulations, education, and incentives.

- **Oregon Watershed Enhancement Board Focused Investment Partnership**[44] goals (as they related to *Aquatic Habitat for Native Fish Species* and *Coho Habitat and Populations Along the Coast*). The Oregon Watershed Enhancement Board Focused Investment Priority for Inland Aquatic Habitat for Native Fish Species guides voluntary actions that address limiting factors related to the protection and restoration of the watershed functions and processes in this habitat type. Initiatives within this priority identify the primary limiting factors outlined in associated federal recovery, state conservation, or tribal plans that the initiative is aiming to address, and are guided by the habitat and population objectives and conservation approaches set forth in these plans. Focal areas for this priority are defined as those native fish habitats in Oregon that are identified as priorities in associated federal recovery, state conservation, or tribal plans. Voluntary restoration and conservation actions are especially encouraged in locations where investments will also address identified non-point source water quality concerns.

[42] NMFS (National Marine Fisheries Service). 2016. Recovery Plan for Oregon Coast Coho Salmon Evolutionarily Significant Unit. National Marine Fisheries Service, West Coast Region, Portland, Oregon.
[43] https://www.co.lincoln.or.us/planning/page/natural-hazards-mitigation-plan
[44] https://www.oregon.gov/oweb/grants/Pages/fips.aspx

STRATEGIES		MCWPP WATER ACTION PLAN STRATEGIES
ENDANGERED SPECIES ACTION FEDERAL COHO RECOVERY PLAN ACTIONS	**MCS-1 (Tributaries), MCS-21 and MCS-22 (Mainstems):** Increase harvest buffers on private industrial timberlands, reduce road densities on private and federal timberlands.	46
	MCS-7 and MCS-8 (Tributaries), MCS-31 and MCS-32 (Mainstems): Conduct riparian planting projects on streams in agricultural lands.	50, 52
	MCS-11 and MCS-13 (Tributaries), MCS-29 (Mainstems): Develop water conservation strategies for municipal and irrigation water withdrawals to improve water quality.	6, 7,
	MCS-12 and MCS-14 (Tributaries): Improve water quality by improving stream shade, and substrate retention.	50, 52
	MCS-17 and MCS-18 (Off-channel and wetlands): Increase beaver pond abundance.	5, 45, 51
	MCS-19 and MCS-20 (Wetlands): Reduce existing/limit channel-confining structures, including roads and infrastructure, in the floodplain that disconnect wetlands from tributaries.	50
	MCS-25 and MCS-26 (Mainstems): Increase large wood and marginal and streambank habitat structure.	50, 52
	MCS-27 (Mainstems): Develop water conservation strategies for municipal and irrigation water withdrawals.	24
	MCS-28 and MCS-30 (Mainstems): Improve water quality by improving stream shade, and substrate retention.	50, 52
	MCS-35 (Estuary): Identify sources of water pollution and develop strategies to reduce pollutants in water discharges.	13
OREGON WATERSHED ENHANCEMENT BOARD FOCUSED INVESTMENT PARTNERSHIP (AQUATIC HABITAT STRATEGIES)	**Reconnect Floodplains**	46, 47, 51
	Restore Stream Flow	46, 47, 52, 53, 54, 55, 56, 57
	Restore Habitat in Stream Channels	46, 47, 48, 49, 50, 52
	Road Repair or Decommission	50
	Riparian Restoration	46, 47, 48, 49, 50, 52
	Supporting Healthy Habitats	33, 36, 39, 40, 41, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61
	Control Invasive Weeds	58
	Easements and Acquisitions	41, 60

LINCOLN COUNTY CLIMATE ACTION PLAN STRATEGIES	**Public outreach and education**	1
	Metered water fixtures / conservation solutions	3, 4, 6, 7, 14, 15, 24, 25, 26
	Rainwater harvesting systems	22
	Incorporate water conservation features in new construction	61
	Water audits and feasibility studies	2
	Cost-share incentives	25
	Educational curriculum for students and citizens	1
	Incorporate green infrastructure	5, 8
	Protect healthy landscapes	12, 16, 17, 18, 19, 20, 21, 40, 41, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61
	Restore degraded landscapes	13
LINCOLN COUNTY MULTI-JURISDICTIONAL NATURAL HAZARDS MITIGATION PLAN	The Lincoln County Multi-Jurisdictional Natural Hazards Mitigation Plan describes priority natural hazards of concern to the Mid-Coast region, including coastal erosion, drought, earthquakes, floods, landslides, tsunamis, wildfire, windstorms, and winter ice.	9, 10, 11, 50

Appendix F: Water providers by population served and connections

There are 52 water providers in the Mid-Coast region that deliver water to resident population of 60,877 people through 24,299 connections. Map of Drinking Water Source Areas.[45]

Alsea
- Fall Creek Water District

Blodgett
- Bless Your Heart Baking and Cafe
- Fir Ridge Campground

Depoe Bay
- City of Depoe Bay

Gleneden Beach
- Kernville-Gleneden-Lincoln Beach Water District

Lincoln City
- Lincoln City Water District
- Oregon Parks and Recreation Department HB Van Duzer State Park
- Lower Siletz Water System
- Calkins Acres Improvement Inc.

Newberg
- Sea Crest

Newport
- City of Newport
- Oregon Parks and Recreation Department Ellmaker State Park
- Oregon Parks and Recreation Department Beverly Beach State Park
- Beverly Beach Water District
- Otter Rock Water District
- Bay Hills Water Association
- Carmel Beach Water District
- Lincoln County Parks - Moonshine Park
- Mad Dog Country Tavern
- Sawyers Landing RV Park

Otis
- Hiland WC - Echo Mountain, Boulder Creek, Bear Creek
- Westwind Stewardship Group
- Otis Junction Water system
- Salmon River Mobile Village
- Salmon River RV Park
- Lincoln City KOA
- Guptil Subdivision

Otter Rock
- Johnson Creek Water Service
- Inn at Otter Crest

Reedsport
- US Forest Service Cape Perpetua Visitor Center

Rose Lodge
- Hiland WC - Riverbend

Seal Rock
- Seal Rock Water District

Sheridan
- Drift Creek Camp

Siletz
- City of Siletz

Tidewater
- Hiland WC - Westwood
- US Forest Service Blackberry Campground

Toledo
- Toledo Water Utilities
- Eddyville Charter School
- Olalla Valley Golf Course

Waldport
- City of Waldport
- Kozy Acres Water System
- Drift Creek Landing
- Taylors Landing RV Park
- Riverside Mobile Park
- King Silver RV Park
- Rovers RV Park
- Happy Landing RV Park/Marina

Yachats
- Southwest Lincoln County Water PUD
- City of Yachats

[45] https://spatialdata.oregonexplorer.info/geoportal/details;id=6a1ec8dd8b6844838cc501c57b6a2c27

Appendix G. User's Guide to Oregon Explorer

Appendix H. Issues identified during collaborative planning but not carried forward

The following are issues that were identified, during plan development, that were not carried forward for one or more reasons, including:

- They were not considered as high a priority as other issues that were addressed during the planning process.
- This voluntary planning partnership was not the most appropriate venue to address the issues.

They include:

Appendix I: Federal and state policies and programs pertaining to Mid-Coast water management

This appendix provides an overview of federal and state policies and programs that pertain to the management and maintenance of water supplies and water quality in the mid-coast of Oregon. Much of the material is either paraphrased or drawn verbatim from a report and companion OSU Extension publication entitled *Trees to Tap: How Forest Management Affects Oregon's Municipal Water* (Souder et al. 2021).

The overview includes sections on:

- Relationships between landownership, regulatory framework, and riparian area protection
- Regulation and management of drinking water in Oregon (the Clean Water Act; Safe Drinking Water Act and Source Water Assessments)
- The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and implementation in Oregon
- Federal forest land management and drinking water
- The Coastal Nonpoint Pollution Control Program (CZARA)
- The Oregon Forest Practices Act

Relationships between landownership, regulatory framework, and riparian area protection

Hillslopes, headwater tributaries, and larger downstream waterways that comprise a particular watershed are all elements of a fundamentally connected and integrated hydrological system (Bracken and Croke 2007; Nadeau and Rains 2007). Headwater streamflow is routed efficiently downstream, meaning that management, weather, or climate-induced changes in streamflow parameters will accumulate downstream (Reiter et al. 2009; Bywater-Reyes et al. 2017; Bywater-Reyes et al. 2018). Because fine sediment and other pollutants can be readily transported downstream, changes in upstream and headwater inputs of these constituents may be directly linked to conditions downstream, e.g., at a municipal drinking water intake.

In contrast to this inherent hydrologic connectivity from smaller to larger tributaries and into mainstem channels, landownership across forested watersheds in coastal Oregon is often fragmented and discontinuous. Regulatory goals and protection for riparian areas vary in fundamental ways across different public and private forest, agricultural and rural residential land ownerships and land uses, and also according to stream attributes (e.g., stream size, whether or not they are fish bearing).

Policy and regulatory mechanisms for protecting riparian areas may be either *prescriptive* or *outcome-based* (Boisjolie 2016). Prescriptive approaches proactively set specific standards for which activities are allowed in riparian areas and which are not. Both federal forestland and

private industrial timberland in the NFCR basin are subject to prescribed rules designed to prevent degradation of water quality before it happens. These rules are considerably more protective on federal forest lands compared to private, most notably in regard to where riparian buffers are required, the width of these buffers, and the amount of harvesting or other activities allowed within them. Riparian area management is regulated on federal BLM lands under the Northwest Forest Plan Aquatic Conservation Strategy and on private industrial timberlands under the Oregon Forest Practices Act Administrative Rules for water protection (Table 1).

Table 1. Regulatory frameworks, goals, criteria and implementation standards for riparian areas under different landownerships in Oregon

Land Ownership	Regulatory Framework/Approach	Regulatory and policy goals for riparian areas	Regulatory criteria, standards, and implementation
Federal **(BLM)**	Northwest Forest Plan - Aquatic Conservation Strategy *Prescriptive*	Halt declines in watershed condition; protect watersheds containing high-quality water, habitat, and healthy fish populations. Develop a network of functioning watersheds that support populations of aquatic and riparian-dependent organisms	Fish-bearing, streamflow duration, site-potential tree-height. Land-management standards: Direct land-use activities based on conservation goals, allow occasional feathering, salvage, and thinning. Riparian buffers 100-500 feet
Private Forest	Oregon Forest Practices Act Administrative Rules - Water Protection Rules *Prescriptive*	Provide resource protection during timber operations adjacent to and within streams so that, while continuing to grow and harvest trees, the protection goals for fish, wildlife, and water quality are met.	Fish-bearing, mean annual flow, domestic water use, streamflow duration. Land-management standards: Specify retention requirements for live and dead trees, no-cut buffers 0-100 feet
Private Agricultural	Agricultural Water Quality Mgmt Plan *Outcome-based*	To prevent and control water pollution from agricultural activities and to achieve applicable water-quality standards.	Standards implemented voluntarily or because of repeated violation of water-quality standards. Land-management standards: None.

Adapted from content in Boisjolie et al. 2019.

In contrast to forestlands, riparian protection standards and allowable management activities are not prescribed for agricultural lands in Oregon. Instead, the Oregon Department of Agriculture (ODA) promotes voluntary best management practices (BMPs) to meet water quality goals but leaves management decisions to individual landowners. For the Oregon mid-coast, these BMPs are provided in the Mid Coast Agricultural Water Quality Management Area Plan (ODA 2019). Guidance in the Area Plan is neither regulatory nor enforceable. Under this *outcome-based* approach, agencies intervene only after the fact if there is a violation of water quality standards (or more commonly, repeated violations) that can be clearly linked to a specific landowner (Boisjolie 2016; Boisjolie et al. 2019). A key challenge with this largely reactive approach to enforcement is that linking downstream water quality exceedances to specific upstream land management practices is often difficult, usually involving extensive monitoring.

The variable patterns of public (mainly USFS federal), private industrial forest, private small woodland, agricultural, and rural residential landownership across mid coast watersheds results in riparian area management goals and protection standards that can fluctuate substantially from stream segment to stream segment (Boisjolie et al. 2017). This variation in the level of policy and regulatory protection provided along different stream reaches and areas guides and shapes the various strategies available to protect and improve drinking source water quality.

Regulation and management of drinking water in Oregon

This section discusses federal statutes and regulations that pertain to drinking water, how these statutes are coordinated to address different but complimentary aspects of drinking water protection, and Oregon's administrative framework for interpreting and implementing them. The Oregon Department of Environmental Quality (DEQ) provides reports, general information, and technical assistance regarding surface water systems, while the Oregon Health Authority (OHA) supplies these services for groundwater systems (Oregon DEQ 2018b). In addition, the OHA regulates the treatment and distribution of potable water under the Federal Safe Drinking Water Act, while the DEQ has regulatory authority under the Federal Clean Water Act for point and non-point sources of pollution.

The Clean Water Act

The Clean Water Act (CWA) provides the basic structure for regulating discharges of pollutants into U.S. waters via national water quality criteria recommendations developed and administered by the USEPA and mostly delegated to the States and Tribes for implementation. This regulatory framework makes a key distinction between *point* sources and *nonpoint* sources of pollution. The CWA made it unlawful to discharge any pollutant from a point source into waters unless a permit is obtained from USEPA or an authorized State or Tribe under the National Pollutant Discharge Elimination System (NPDES) permit program. Point sources are discrete conveyances such as pipes or human-made ditches (USEPA 2018a).

The USEPA defines nonpoint source (NPS) pollution as pollution from diffuse sources resulting from land runoff, precipitation, atmospheric deposition, drainage, seepage or hydrologic modifications. (USEPA 2018b.) NPS pollution is caused by rainfall or snowmelt moving over and through the ground, where it picks up and carries natural and human-made pollutants, depositing them into surface waters and ground waters. Logging operations are typically dispersed across large areas and affected by natural variables such as weather, channel morphology, or geology and soil characteristics of the watershed. This presents challenges in clearly distinguishing harvesting impacts from natural factors. Thus, it was relatively straightforward for the USEPA to define silvicultural activities such as thinning, harvesting, site preparation, reforestation, prescribed fire, wildfire control and pest control as NPS sources (USEPA 2018c). The USEPA also defines forest road construction, use and maintenance as NPS sources, which has been more controversial.

Due to its generally dispersed nature, NPS pollution is addressed through area-wide management planning processes and voluntary incentive-based, quasi-regulatory, or regulatory programs. Oregon and other western states have had regulatory programs to address NPS pollution from forest operations (in the form of forest practice acts) since the 1970s. Because NPS pollution causes about 60% of water quality impairments, Congress amended the CWA in 1987 to establish the Nonpoint Source Pollution Management Program under Section 319, which provides States and Tribes with grants to implement controls described in their approved NPS pollution management programs (USEPA 2018c).

The Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was enacted in 1974, and significantly expanded in 1996, specifically to protect drinking water quality. The SDWA focuses on all U.S. surface water or groundwater sources actually or potentially used for drinking and requires USEPA to establish and enforce standards to protect tap water. The USEPA National Primary Drinking Water Regulations (NPDWR) are legally enforceable standards, treatment techniques and water-testing schedules that apply to public water systems. The NPDWR place legal limits - "maximum contaminant levels" (MCLs) - on over 90 drinking water contaminants. The MCLs are levels that protect human health and that water systems can achieve using the best available technology. Regulated contaminants are grouped as follows:

- Microorganisms
- Disinfectants
- Disinfection Byproducts (DBPs)
- Inorganic Chemicals
- Organic Chemicals
- Radionuclides

The USEPA also established National Secondary Drinking Water Regulations (NSDWRs) that set non-mandatory water quality standards for 15 so-called “nuisance” contaminants. These

"secondary maximum contaminant levels" (SMCLs) serve as guidelines to assist public water systems in managing their drinking water for aesthetic effects (e.g., taste, color, odor), cosmetic effects (e.g., skin or tooth discoloration) and technical effects (corrosion, staining, scaling or sedimentation in distribution systems or home plumbing). These contaminants can result in significant economic impacts, e.g., by reducing the efficiency of distribution systems, but are not considered to be human health risks at the SMCL (USEPA 2017a, b).

The USEPA uses the Unregulated Contaminant Monitoring Rule (UCMR) program to collect occurrence data for contaminants suspected to be in drinking water, but for which health-based standards have not been set under the SDWA. These data are collected to support USEPA decisions regarding whether to regulate particular contaminants to protect public health. Every five years USEPA reviews the list of unregulated contaminants, largely based on the Contaminant Candidate List (CCL), a list of contaminants that 1) are not regulated by the NPDWR; 2) are known or anticipated to occur at public water systems and, 3) may warrant regulation under the SDWA (USEPA 2017c).

In 2006, based on evidence that *Cryptosporidium* and other microbial pathogens are highly resistant to traditional drinking water disinfection practices (usually chlorination), and that the disinfectants themselves can react with naturally occurring materials in water to form byproducts that may pose health risks, the USEPA enacted updated rules to balance the risks of microbial pathogens and disinfection byproducts (DBPs). Under these rules - the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) and Stage 2 Disinfection Byproduct Rule (Stage 2 DBPR) - surface water systems are required to monitor source water for *Cryptosporidium*, *E. coli*, and turbidity, and to identify and monitor locations in their distribution systems likely to have high levels of DBPs. If source waters do not meet standards, surface water systems must select from an array of "microbial toolbox" treatment options to meet treatment requirements. Locations identified as DBP "hotspots" are to be monitored for compliance with maximum residual disinfectant levels (MRDLs) for disinfectants, and DBP MCLs established under the Stage 1 Disinfectants and Disinfection Byproducts Rule (Stage 1 DBPR) (USEPA 2005, 2017a; NACWA 2006).

The SDWA allows individual states to set and enforce their own drinking water standards if the standards are at a minimum as stringent as USEPA's national standards. The USEPA delegates primary enforcement responsibility for public water systems to states and Indian Tribes if they meet certain requirements. Oregon implements these primary (health-related) standards for USEPA, and also encourages attainment of secondary standards (nuisance-related) (USEPA 2018d).

How CWA and the SDWA overlap

In the past, the CWA and SDWA had mostly separate goals and functions. The CWA focused on environmental protection and maintaining "fishable/swimmable" waters, primarily by identifying and regulating sources of pollution in waterways. In contrast, the SDWA focused on municipal

water treatment standards and providing clean drinking water at the tap. Over time, rising demand for surface water, driven by population growth and associated development, has been accompanied by increases in wastewater and stormwater, and reduced in-stream flow volumes available to keep these wastes diluted. These changes can, in turn, escalate loadings of sediment, nutrients, bacteria, and other pollutants in community water sources. In response to the increasingly interrelated nature of watershed management and provision of safe drinking water, the SDWA evolved to encompass environmental as well as consumer protection, resulting in overlaps with the CWA, and greater emphasis on cooperation and holistic water management among agencies charged with implementing the two statutes (NACWA 2006).

Coordination across the CWA and SDWA is motivated by potential synergisms among goals and outcomes of these policies. Efforts driven by the SDWA to reduce contamination of drinking water sources can also protect aquatic ecosystems and wildlife and provide higher quality and safer water-based recreation opportunities. Conversely, using the CWA to develop Ambient Water Quality Criteria that are protective of aquatic life can also help achieve and maintain safe drinking water (ASDWA 2021). Among implementers of both statutes, preventing contamination is widely understood to be much more cost effective at providing safe drinking water than removing contaminants or finding alternative water sources after the fact.

Collaboration among CWA and SDWA implementers also facilitates more effective action to reduce disinfection byproducts (DBPs) in drinking water. These DBPs can form when a disinfectant (e.g., chlorine, chloramine, chlorine dioxide) reacts with organic matter– often decomposing plant matter - in source water (USEPA 2005). Total trihalomethanes and haloacetic acids are widely occurring DBPs which have been linked with increased cancer risk, problems with reproductive systems and other human health risks (USEPA 2006). Dissolved organic matter (DOM) from forest detritus is a major precursor to DBPs in drinking water sources (Bardwaj 2006, Karanfil and Chow 2016). Thus, forest management activities that influence the quantity and mobility of this source of DOM in source waters can influence the potential for DBPs to form during water treatment. Addressing DBP issues efficiently requires coordination across the entire drinking water production chain from source water to tap.

The SDWA Source Water Assessment Program

In 1996, Congress significantly expanded the SDWA to facilitate prevention of contamination through an increased focus on drinking water source protection. The 1996 revisions were instrumental in pushing the SDWA into the realm of the CWA, most notably via the SDWA's new Source Water Assessment Program. This program, along with the UCMR Program and the LT2ESWTR (discussed above), extended the SDWA's largely post-hoc emphasis on regulating water treatment to include environmental protection focused on source waters (NACWA 2006). The 1996 SDWA revisions required states to develop USEPA-approved programs to carry out Source Water Assessments (SWAs) for all public water systems in the state. The SWAs focused on delineation of drinking water sources, identification of the origins of USEPA-regulated contaminants (and any additional contaminants selected by the state) in those source waters,

and providing water utilities, community governments, and other stakeholders with information needed to protect drinking water sources. The 1996 amendments outline six steps for conducting SWAs for public water systems (PWSs).

Step 1 – **Delineate the source water protection area** (SWPA). Delineation shows the area to be protected based on the area from which the PWS draws its drinking water supplies.

Step 2 – **Inventory known and potential sources of contamination**. The contaminant source inventory lists all documented and potential contaminant sources or activities of concern that may be potential threats to drinking water supplies.

Step 3 – **Determine the susceptibility of the PWS to contaminant** sources or activities within the SWPA. Determining susceptibility of the PWS to inventoried threats relates the nature and severity of the threat to the likelihood of source water contamination.

Step 4 – **Notify the public** about threats identified in the contaminant source inventory and what they mean to the PWS. Effective programs ensure that the public has information necessary to act to prevent contamination.

Step 5 – **Implement management measures** to prevent, reduce, or eliminate risks to your drinking water supply. The assessment information can support formulation and implementation of measures to protect the source water. These measures can be tailored to address each threat or array of risks specific to each PWS.

Step 6 – **Develop contingency planning strategies** that address water supply contamination or service interruption emergencies. Water supply replacement strategies are an indispensable part of any drinking water protection program in the event of short- or long-term water drinking water supply disruption.

The 1996 revisions also authorized voluntary source water protection partnerships between state and local governments focused on reducing contaminants in drinking water, opportunities for financial and technical assistance, and developing long-term source water protection strategies, usually documented in Source Water Protection Plans (NACWA 2006; Tiemann 2017).

Programs for local source water assessment and source water protection planning

In 2015, Congress enacted the Grassroots Rural and Small Community Water Systems Assistance Act, reauthorizing and revising the small water system technical assistance program included in the 1996 SDWA expansion. Under this act, the Source Water Protection Program (SWPP) is coordinated jointly by USDA Farm Service Agency (FSA) and the National Rural Water Association (NRWA), a non-profit water and wastewater utility membership organization. The SWPP is designed to help prevent pollution of drinking water sources for rural residents. Participation in the program is voluntary. Rural source water technicians work with specialists from the USDA Natural Resources Conservation Service (NRCS) and state and county staff to identify areas where pollution prevention is most needed. These technicians then work with

state rural water associations to form local teams comprised of citizens and representatives from federal, state, local, and private organizations. They collaborate on Rural Source Water Protection plans to promote clean source water through voluntary actions that local landowners can implement to prevent contamination. The goal is to work at the grassroots level to educate and inform rural residents about practical steps to prevent water pollution and improve water quality.

The Oregon Association of Water Utilities (OAWU) is a nonprofit, independent association of about 700 mostly smaller and rural public and private community water utilities in the state. The OAWU represents their members' interests in the Oregon legislature and coordinates with the National Rural Water Association (NRWA) which represents rural water systems at the national level. The OAWU also plays an important role in addressing drinking water issues at the local water system level, through onsite technical assistance in areas such as SDWA and CWA regulations, water treatment technology, distribution system operation and maintenance, and wastewater treatment and collection. The OAWU Source Water Specialist deals specifically with drinking water protection, working directly with local water systems to prepare drinking water protection plans that address all state and federal requirements including specifically addressing potential contaminants through education of local management authorities and best management practices to help reduce the likelihood of contamination.

The American Water Works Association (AWWA) mission is to support water utilities in evaluating and improving their water quality, operations, maintenance, and infrastructure. The AWWA has developed detailed guidance for local municipalities to use in developing their SWAs and protection plans - Utility Management Standard G300, Source Water Protection (AWWA 2014). This American National Standards Institute (ANSI)-approved standard and its accompanying operational guide (Gullick 2017) outline six primary components of successful source water protection (SWP) programs and requirements for meeting the standard:

- A SWP program vision and stakeholder involvement
- Source water characterization
- SWP goals
- SWP action plan
- Implementation of the action plan
- Periodic evaluation and revision of the entire SWP program

How Oregon agencies coordinate to provide safe drinking water

In Oregon, the SDWA is directly implemented by Oregon Drinking Water Services (DWS), within the Environmental Health Section of the Public Health Division, Oregon Health Authority (OHA) under ORS 338.277 and 448.273. Under SDWA, DWS is primarily involved with administering and enforcing drinking water quality standards for public water systems, but also with source water protection, primarily for groundwater systems. The Oregon Department of Environmental Quality (DEQ) implements CWA authorities to address pollutants that affect the quality of

drinking water source waters, primarily surface waters. In practice, the DEQ Drinking Water Protection Program coordinates with OHA's DWS through an interagency agreement to carry out provisions of the two acts and jointly provide clean drinking water. Although OHA is the primary implementer of the SDWA, DEQ took the lead on the SWAs mandated by the 1996 SDWA revisions, conducting all surface water assessments and assisting on the groundwater assessments.

The DEQ also administers the Oregon Coastal Nonpoint Pollution Control Program (CNPCP). Coastal states are required to develop such programs to be eligible for federal funding to mitigate nonpoint source pollution under the federal Coastal Zone Management Act Reauthorization Amendments of 1990 (CZARA). Coastal states are also required to implement a set of management measures based on guidance published by the USUSEPA. These programs are designed to restore and protect coastal waters from nonpoint source pollution and to mitigate impacts to beneficial uses of these waters, including use for municipal drinking water. Oregon's CNPCP was developed in cooperation with the Oregon Department of Land Conservation and Development (DLCD) Oregon Coastal Management Program (OCMP). The CZARA, and how it intersects with drinking water protection in Oregon, are discussed in more detail below.

The DLCD also coordinates with DEQ to offer guidance to communities who may wish to enhance protection of their source watersheds through improved land use regulations such as comprehensive plan and zoning ordinance updates (Oregon DEQ 2017).

Source Water Assessments in Oregon

As stipulated by SDWA and Oregon Regulations (OAR 333-061-0020(125)), Source Water Assessments (SWAs) were completed between 1996 and 2005 for community water systems in Oregon serving at least 15 hookups or more than 25 people year-round (OAR 333-061-0020(25). Under the SDWA, smaller systems and transitory uses are also called public water systems (see OAR 333-061-0020(107) for a definition of these), but these are beyond the scope of this report. In following years, Oregon agencies significantly expanded their capabilities for analyzing natural characteristics and potential pollutant sources. With this expanded capacity, Updated Source Water Assessments (USWAs) with more detailed data, maps, and technical information were completed for roughly 50% of these systems in 2016-2017.

The assessments 1) defined groundwater and surface water source areas which supply public water systems, 2) inventoried each area to determine potential sources of contamination, and 3) determined the most susceptible areas at risk for contamination. For surface water systems, DEQ prioritized the 52 coastal community water systems under the rationale that these systems are challenged by geographic setting, climate and geology, and seasonal tourism in ways that other areas in Oregon do not necessarily experience. For watersheds with more than one intake, Oregon completed the original SWAs by stream or river segment. Each SWA represents the area from the public water system's intake to the next intake upstream. All protection areas for

intakes upstream of a water system's intake are included in its drinking water source area. Activities and impacts in the source area for upstream water users also have the potential to impact downstream water users (Oregon DEQ 2021).

As part of the USWAs, DEQ developed a statewide land use/ownership Geographic Information Systems (GIS) layer to evaluate land cover in drinking water source areas. Maps for each individual public water system are provided in that system's USWA report. Information from the SWAs for surface water systems is available to the public via a database maintained jointly by the DEQ and OHA. In 2018, after consulting with stakeholders, the DEQ also finalized a Surface Water Resource Guide to provide additional technical assistance and information to surface water community water systems (Oregon DEQ 2018c). This document (and a companion Groundwater Resource Guide) will continue to be updated and improved as source water protection efforts in Oregon move forward. The USWAs and Resource Guides are ultimately intended to assist public drinking water providers, community governments, and others in the development of community-based Drinking Water Protection Plans to protect their upstream source waters.

Several rural water providers in Oregon have voluntarily worked with the Oregon Association of Water Utilities (OAWU) to take advantage of the USDA-FSA SWPP. Most of utilize groundwater, but some are surface water systems. The protection plans are based on interviews with water utility personnel, local managers and landowners, information from the SWA or USWA, and a visit to the source water intake and source watershed. The plans include:

- A map of the planning area;
- An inventory of potential contaminant sources, and characteristics and sensitivity of the source water;
- A definition of areas and community profile that align with participating local entities and organizations;
- A definition of voluntary measures and best management practices that may be initiated;
- Identification of public education initiatives, entities and resources to facilitate plan implementation and sustainability; and
- A contingency and emergency response plan in the event of problems with the local drinking water supply. (Collier 2018.)

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

Pesticides are products used to control pests - organisms that are harmful to humans or human concerns. Target pests include weeds, insects, plant pathogens, molluscs, birds, mammals, fish, nematodes and microbes that impact crops or other property, displace or harm native species, or spread disease. The term pesticide encompasses herbicides, insecticides, rodenticides, nematicides, fungicides, molluscicides, piscicides, avicides, bactericides, insect repellents, animal

repellents and antimicrobials. Herbicides applied to control weeds or other unwanted plant species account for approximately 80% of all pesticide use.

In addition to providing a range of benefits, pesticides can also be toxic to humans and other species. Potential human risks range from short-term toxicity to long-term effects such as cancer and reproductive system disorders. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires that any product used to kill or otherwise control pests cannot be sold, distributed or used unless it is registered (licensed) by EPA. This registration is a scientific, legal, and administrative procedure through which EPA examines

- The ingredients of the pesticide;
- The particular site or crop where it is to be used;
- The amount, frequency, and timing of its use; and
- Storage and disposal practices.

In evaluating a pesticide registration application, EPA assesses a wide variety of potential human health and environmental effects associated with use of the product. The company that wants to produce the pesticide must provide data from studies that comply with EPA testing guidelines. EPA develops risk assessments that evaluate the potential for 1) harm to humans, wildlife, fish, and plants, including endangered species and non-target organisms; and 2) contamination of surface water or ground water from leaching, runoff, and spray drift (USEPA 2021a).

The primary objective of FIFRA is to ensure that, when used in accordance with their approved labeling, pesticides will not generally cause unreasonable adverse effects to human health or the environment.

To reach this objective, FIFRA requires EPA to establish a range of standards and requirements for pesticides once they are registered, including their labeling and packaging, worker protection standards, and the authority of states to implement, augment and enforce FIFRA.

The FIFRA stipulates that all registered pesticide products must display labels that show the following information clearly and prominently:

- Name, brand, or trademark product sold under
- Name and address of the producer or registrant
- Net contents
- Product registration number
- Producing establishment's number
- Ingredient statement
- Warning or precautionary statements
- Directions for use
- Use classification

Directions for use often include specific instructions regarding use of the pesticide in proximity to streams and other water bodies, intended to minimize the chance of pesticide drift or movement through surface or subsurface flow into the water body. A key Best Management Practice (BMP) for pesticide use is to adhere to these instructions rigorously (Michael 2004).

Individual states may further restrict the sale or use of any registered pesticide but may not permit any sale or use prohibited by FIFRA. A State may register additional uses of a federally registered pesticide to meet local needs unless EPA previously denied, disapproved, or canceled such use. States have primary enforcement responsibilities for pesticide use violations if EPA determines that the state has adopted and is implementing adequate pesticide use laws and regulations, enforcement procedures, and recordkeeping and reporting requirements. It is unlawful for States to impose or continue in effect any requirements for labeling or packaging in addition to or different from those required under FIFRA (USEPA 2021a).

FIFRA and the SDWA

Disinfectants that are sold to treat drinking water must be registered as pesticides under FIFRA.

Other examples of pesticides that must be registered include piscicides (substances used to kill fish) used to pre-treat water, and algaecides, bactericides and molluscicides. The label of a registered pesticide will state whether the pesticide can be used in drinking water.

Under SDWA, public water systems are required to treat drinking water for bacteria, among other contaminants. Public water systems that use disinfectants to treat for microorganisms such as bacteria must ensure that the disinfectant is registered under FIFRA. Registration/compliance under FIFRA does not mean that a product meets the requirements of other environmental and public health protection statutes, including the SDWA, or vice versa. Further, FIFRA registration/compliance does not mean that the product meets state or tribal laws regarding drinking water products for use by PWSs.

The Safe Drinking Water Act (SDWA) generally imposes requirements on Public Water Systems (PWSs), not on product manufacturers. As a result, there is no disinfectant product approval, registration, or license under the SDWA. However, some states, tribes or territories may have such requirements. For example, many states require that products used for treating drinking water be certified by the National Sanitation Foundation (NSF) International. NSF International does not confirm a product's registration status as a part of its certification process (USEPA 2021b).

EPA Human Health Benchmarks for Pesticides (HHBP)

Advanced testing methods now enable the detection of pesticides in water at very low levels. Small amounts of pesticides detected in drinking water or drinking water sources do not necessarily indicate a health risk. EPA has developed human health benchmarks for 430 pesticides to aid in assessing: (1) whether the detection level of a pesticide in drinking water or

drinking water sources may indicate a potential health risk; and (2) the prioritization of water monitoring efforts.

The HHBP table includes noncancer benchmarks for exposure to pesticides that may be found in surface or ground water sources of drinking water. Noncancer benchmarks for acute (one-day) and chronic (lifetime) drinking water exposures to each pesticide were derived for the most sensitive life stage, based on the available information. The table also includes cancer benchmarks for 48 pesticides that have toxicity information that indicates the potential to lead to cancer. The HHBP table includes pesticides for which EPA's Office of Pesticide Programs has available toxicity data but for which EPA has not yet developed either enforceable National Primary Drinking Water Regulations (e.g., maximum contaminant levels) or non-enforceable Drinking Water Health Advisories (USEPA 2021c).

Implementation of FIFRA in Oregon

The Oregon Department of Agriculture (ODA) is the state's lead agency for pesticides, including implementation of FIFRA. In addition to ODA, state agencies with statutory authority for development and enforcement of water quality policies related to pesticides include the Oregon Department of Environmental Quality (DEQ), the Oregon Department of Forestry (ODF), the Oregon Health Authority (OHA), and the Oregon Watershed Enhancement Board (OWEB). Under FIFRA, the EPA encourages states to develop and implement pesticide management plans (PMPs). Oregon's Water Quality Pesticide Management Team (WQPMT) - comprised of representatives from the state agencies listed above and from Oregon State University (OSU) - completed the state's PMP and EPA approved it in 2011. The plan outlines the roles, policies, and legal authorities of each government agency with the responsibilities for protecting Oregon's water resources from pesticides and the process by which these activities will be coordinated.

The WQPMT currently facilitates and coordinates water quality activities such as monitoring, analysis and interpretation of data, effective response measures, and management solutions. WQPMT goals and objectives:

- Identify and prioritize higher risk pesticides, use patterns, and watersheds
- Facilitate water quality monitoring plans, resources, and activities
- Annually evaluate pesticide water monitoring results
- Facilitate management solutions and outreach and educational activities through local stakeholder groups to prevent or reduce pesticide contamination in water
- Improve communication with state and federal agencies, farmers, commodity groups, OSU Extension, environmental groups, industry, local water entities, and others about pesticides and water quality
- Measure progress and try new strategies if necessary

Pesticide stewardship partnerships (PSPs) in Oregon use local expertise combined with water quality sampling results to promote voluntary changes in pesticide use practices that result in improvements to water quality that benefit human health and aquatic life. There are currently nine PSPs in Oregon, mainly in areas with significant industrial agriculture other than forestry. Statewide, most pesticide monitoring is conducted under these nine PSPs. There is currently not a PSP in the MCWPP planning area (ODA 2021).

Pesticides of concern in Oregon

Nationwide, state agencies originally compiled a list of 57 active ingredients or groups of active ingredients that were most likely to affect water quality. The WQPMT added additional pesticides that had the potential to raise concerns in Oregon, for a current total of 72. Of these 72 active ingredients, WQPMT annually selects a subset of this list for further evaluation.

In 2019, the WQPMT modified its methodology to assess the status of pesticides detected in Oregon's waterbodies, based on the concentration of a pesticide and the frequency at which it is detected. The analysis is conducted for each watershed participating in a PSP and provides for watershed-specific designations of *Pesticides of High Concern* (PHC), *Pesticides of Moderate Concern* (PMC), and *Pesticides of Low Concern* (PLC). If a pesticide is determined to be a PHC in 30% or more of the participating watershed, it is designated as a statewide PHC (ODA 2021).

<u>Statewide pesticides of High Concern, 2018-20</u>

Chlorpyrifos
Diazinon
Diuron
Imidacloprid
*Metsulfuron-methyl
Oxyfluorfen

<u>Statewide pesticides of Moderate Concern, 2018-20</u>

*Atrazine
Bifenthrin
Carbaryl
Chlorothalonil
Dimethenamid-p
Dimethoate
Ethoprop
*Glyphosate
Linuron
Malathion
Metolachlor
Pendimethalin
Prometryn
Pyripoxfen
Simazine
*Sulfometuron methyl
2,6-dichlorobenzamide (degradate of Dichlobenil)
AMPA (degradate of Glyphosate)

Pesticides and forestry: The Forest Activity Electronic Notification and Reporting System

Aside from industrial forestry, commercial agriculture is limited within the MWCPP planning area. Pesticides marked with an asterisk* in the lists above, all of which are herbicides, are used in industrial forestry in western Oregon. These herbicides are applied almost exclusively just prior to and/or just after harvesting in order to reduce vegetation that competes with tree seedlings planted to re-establish the forest stands. Re-establishing forest stands on clearcut industrial forestland within 24 months after harvest is required by Oregon state law under the Forest Practices Act (FPA) (Souder et al. 2021).

The Oregon Forest Practices Act (FPA) requires forest landowners and operators to notify the ODF at least 15 days before they begin forest operations on any nonfederal lands in Oregon. "Forest operations" include a range of harvesting, road work, site preparation actions, and also application of forest chemicals including pesticides. The Notification of Operations and Application for Permit (NO/AP) process is conducted through the ODF Private Forests and Protection from Fire divisions. In 2014 the ODF updated the NO/AP process by implementing its Forest Activity Electronic Notification and Reporting System (FERNS), a web-based, centralized database of all forestry operations subject to ODF oversight. The FERNS application is integrated with the state's GIS system. Any interested person or party can subscribe to FERNS and receive electronic notifications of pending forest operations, including applications of chemicals, in their area. Subscribers can also review and submit official comments about the forest operation work plans. Online subscriptions to FERNS are free.

The Pesticide Analytical and Response Center (PARC)

The EPA defines a *pesticide incident* as any exposure or effect from a pesticide's use that is not expected or intended. Pesticide spills can also be a type of incident. To address pesticide incidents, Oregon's Pesticide Analytical and Response Center (PARC) was created in 1978 and reauthorized in 1991 under the ODA. The PARC is mandated to perform the following activities with regard to pesticide-related incidents in Oregon that have suspected health or environmental effects:

- Collect incident information
- Mobilize expertise for investigations
- Identify trends and patterns of problems
- Make policy or other recommendations for action
- Report results of investigations
- Prepare activity reports for each legislative session.

The PARC has no regulatory authority. Its primary function is to coordinate investigations to collect and analyze information about reported pesticide incidents. This information is used to identify trends and patterns then make recommendations, when warranted, to state agencies including public education and industry consultation, regulatory and legislative changes, and

other actions. Member agencies usually conduct the investigations and take any necessary enforcement action(s). These agencies are: Oregon Health Authority (OHA), Oregon Department of Fish and Wildlife (ODF&W), Oregon Department of Environmental Quality (DEQ), Oregon Department of Forestry (ODF), Oregon Occupational Safety and Health Administration (OR OSHA), Office of the State Fire Marshal (SFM), Oregon Poison Center (OPC), and Oregon Department of Agriculture (ODA).

Federal forest land management and drinking water

Overview

From the 1950s through the 1980s, much of the federal forest land base was managed with a focus on timber production. In the 1990s, federal forest management shifted toward aquatic and terrestrial habitat protection, and provision of ecosystem services such as high-quality water. The following section outlines the increasingly detailed guidance for protection and maintenance of municipal drinking water sources on federal forest land that has accompanied this shift in management focus.

The Northwest Forest Plan and Aquatic Conservation Strategy

The 1994 Northwest Forest Plan (NWFP) marked a major reorientation in management focus for central and western Oregon national forests from timber production to ecosystem-based, landscape-level biodiversity and habitat conservation. These goals are addressed via an extensive network of riparian and old-growth reserves with some timber harvest allowed on intervening lands where it is still an important, but usually secondary objective. Today, timber harvested on lands within the NWFP area comes mostly from thinning rather than regeneration cutting, and represents only a small percentage of pre-NWFP harvest volumes (Simončič et al. 2015; Thomas et al. 2006).

The Aquatic Conservation Strategy (ACS) guides management of riparian and aquatic ecosystems on federal forest lands within the NWFP area. The goals of the ACS are to 1) maintain and restore ecological processes that create and maintain habitat for native aquatic and riparian species; and 2) provide sources of high-quality water, recreation, and other ecological benefits. The ACS has five components: 1) watershed analysis; 2) riparian reserves; 3) key watersheds; 4) watershed restoration; and 5) standards and guidelines for management activities (USDA and USDI 1994).

Riparian reserves encompass watershed areas that are ecologically closely linked with streams and rivers. The reserves are two site potential tree-heights wide (minimum of 300') on fish-bearing streams and one site-potential tree-height wide on non-fish-bearing streams. On some larger waterways, the 100-year floodplain serves as the reserve boundary. *Tier 1* key watersheds (a total of 141, covering 8,154,500 acres) are refugia for aquatic organisms or have high

restoration potential. *Tier 2* key watersheds (a total of 23, covering 1,112,000 acres) are sources of high-quality water (USDA and USDI 1994). Most Tier 2 watersheds were designated based on their value as drinking water sources.

The 2012 planning rule for national forests

This rule sets out updated requirements for National Forest System (NFS) unit management plans and includes several provisions related to drinking water. Every plan must identify lands within the planning area that are not suitable for timber production, and watersheds that are a priority for maintenance or restoration. The plan must include components (e.g. standards or guidelines) to maintain or restore public water supplies, source water protection areas and other drinking water sources, including prevention or mitigation of impacts to quantity, quality, and availability. Plans must establish width(s) for riparian management zones around all lakes, perennial and intermittent streams, and open water wetlands, giving special attention to land and vegetation 100' from the edges of all perennial streams and lakes. The plan must ensure implementation of national water quality BMPs established by the USFS Chief in the Forest Service Directive System. When developing plan components for integrated resource management, public water supplies and associated water quality must be considered (National Forest System Land Management Planning 2012).

USDA Forest Service Manual Direction

The Forest Service Manual (FSM) codifies authorities, objectives, policies, responsibilities, and guidance that USFS line officers and staff use to plan and execute assigned programs and activities. FSM 2500 (Watershed and Air Management), Chapter 2540 (Water Uses and Development), Section 2542 (Municipal Supply Watersheds) lists the objective to manage National Forest System (NFS) lands for multiple uses by balancing present and future resource use with domestic water supply needs. Managers are directed to meet this objective by identifying watersheds serving as principal community water sources and developing case-specific prescriptions for each. Specific policy direction is given to "not rely on management practices to provide pure drinking water", but rather to "use only proven techniques in management prescriptions for municipal supply watersheds" (USDA Forest Service 2007).

Forest supervisors must maintain detailed, up-to-date inventories of municipal watersheds, including number of users in each, total acres of the watershed and percent in USFS ownership, amount and percent of annual flow withdrawn, alternative sources available to users, and any contingency plans for emergencies. Supervisors also develop and coordinate measures necessary for management of these watersheds, and post and inform the public of restrictions in them, including reasons for the restrictions. Factors to be evaluated in forest planning where municipal supply watersheds are an issue include:

- Existing water resource conditions as determined by a hydrologic investigation.
- Current uses, values, and management requirements for other resources in the watershed.

- Projection of use in the watershed under multiple-use management practices.
- Current and proposed handling and treatment of water by the municipality, or other water user, after water is diverted from the municipal supply watershed.
- The extent to which use within the watershed can be regulated, including percent of national forest land within the watershed, accessibility, private land development, and mining activity.
- Adjustments of normal multiple-use management practices required to meet municipal water supply needs; and economic effects of modifying normal management practices.

Forest management plans must show municipal supply watersheds as special management areas when management intensity and timing differ from other areas. The plans must also include:

- A statement of objectives for managing the water resources on and flowing from the watershed, including quality, quantity, and timing criteria for the water resource.
- A display showing the proportion of total streamflow used for municipal purposes, the location and size of the municipal supply watershed and associated reservoirs, and the type and amount of permitted public uses at water-supply reservoirs.
- Guidelines for protection, management, use, and development, together with coordinating requirements for other uses and activities within the watershed.
- Guidelines for monitoring uses, activities, and water quality characteristics that may be affected by forest management activities.

When a municipality desires protective actions or restrictions not specified in the forest plan, it must apply to the USFS for consideration of these needs. If deemed appropriate by the Regional Forester, requested restrictions may be incorporated in the forest plan without written agreements. In other cases, when multiple-use management fails to meet municipality needs, the forest supervisor may consider formal agreements under 36 CFR 251.9 - Management of Municipal Watersheds. Such agreements to assure protection of water supplies are used only when requested by the municipality and deemed necessary by the Regional Forester. A special use authorization may be needed which specifies the types of uses, if any, to be restricted; the nature and extent of any restrictions; any special land management protective measures and/or any necessary standards and guidelines needed to protect water quality or quantity; and resources to be provided by the municipality. Special use authorization is required for the municipality to use subject lands, restrict public access, or control resource uses within the watershed (USDA Forest Service 2007).

FSM Section 2532 – Water Quality Management – lists the specific objective to ensure safe drinking water for public use on national forests, and a policy to establish and apply the National Best Management Practices (BMPs) Program to all land and resource management activities as the method of control for non-point sources of water pollution to achieve Federal, State, Tribal, or local water quality goals. The National BMP Program consists of: 1) a set of

National Core BMPs, 2) standardized monitoring protocols to evaluate BMP implementation and effectiveness, 3) corresponding national direction in the Forest Service Directive System, and 4) a data management and reporting structure. Much of this guidance is coordinated and consistent with EPA standards and protocols for water quality protection, monitoring and data archiving. The BMPs are described in the National Core BMP Technical Guide (USDA Forest Service 2012) and are often adapted for specific local conditions and needs.

All USFS agency-owned drinking water systems operated by permittees or by USFS personnel must be operated in compliance with the SDWA and requirements of the state in which each system is located. This guidance is contained in Forest Service Manual chapter 7420 (USDA Forest Service 2010a) and a regional supplement for USFS Pacific Northwest Region 6 (USDA Forest Service 2010b.) Requirements for USFS-owned drinking water systems evolve over time as new laws and regulations are implemented to assure the safety of drinking water.

The USFS National Watershed Condition Framework

Introduced in 2010, the National Watershed Condition Framework (WCF) is a strategic and systematic approach to guiding USFS watershed restoration programs and activities. Initially, the state of physical and biological characteristics and processes that affect soil and hydrologic functions supporting aquatic ecosystems in the watershed is assessed and the watershed is classified as 1) functioning properly; 2) functioning at risk; or 3) functioning impaired. Depending on current function and uses, values affected, restoration potential, the urgency of actions needed, partner interests and other local factors, watersheds are then prioritized for maintenance and restoration. Local-level decision making and implementation enable communities to determine how to best steward their forests and capitalize on the benefits of improving watershed condition. Protection of municipal drinking water sources is a key consideration in many WCF projects (USDA Forest Service 2018a.)

The Drinking Water Providers Partnership is a collaboration of the Geos Institute, USFS Region 6 (Oregon and Washington), Oregon DEQ, the Washington Department of Health, U.S. EPA Region 10, the U.S. Bureau of Land Management OR/WA Office, and WildEarth Guardians. Since 2016, this program has provided 22 grants in Oregon to cooperatively fund watershed restoration projects in WCF Priority Watersheds that are sources of drinking water. These projects jointly improve fish habitat.

Drinking water source protection provisions in the 2018 Farm Bill

The farm bill is an omnibus, multiyear law that governs an array of agricultural, food and conservation programs and provides policymakers an opportunity to comprehensively address emerging issues. The 2018 Farm Bill amended the 2003 Healthy Forests Restoration Act (HFRA) with a new Water Source Protection Program (Title VIII, Subtitle D, SEC. 8404) targeted toward protection and restoration of drinking water sources on National Forest System land. The bill authorized appropriation of $10 million in funding to carry out the new program for each fiscal year 2019-2023.

The USFS uses the SDWA definition of a municipal watershed: an area that serves a public water system that provides water for human consumption, has at least 15 service connections, or regularly provides water to at least 25 people. Designation of municipal watersheds on USFS lands recognizes the need to protect public water supplies. For some communities, wells outside the national forest are the primary water source, but wellhead protection zones may extend onto USFS lands.

Municipal watersheds on USFS land may be managed for multiple uses so long as management activities do not degrade water quality. All USFS agency-owned drinking water systems must be operated in compliance with the SDWA and requirements of the state in which each system is located. This policy applies to both USFS owned water systems operated by permittees and those operated by USFS personnel. This guidance is contained in Forest Service Manual chapter 7420 (USDA Forest Service 2010a) and a regional supplement for USFS Pacific Northwest Region 6 (USDA Forest Service 2010b.) Requirements for USFS-owned drinking water systems evolve over time as new laws and regulations are implemented to assure the safety of drinking water.

Agreements between the USFS and the State of Oregon to protect drinking water sources

The USFS Region 6 and the state of Oregon have an MOU to cooperate and coordinate in implementing the CWA and SDWA and protect, restore and maintain the physical, chemical and biological conditions of Oregon's "Waters of the State" that support beneficial uses, including drinking water (USDA Forest Service 2014). Some municipal watersheds on USFS land in Oregon are managed under agreements between the local municipality supplied by that watershed and either the Secretary of Agriculture or the USFS. In such cases, actions that could degrade water quality are either prohibited or are subject to approval by the respective city (USDA Forest Service 2018b). These agreements can take different forms, depending on the history and issues specific to each municipality and watershed. Formal agreements under 36 CFR 251.9 - Management of Municipal Watersheds – are summarized above.

The Endangered Species Act (ESA)

Overview

The federal Endangered Species Act (ESA) of 1973 provides a regulatory framework to conserve, protect and recover endangered and threatened species and the ecosystems upon which they depend. When a species is listed as *endangered* under the ESA, it means that species is in danger of extinction throughout all or a significant portion of its range. Being listed as *threatened* means the species is likely to become endangered within the foreseeable future. *Candidate* species have been studied and warrant being proposed for listing as threatened or endangered.

Sensitive species need special management to maintain and improve their status and prevent a need for listing under the ESA.

The ESA requires that listing determinations be based solely on the best scientific and commercial (e.g., catch data) information available. Consideration of economic impacts when making species listing determinations is prohibited. For terrestrial and freshwater organisms, the ESA is administered primarily by the U.S. Fish and Wildlife Service (USFWS). For marine species including whales and other mammals, and also anadromous fish such as salmon, the ESA is administered by the U.S. Department of Commerce National Marine Fisheries Service (NMFS). After 1970, when it was moved to Commerce's newly formed National Oceanic and Atmospheric Administration (NOAA), the NMFS has been referred to as NOAA Fisheries.

Concurrently with listing a species, the ESA requires these agencies - "to the maximum extent prudent and determinable"- to designate *critical habitat* for the species. Critical habitat determinations must be based on the best science information available but differ from listing determinations in that they must also account for economic effects. Critical habitat is the area occupied by the species when it is listed that contains physical or biological features essential to conserving the species and that may require special management or protection, as well as specific areas not occupied by the species when it is listed that are essential for conserving the species. Critical habitat designations affect only federal agency actions or federally funded or permitted activities. The law requires other federal agencies, in consultation with the USFWS and/or NOAA Fisheries, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species.

The ESA also prohibits under Section 9(a)(1) any action that causes a "taking" of any listed species of endangered fish or wildlife. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Section 4(d) of the ESA requires the agencies to promulgate regulations specifically tailored to protect threatened species. These regulations often simply extend the prohibitions for endangered species to threatened ones, except that prohibitions on taking the species may be limited by a cooperative agreement with a state. The USFWS promulgated a rule - the "blanket 4d rule" - which extends the prohibitions for endangered species to threatened species unless the agency promulgates a specific Section 4(d) rule for the species. NOAA Fisheries has taken a different approach and aims to promulgate a specific Section 4(d) rule for each threatened species (Ward 2019).

Many species in need of protection are composed of multiple subspecies. In these cases, a key goal is to identify and protect diversity within the species to maintain viable populations. Recognizing this, Congress amended the ESA in 1978 to permit the listing of "distinct population segments" as well as entire species. But Congress provided little guidance on how to distinguish these distinct population segments. In the 1990s, NOAA Fisheries biologists charged with assessing populations of Pacific Northwest salmonids refined a framework to do so based on

evolutionarily significant units (ESUs) within these species. An ESU is a population of organisms that is considered distinct for purposes of conservation. To be considered an ESU the population had to 1) be "substantially reproductively isolated" from other populations, and 2) represent "an important component in the evolutionary legacy of the species." Using a combination of geographic, ecological, and genetic data, these biologists described 51 ESUs for the 7 species of anadromous Pacific Northwest salmonids (DeWeerdt 2002).

The ESA's ultimate goal is to "recover" species so they no longer need protection and can be removed from being listed as endangered or threatened. Recovery plans describe the steps needed to restore a species to ecological health. USFWS or NOAA Fisheries biologists write and implement recovery plans with the assistance of species experts; other Federal, State, and local agencies; Tribes; nongovernmental organizations; academia; and other stakeholders (USEPA 2021d; USFWS 2021).

ESA considerations within the MCWPP planning area

Prohibition of certain activities to protect species listed as threatened or endangered under the ESA could affect mid-coast water planning and water supplies in various ways. Maintenance of good water quality is usually integral to ESA provisions aimed at protecting habitats for aquatic species, and also a key goal for municipal water users. Abell et al. (2019) note that protecting drinking water at its source relies primarily on maintaining nature's ability to capture, infiltrate, store, and filter water and that these functions are also critical for numerous riparian and aquatic species. They found that areas that serve as drinking water sources also often have high biodiversity values and point to the efficiencies that may accrue from optimizing for multiple benefits simultaneously. Abell et al. (2019) focused on conserving biodiversity by leveraging investments in drinking water source protection. But this synergy can work both ways- their work also indicates the potential to leverage investments in aquatic habitat improvement to help protect drinking water quality.

However, in other instances ESA provisions for aquatic habitat protection may not be as consistent with the goals of water users. For example, protection of instream flow volumes to maintain aquatic habitat quality may result in restrictions on the amount of water available for withdrawal from some streams. Any such issues or conflicts would likely be most acute in late summer when seasonal low flows and the greatest risk for stream temperature exceedances that impact ESA listed fish intersect with what is often the time of greatest water demand in coastal Oregon communities.

The most common and significant intersections of the ESA and mid-coast water planning are likely to be in the realm of actions taken to protect and restore the Oregon Coast Coho salmon *(Oncorhynchus kisutch)* ESU. This and other salmon species are iconic and both culturally and economically significant in Oregon but have been drastically reduced in abundance due to a combination of freshwater habitat alteration and loss, overharvesting, effects of hatchery fish, and other factors. Because salmonids range from the open ocean through estuaries to

headwater streams over their life histories, addressing these issues is very complex. Defining distinct populations, then assessing their viability and future prognoses is difficult, controversial, and fraught with uncertainty, as indicated by the shifts in ESA policies related to the Oregon Coast Coho salmon ESU summarized below.

After a comprehensive status review in 1995, NOAA Fisheries proposed listing the Oregon Coast Coho salmon ESU as threatened. Since then, the agency completed several additional status reviews for the species, and its ESA listing classification has changed back and forth between threatened and not warranted for listing several times. These shifts occurred in response to new science information and to legal determinations under lawsuits by plaintiffs both supportive of listing (Oregon Natural Resources Council; Trout Unlimited) and against listing (Alsea Valley Alliance). At issue in these lawsuits were the status of hatchery fish in relation to the ESU, the future prognosis of the ESU, and what constituted "best available science" used to support agency decisions. Also during this time, the State of Oregon sought to avoid listing of the Oregon Coast Coho salmon ESU, while still working to recover the species. These efforts included the 1997 Oregon Coastal Salmon Restoration Initiative, later renamed the Oregon Plan for Salmon and Watersheds (Oregon Plan), the 2002 Oregon Native Fish Conservation Policy, the 2005 Oregon Coastal Coho Assessment, and the 2007 Oregon Coast Coho Conservation Plan.

Despite the State's efforts, in 2008 NOAA Fisheries once again found that listing the Oregon Coast Coho salmon ESU as threatened was warranted and designated critical habitat for the species at this time. Critical habitat includes reaches in dozens of streams in the following watersheds that are within or drain into the MCWPP planning area:

- Salmon River/Siletz/Yaquina Bay Watershed
- Upper Yaquina River Watershed
- Middle Siletz River Watershed
- Lower Siletz River Watershed
- Upper Alsea River Watershed
- Lower Alsea River Watershed
- Beaver Creek/Waldport Bay Watershed
- Yachats River Watershed
- Lower Siuslaw River Watershed

In 2008, NOAA Fisheries also established protective regulations that apply under ESA Section 4(d) including ESA section 9(a)(1) take and other prohibitions. The agency has a policy to identify, to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of Section 9 of the ESA. Activities that may harm the Oregon Coast coho ESU resulting in a violation of the Section 9 take and other prohibitions that may also intersect with water quality include, but are not limited to:

- Land-use activities that degrade habitats for the Oregon Coast coho ESU (e.g., logging, grazing, farming, urban development, road construction in riparian areas and areas susceptible to mass wasting and surface erosion);
- Destruction/alteration of the habitats for the Oregon Coast coho ESU, such as removal of large woody debris and "sinker logs" or riparian shade canopy, dredging, discharge of fill material, draining, ditching, diverting, blocking, gravel mining, or altering stream channels or surface or ground water flow;
- Discharges or dumping of toxic chemicals or other pollutants (e.g., sewage, oil, gasoline) into waters or riparian areas supporting the Oregon Coast coho ESU;
- Violation of discharge permits;
- Application of pesticides affecting water quality or riparian areas for the Oregon Coast coho ESU.

Actions that NOAA Fisheries concluded would not, to the best of their knowledge, result in violation of the Section 9 take and other provisions include federally funded or approved projects that involve activities such as silviculture, grazing, mining, road construction, dam construction and operation, discharge of fill material, stream channelization or diversion for which ESA Section 7 consultation has been completed, and when activities are conducted in accordance with any terms and conditions provided by NMFS in an incidental take statement accompanying a biological opinion.

In 2011, after another status review, the agency issued a final determination to retain the threatened listing. In making these determinations, NOAA Fisheries indicated that the capacity of, and efforts being made to by the State of Oregon to protect the species did not provide sufficient certainty of implementation or effectiveness to mitigate the assessed level of extinction risk. The threatened listing for the Oregon Coast Coho salmon ESU was retained under the most recent status review in 2016 and remains in effect at this writing, as do the critical habitat designations and protective regulations for the species.

In coordination with ODFW, NOAA Fisheries developed the Oregon Coast Coho Salmon Recovery Plan, finalized in December 2016. In that plan, NOAA Fisheries indicates that out of 28 west coast salmonids listed under the ESA, the Oregon Coast coho is one of the closest to recovery. Since the species was listed in 1998, key threats such as hatchery practices and harvesting have been abated through concerted efforts by numerous parties. While annual returns fluctuate greatly with variable ocean conditions, as of 2016 more native coho were returning to the Oregon Coast than at the time of listing. NOAA Fisheries anticipates that a focused, effective recovery implementation strategy could serve as the final catalyst for recovering and delisting the species (NFMS 2016b).

Coastal Nonpoint Pollution Control Program

The 1972 Coastal Zone Management Act (CZMA) provides a formal structure to address the challenges of continued population growth and development in coastal areas. The CZMA is focused on ensuring access to clean water and healthy ecosystems that support strong coastal economies by integrating science, technology, and public policy. Administered by the National Oceanic and Atmospheric Association (NOAA), the goals of the CZMA are to "preserve, protect, develop, enhance, and restore where possible, the coastal resources" (NOAA 2018).

The Coastal Zone Act Reauthorization Amendments of 1990 (CZARA) included a new Section 6217, "Protecting Coastal Waters", requiring each state with a coastal zone management program approved under section 306 of the CZMA to develop and implement a Coastal Nonpoint Pollution Control Program (Coastal Nonpoint Program) to prevent and control polluted runoff. Oregon's Coastal Nonpoint Program is administered by the Department of Land Conservation and Development (DLCD). Most regulations in the program were developed as state rules not related to CZARA, such as Department of Environmental Quality (DEQ) water quality regulations; Department of State Lands (DSL) Wetland Program; the Oregon Forest Practices Act (OFPA); Department of Agriculture (ODA) water quality management plan requirements; and Water Resources Department (WRD) requirements for water use, and dam construction and operation (DLCD 2021).

Section 6217 of the CZARA requires coastal states to implement nonpoint source pollution management measures developed by the EPA. These measures are organized into two tiers and encompass activities in farming, forestry, urban areas, marinas, areas near rivers and streams, and wetlands. The first tier is intended to protect coastal waters generally and therefore is not linked to specific water quality problems. If the first tier does not enable coastal waters to meet water quality standards and protect designated uses, then the state must implement a second tier of management measures. The second tier of "additional" management measures is targeted specifically at restoring coastal waters so as to attain and maintain applicable water quality standards under section 303 of the Clean Water Act (CWA) and to protect beneficial water uses designated by the state (NOAA and EPA 1993). Beneficial uses are designated for each of Oregon's waters in the Oregon Administrative Rules for water quality standards. These "waters of the state" include all surface waters except those on private land which do not include or border any natural waters. (Oregon Legislative Counsel Committee 2017.) For Oregon's coastal waters, designated beneficial uses include "public domestic water supply" in all streams and rivers inland from the estuary or head of tidewater influence (Oregon DEQ 2018).

Section 6217 also requires each coastal state to submit their coastal nonpoint program - which lays out how they intend to implement their pollution management measures - to the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA) for approval. Failure to submit an approvable program can result in a state losing a portion of its Federal funding under section 306 of the CZMA and section 319 of the CWA.

As required by the CZARA and CWA, Oregon submitted its Coastal Nonpoint Program in 1995. In 1998, the NOAA and EPA conditionally approved Oregon's program. Full approval was to be granted if and when the state met a number of specific conditions. The conditions required application of EPA management measures to address impacts stemming from a range of activities including agriculture, forestry, urban development, highways and bridges, marinas, stormwater and waste management, and construction sites. In regards to forestry, the NOAA and EPA found that the following additional management measures were necessary to meet applicable water quality standards and fully protect beneficial uses:

- Protect riparian areas for medium-sized and small fish-bearing (type "F") streams and non-fish-bearing (type "N") streams
- Address the impacts of forest roads, particularly so-called "legacy" roads
- Protect high-risk landslide areas
- Ensure adequate stream buffers for the application of herbicides, particularly on non-fish bearing streams

These measures were specifically focused on protecting streams from timber harvesting impacts, controlling runoff from old forest roads and landslide-prone areas, and guarding streams against aerial herbicide spraying (House 2016). In their rationale for the forestry related findings, the federal agencies focused on water quality standards necessary for spawning and survival of salmonid fish, and on protecting beneficial uses, which include municipal water supplies (NOAA and EPA 1998). In more recent documentation regarding the need for the additional measures, the agencies explicitly referred to impacts on drinking water quality in their discussion of aerial application of herbicides (NOAA 2015).

Working with the federal agencies, Oregon subsequently met nearly all of the conditions laid out in 1998 by incrementally modifying its program over time. But the state faced challenges in meeting conditions related to development, onsite sewage disposal, and forestry. In 2009, Northwest Environmental Advocates (NWEA) sued the NOAA and EPA for violating CZARA provisions requiring the agencies to withhold a percentage of CWA and CZMA funding from states that fail to submit approvable nonpoint source programs. The plaintiffs alleged that despite Oregon's failure to submit an approvable program, the federal agencies had not disapproved the program or withheld grant funds (as required by CZARA) and that as a consequence, Oregon had not improved its forest practices sufficiently to protect coastal water quality (NWEA 2010). In 2010, the Oregon US District Court directed the NOAA and EPA to either fully approve or disapprove Oregon's nonpoint program by May 15, 2013 (NWEA v. Locke et al. 2010).

In 2013, the NOAA and EPA signaled their intent to find that the state had not fully satisfied the conditions related to new development, onsite sewage disposal systems, and additional management measures for forestry. In 2014, Oregon supplied additional documentation in

support of its nonpoint program. In 2015, the federal agencies found that the state had met the conditions for new development and onsite sewage disposal systems, but not for forestry. As a result, the agencies disapproved Oregon's Coastal Nonpoint Program, triggering a 30% holdback of Oregon's Section 306 funds – a loss of $1.2 million from roughly $4 million in annual federal grant funding that the state had been using to address coastal pollution (NOAA 2015; House 2016). These funds will be withheld until the state's coastal nonpoint program is approved. The EPA and NOAA also expressed concern over the Oregon Department of Agriculture (ODA) enforcement program for nonpoint source pollution on agricultural lands. This concern was not used as a basis for disapproval, but the agencies stated they will revisit the issue the next time they review the state's program for compliance.

In a 2016 review of Oregon's coastal program, NOAA found that owing to the funding cut, Oregon has not been able to fill staff and technical support positions, and that the program can no longer provide planning or technical assistance grants to coastal local governments with Section 306 funding. The coastal program may also have less funding and technical assistance to support other state agency projects to improve coastal management (NOAA 2017). Programs affected are DEQ's nonpoint source reduction program, and Oregon Coastal Management Program (OCMP) planning assistance grants for local governments in the coastal zone. The DLCD reported the loss of two staff positions and $2.6 million accumulated loss of funding for these programs by spring 2019 (Oregon DLCD 2021).

In April 2017, the Oregon Board of Forestry adopted new rules to increase shade buffers on small and medium salmon, steelhead and bull trout fish-bearing streams. Oregon has described the strategies in place to address the remaining additional management measures, but to date the EPA and NOAA have not found them to be acceptable. Discussions have continued between the state and the federal agencies, but no formal assessment has been done since 2015. It is not known when the state will seek a reassessment from EPA and NOAA (Oregon DLCD 2021).

The Oregon Forest Practices Act

The Oregon Forest Practices Act (FPA) is the state's primary regulatory framework for addressing the environmental impacts of forest operations on state and private industrial and non-industrial forest lands. The Forest Practices Act sets standards for all commercial activities involving the establishment, management and harvest of trees in the state. The seven-member Oregon Board of Forestry (BOF) has primary responsibility for interpreting the FPA and setting enforceable forest practice rules "in the public interest" (ORS 527.630(2)). Under ORS 468B.110(2), ORS 527.765, and ORS 527.770, the BOF establishes Best Management Practices (BMPs) or other control measures by rule that, to the maximum extent practicable, will ensure attainment and maintenance of water quality standards.

The Oregon Environmental Quality Commission is a five-member panel of Oregonians appointed by the governor for four-year terms to serve as Oregon Department of Environmental Quality's policy and rule-making board. The Commission has the authority to request rule changes to rules in the FPA, including strengthening protections for soil and waterways. If the Commission does not believe that the FPA rules will accomplish this result, it is authorized to petition the BOF for more protective rules.

When passed in 1971, the FPA was the first legislation of its kind in the U.S. The FPA's first rules were implemented in 1972 and emphasized Best Management Practices (BMPs), which have since been revised repeatedly in response to emerging environmental concerns and science findings. Rules for pesticide use were strengthened in 1977 and again in 1996. In 1983, new rules focused on road and log landing parameters were added in response to heightened concern over road-related landslides in western Oregon. Rules to address landslide risks associated with harvesting in steep areas were more controversial, but were enacted two years later. The issue of linkages between forestry and landslides on steep slopes surfaced again 1996, one of the wettest years on record, when impacts from numerous slides in western Oregon increased public attention on the matter. In 1997, additional restrictions focused on public safety were placed on logging on steep slopes near roads or where people might be present (OFRI 2018a, Langridge 2011). Langridge (2011) describes scientific and policy debates associated with the 1997 rule changes and how the issue was framed primarily in terms of human safety while environmental protection was de-emphasized. As of August 2021, the FPA does not have any water quality protection provisions for operations in landslide-prone areas.

Rules associated with riparian vegetation and buffer strips have arguably been the most contentious and have evolved to the greatest degree. Riparian rules were modified in 1987 and again, more significantly, in 1994. Increasingly comprehensive and integrated science reports on topics such as the cumulative effects of forest practices (Beschta et al. 1995) and the status of salmonids and their habitat (Botkin et al. 1995), coupled with federal direction to mitigate dwindling salmon runs kept pressure on the forestry board to further restrict harvesting in riparian and landslide-prone areas. But the studies also demonstrated the inherent complexity of these issues (Hairston-Strang et al. 2008).

In 2003, Forest Practices Act rules were updated to require the use of higher quality rock or the suspension of log hauling during very wet weather, based on findings from an Oregon Department of Forestry monitoring study on wet season use of forest roads (Robben et al. 2003, ODF 2003).

The most recent Forest Practices Act rule changes were in 2016 and 2017, and include 60-foot no-spray buffers for aerial herbicide use around homes and schools; a new salmon-steelhead-bull trout category of stream classification and wider riparian buffer strips that must be left around these streams, and additional protections for bald eagles (OFRI 2018b). The salmon-steelhead-bull trout rules are the first change to Forest Practices Act riparian rules since 1994. As

of August 2021, The FPA still lacks provisions to protect small, non-fish-bearing, ephemeral and intermittent streams during harvesting.

Forest Practices Act administration and compliance monitoring

Oregon Department of Forestry (ODF) stewardship foresters administer Forest Practices Act rules by working with forest landowners and operators to help them comply with Forest Practices Act requirements. The Oregon Forest Resources Institute publishes a detailed manual to assist with planning and execution of timber harvests that comply with the FPA (Cloughesy and Woodward 2018). The ODF Forest Practices Monitoring Program reviews the effectiveness of the Forest Practices Act and its rules. This program provides science information for adapting regulatory policies and management practices, delivers education and training on FPA rules, assesses whether FPA rules and voluntary guidance sufficiently protect natural resources, and evaluates whether FPA rules are complied with and if voluntary measures are implemented. If FPA violations are identified, ODF starts with education and notices of correction before going into formal enforcement. Citations may be issued requiring cessation of the violating practice until agreement is reached on a mitigation strategy, and a legally binding consent order signed (ODF 2019).

Since 2013, compliance monitoring has been conducted through the ODF Private Forests Monitoring Unit using contractors who audit FPA rules for road construction and maintenance, timber harvesting, some riparian management area measures, measures for small wetlands, and rules for operations near waters of the state. Audits through 2016 found 97% overall compliance (ODF 2018).

The Forest Practices Act also requires forest landowners and operators to notify the ODF at least 15 days before they begin forest operations on any nonfederal lands in Oregon. As defined in the Forest Practices Act, forest operations include timber harvesting, road construction and reconstruction, site preparation, slash treatment, woody biomass removal, chemical application, land use changes, and certain noncommercial forest activities. In addition, permits are required for any operation using power-driven machinery or fire. The Notification of Operations and Application for Permit (NO/AP) process is conducted through the ODF Private Forests and Protection from Fire divisions. In 2014 the ODF updated the NO/AP process by implementing its Forest Activity Electronic Notification and Reporting System (FERNS), a web-based, centralized database of all forestry operations subject to ODF oversight. The FERNS application is integrated with the state's GIS system. Any interested person or party can subscribe to FERNS and receive electronic notifications of pending forest operations in their area. Subscribers can also review and submit official comments about the forest operation work plans. Online subscriptions to FERNS are free.

About 60% of Oregon's forestland is owned by the federal government, about 34% is privately owned (of which 22% is held by owners with 5,000 acres or more and 12% with less than 5,000 acres), 3% is owned by the state, 1% by local government, and 2% by tribes (OFRI 2017).

Because the Forest Practices Act and its rules apply only to nonfederal forestland in Oregon, and to ensure that consistent minimum standards are met, the ODF, U.S. Forest Service, and U.S. Bureau of Land Management agreed that Oregon's forest practice rules would be met or exceeded on federal land in Oregon (Hairston-Strang et al., Adams and Ice 2008). The Clean Water Act requires federal land managers to ensure that their practices will meet state water quality standards, laws, and rules (consistency review). In addition, state forests owned by the Department of State Lands and the forestry board typically exceed Forest Practices Act requirements through their management plans.

Oregon Forest Practices Act rules with particular relevance for drinking water

Arguably, the original Forest Practices Act and most subsequent revisions to it were intended primarily to maintain or improve water quality. But certain sections are more directly related to drinking water than others. Minimizing soil disturbance and erosion potential to protect water quality is fundamental to nearly all Forest Practices Act rules for timber harvesting (Division 630). Other Forest Practices Act sections that are relevant for drinking water include:

Division 620 — Chemical and other petroleum product rules
Division 625 — Forest road construction and maintenance, and several divisions of the water protection rules
Division 635 — Purpose goals, classification and riparian management areas
Division 642 — Vegetation retention along streams
Division 645 — Riparian management areas and protection measures for significant wetlands
Division 650 — Riparian management areas and protection measures for lakes
Division 655 — Protection measures for "other wetlands," seeps and springs
Division 660 — Stream channel changes

Provisions relating to riparian management areas, streamside buffers, and stream crossings for forest roads are often focused on maintaining conditions for coldwater fish species, but domestic water use is also explicitly referenced in the Forest Practices Act stream classification system. Protection of water quality to benefit fish and maintaining safe drinking water sources for humans are not mutually exclusive goals — measures targeted toward either goal often produce benefits for the other (Abell et al. 2019).

The Oregon Forest Practices Act Stream Classification System

The Forest Practices Act protection goal for water quality is to ensure that, to the maximum extent practicable; nonpoint source discharges of pollutants resulting from forest operations do not impair the achievement and maintenance of the water quality standards (ODF 2018, p. 53).

The Forest Practices Act uses a stream classification system to align the physical flow characteristics and beneficial uses of a water body to a set of appropriate protection measures. This classification system, and methods by which streams are classified, have been refined over time to reflect new science knowledge or policy imperatives. A Type F stream is any stream used seasonally or year-round by anadromous fish, game fish, or fish listed as threatened or endangered under the federal or state endangered species acts. Type F streams may also serve as community water sources. In July 2017, the salmon, steelhead and bull trout (Type SSBT) category was added along with modified stream buffer rules to better protect the cooler water quality temperatures needed by these fish (Groom et al. 2018). A Type D stream is any stream which does not contain fish (as defined above) and is located within a specified distance upstream of any domestic water intake for which an Oregon Water Resources Department permit has been issued. All other streams are classified as Type N.

The distance upstream from an intake that Type D (domestic water use) classification applies varies according to whether the intake meets Oregon's definition for a community water supply: has 15 or more service connections used by year-round residents, or which regularly serves 25 or more year-round residents. If the intake meets one of these criteria, Type D classification initially applies to the length of stream that was designated Class I under the classification system in effect on April 22, 1994 (as shown on district water classification maps). If the intake is not for a community water supply (as defined above) Type D classification initially applies for the shortest of 1) the distance from the intake upstream to the farthest upstream point of summer surface flow, 2) half the distance from the intake to the drainage boundary, or 3) 3000 feet upstream from the intake. Type D classification also applies to tributaries off the main channel as long as the above conditions hold.

Streams are further classified by size:

Small — average annual flow of 2 cubic feet per second (cfs) or less
Medium — average annual flow greater than 2 but less than 10 cfs
Large — average annual flow of 10 cfs or greater.

Criteria for establishing average annual flows are explained in Forest Practices Technical Note Number 1 (ODF 1994). Actual measurements of average annual flow may substitute for the calculated flows described in the technical note. Any stream with a drainage area less than 200 acres is assigned to the small stream category regardless of the flow calculated.

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Appendix J. Oregon's Mid-Coast estuaries

Salmon River Estuary. This is classified as a Natural Estuary and has little residential, commercial, and industrial development. The entire estuary and its associated wetlands are part of the Cascade Head Experimental Forest and Scenic Research Area, which is owned and managed by the US Forest Service. The entire Cascade Head area is 11,890 acres; the estuary comprises 205 acres.

Areas of Ecological Importance and Critical Habitat Designations: Habitat areas include wetlands, mudflats, emergent herbaceous wetlands, and intertidal marsh. The estuary provides transitional habitat between freshwater and saltwater for upstream spawning migrations for anadromous fish and rearing areas for juveniles and smolts. The Salmon River Estuary is part of the Salmon River Estuary-Cascade Head Conservation Opportunity Area.

Species of Interest: In addition to providing habitat for salmon, the Salmon River Estuary was nominated as an Important Bird Area for brown pelican, bald eagle, and peregrine falcon, and for its abundance of shorebirds, including western sandpipers.

Siletz Bay Estuary. Siletz Bay is classified as a Conservation Estuary by the Oregon Land Conservation and Development Department. It lacks jetties or channels, but is near Lincoln City, which has altered some of the shoreline near the estuary. The US Fish and Wildlife Service (USFWS) manages a 568-acre portion of the bay as a national wildlife refuge, which includes coastal conifer and hardwood forest, estuarine tidelands, and freshwater riparian habitats. The estuary was formerly diked to drain land for raising dairy cows. The USFWS is managing the refuge to allow the salt marsh to return to its natural state, where tides inundate the refuge twice daily. The Siletz Bay is a Conservation Opportunity Area.

Species of Interest: The Siletz Bay Wildlife Refuge provides nursery habitat for coho and Chinook Salmon, Steelhead and Cutthroat Trout, and other anadromous species. Spring Chinook usually arrive to the refuge in May, and American shad arrive between late April to the end of May. The refuge is also home to red-tailed hawks, bald eagles, barn owls, red-shouldered hawks, ospreys, turkey vultures, merlins, and peregrine falcons as well as estuary-dependent birds, including great blue herons, great egrets, Virginia rails, eared grebes, brown pelicans, buffleheads, common mergansers, wood ducks, northern shovelers, American wigeon, green-winged teals, and double-crested cormorants. Mammals at the refuge include Roosevelt elk, black-tailed deer, harbor seals, mink, river otter, muskrat, and beaver. Siletz Bay has native, common eelgrass as well as exotic *Zostera japonica,* which was introduced with non-native oysters.

Depoe Bay Estuary. Depoe Bay estuary is about 25 acres and is classified as a Shallow-Draft Development Estuary. The estuary is landlocked, with the exception of the harbor entrance, which was developed to support fishing, tourism, lumber, and agriculture. The bay supports bald eagle nesting sites and black oystercatchers, among other species. Depoe Bay is a Conservation Opportunity Area.

Yaquina Bay Estuary. Yaquina Bay is a 4,300-acre estuary located in the City of Newport. It is classified as a Development Estuary. Current human uses of Yaquina Bay include fishing and fish processing, logging, shipping, tourism, aquaculture, and agriculture. The estuary has been dredged and filled at several locations to support these uses and to allow for development. Oregon State Parks owns the Yaquina Bay State Recreation Site, a 32-acre parcel of land overlooking the mouth of Yaquina Bay. There are large, cultivated shellfish operations in the Yaquina estuary.

Areas of Ecological Importance and Critical Habitat Designations: Yaquina Bay is listed as critical habitat for Green Sturgeon. Yaquina Bay State Recreation site is a spruce and pine forested bluff. Lower Yaquina Bay has little freshwater influence and is popular for shellfish harvesting. The Wetlands Conservancy has identified high salt marsh, tidal Sitka spruce swamp, and non-tidal Sitka spruce swamp as the highest priorities for habitat restoration. The estuary also has eelgrass beds, and nesting eagles and osprey. Spruce swamps are located in the upper estuary along Elk Creek and Little Elk Creek and areas for potential restoration of high salt marsh are located in Boone Slough and Nute Slough. Currently, there is an eelgrass mitigation project in the eastern portion of Marina Bed. Yaquina Bay is a Conservation Opportunity Area.

Alsea Bay Estuary. Alsea Bay is designated as a Conservation Estuary, is one of only six estuaries in Oregon that is managed for conservation under the Coastal Zone Management Act, and does not have jetties at the ocean entrance. Recreational fishing and clamming are allowed in Alsea Bay and species present include cockles and purple varnish clams, softshell clams, and Dungeness crabs. There are two public boat launches at Alsea Bay, including the Port of Alsea boat launch and McKinley's Marina.

Species of Interest: Alsea Bay supports Green Sturgeon as well as a diversity of other species.

Areas of Ecological Importance and Critical Habitat Designations: The east side of Alsea Bay has more than 400 acres of undisturbed marsh habitat and additional marsh habitat in the lower reaches of Drift Creek, a Forest Ecosystem Management Assessment Team (FEMAT)-designated key watershed. Additional tidal high marsh habitat that is recovering from previous grazing disturbance is found west of Barclay Meadows and east of Eckman Lake. The Bayview Oxbow has about 150 acres of diked former tidal marsh. Barclay meadows contains small areas of diked former tidal marsh. Bain Slough is a forested wetland located at River Mile 9 that has well-developed remnant tidal channels. A tidegate, ditching, and residential development all reduce tidal influences at Bain Slough, which was likely a spruce tidal swamp at one time. Alsea Bay has been identified as a Conservation Opportunity Area.

Yachats River Estuary. Yachats River Estuary is about 40 acres, is a minor estuary, and is classified as a Conservation Estuary. The Yachats River Estuary is part of the Yachats River Area Conservation Opportunity Area. It is a designated Important Bird Area of Oregon and includes marbled murrelet and spotted owl nesting sites.

Appendix K. ODFW comments regarding the draft action plan and instream demand

Oregon
Kate Brown, Governor

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September 21, 2021

Via E-Mail:
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Harmony Burright, Oregon Water Resources Department - Harmony.S.Burright@oregon.gov

RE: ODFW Comments Regarding the Draft Action Plan and Instream Demand

Dear Adam and Harmony,

Thank you for the opportunity to comment on Oregon's Mid-Coast Water Planning Partnership Draft Water Action Plan (Plan). In our review, we notice that there is very little information on Step 3 results, particularly regarding the Instream Demand, which is an important component for the Oregon Department of Fish and Wildlife (ODFW). ODFW initially provided information for Step 3 that was utilized in the Plan; however, it was understood that the assessment was preliminary and based on available information at the time. ODFW has continued to refine methods for better estimating instream needs when data is limited. We are including here an overview of ODFW's current perspective on instream values and providing a more comprehensive means to understand instream needs across the planning area. We have incorporated some of this information into the September 8, 2021 Plan Draft; please feel free to include this letter as an Appendix in the Plan if the Partnership feels it would provide appropriate context.

As stewards of Oregon's fish and wildlife, ODFW prioritizes the sustainability of healthy ecosystems that support the economy and cultural values upon which Oregonians rely. ODFW supports Oregon's fish, wildlife, and ecosystems in part by identifying instream flow targets and working with stakeholders on voluntary flow restoration and/or protection efforts. These efforts are vital to ODFW's mission to protect and enhance Oregon's fish and wildlife and their habitats for use and enjoyment by present and future generations.

Supporting healthy freshwater ecosystems provides benefits beyond those important to fish and wildlife. All Oregonians, individuals and businesses alike, rely on healthy aquatic ecosystems for such things as drinking water, flood control, transportation, recreation, purification of human and industrial wastes, habitat for plants and animals, and production of fish and other foods or marketable goods. Therefore, an integrated approach to managing water resources must include the flows necessary to protect all these benefits, and consider impaired flows, reduced water quality, and diminished fish and wildlife as early warning signs of potential impacts to public benefits.

ODFW Letter to Mid-Coast Partnership
September 21, 2021
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Regional and statewide efforts, such as the Governor's 100-Year Water Vision, Integrated Water Resources Strategy, and Place-based Integrated Water Resources Planning, prioritize the value of instream flow and strive to better balance in and out-of-stream needs in hopes of keeping Oregon healthy and thriving.
Through its Step 2 and Step 3 processes, ODFW assisted the Partnership in performing a preliminary analysis of instream needs. The analysis included a summary of existing instream water rights in the Mid-Coast Planning Area, along with an analysis of how often existing instream water rights are likely to be met. However, ODFW noted that additional data was needed for a more complete understanding of instream needs, because using instream water rights as a proxy for instream need has certain limitations, including:

- Limitations exist in statute and rule that effectively prohibit state agencies from applying for anything beyond the "minimum quantity of water necessary to support the public use requested by an agency" (ORS 537.332(2)). It is important to note that minimum flows do not mean the absolute minimum flow that can sustain a population, but rather the minimum necessary to serve the management objective of the applicant agency. However, this has not been construed to include the full range of flows needed for ecosystem health, and therefore, does not include protection for seasonally varying flows that provide important habitat formation and maintenance functions.
- The Oregon Water Resources Department (WRD), through implementation of their rules, often reduces ODFW's biologically-based instream water right application amounts to the 50th percentile flow, although the rule does indicate that there can be exceptions "where periodic flows that exceed the natural flow or level are significant for the applied public use" (OAR 690-077-0015(4)).
- The allowed methods in ODFW's instream rules (OAR 635-400; last modified in 1989) for determining instream flow amounts do not include a mechanism for developing temperature-based flow targets. However, ODFW recognizes that temperature stresses associated with increasing drought and heat impacts are already negatively affecting native fish and wildlife species, including sensitive, threatened, and endangered (STE) species. In response, ODFW recently adopted a Climate and Ocean Change Policy "…to ensure that the Department prepares for and responds appropriately to the impacts of a changing climate and ocean on fish, wildlife, their habitats, and their use and enjoyment by current and future Oregonians" (OAR 635-900; 2020).

ODFW is pleased to see that the Partnership recognizes the value of instream flows and is committed to acquiring information to fill data gaps - including a full suite of instream needs - and using that information to plan, implement, and monitor pilot projects in high-priority areas that address the limitations noted above. The ODFW Water Quality and Quantity Program's strategic goals include establishing statewide instream flow and temperature protection targets and facilitating streamflow and water temperature restoration on the ground. Therefore, this place-based planning effort provides an opportunity for the Partnership and ODFW to continue working collaboratively to:

1. More fully characterize basin-wide instream needs using ODFW's updated guidance document (expected 2021) to provide a foundational assessment, particularly on streams with STE species that currently lack instream targets.
2. Use outcomes of the updated instream needs assessment, along with existing data, to identify high-priority locations for pilot projects that address instream needs. Existing data may include (but are not limited to):
    a. ODFW's Aquatic Habitat Prioritization (expected 2021) and other relevant geospatial datasets that will contribute to location prioritization.
    b. Findings from earlier Mid-Coast place-based planning steps.
    c. Existing IFIM studies or other studies that address habitat requirements.
    d. Sites with water temperature data.
    e. Other relevant data from local, state, tribal, and federal partners, and data from other restoration scientists/practitioners (e.g., NGOs, academia, consultants).
3. Plan, implement, and monitor pilot projects that focus on:
    a. <u>Seasonally Varying Flow (SVF) Targets</u>
    Existing ODFW instream flow targets are based on species-specific instream needs for each life stage (e.g., springtime flows necessary for steelhead spawning, summer flows for juvenile rearing, and fall flows for Chinook and Coho spawning). Streamflows necessary for broader habitat maintenance and formation (e.g., pool development, gravel recruitment, etc.) are not currently incorporated into ODFW instream flow target development. Present methodologies primarily base late fall-early spring instream flow targets on juvenile rearing and/or egg incubation needs, which are typically minimal relative to natural flow conditions during this period of peak annual flows. ODFW intends to identify and develop techniques for the determination of peak channel maintenance and formation flows in the next several years. The Mid-Coast planning area provides an ideal pilot location to test techniques and collect field data.
    b. <u>Temperature-based Flow Targets</u>
    Similar to peak habitat maintenance and formation flows, relationships between water temperature, streamflow, and species thermal limits have not, until recently, been incorporated into ODFW instream flow target development. As climate change progresses, water temperature is anticipated to become a primary limiting factor for cold-water species. ODFW is initiating pilot projects around the state to incorporate relationships between water temperature and streamflow into development of instream flow targets. These assessments typically require several years of paired water temperature and streamflow datasets. ODFW is interested in working with the Partnership to scope potential data collection locations and collaborate on water temperature logger deployment and retrieval. Following several seasons of data collection, ODFW would develop updated water temperature-based

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instream flow targets for study sites, which could aid in prioritizing Actions listed in the Plan.

c. Instream Water Right Monitoring
ODFW has applied for the vast majority of instream water rights in Oregon, with the intent of identifying and legally protecting the flows necessary for the health of aquatic ecosystems. However, in many parts of the state, these instream water rights are junior to most out-of-stream water rights (senior rights in terms of prior appropriation) and, therefore, result in minimal actual protection of instream flows. Coastal Oregon is an exception to this norm, where some instream water rights have sufficiently senior priority dates to provide some protection of instream flows from diversion by upstream, junior out-of-stream water right holders. ODFW is interested in collaborating with OWRD and the Partnership to develop a monitoring framework that assesses gaps in stream gage coverage and identifies priority locations for additional gages to improve protection of streamflows afforded by the senior instream water rights on the Mid-Coast.

ISWRs continue the Department's work to conserve the state's fish and wildlife resources for the benefit of present and future generations and are a critical part of maintaining habitat for those resources in the face of an uncertain water future. ODFW looks forward to continued collaboration and assisting the Partnership when time and resources allow.

Sincerely,

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