Oregon's Integrated Water Resources Strategy

Framework

Goal 1: Improve Our Understanding of Oregon's Water Resources

Understand Water Resources Today

OBJECTIVES

CRITICAL ISSUES

- Further Understand Limited Water Supplies & Systems *(groundwater, surface water and their interaction)*
- Improve Water Quality & Water Quantity Information
- Further Understand Our Water Management Institutions

RECOMMENDED ACTIONS

Understanding Water Resources / Supplies / Institutions

1a. Conduct additional groundwater investigations
1b. Improve water resource data collection and monitoring
1c. Coordinate inter-agency data collection, processing, and use in decision-making

Goal 1 (continued)

Understand Instream and Out-of-Stream Needs

CRITICAL ISSUES

- Further Define Out-of-Stream Needs / Demands *(i.e., diverted water)*
- Further Define Instream Needs / Demands *(i.e., left-in-place water)*

RECOMMENDED ACTIONS

Understanding Oregon's Out-of-Stream Needs/Demands

2a. Update long-term water demand forecasts 🕮
2b. Improve water-use measurement & reporting
2c. Determine pre-1909 water right claims
2d. Update water right records with contact information
2e. Update Oregon's water-related permitting guide

Understanding Oregon's Instream Needs/Demands

3a. Determine flows needed (quality & quantity) to support instream needs 🕮
3b. Determine needs of groundwater dependent ecosystems 🕮

Goal 1 (continued)

Understand the Coming Pressures That Affect Our Needs and Supplies

OBJECTIVES

CRITICAL ISSUES

- Economic Development
- Water & Energy Nexus
- Water & Land Use Nexus
- Population Growth
- Climate Change
- Infrastructure
- Education & Outreach

RECOMMENDED ACTIONS

The Water-Energy Nexus

4a. Analyze the effects on water from energy development projects & policies 🕮
4b. Take advantage of existing infrastructure to develop hydroelectric power
4c. Promote strategies that increase/integrate energy & water savings 🕮

Climate Change

5a. Support continued basin-scale climate change research efforts 🕮
5b. Assist with climate change adaptation and resiliency strategies 🕮

Economic Development & Population Growth

(See Actions 2.A. and 3.A.)

The Water and Land Use Nexus

6a. Improve integration of water Information into land use planning (& vice versa)
6b. Update state agency coordination plans
6c. Encourage low-impact development practices 🕮

Infrastructure

7a. Develop and upgrade water & wastewater infrastructure
7b. Encourage regional (sub-basin) approaches to water and wastewater systems

Education and Outreach

8a. Support Oregon's K-12 environmental literacy plan
8b. Provide education and training for Oregon's next generation of water experts 🕮
8c. Promote community education and training opportunities 🕮
8d. Identify ongoing water-related research needs 🕮

Goal 2: Meet Oregon's Water Resource Needs

Meet Oregon's Instream and Out-of-Stream Needs

CRITICAL ISSUES

- Place-Based Efforts
- Water Management & Development
- Healthy Ecosystems
- Public Health
- Funding

RECOMMENDED ACTIONS

Place-Based Efforts

9a. Undertake place-based integrated, water resources planning
9b. Coordinate implementation of existing natural resource plans
9c. Partner with federal agencies, tribes, and neighboring states in long-term water resources management

Water Management & Development

10a. Improve water-use efficiency and water conservation 🕮
10b. Improve access to built storage 🕮
10c. Encourage additional water reuse projects 🕮
10d. Reach environmental outcomes with non- regulatory alternatives 🕮
10e. Authorize and fund a water supply development program

Healthy Ecosystems

11a. Improve watershed health, resiliency, and capacity for natural storage
11b. Develop additional instream protections
11c. Prevent and eradicate invasive species
11d. Protect and restore instream habitat and habitat access for fish & wildlife

Public Health

12a. Ensure the safety of Oregon's drinking water
12b. Reduce the use of and exposure to toxics and other pollutants
12c. Implement water quality pollution control plans

Funding

13a. Fund development & implementation of Oregon's IWRS
13b. Fund water resources management at the state level
13c. Fund communities needing feasibility studies for water conservation, storage, and reuse projects

KEY: 🕮 Ongoing need for applied research

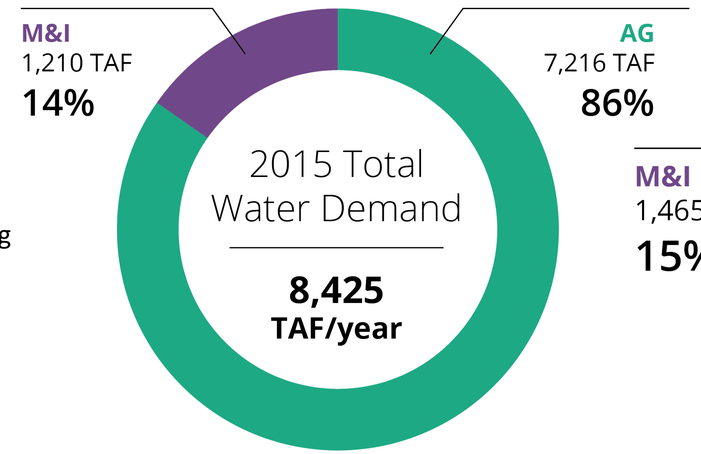
Statewide Long-Term Water Demand Forecast

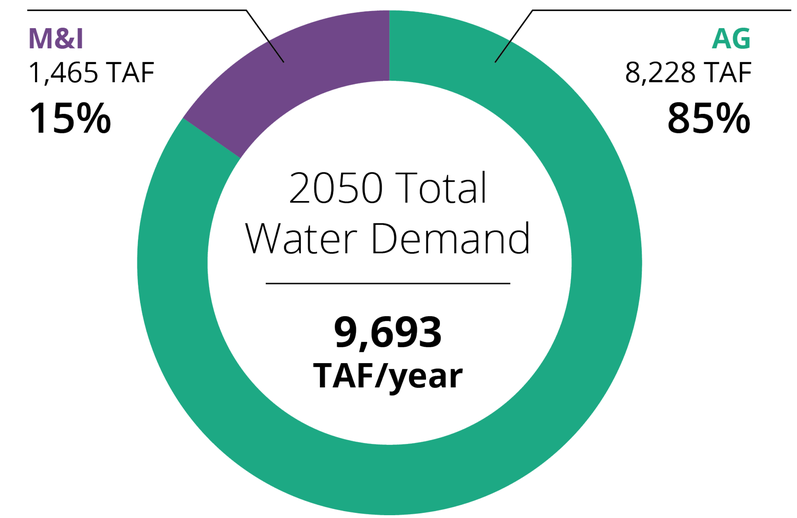
Recommended Action 2a

Background

In 2015, the Oregon Water Resources Department partnered with MWH Global to update statewide water demand values for major water use sectors, which were first developed in 2008 as part of the Oregon Water Supply and Conservation Initiative.

The 2015 Statewide Long-Term Water Demand Forecast is a conversation starter, describing potential long-term water needs in an Oregon that may not be able to rely on historic patterns to predict future rainfall and snowpack. The total change in water demand rests on numerous assumptions about the future; factors that communities, governments and private partners can address together.

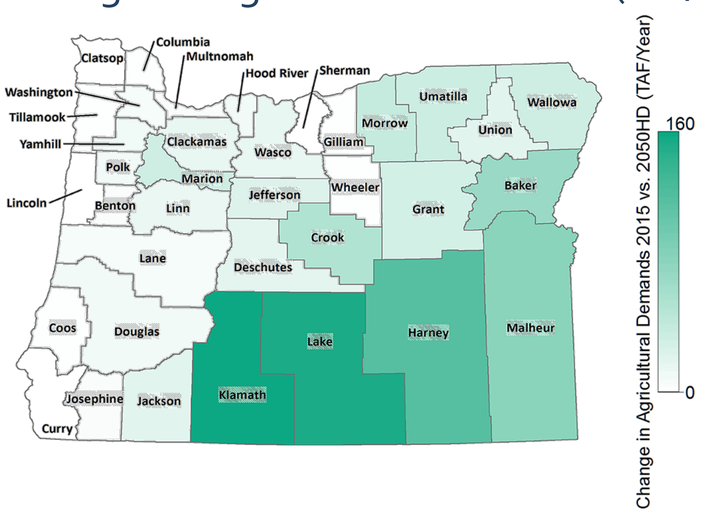




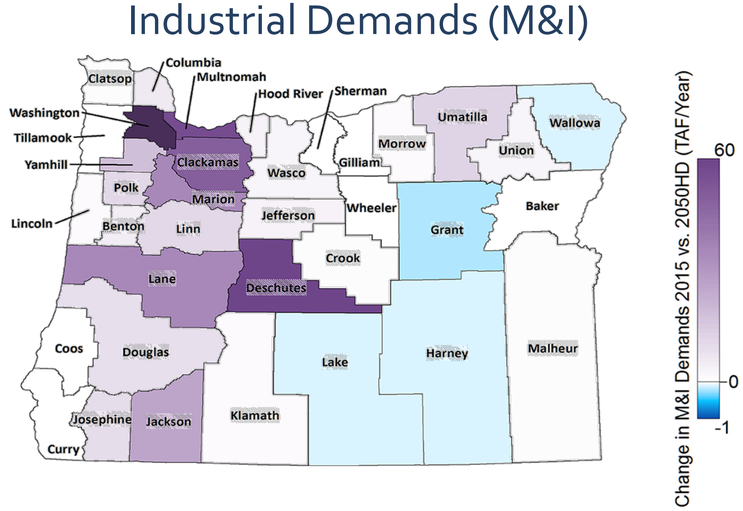
Possible Trends for Oregon (2015 to 2050)

The 2015 Demand Forecast builds upon the 2008 initiative, which explored future scenarios or pathways to possible conditions, based on certain assumptions. The 2015 studies, scenarios, and assumptions include a projected increase in both population and a longer, warmer growing season, leading to more demand from agricultural, commercial, residential and industrial water users by 2050. If future climate conditions are both hotter and drier, and population increases as predicted, Oregon could be faced with a need for an additional 1.3 million acre-feet of water annually, or nearly 424 billion gallons per year. This represents 250,000 acre-feet for municipal and industrial uses and 1.1 million acre-feet for agricultural uses.

Changes in Agricultural Demands (AG)



Changes in Municipal & Industrial Demands (M&I)



Drivers of Change in Water Demand

Municipal & Industrial

20%	40%	+1.5 GALLONS PER DAY
Projected increase in M&I demands	Projected increase in population statewide (~1.5 million people)	The statewide average M&I water use is expected to increase slightly, from 150.5 to 152 gallons per day, per person.

Agriculture

UP TO 9%	UP TO 8.5°F	UP TO 14%
Increase in the total consumption of water by Oregon's crops	Increase in temperature by mid-century	Increase in statewide average irrigation demands

Scan the QR code for more information:

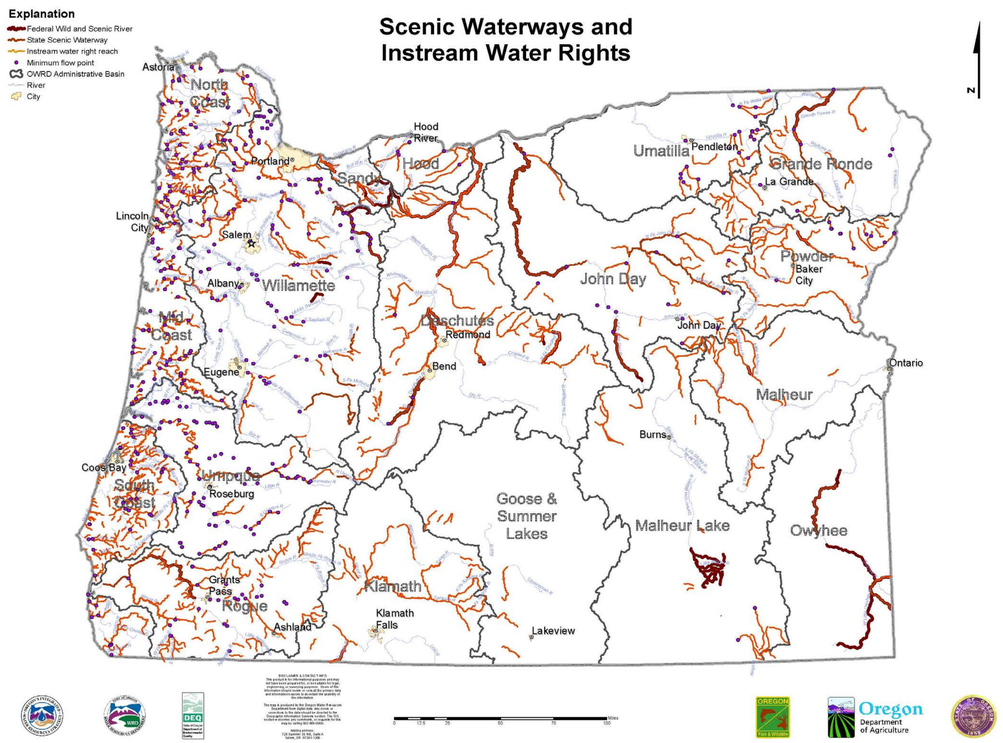
Securing Additional Instream Protections

Recommended Action 11b

Background

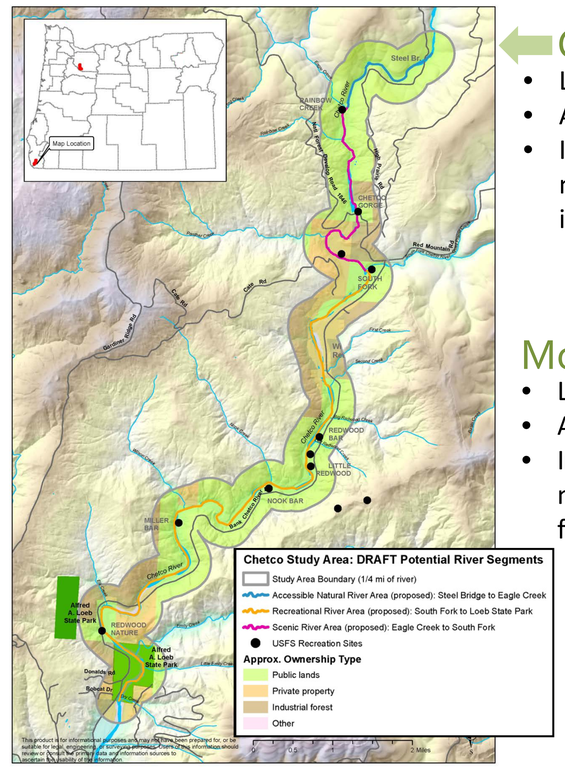
Instream Water Rights Act: In 1987, the State of Oregon passed the Instream Water Rights Act recognizing water instream as a beneficial use and authorizing state agencies to establish instream water rights. Currently, Oregon has over 900 state-agency held instream water rights. As of 2014, the Oregon Water Resources Department has processed more than 1,100 individual instream leases, instream transfers, and allocations of conserved water, restoring about 1,792 cubic feet per second of streamflow for fish and wildlife, recreation, and pollution abatement.

Scenic Waterway Program: The people of Oregon established the Oregon Scenic Waterways Program in 1970. The program strives to achieve a balance between protecting the rivers´ natural resources and the equally valuable lives and plans of the people who live along them. Prior to 2016, there were 20 Scenic Waterways throughout Oregon. The Oregon Water Resources Department is responsible for establishing flow requirements for designated waterways.



Two Rivers Designated as State Scenic Waterways

Oregon just recently designated two new scenic waterways. Governor Kate Brown designated portions of the Chetco and Molalla Rivers in January of 2016. These rivers were chosen because they meet the Scenic Waterways Act criteria for outstanding scenic, fish, wildlife, geological, botanical, cultural, and outdoor recreation opportunities. The Oregon Parks and Recreation Department utilized studies and citizen advisory groups to develop recommendations for designations and draft management plans for the two proposed waterways. Additionally, the Oregon Water Resources Department utilized the same advisory groups to develop scenic waterway flow requirements for the proposed reaches.

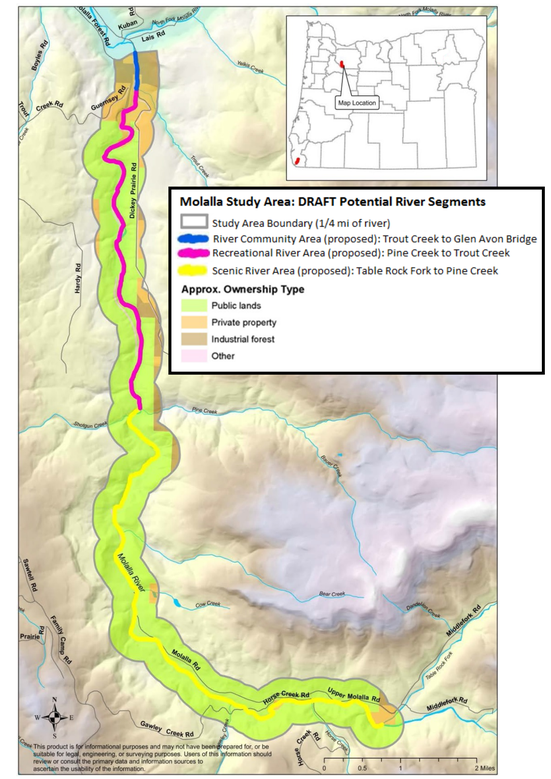


Chetco River

- Located in Curry County
- Approx. 14-mile reach
- Includes approximately 1.0 million acre-feet of instream flow protection

Molalla River

- Located in Clackamas County
- Approx. 13.2-mile reach
- Includes approximately 0.3 million acre-feet of instream flow protection



"Oregon is blessed with a diversity of river systems that richly contribute to our quality of life, and Oregonians value our rivers' importance to our economies, communities, and ecosystems. Stewardship of our rivers is increasingly important as our population grows and our climate changes."

– Governor Kate Brown, January 27, 2016

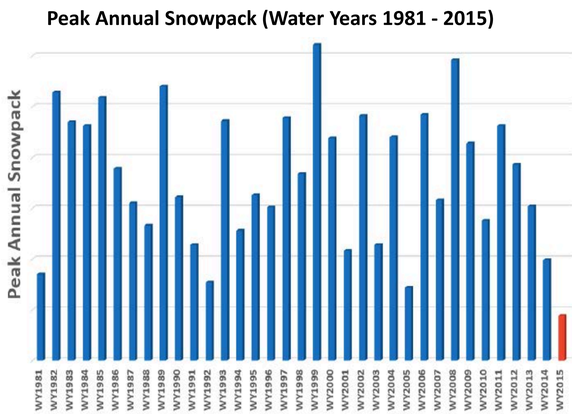
For more information, visit http://bit.ly/scenicwaterways

Building Drought Resiliency

Drought in Oregon

Drought is a common and frequent occurrence in Oregon. The droughts of 1976-1977, 1992, 2001-2002, and 2015 were felt statewide. The drought of 2015 was especially challenging. By September, 25 counties were under a state drought declaration. This was particular difficult for areas that had experienced drought conditions during the previous two years.

Record warm temperatures during 2015 contributed significantly to water supply shortages throughout the state. Warm temperatures led to a winter with record-low or near-record-low snowpack, contributing to dry soils and vegetation, as well as lower than normal streamflows and peak runoff occurring earlier in the year.



Source: Natural Resources Conservation Service

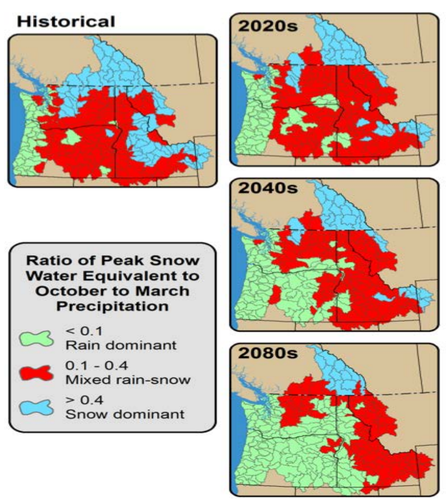
Documenting and reviewing the conditions, impacts, and responses to the drought is an important component of understanding and preparing for the potential implications of future drought years. Doing so is critical, especially as climate projections indicate that the Pacific Northwest will more regularly experience warmer and wetter winters and warmer summers.

Changes in Snowpack

With a predicted increase in regional mean temperature of 3.3 to 9.7 degrees Fahrenheit by the end of this century, Oregon can expect to see the percentage of precipitation that falls as rain, instead of snow, to increase significantly (Mote, et al., 2014).

Precipitation arriving as rain instead of snow may contribute to increased frequency and magnitude of high flow events, decreased summertime snowmelt run-off, and reduced recharge to groundwater aquifers.

Changes in Snowpack



Source: Hamlet et. al., 2013

Executive Order on Drought Resiliency

Due to the severe drought conditions, Governor Kate Brown issued an Executive Order in July 2015, directing state agencies to reduce water use at all state-owned facilities and to update the state's emergency response plan for drought, the incident annex to the state's emergency operations plan. Previous versions of the annex were completed in March 1988, February 1991, June 1993, June 2001, and September 2002. A revised drought annex was completed in January 2016.

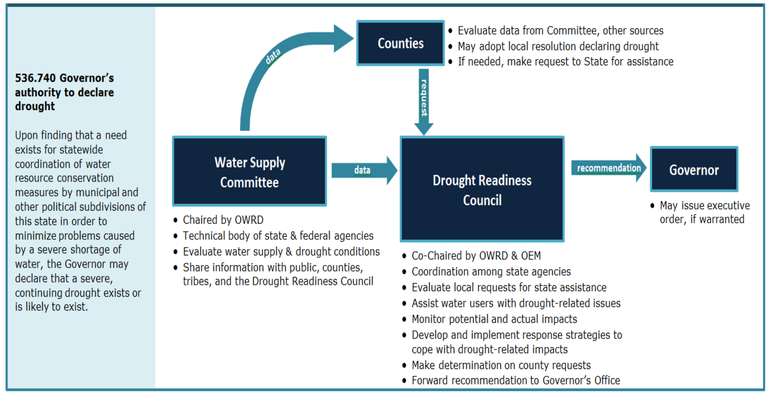
Through this Executive Order, the Governor also directed the Water Resources Department and its partners to build drought resiliency actions into the next iteration of Oregon's Integrated Water Resources Strategy, due in 2017.

Drought Declaration Process

The Water Supply Availability Committee, chaired by the Oregon Water Resources Department, provides the scientific foundation that decision-makers need to identify and respond appropriately to drought. The Committee consists of ten state and federal science and emergency preparedness agencies.

The Drought Readiness Council, co-chaired by Oregon's Water Resources Department and the Office of Emergency Management, reviews local requests for assistance and makes recommendations to the Governor regarding the need for state drought declarations. The Council consists of nine state agencies with natural resources management, public health, or emergency services expertise.

Drought Declaration Process



Federal drought designations are automated using the U.S. Drought Monitor and are administered differently than drought declarations issued by the Oregon Governor. Federal declarations are conducted under the authority of the U.S. Secretary of Agriculture and are distinct from Presidential disaster declarations.

Collaborative Water Planning in Oregon

Recommended Actions 5a, 9a, 9b, 10b, 10d

Water is important to all Oregonians. It is vital to community well-being, economic development and a healthy environment. Across Oregon, every place has its unique water challenges that, if left unaddressed, may increase in the future. Collaborative water planning can help Oregonians understand and meet current and future water needs for people, the economy, and the environment.

Place-Based Planning

Place-based planning provides an opportunity for communities to better understand local water resources and to coordinate efforts so that individuals and organizations are working towards a shared vision of their water future. Through a collaborative and integrated planning effort, communities will identify solutions to meet instream and out of stream water needs, taking into account water quantity, quality and ecosystem needs.

Planning Guidelines

Oregon's Draft Place-Based Planning guidelines were developed by researching programs in neighboring states and gathering extensive input from stakeholders across Oregon. The place-based planning framework includes five steps:

1. Build a collaborative and inclusive process
2. Gather information to understand current water resources and identify gaps in knowledge
3. Examine current and future water needs
4. Develop and prioritize strategic solutions to meet water needs
5. Create a local integrated water resources plan

Four Pilot Areas

In February 2016, four communities were awarded $657,000 in grants to pilot place-based planning in partnership with the Water Resources Department and other state agencies. The pilot areas include: the Mid-Coast Basin, the Malheur Lake Basin, the Lower John Day Sub-Basin and the Upper-Grande Ronde Sub-Basin. The place-based planning program is in a pilot phase through 2019.

Expected Outcomes

- Greater community involvement in water planning
- Better coordination between state and local partners
- Broadly supported local projects that can provide social, economic, and environmental benefits
- Improved local capacity to adapt to a changing climate

Giving those who live, work and play in a watershed a greater voice in their water future.

Basin Studies

Basin studies are collaborative studies between local, state, and federal entities to evaluate water supplies and demands, and identify strategies that help basin partners sustainably manage water in a changing climate. The Bureau of Reclamation WaterSMART program includes four elements:

1. Projections of future supply and demand, including the impacts of climate change
2. An analysis of how water and power operations and infrastructure will perform in a changing climate
3. Development of adaptation and mitigation strategies to meet water demands
4. A trade-off analysis of the adaptation and mitigation strategies identified

Upper Deschutes Basin Study

The Upper Deschutes Basin Study is a $1.5 million cooperative study funded by the Bureau of Reclamation and the Water Resources Department. The Study involves over 35 basin partners who will collaboratively develop and evaluate options for addressing imbalances in water supply and demand for instream and out-of-stream uses. The Study, which is expected to be complete in fall 2018, will provide a common understanding of the interconnected effects of options that may move water between uses and users.

Willamette Basin Feasibility Study

First initiated in 1996, the Willamette Basin Feasibility Study is a cooperative study between the Water Resources Department and the US Army Corps of Engineers. Study partners signed a new cost-share agreement in August 2015 to determine if operational changes in the allocation of stored water would better serve present and future resource needs in the basin. A tentatively selected plan will be completed in fall 2017.

Statewide Groundwater Quality Monitoring

Recommended Action 1b

Background

Groundwater contamination can come from many sources including failing septic systems, improper agricultural practices, improper hazardous waste storage or disposal, abandoned wells and other human factors. Protecting groundwater is essential because mitigating contamination is extremely difficult and costly, and can pose a threat to human health. Over 700,000 rural Oregonians are almost completely dependent on groundwater.

The Oregon Legislature provided funding to the Oregon Department of Environmental Quality in 2013 to develop a statewide groundwater quality monitoring program. Prior to this investment, monitoring was only routinely conducted in Oregon's three Groundwater Quality Management Areas, located in northeast Malheur County, the Lower Umatilla Basin and the Southern Willamette Valley (as shown on the map). With this funding, DEQ will implement a number of initiatives through its groundwater monitoring program:

- Monitor groundwater for contaminants of concern, including nitrate and pesticides
- Assess two geographic regions per year for ten years
- Determine areas of the state that are especially vulnerable to groundwater contamination
- Determine status of ambient groundwater quality
- Identify emerging groundwater quality problems
- Inform groundwater users of potential risks from contamination

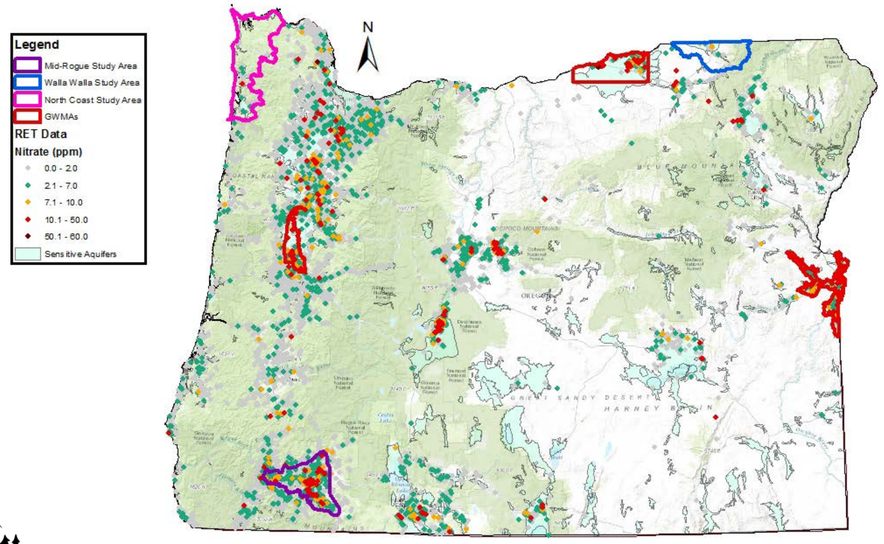


Figure 1. Current Groundwater Monitoring areas: three Groundwater Management Areas (Northeast Malheur County, the Lower Umatilla Basin, and the Southern Willamette Valley) and the new Statewide Groundwater Monitoring Program study areas (Mid-Rogue, North Coast, and Milton-Freewater/Walla Walla), as well as Real Estate Transaction (RET) nitrate data and sensitive aquifers highlighting possible areas of concern or vulnerability.

Data Collection

- Mid-Rogue, North Coast, and the Milton-Freewater/Walla Walla Basin sampled in 2015-16
- 60-100 wells were sampled in each study area
- Most wells are volunteered by private landowners
- Nitrate, arsenic, bacteria, common ions, and 136 pesticides included in analyte list
- Additional analytes, such as legacy pesticides, pharmaceuticals, and perchlorate were added according to local risk factors and program capacity

Local Collaboration

- Local stakeholders invited to assist with outreach and communication to local well owners
- Local public health representatives asked to assist well owners addressing water quality issues with their wells

Information Sharing

- Educational packets on common contaminants, treatment devices, and well stewardship distributed to each participant
- Individualized laboratory reports sent to each participant, along with explanation of contaminants found in the well
- Summary report of each study area made available to the public along with a local community presentation of results

Planning for Future Monitoring

The Groundwater Technical Advisory Team was convened to discuss the Statewide Monitoring Study design and share technical expertise related to groundwater resources in the State of Oregon. Factors considered when prioritizing future study areas:

- Previous DEQ studies
- Real Estate Transaction Data (nitrate, arsenic, bacteria)
- Presence of sensitive aquifers
- Land use
- Septic tank density in basin
- Soil characteristics
- Data gaps
- Population density
- Vulnerable communities
- Partnerships

For questions or more information, contact groundwater.monitoring@deq.state.or.us or call 503-693-5736

Pesticide Stewardship Partnerships

Recommended Action 12b

Monitoring Data Helps Focus Watershed Improvements

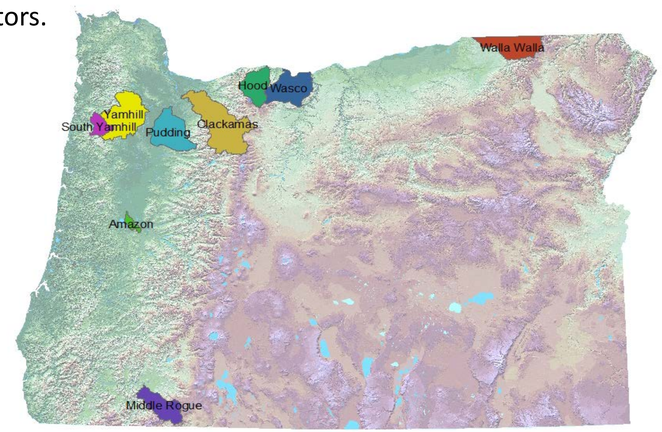
Partnership Objectives

Oregon Pesticide Stewardship Partnerships (PSP), initiated in the early 2000s, use local expertise and water quality sampling results to encourage voluntary changes in pesticide use and management practices, as well as to reduce pesticide levels in individual watersheds.

Partnerships are on-going in nine watersheds. Additional funding provided by the Oregon Legislature in 2013 provides for the expansion of this program through three major components: (1) expansion of PSP monitoring into additional watersheds and water sources, (2) technical assistance based on monitoring results, and (3) free waste pesticide collection events for growers and other commercial applicators.

Current Partnerships in Action

Currently there are nine partnerships located in seven sub-basins (see map). The watersheds include agricultural, urban, rural, and forested areas. The most recent project started in the Middle Rogue Watershed in 2015. An inter-agency state team coordinates these projects with local watershed partners.



PSP Model

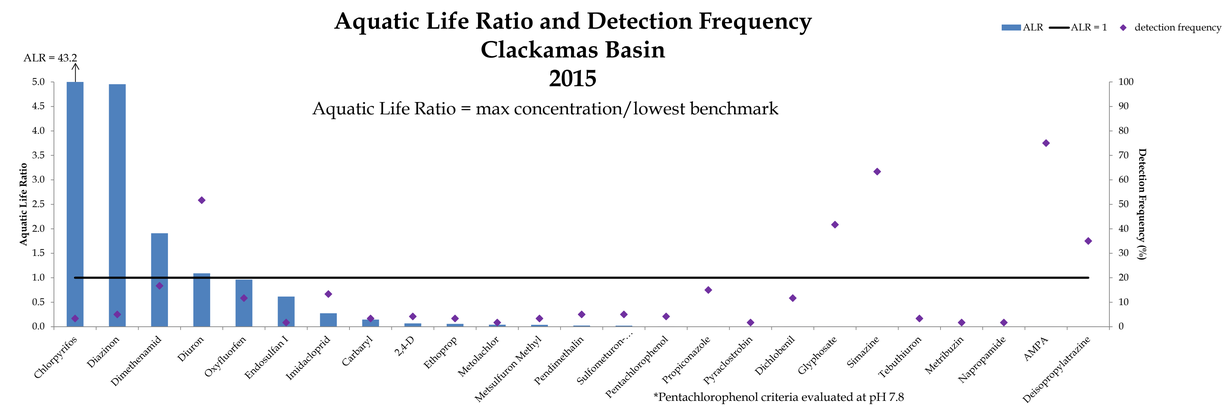
Four steps outline the simple framework for a PSP partnership: (1) water and sediment samples collected in strategic locations, (2) information from the monitoring is communicated back to the local community, (3) as a team, best management practices and technical assistance targets are identified and implemented, and (4) water samples are taken to monitor implementation effectiveness. This process is iterative for at least five years. In this way, the implementation is tailored by the needs of the community.

Monitoring

The Oregon Department of Environmental Quality (DEQ) and its partners monitor for over 120 pesticides and degradates at 40 stream sampling locations around the state. In order to ensure the collection of quality and consistent data, DEQ provides sampling training for partners, assistance with sample collections, and data interpretation.

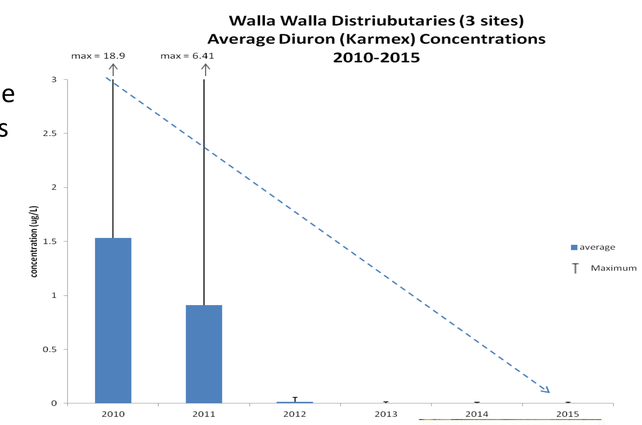
Communicating Water Quality Impacts

Each year, the PSP team meets with watershed stakeholders to share results. Aquatic life ratio (indicating levels relative to benchmarks) and detection frequency charts are important communication tools.



Pathway to Improvement

Data is used to inform a community of how pesticide use may impact waterways. For example, high levels of diuron were detected in Little Walla Walla waterways. Based on the data, growers switched to mechanical controls and spot treatments with less persistent herbicide. These simple actions resulted in less use of diuron in the watershed and monitoring showed a significant decrease in water concentrations (see graph).



Technical Assistance

- Purchase equipment for use by growers, e.g. tunnel sprayer (picture on right)
- Provide direct training and incentives to pesticide users

Outreach – Pesticide Collection Events

- Over 300,000 pounds of waste pesticides collected and properly disposed of since 2006. Mix of "legacy" and current use pesticides
- Over 10,000 pounds of rinsed empty plastic containers collected for recycling

Oregon's Monitoring Strategy

Recommended Actions 1b, 1c

Measuring Flows in Rivers and Streams

The Oregon Water Resources Department operates more than 250 stream gages, of which 80 percent are near real-time. The entire network, shown on the map below, includes 345 additional gages operated by cooperators, such as the U.S. Geological Survey (USGS). The Department includes cooperators' gages as part of its network and utilizes the data collected at those sites in day-to-day operations and scientific studies.

To carry out recommended actions of the Integrated Water Resources Strategy, the 2013 Oregon Legislature provided the Department with resources to install new gages each biennium. Since then, approximately 20 new gaging stations have been installed across the state.

A Monitoring Strategy was developed in February 2016 to guide future investments in surface water and groundwater monitoring sites. It also provides a framework for evaluating the effectiveness of the Department's current monitoring network of stream gages and observation wells. Through this Monitoring Strategy, the Department has developed several objectives, such as installing new sites that support climate change research, water management, water supply planning, groundwater management, instream needs, and a better understanding of extreme events, such as floods and droughts. Partnering with other agencies will be key to carrying out the Department's Monitoring Strategy.

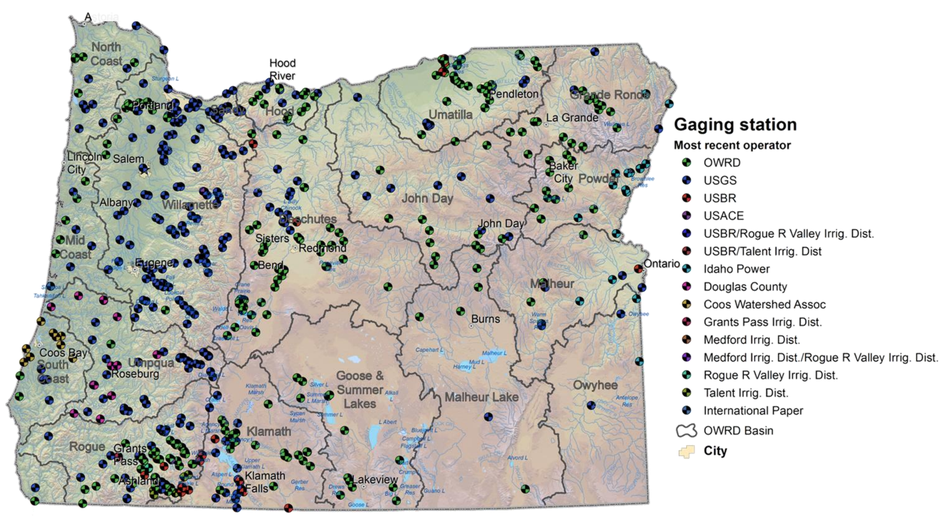


Figure 1: Gaging Stations in Oregon

Conducting Groundwater Investigations

Conducting groundwater investigations is a priority for the state, which typically evaluates groundwater resources at the basin scale through a cooperative, cost-share science program with the U.S. Geological Survey. This allows the Water Resources Department to develop a broad understanding of the groundwater system and to assist state and local planning efforts.

The Department, in cooperation with the USGS, has completed basin studies in the Deschutes Basin, the sedimentary aquifers of the Willamette Basin, and the Upper Klamath Basin over the past 20 years. A new 5-year study was initiated in the Malheur Lake Basin in 2016. The State has prioritized additional basins for subsequent groundwater studies. These include the Umatilla and its Walla Walla sub-basin, and the Hood, Grande Ronde, and Powder Basins.

Expanding the Observation Well Network

The Water Resources Department currently has 376 state observation wells, 60 of which have continuous recorders installed that take water level measurements every 1-2 hours. This state network of wells monitors long-term and seasonal water level changes in principal aquifers. Additionally, the Department currently measures water levels in about 1,100 other wells across the state, some of which are project based wells.

The Department is actively installing new observation wells across the state. The 2013 Oregon Legislature provided funding for new monitoring sites, groundwater studies, and staff. In 2015, the Department installed 14 new monitoring wells, all equipped with continuous recorders.

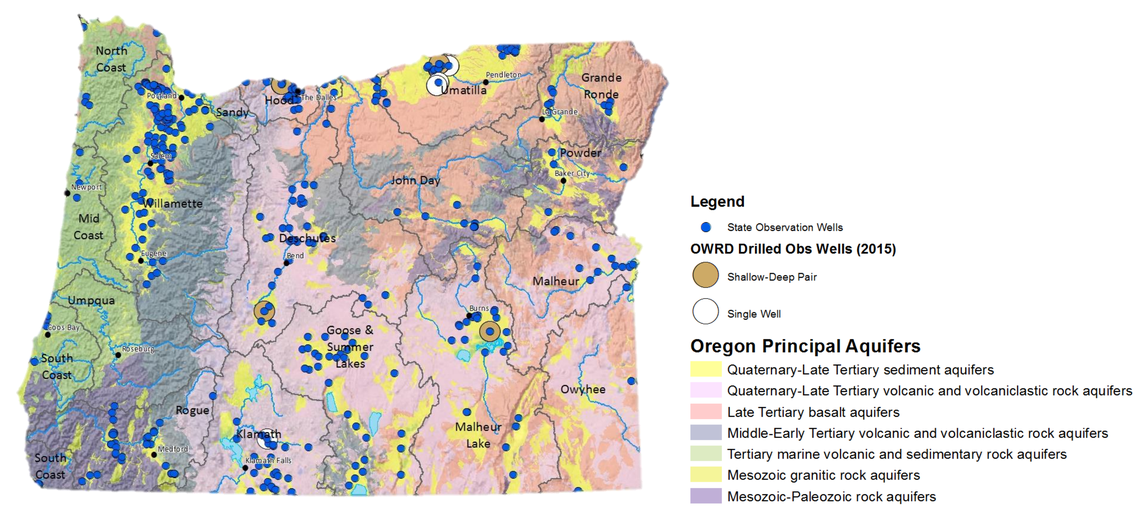


Figure 2: Observation Wells & Principal Aquifers in Oregon