



OREGON'S 100-YEAR WATER VISION

Technical Workshop Summary

On November 14, 2019, more than 70 participants from local governments, environmental and agricultural groups, agencies, and others gathered to discuss the current water infrastructure and ecosystem management questions they are actively working to solve. Participants were also tasked with identifying data gaps in five topical areas: water availability and use, water quality, environment, funding and finance, and future trends. Each of these breakout discussions is generally summarized below. Raw notes from the meeting can be found at www.OregonWaterVision.org.

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The Need

From the workshop and from conversations and surveys with community water leaders, it is clear that Oregon's water managers need better, more cohesive, and more usable data and information about water to forecast their community's water needs and prioritize water investments. Some of the specific needs include:

- Water budgeting—forecasting and tracking water availability, demand, and use;
- Natural and built infrastructure condition and improvement needs/plans/costs; and
- Ecosystem status and trends.

Water managers have clearly identified that they want water information to be current, high quality, transparent, accessible, and usable. There is a desire that Oregon have more integrated water data that are accessible at a regional level for the purpose of enabling Oregonians to make smart water decisions that keep our communities thriving for the next 100 years.

Key terms

Throughout this document, several terms are used that, in other context, can sometimes be interchangeable. For the purpose of this document, however, they have specific meanings.

Key water management question: Significant decisions water managers (e.g., irrigation district managers, restoration contractors, foresters, farmers, city water engineers, wastewater plant operators, county flood managers, etc.) make on a regular basis that require information about current and future water quantity, quality, and ecosystem status and trends.

Framework: The agreements amongst data providers (agencies and others) on digital availability, data quality, format, and privacy protections that make it possible to have integrated access to the information water managers are asking for.

Platform (data and information): The data standards, technological connections, user interfaces, and other aspects of data and information systems that allow water data to be accessed, organized into information, and used to support decision-making.

Information: Data that have been organized, synthesized, presented, or analyzed in some way that begins to attach meaning to the individual bits of data. Information is often what is needed to support decisions, but you cannot have information without data.

Data: Characteristics of water (e.g., water quality, quantity, stream location, groundwater basin boundaries, or water use) that are collected, stored, and made available. Alone, data may have little meaning until they are organized into information.

Water managers: people who manage, plan, and maintain water systems, both built and natural, in communities across the state.

Key Management Questions

Oregon's water managers are making decisions each day about how to advance health, economy, environment, and safety. Many of those decisions require information that is created from high quality, current, and usable data. Participants were interested in a better understanding of which data and information are available, and a clear articulation of how reliable those data are (e.g., some data are better than no data, but really bad data are not necessarily better than no data). There was also interest in getting higher resolution and more real-time foundational data (e.g., hydrology, weather, and hydrogeology).

Overall, water managers were interested in ways to build a more integrated water information framework to make existing water data more usable as information. Questions around managing water data and information included:

- Are there better ways to provide and present information to support water planning;
- What are some indicators water managers can use, both for their own tracking and also for reporting at a statewide level (e.g., for Washington's salmon recovery efforts); and
- Where are there duplications of effort and opportunities to consolidate data collection and sharing across agencies?

This section contains a summary of the key water management questions workshop participants identified as needs for information during the workshop. Based on the input received, questions are organized by theme:

- Water availability and use
- Water quality
- Ecosystems
- Infrastructure
- Funding
- Regulation
- Process
- Education and culture change
- Future trends

Water availability and use

Overall, people were interested in knowing (as close to real time, and as fine a resolution as possible):

- How much water, both surface and ground, is available and used, for which uses, where, and when?
- What are current flows in stream, especially in smaller streams?
- What are sustainable levels of water extraction (groundwater and surface water) that are protective of the environment and practical for communities?
- What is the projected water availability and demand in the future—both near and long term forecasts?

Balancing water needs

Participants recognized that better information was needed to balance the multiple demands on water. What do water users actually need to maintain essential functionality of the activity they are using water for, and how should these needs be prioritized? What are the impacts of these different water uses?

How water flows, and how ground and surface water are connected

Participants were interested in data that could provide water managers more information on how water actually moved through the watershed—from ground to surface, and across the landscape. What are the links between surface and groundwater? How much water flows from public lands and other headwater forests and what is the relationship between forest health/forest management and water?

Agriculture and municipal water

Agricultural and municipal water managers each had specific information needs. For agriculture water uses, how much water is available (when/where/how much) instream and out of stream, actual water usage, and the associated impacts of that usage on water quality, supply, and overall watershed health were of key concern. Managers also wanted to know where the specific places of use and points of diversion for water are, and where water is overallocated.

For municipal water uses, questions around current and future community needs over time, as well as water usage upstream when water rights are considered were discussed.

Water conservation and reuse

Participants were interested in ways to make more efficient use and reuse of the water we have. What is the total potential for water conservation, and where is the greatest opportunity? How do we incentivize water conservation? Can we reuse water? How do we efficiently recharge our ground water?

Storage and backup / redundant water supplies

Participants were interested in how water could be available when needed—either through storage or backup water supplies. What is the statewide and local need for storage in light of climate change? How can local communities site, build, and use resilient storage systems? Where is and where isn't there redundancy, and where are the greatest opportunities to build in redundancy to water supplies?

Water quality

Water quality is a function of hydrology, surrounding land uses, and pollution loading.

Participants were interested to know:

- What current pollution sources and loading are occurring at the tributary scale?
- What drives harmful algal blooms, and how can they be identified and prevented?

- How can safe drinking water be provided to our community, now and into the future, given fiscal and regulatory challenges?
- How can we monitor and prevent introduction of new, and remove existing, emerging contaminants from water?
- What is the future need for water treatment, and how can natural infrastructure be utilized?
- How do we understand ocean and estuary water quality?
- What are status and contamination risks in source watersheds?
- How can we accomplish and understand real-time monitoring of water quality and biological metrics for watershed health?
- How are current sources complying with current regulations?

Ecosystems

A range of topics and questions were identified relative to better understanding ecosystems including:

- Current ecosystem condition and function
- Status and trends of instream flows
- Opportunities for restoration and protection of water instream and of habitat and other natural infrastructure
- Where has flood irrigation existed so long that habitat could be altered with more efficient irrigation systems?
- Mapping to identify land use in relation to coastlines, rivers, seagrass beds, etc.
- How much water and of what quality/location/timing is needed to support fish
- Where should restoration investments occur to respond to climate change? Where are fish passage barriers? What is the potential and opportunity for beaver restoration?
- Where are restoration projects occurring?
- What is the change in fish survival as a result of large woody debris projects?
- What are the key indicators/metrics that drive watershed health conditions in urban and rural areas?

Infrastructure

Participants were interested in answering a range of infrastructure questions, such as:

- What infrastructure investments are needed in next 5, 20, and 50 years?
- How much infrastructure has reached or exceeded its design life/expectancy?
- What contaminants does old infrastructure contain (e.g., toxins in sediment behind dams)?
- Is new infrastructure “properly” built?
- How can infrastructure be kept affordable?

- How will future capital improvement plans for one water collectively impact the ratepayer?
- Is the current pricing/cost of water to companies, residents, and others reflective of the true cost of water?

Natural infrastructure

Many questions centered on the potential for natural infrastructure. What natural infrastructure is there and what are its conditions? Where can we use our natural and working landscapes to clean, manage, and store water? More specifically, how do we restore floodplains to keep our communities and property safe? What built infrastructure needs can natural infrastructure address, and how do we pay for those projects?

Safety

Participants were interested in information that could support preparedness for disasters, especially earthquakes. What is the plan to replace water treatment, delivery, and storage infrastructure post disaster? How do we best communicate with residents about emergency plans in catastrophic events?

Infrastructure removal and upgrades

Not all infrastructure needs to be replaced—some dams, levees, and culverts need to be removed. Other infrastructure needs upgrading. Participants asked which built infrastructure needs to be removed, and which built and natural infrastructure needs to be upgraded/restored to meet future conditions and pressure?

One infrastructure, multiple purposes, multiple benefits

Where are the opportunities to co-locate electric power, fiber optic cable, and broadband data cable with water infrastructure? And how can one infrastructure investment provide as much public benefit as possible (e.g., irrigation modernization also restoring instream flows)? Also, what is the aquifer storage and recovery capacity and potential in each basin?

Funding

Management questions around funding included:

- Into what do we invest limited funding that is most effective?
- Which communities and watersheds are a priority for that funding?
- Where are the current resources to replace, repair, or remove built and nature infrastructure?
- How do you ensure a public benefit from investment?
- What do state agencies need to implement a 100-Year Water Vision?
- What are the resource needs for water planning and infrastructure improvements?
- What is the workforce capacity to implement projects effectively?

Regulations

So much of how water gets managed is driven by federal, state, and local regulatory requirements. Participants wanted answers to such questions as:

- What are current regulatory frameworks and how can regulatory certainty be provided?
- What operational and infrastructure changes will be required by future regulation, and when—with enough lead time to build and make changes?
- What flexibility will there be to adapt existing rules and regulations to today's conditions and future innovations?
- Are there opportunities for outcome-based regulations, rather than practice- or process-based regulation?

Participants were also interested in information that could better align water rights, use, and availability. Questions included:

- Where is water being used without or in exceedance of water rights?
- Where is there opportunity to “clean up” existing water rights to make more water available?
- Where have water rights been adjudicated? Where do they need to be adjudicated? What data are needed to support adjudication?
- How are planned changes in water use communicated to others so that consequences can be better anticipated and planned for?
- What are the levels of compliance with current regulations, both for water quantity and quality?

Process

Participants recognized that much of managing water is getting the information needed to improve coordination and make good decisions. Some of those questions included:

- What are the best ways to value different uses of water, and how do we plan development around those different values?
- What are the policies, regulations, and processes needed to make sure the decisions of one place positively affect the water in the next place?
- What are the communication tools and coalitions needed to create common cause for the long term, especially among municipalities and agriculture?
- What are the best practices for building trust amongst those in conflict, and what are some of the best practices for building partnerships?
- How do we know different voices are being heard in decision processes?
- What are the different roles needed for coordinated water management and encouraging best practices, and who fills them?

- What are the best ways to get to “one water” management across agencies and to integrate agency decision processes and missions so as to enable the kinds of environmental and built infrastructure investments needed to solve problems?
- How can basins and agencies best coordinate data collection, turn it into information, and use it to make technical and policy decisions, and communicate that information and decisions out to the public and other partners?
- How can multiple local governments work together in a process to combine resources and invest in multi-objective projects?
- How can local governments and the state work together to prioritize necessary system improvements, and how will we prioritize investments in Research and Development and in generating water information?

Education and culture change

Participants were interested in the types of messages and strategies that work best to change people’s understanding, dialogue, and behavior relative to water in Oregon. This included questions such as:

- What changes are needed in water user knowledge, attitude, and behavior to match both the current and future water needs?
- What are the strategies that can shift how people understand and talk about the different water needs in different parts of the state?
- What messages and tools are needed to convey urgency to the public?
- How do we implement collaborative planning, equitably invest, and gain the trust of stakeholders and the general public?

Future trends

Participants were interested in more information that helps forecast future trends. Topics and questions included:

- Climate change impacts on the timing, quantity, and quality of water in specific locales
- What is needed to adapt to future climate scenarios given projected changes to snow, runoff, surface flows, and groundwater?
- What are the risks posed to current water resources and water systems?
- What are the future needs for ecological flows—both base and peak flows?
- Where are there periodic water spikes and droughts?
- Population forecasts that anticipate climate change migration patterns
- Projected changes in land use and how that land use can better accommodate ecosystem needs
- Future water availability and planning for land use and economic development needs
- Changing energy patterns and impact on water

- How can technological upgrades, specifically in rural systems, better inform future management decisions?
- Future crop production patterns
- What will the future hydrograph look like so that we can project water supplies when designing an irrigation, municipal, or other water transport system?
- What are the root causes of change in water reliability?
- What is the difference in water planning and needs for “growth in demand” vs. “reliable availability”?

Topical Breakout Groups

Following the discussion of management questions, participants joined a series of breakout groups (each participant joined 3 groups) on data gaps by topical areas, and were asked:

- Water availability and use: How much water do we have? How are we using it? How long will it last?
- Water quality: What do we need to know to ensure our water is swimmable, fishable, and drinkable?
- Environment: What do we need to know to ensure our ecosystems have what they need to thrive?
- Future trends: What information do we need to plan for the future?
- Funding and finance: How do we pay for the investments we need to make?

Across all of the breakout sessions, there were a number of identified gaps that pointed more toward a need for an integrated data platform for water information in Oregon. This was a specific concern for small and rural communities who often lack the capacity to do their own data collection and analysis. Some of those particular gaps included:

- Decision support tools, compatible with GIS, for predictive water planning
- Integrative models that combine the seasonality of snowpack, rainfall, instream flows and uses to predict water availability statewide
- High quality, accessible, public, statewide, real-time, and basin-specific data that has been accumulated, standardized, and aggregated across state agencies in a way that is accurate, accessible, and affordable (water quantity, quality, and habitat)
- Agency agreements for coordinated data collections and analysis
- A tool that harmonizes state, federal, and private sector data to understand climate adaptation and the connectivity between all water users and the ecosystem
- Stable funding for the maintenance of a tool like this

Water availability and use

In the “Water availability and use” breakout groups, participants were asked to identify specific data and information needs that impact the planning and management of water resources.

Overall, people were interested in understanding a multitude of factors that impact water availability and use, including:

Ground and surface water connection – Communities need to understand groundwater quality and quantity and the connection between ground and surface water, as well as groundwater recharge rates.

Supply – Information is needed to better understand whether current water supplies in various areas of the state can meet current and future demands. Instream flow data and current and future precipitation trends will also be needed. Higher resolution hydrology data and a more robust stream gage network were specifically cited. Information that helps communities better understand sustainable levels of ground and surface water extraction will help decision-making for communities and the environment.

Storage – Information is needed on where water is stored and where potential/planned storage projects may be considered. For natural infrastructure, information is needed on climate change impacts on seasonal water storage for forests, soils, and snowpack.

Water uses – Information is needed regarding current water use—when it is used, and who is returning water to the river, and when. Seasonal projections are needed to understand water availability during the growing season, along with specific crop water needs. Instream data needs include base, peak, and ecological flow targets for fish, along with meteorological streamflow information.

Conservation and reuse – Information on best practices, policy options, and residential options are needed for both water conservation and reuse.

Water quality

In the “Water quality” breakout groups, participants were asked to identify specific data and information needs around planning and management of water quality. Participants were interested in understanding a variety of water quality factors, including:

Treatment practices – A full inventory and analysis of treatment techniques and key indicators to prioritize and evaluate the cost, benefits, return on investments, and potential unintended consequences of specific water quality treatment options is needed.

Watershed and pollution – Information is needed about nonpoint sources of pollution throughout a watershed, how upstream land use and management affects water quality, and the fate and transport of pollutants within waterways. Furthermore, established best management practices are needed for leveraging natural infrastructure to enhance water quality before toxins can enter aquatic ecosystems.

Public support and education – Communities need a better overall understanding of public awareness of water quality issues and support for water quality investments, especially within smaller water systems that have a larger potential cost burden on rate payers.

Management and regulations – There is a need for more holistic watershed analyses that take social, economic, environmental, and cultural factors, and real-time water quality data into account. Furthermore, case studies of successful management approaches can inform what strategies are improving water quality, effectively leveraging resources and community capacity, and interacting with the state regulatory framework are needed.

Environment

In the “Environment” breakout groups, participants were asked to identify specific data and information needs around water and the environment that are currently lacking in quality, accessibility, or accuracy. A range of questions were identified relative to better understanding environment and ecosystems including:

Watershed health – Information about overall watershed health is needed in every basin. Communities need information on upstream land use activities and impacts, as well as the ecological impacts of disease, pests, and invasive species. Watershed models that incorporate climate change scenarios are also needed in every basin.

Species and habitat needs – There is a need for general aquatic species distribution, diversity, needs, indicators, productivity, and resiliency. Similarly, there is need for information about optimal habitat and water quality parameters for macroinvertebrates, beaver, and sensitive fish species as well as opportunities for habitat enhancement and restoration.

Instream flow and water quality – Real-time data on base, peak, ecological flows, and the timing of flows are all needed. Similarly, information on the ecological impacts of pesticides and emerging contaminants, such as microplastics and pharmaceuticals, is needed.

Natural Infrastructure – There is a need for standardized best management practices and an inventory of riparian buffers and storage capacity in natural infrastructure. Further discussions expressed a need to identify natural systems vulnerable to catastrophic impacts of climate change and natural disasters, specifically wildfire.

Regulations and management – There is a need for regulatory certainty for managers and natural resource industries (e.g., forests, farming, and other sectors that use natural resources). For regulatory certainty to occur, accurate water budgets and sustainable resource extraction models are needed.

Future Trends

In the “Future trends” breakout groups, participants were asked to identify specific data and information needs around future and emerging trends that impact the planning and management of water. Participants were very interested in more information that helps forecast future trends, including:

Climate Change – Climate models that specifically focus on source water and habitat vulnerabilities, instream flows, impacts on agriculture and utilities, and the overall cost impacts are needed.

Population – Population models that take into account climate refugee movement are needed to predict future shifts in geographic distribution in rural and urban areas.

Economy – Economic analyses that identify market shifts and emerging trends in commercial, industrial, residential, natural resource, and technology industry needs are needed.

Future development and land use – Communities need local housing demand projections as well as analyses of safe locations for future development.

Water quality – Information around emerging contaminants, when and where harmful algal blooms may occur, and best management practices for aquifer restoration are needed. Managers also need regulatory certainty to enable long-term planning.

Water quantity – Forecasts for surface and groundwater supplies, in both built and natural infrastructure, and future water usage for municipalities and agriculture are needed. Furthermore, communities need to know where back up / redundant water supplies could exist, and which groups of people are vulnerable to water insecurity.

Resiliency – Long-term community resiliency analyses to evaluate the potential impacts of seismic events, wildfires, and other natural disasters on local resiliency and water supplies is needed for future planning. Communities also need more information on decentralized reuse to expand water use efficiencies locally.

Funding and Finance

Oregon water leaders recognize the need for more investment in built and natural infrastructure to support the wide range of current and future water needs. Information needs included:

Revenue – Information on the current revenue sources available to water managers, and what is the current debt capacity for different special districts, local governments, and the state is needed. There is also a need for information on public willingness-to-pay and support of investments that will result in rate increases. The state also needs to identify potential new sources of revenue, and evaluate the feasibility of opportunities such as capturing the value created by “water exports” (e.g., beer, blueberries, or other water-intensive and high value products); and/or different approaches to water pricing to encourage efficient use.

Using the funding more equitably and efficiently – Communities need to identify opportunities to better coordinate and use existing revenue efficiently for better results, and how to ensure equitable access to current and future revenue for water investments. There is a need for information on funding needs and gaps by geography, between urban and rural communities,

and across sectors. Resources to raise awareness of different funding sources, and better navigation of existing funding criteria and requirements, are also needed.

There is a need for more information on the opportunities to sync up and integrate different grant requirements, timelines, and loan repayment schedules, and to streamline multiple funding sources to coordinate investment priorities and share services. Communities also need to know the best practices for public-private partnerships. Likewise, there is a need for established strategies for making investments that produce multiple outcomes and reduce future costs.

Needs for more funding and different expenditures – Communities must be able to anticipate a need for additional resources and expenditures in specific areas, like data acquisition and long-term planning for climate change and shifting population dynamics. Similarly, communities need funding for entirely new investments, like building redundancy into existing water systems, or restoring natural infrastructure that protects source water.

Investment prioritization – Communities need to be able to prioritize investments, and to do that, they need first to understand who is the most vulnerable to water insecurity. Furthermore, cost-benefit analyses are needed to determine if money should be invested in built or natural infrastructure to address water quality problems upstream. Return-on-investment analyses of current systems are also needed.

Offers and Asks

Participants were given an opportunity to make particular asks of other participants and the state, and to offer data and information they had to others in the room. Participants asked for a variety of high-level commitments from the state. A few of which were consistent follow-through as well as inclusion. Furthermore, a large number of participants asked for a publicly available, consolidated platform with statewide data on water supply and use, ecological conditions, and population growth, on a basin-specific scale.

Consistent, transparent, good-faith engagement and collaboration were both requested of the state and offered by participants. There were a variety of other specific data and process asks and offers that are in the raw notes and are not summarized in this document.