Oregon
Kate Brown, Governor

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MEMORANDUM

TO: Water Resources Commission

FROM: Racquel Rancier, Senior Policy Coordinator
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SUBJECT: Agenda Item B, March 12, 2015
Water Resources Commission Meeting

Integrated Water Resources Development:
Meeting Instream and Out-of-Stream Needs

I. Introduction

Oregon continues to face challenges meeting instream and out-of-stream water needs. During this agenda item, staff will describe activities that have been underway to help Oregon meet its water needs. These activities include place-based integrated water resources planning; SB 1069 water conservation, reuse and storage feasibility study grants; and project implementation funding.

II. Background

Since 2008, the Water Resources Department has been looking at more ways to help Oregonians meet their instream and out-of-stream water needs. In 2008, the Water Resources Department secured resources through SB 1069 to provide grants that help fund the "feasibility study" phase of water conservation, re-use, and storage projects.

The state's 2012 Integrated Water Resources Strategy included a number of recommended actions to meet Oregon's water needs, including supporting a place-based approach to water resources planning (9.A), continuing funding of feasibility studies (13.C), and funding a water resources development program (10.E). These recommended actions further support the implementation of other recommended actions in the strategy such as supporting water conservation and efficiency (10.A), water reuse (10.C), built storage (10.B), and protection and restoration of streamflows (11.B).

In 2013, the Oregon Legislature passed Senate Bill 839 establishing a Water Supply Development Account to provide loans and grants for water resource projects that have economic, environmental, and community benefits. Projects include those that meet instream or out-of-stream needs.

III. Place-Based Planning

Place-based integrated water resources planning, is a voluntary, collaborative approach to planning that will allow communities and stakeholders, in partnership with the state, to understand their instream and out-of-stream water resources needs, and then identify solutions and potential projects in order to meet those needs now and into the future. Projects identified through a collaborative, place-based planning process are more likely to have broad support and be well-vetted, which means that they will likely be more competitive for feasibility and implementation funding.

At the November 2014 Commission meeting, staff presented draft place-based planning guidelines and received additional feedback from the Commission. Following the Commission meeting, the Department began revising the guidelines. Staff solicited another round of input from agency partners. Refer to Attachment 1 for a copy of the revised draft guidelines.

Some of the notable changes made include:

- Adding direction that planning groups should consult with the Water Resources Department for the purposes of reviewing the planning area boundaries, determining the state's ability to participate in the planning process, and to review the public process.

- Removing reference to state agencies acting in a non-voting capacity. It may be appropriate for state agencies to play a voting role. The document should provide that level of flexibility during the process of piloting these guidelines.

- Adding an additional planning element (now referred to as "steps") in the planning process. New "Step 5: Plan Adoption and Implementation" includes an inter-agency review of the final draft version of a place-based plan. The guidelines were also adjusted to include the Water Resources Commission as part of the final acceptance process. The Commission will make a determination regarding whether the plan meets the intent of the planning guidelines and the broader goals and objectives of the statewide Integrated Water Resources Strategy.

During December, the Department provided an update on the draft guidelines to region managers at their quarterly meeting and continued discussions with members of the Environmental Justice Task Force. The Oregon Water Utilities Council also invited the Department to its January meeting to give an update on the process. Oregon Department of Environmental Quality's three integrated water resources specialists are also assisting with coordination and communication, recently providing updates to their senior leadership and management staff within the water quality program.

The Department plans to post the place-based planning guidelines to the IWRS Project website and distribute a copy to the public through the IWRS electronic mailing list, which reaches more than 1,100 subscribers. The draft guidelines will also be sent to organizations that hosted workshop discussions with agency staff during the Spring and Summer 2014.

The Department and its IWRS partner agencies will continue outreach efforts throughout the spring to help gauge interest and a build a greater awareness of this voluntary planning tool. The Department decided to release the place-based planning guidelines during 2015 as draft so that Oregonians have an opportunity to discuss and pilot-test these guidelines.

IV. Water Conservation, Reuse and Storage Feasibility Study Grants

The Commission awarded 15 grants last year under the SB 1069 (2008) Water Conservation, Reuse and Storage Feasibility Grant program. One grantee, Central Oregon Irrigation District, has already completed its feasibility study (West F-Lateral Study) and has begun constructing the piping project. Other grantees continue to make progress on completing their studies and have been submitting quarterly reports to Department staff. However, the cities of Silverton and Mt. Angel withdrew their joint application to study underground storage, as Silverton decided to re-direct their resources to other projects.

The Department has $750,000 in its base budget for the grant program. The Governor's 2015-17 Recommended Budget requests an additional $2 million for the program. Department staff are currently working on conducting outreach for the 2015 grant cycle and expect to close the application period during July 2015. Conducting outreach well in advance of the close of the application period will help potential applicants have ample opportunity to prepare competitive applications.

V. Senate Bill 839 Implementation

Before the Water Resources Department and Commission can begin developing rules and issuing grants and loans under SB 839 (2013), the bill requires the Governor, in consultation with Legislative leadership, to appoint a Seasonally Varying Flows (SVF) Task Force and a Governance Task Force.

Seasonally Varying Flows Task Force
The role of the SVF Task Force was to recommend a method to determine which flows are appropriate for storage and which are needed for biological, ecological and physical functions.

As defined in Section 1 of the bill, "seasonally varying flows," means:

> The duration, timing, frequency and volume of flows, identified for the purposes of determining conditions for a new or expanded storage project, that must remain instream outside of the official irrigation season in order to protect and maintain the biological, ecological, and physical functions of the watershed downstream of the point of diversion, with due regard given to the need for balancing the functions against the need to store water for multiple purposes.

The types of water resources projects that are the focus of this work are certain water storage projects that seek public funding under SB 839. The report that resulted from the SVF Task Force revolves around a decision matrix, intended to help funding applicants and the state determine: (1) how much of an impact a project may have on its surroundings, and (2) how

much information already exists about the hydrological, biological, and hydraulic / physical conditions of the proposed location.

Once these two factors have been determined, the decision matrix helps identify what additional information is needed, if any, and the methods for data collection and data analysis necessary to establish seasonally varying flows for each water storage project. An accompanying narrative provides background, definitions, and instructions to help the applicant and state understand how the matrix is to be used. The narrative and matrix were approved by the task force without opposition (see Attachment 2).

Governance Task Force
The role of the Governance Task Force was to look at the structure for water development project loans and grants under SB 839 and develop any proposals for changing the structure that the Task Force determines are warranted. The review may also include, but need not be limited to: (1) possible changes in the long-term structure of the role of the state in providing loan and grant funding for water resources development under SB 839; and (2) the decision-making process for the allocation of newly developed water from projects whose uses of water were not specified in the funding application.

The Governance Task Force Report summarizes some of the key issues that the task force discussed, including the state's role in water resources development and the structure of Senate Bill 839.

With regard to the state's role in water resources development, the task force considered the state's funding structure to meet instream and out-of-stream needs, as well as the state's role in project finance. Discussions around the funding structure included: steps to identify and fund water resources solutions, the structure of funding programs, and the long-term needs for program evaluation and adaptation.

The task force also reviewed the structure of the grant and loan process as outlined in SB 839, exploring issues around legislative adjustments, scoring and ranking, and the funding and timelines for developing seasonally varying flows.

The Governance Task Force Report is being finalized and staff will provide the Commission with the report once it has been completed.

SB 839 Next Steps
SB 839 directs the Commission to adopt Seasonally Varying Flows rules in time for them to take effect on January 1, 2015. Since it is not possible to meet this timeframe, the Governor's Office has submitted 2015 legislation (HB 2400) to modify the timelines to reflect the delivery of the task force report and to allow time for the rules to be developed.

Given the significant interest in the program and the prospect of additional funding during the 2015-17 biennium, implementation of SB 839 is a priority for the Department. Staff have begun meeting with a rules advisory committee to begin drafting the rules. Staff plans to bring rules to the Water Resources Commission for consideration at its June meeting.

VII. Conclusion

Oregon's water challenges, if left unaddressed, will increase in the future. Failing to address these challenges will affect the quality of life for Oregonians and prevent communities and the State from meeting their water needs. In order to successfully meet its instream and out-of-stream needs, the state will need to invest in voluntary, place-based integrated water resources planning, project feasibility analysis, and project implementation.

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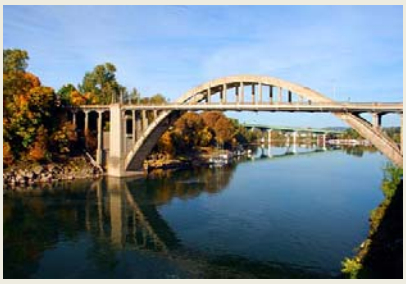
Attachment 1: Draft Place-Based Planning Guidelines
Attachment 2: Seasonally Varying Flows Task Force Report



Draft Guidelines

A Tool for Conducting Place-Based Integrated Water Resources Planning in Oregon

February 2015

About these Draft Guidelines

These guidelines were written to support implementation of Oregon's 2012 Integrated Water Resources Strategy, specifically Recommended Action 9A: "Undertake Place-Based Integrated Water Resources Planning." They were developed by the Oregon Water Resources Department through a series of stakeholder workshops, public input, and assistance from several natural resource agencies. These guidelines are a tool to support voluntary planning efforts aimed at meeting instream and out-of-stream needs, including water quantity, water quality, and ecosystem needs.

The state will provide technical assistance and seek funding to further place-based integrated water resources planning efforts across the state. The Governor's Budget, released in December 2014, proposes grant funds and two additional staff housed at the Water Resources Department.

These guidelines remain in draft form to allow for suggestions and adjustments that may be made during 2015. By releasing these guidelines now, our hope is that a given 'place' will have time to pilot test these guidelines and provide productive feedback.

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Table of Contents

Why Take a Place-Based Approach to Integrated Water Resources Planning?

Introduction

Water is one of the world's most precious natural resources. With more than 100,000 miles of rivers and streams, 360 miles of coastline, and more than 1,400 named lakes, Oregon is renowned for its water. Our rivers, streams, lakes, wetlands, estuaries, springs, and aquifers provide a wide range of benefits to all Oregonians.

A clean and reliable source of water is essential for meeting our basic human needs, and for supporting Oregon's economy. Thousands of businesses and industries rely upon water in some form, to irrigate a crop, to manufacture a product, or to provide a service or experience.

Oregon's economy, in turn, is dependent upon a healthy environment where water resources play an essential part. Fish and wildlife need water of sufficient quantity and quality to live, reproduce, and thrive. Fully functioning ecosystems are necessary to support our commercial and recreational needs and a quality of life unique to Oregon and the Pacific Northwest.

In recognition of the importance of water to all Oregonians, and with leadership, support, and direction from the Oregon Legislature and the Water Resources Commission, the Oregon Water Resources Department led the development of the state's first Integrated Water Resources Strategy (IWRS). The Department worked closely with the Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, and the Oregon Department of Agriculture during its development.

Adopted in 2012, the IWRS serves as a blueprint for achieving the state's long-term goals of improving our understanding of the status of Oregon's water resources, including our instream and out-of-stream needs (water quantity, water quality, and ecosystem needs), and implementing recommended actions to meet those needs today and into the future. One action in the IWRS, Recommended Action 9A, calls for helping communities undertake a place-based approach to integrated water resources planning.

Place-Based Planning – A Key Step for Attaining a Community's Vision for the Future

Although Oregon is often thought of as a water-rich place, it is not without challenges. As described in the Integrated Water Resources Strategy, the state faces many water-related challenges. Organized in broad categories called "critical issues," these statewide challenges are summarized below.

- Limited water supplies and systems
- Gaps in data & information
- Understanding various institutions
- Understanding needs/demands
- Population growth
- Economic development
- Climate change
- Energy-water nexus
- Infrastructure challenges
- Changes in land-use
- Education and outreach
- Integrating various planning activities
- Maintaining and developing partnerships
- Water management/development (conservation, storage, reuse, etc.)
- Ecological health (natural storage, instream protections, invasive species, habitat)
- Public health (drinking water, toxics, pollutants, recreation)
- Funding

These issues affect most communities across the state. Water supply shortages for instream and out-of-stream uses already occur in many locations throughout the state, and will likely be intensified by a changing climate and increases in future demand. Similarly, while efforts have been successful in improving water quality, new pollutants are emerging, and about 22,000 stream miles and 30 lakes and reservoirs are water-quality impaired. Even with significant gains in restoring habitats and watersheds functions throughout Oregon, many species are still at a fraction of their historic levels, with several listed as threatened or endangered under the Federal Endangered Species Act.

Although every river basin in Oregon is unique in terms of widely varying ecological issues, community values, and economic dynamics, every community has its own water challenges that if left unaddressed, will likely increase in the future. Failing to address these challenges can impair the quality of life for Oregonians and hinder communities from reaching their economic, social, and environmental potential.

Water is essential for economic growth in both urban and rural areas across the state. In order for a community to achieve its economic and environmental goals for the future – for example, to provide jobs for its citizens and to ensure that a strong vibrant fishery and recreation opportunity exist – we must consider how instream and out-of-stream water quantity, water quality, and ecosystem needs will be met today and in the future.

Water crosses political boundaries and connects the landscape, and as such, water challenges cannot be adequately addressed using a piecemeal, uncoordinated approach. Solutions must be holistic and coordinated so that partners are not working at odds with one another.

Initiating a "place-based" integrated water resources planning approach is a tool for Oregon communities to achieve that level of coordination, by collaboratively developing a shared vision for the future, and anticipating and addressing specific water-related challenges. Such planning gives those who live, work, and play in a community and who care deeply about it a stronger voice in their water future, which in turn will provide a pathway for building the political and public support needed for water resources projects (instream and out-of-stream). This support will be particularly helpful in demonstrating that projects are well-vetted and supported at the local level, and therefore merit technical or financial assistance. Furthermore, communities that undertake a place-based approach can help inform statewide efforts, including providing data and input to future iterations of the IWRS. In essence, place-based integrated water resources planning will allow communities to identify their water resources needs and then partner with the state to develop solutions and a suite of projects that will help meet those needs now and into the future.

Purpose and Use of the Guidelines

These guidelines were written knowing that piloting integrated water resources planning at a watershed level will inform the long-term, place-based planning program in Oregon. During this pilot phase, the state can adjust or adapt the guidelines to provide greater clarity or direction as needed.

The IWRS Project Team welcomes input from local communities employing these guidelines. Send comments to: waterstrategy@wrd.state.or.us.

Five Steps of Place-Based Planning

A place-based plan should adhere to the following five steps:

1. Build a Collaborative & Integrated Process
   Create a structure and process that fosters collaboration, bringing together various sectors and interests to work toward the common purpose of maintaining healthy water resources to meet the needs of the community and the environment. Ensure a balanced representation of interests and a meaningful process for public involvement.

2. Characterize Water Resources, Water Quality, & Ecological Issues
   Describe and assess current water supplies, water quality, and the status of ecosystem health to determine any existing challenges and potential opportunities.

3. Quantify Existing and Future Needs/Demands
   Define how much water is needed to meet current and future water needs – instream and out-of-stream – water quantity, water quality, and ecosystem needs/demands. Plans should address how climate change, population growth, and land use affect water resources and the ability to meet these needs within the community. Meeting water needs should be considered within the context of specific watersheds, accounting for the hydrological, geological, biological, climatic, socio-economic, cultural, legal, and political conditions of a community.

4. Develop Integrated Solutions for Meeting Long-Term Water Needs
   Recommend a suite of actions to address the community's water-related challenges with the goal of meeting both instream and out-of-stream needs.

5. Adopt the Plan
   Planning groups should formally adopt the plan. Agencies will review the plan and the Water Resources Commission will have an opportunity to formally accept the plan, based upon whether it meets the goals and objectives of the statewide Integrated Water Resources Strategy.

To be considered a place-based plan that helps implement the statewide Integrated Water Resources Strategy, planning groups should adhere to these planning guidelines and the following fundamentals:

- Recognize the public interest in water, state authorities, and responsibilities.
- Comply with existing state laws and policies.
- Ensure balanced representation of all interests.
- Have a meaningful process for public involvement (e.g., advertise and hold public meetings).
- Adhere to the 2012 IWRS Guiding Principles. Refer to Appendix A.
- Remember that a place-based plan, on its own, cannot change existing laws or jeopardize existing water rights.

Within a basin or sub-basin, multiple plans governing the use and protection of water resources may already exist. Examples include water management and conservation plans (by a municipal water provider or irrigation district), fish conservation and recovery plans, Biological Opinion Implementation Plans, basin programs that govern future allocations, the laws administering the

Forest Practices Act, Total Maximum Daily Loads (TMDLs) for improving water quality, and many local implementation plans. There are also local land-use plans, watershed restoration action plans, and locally-developed agricultural water quality management plans. Taken together, these plans and their respective strategies engage many agencies and entities at every level.

In envisioning a place-based planning approach, these existing regulations, plans, and programs do not go away, but instead provide a baseline of information, history, and rules that should be considered, coordinated, and built upon. A voluntary integrated water resources plan can help bring together these plans and programs in a more strategic and effective way, providing greater opportunities for coordination and funding while making progress on multiple fronts.

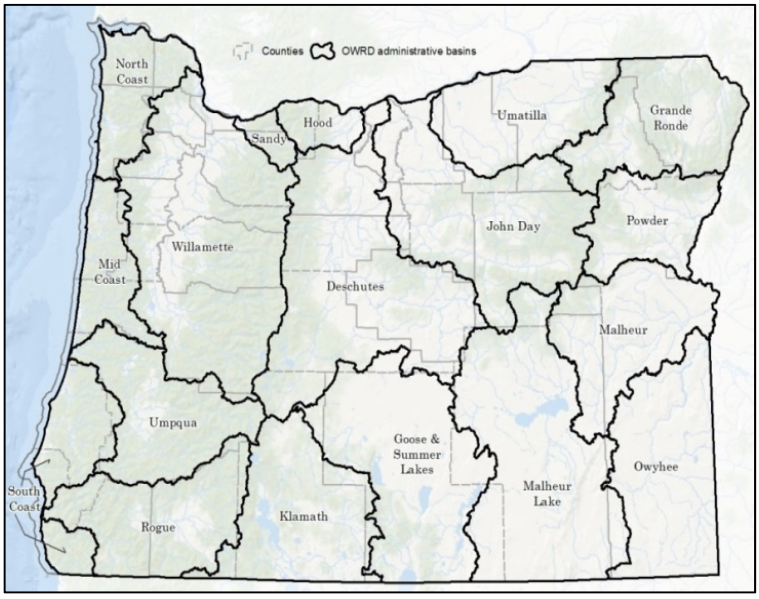
Planning Step 1: Build a Collaborative & Integrated Process

During this initial step, a representative(s) of the planning group should consult with the Water Resources Department for the purposes of: defining the planning scale, convening the process, involving state agencies as partners, inviting and involving diverse interests, and ensuring a public process with consensus decision-making.

Define the Planning Scale

Planning groups have the flexibility of establishing their own geographic planning scale, so long as it meets certain criteria. The Water Resources Department's existing administrative drainage basins are a good starting point for identifying the planning scale (see Figure 1). These administrative boundaries are further divided into smaller geographic areas within the Department's basin programs (refer to OAR Chapter 690, Divisions 500-520). Planning groups can chose to focus on smaller geographic areas, such as a sub-basin, or a group of sub-basins, within these boundaries. For example, planning groups could focus on the upper, middle, or lower section of a basin. To the extent possible, planning groups should utilize watershed-based boundaries, accounting for both groundwater and surface water, and situations where the source of water for certain uses (e.g., drinking water or irrigation) originates in an adjacent basin or sub-basin.

Figure 1: Administrative Basins in Oregon (OWRD)



Convene the Process

Since developing a place-based plan is completely voluntary, local partners will need to initiate the effort and convene the process. These guidelines do not suggest who the convener should be, but rather, describe the role and responsibilities of a convener(s). Oregon's Policy Consensus Initiative (PCI) provides resources to help facilitate collaborative planning and has developed basic principles

to help conveners understand their role in the planning process. Planning groups should refer to PCI's resources, particularly the "Role of a Convener," an excerpt of which is included as Appendix B. Conveners, and any sponsoring entities, should communicate to the Water Resources Department of their intentions to organize a planning group and to develop a place-based plan.

Involve Agencies as Partners

The role of state agencies in development of a place-based plan is to provide data and information, and generally, offer support, advice and direction throughout development of the plan. The Water Resources Department and its sister agencies can help planning groups incorporate the goals and objectives of the Integrated Water Resources Strategy at the local level, and understand the regulatory structures in place today.

If resources allow, the Water Resources Department could serve as a planning member or act as a liaison for other natural resources agencies not able to commit staff resources to participate in planning-related activities, such as face-to-face meetings. At a minimum, planning groups should consult with other agencies, such as the Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, and Oregon Department of Agriculture to determine agency participation. A state agency could serve as a facilitator or play a co-convening role, if requested by local communities and if resources allow.

If federal projects or land management programs exist within the planning area, groups should reach out to federal agencies to determine participation as well.

Invite & Involve Diverse Interests

The planning group will need to decide its own structure for involving diverse interests and should describe this approach within its plan. Most importantly, the structure needs to ensure that the planning body represents a balance of interests from different sectors. Diverse representation is a key tenet of integrated water resources management. Each basin will be unique in terms of the actual distribution of interests and stakeholders. Having diverse interests engaged and invested from the beginning will help ensure a process that meets both instream and out-of-stream water needs. Remember that these needs encompass water quantity, water quality, and ecosystem needs, considering both surface water and groundwater resources.

In determining the composition of a planning group, it is important to ensure that all persons potentially affected by a place-based plan have a voice in the decision-making process. This includes environmental justice communities, particularly members of minority or low-income communities, tribal communities, and those traditionally under-represented in public processes.

The place-based plan should describe how the planning members were determined, including a list of those that were invited to participate. Interest groups will need to decide for themselves what individual(s) best represents their interests for planning group participation. The plan should describe those responsible for its development and implementation. The description should contain enough detail to help stakeholders and the public understand how to communicate with the planning group and participate in plan development. Generally, interests in any given place will include:

- Local governments (cities and counties)
- Tribal governments
- Municipal water and wastewater utilities

- Major industries or employers
- Agriculture
- Forestry
- Self-supplied water users
- Conservation/environmental groups
- Power companies
- Small business
- Private landowners
- Special districts (e.g., irrigation, public utilities, flood control, parks/recreation, drainage, ports, etc.).
- State and federal agencies (natural resources, land management, business development)

Ensure a Public Process & Consensus Decision-Making

Reaching decisions within the planning group must be an inclusive and transparent process. Making decisions by consensus is an effective technique, meaning that one or two in the group may dissent, while the rest of the group supports the decision—or can "live with it." Getting to consensus provides a solid foundation upon which to build a plan and subsequent related actions, because it signals long-term support and commitment from a diverse set of stakeholders and partners.

Any place-based plan needs to employ a strong communication strategy, not only to ensure public participation in plan development, but to also engage the broader community on implementation of the plan. Publicize, in advance, meetings of the planning group, and accept public comment during every meeting.

Ensure a means of online communication as well, by setting up a website and posting materials regularly. Consider using a list-serve, and/or email account that can be used to quickly and widely disseminate information. Use these media, as well as print or other venues, to advertise upcoming meetings and public comment opportunities. Planning groups should comply with the state's Public Meetings Law. Refer to Appendix C for references, including a "quick guide" developed in 2010 for local and state officials, members of Oregon boards and commissions, citizens, and non-profit groups.

Planning Step **2**: Characterize Water Resources, Water Quality, & Ecological Issues

The purpose of this step is to help the planning partners collectively identify challenges currently facing the community, and to start mapping potential solutions or opportunities to address any water quantity, water quality, or ecological issues. This planning step represents the data gathering and assessment phase. Oregon's 2012 Integrated Water Resources Strategy provides a statewide framework of critical issues that can be used for reference.

This step of the planning process is also an opportunity to tell the story of what makes the area unique, describing the economic, social, cultural, and landscape characteristics of the community. This includes the physical characteristics of water resources, such as major rivers, tributaries, aquifers, and other resources, noting whether they are rain, snow, or spring-fed systems.

Extensive planning efforts in the 1960s through the early 1990s examined water resources issues for most areas of the state and resulting basin programs describe how water can be allocated in the future. Planning groups should consider existing basin program policies, objectives, and

classifications (OAR Chapter 690, 500-520), and any other existing legal protections, when characterizing water resources issues.

In addition to surface water, describe the availability of groundwater resources to the extent known. Describe, if possible, where additional data is needed. Note any groundwater protected areas and the status of groundwater in these areas. Existing data or basin investigations are available from the Water Resources Department and the U.S. Geological Survey.

The place-based plan should describe water quality –both surface water and groundwater– in the planning area. Items to consider for water quality include: designated beneficial uses, impaired water bodies, groundwater management areas, total maximum daily loads, permitted discharges, non-point sources of pollution, and any monitoring or relevant publications that can be used to characterize surface water or groundwater quality conditions.

The plan should include a general description of the ecological health of the planning area. This section should include a description of key species and habitats. Describe the historical and current presence of aquatic species, including any migratory fish, listed species under the Endangered Species Act with their current status, and species on ODFW's State Sensitive List. Include a discussion of limiting factors that affect aquatic habitats in the watershed. As an example, the 2006 Oregon Conservation Strategy provides a list of limiting factors to consider: water quantity (low flows), water quality, invasive species, water temperature, sedimentation, passage barriers, degraded riparian condition, and loss of habitat complexity.

Refer to Appendix C for technical resources and publications to help complete Planning Step 2.

Planning Step 3: Quantify Existing and Future Needs/Demands

The purpose of Planning Step 3 is to identify how much water is needed to support current and future uses of water, to examine when and where supplies do not meet instream or out-of-stream needs / demands today, and to determine where existing supplies are likely to fall short in the future.

Planning groups should quantify existing and future instream and out-of-stream water needs in the watershed, using a 50-year planning horizon, and accounting for future pressures such as climate change, population growth, and changes to land-use. Keep in mind that such needs encompass water quantity, water quality, and ecosystem needs. Many of these needs may already be quantified in municipal or agricultural water management plans, TMDL plans, habitat restoration plans, forest management plans, or conservation and species recovery plans. Planning groups should identify where conflicts among uses are most likely to arise in the future. This is critical information that will shape how solutions are developed later in the planning process.

Out-of-Stream Needs/Demands

Describe existing water rights in the basin, generally. Are consumptive uses (e.g., municipal, agricultural, industrial, domestic, etc.) being met today? Are uses met by surface water, groundwater, stored water, or non-traditional sources of water, such as recycled water, treated effluent, rainwater catchment, or stormwater? Evaluate the reliability of existing infrastructure (diversion works, storage reservoirs, delivery systems, etc.). The local watermaster may have information regarding the history and frequency of water shortages during dry years in the area.

Oregon's Water Rights Information System and annual water use reports may also be useful for understanding existing water uses.

Instream Needs/Demands

Describe existing instream needs in the planning area to determine if such needs are currently being met. Consider existing protections (e.g., instream water rights, pending instream water right applications, scenic waterway flows, or flows specified in project operations) to support fish, wildlife, recreation, or pollution abatement. Also assess flow needs to support other uses, such as navigation or hydropower. Groundwater often contributes flow to surface water bodies and supports various ecological functions; therefore, groundwater should be considered for assessing instream needs. Determine how often instream flows are met in wet or dry years and the likelihood such flows will be met in the future. Refer to the Integrated Water Resources Strategy for more information on the suite of flows that are needed to support instream uses.

Climate Change & Natural Hazards

As planning groups are conducting assessments under Planning Element #2 (characterizing issues) and Planning Element #3 (defining needs/demands), groups will need to consider the risks posed by climate change. The analysis could identify vulnerabilities of (a) human systems, (b) natural systems, and (c) infrastructure and the built environment. Projected climate change impacts include a longer freeze-free season, increased water demand due to warmer summertime temperatures, and higher spring flows/lower summer flows in snowmelt-dominated basins.

Planning groups should assess whether natural and built systems are vulnerable to certain natural events, such as droughts, wildfires, floods, or possibly seismic events. The frequency, duration, intensity, and impacts of past events and potential future events should be considered. Planning groups may wish to consider developing a multi-year, worst-case planning scenario to aid in development of drought, flood, or other preparedness-type strategies.

Planning Step 4: Develop Integrated Solutions for Meeting Long-Term Water Needs

Developing the solutions toolbox is paramount for meeting instream and out-of-stream water needs in a given place, today and into the future. Considering the diversity of water challenges, planning groups will likely need to consider a suite of tools, examining various options for meeting unmet needs/ demands. This can include maintaining current practices, if they are sufficient to meet future needs / demands. Use of the following tools can help bridge any gaps identified. Note that the following solutions, listed in no particular order, is not all encompassing. Innovative approaches or solutions are strongly encouraged.

(a). Efficiency and Conservation Measures

Consider improving water-use efficiency and employing conservation practices as a means for meeting water needs. At the individual level, irrigators can reduce on-farm water use by implementing a number of new technologies and practices. Several irrigation districts throughout Oregon have made their delivery systems more efficient in recent years, finding ways to save water, reduce costs, and improve the reliability of deliveries to water users. The state's Allocation of Conserved Water program is a water right transfer tool that puts some water back instream while allowing some water to be applied to additional acreage.

Water conservation opportunities exist within municipal water systems as well. Delivery system upgrades and household-level programs that install low-flow toilets, faucet aerators, and high-efficiency shower heads can be effective tools for reducing water use and meeting additional demands. Rebate or outreach programs sponsored by municipal water providers have been effectively used in Oregon in the past and continue to be used to complement system upgrades.

Landscaping can account for a significant use of water; installing efficient irrigation systems or selecting plants that require less water can also be effective tools, along with other landscaping techniques. (Refer to IWRS Action 10A for more information).

(b). Built and Natural Storage

Storage as a water management tool includes natural storage, built storage (above-ground and below-ground), and operational changes to existing storage projects.

The state of Oregon has a policy described in OAR 690-410-0080 that gives high priority to storage that optimizes instream and out-of-stream public benefits and beneficial uses. Multi-purpose storage is preferred over single-purpose storage.

If planning groups are considering new storage as a potential water management tool, the following should be considered:

- Purpose (e.g., type, location and extent of use, benefits);
- Legal Requirements (e.g., state, federal, and local legal requirements);
- Social Considerations (e.g., recreational, public support, cultural, historic);
- Technical Constraints (e.g., siting issues, public safety and structural integrity);
- Financial Realities (e.g., project financing including site costs, cost sharing and repayment, and operating, maintenance and rehabilitation costs);
- Economic Analysis (e.g., project benefit/cost analysis);
- Land Use (e.g., ownership, comprehensive plans, coordination);
- Environmental Effects (e.g., impacts on streamflows, fisheries, wildlife, wetlands, habitat, biological diversity, water quality and opportunities for mitigation);
- Other (e.g., direct and indirect impacts).

For existing storage projects within the watershed, planning groups should evaluate current storage capacities, authorized purposes, and operational practices to determine if management or engineering adjustments could help meet any unmet needs/demands.

Planning groups should also consider the enhancement of watershed storage capacity through natural processes using non-structural means. These non-structural means include maintaining forested and riparian areas, protecting or restoring floodplain functions, preserving wetlands, and restoring upland meadows. (Refer to IWRS Actions 10B and 11A for more information).

(c). Water Right Transfers & Rotation Agreements

Water right transfers allow the water right holder to change the point of diversion, place of use, or type of use. The state provides options for permanent transfers, temporary transfers, and instream leases. Transfers can be used to move water to where it is needed, or to provide mitigation water for new consumptive uses of water. One of the basic tenets of a water right transfer is ensuring that

other instream or out-of-stream uses are not injured as a result of the changes to the use. Whether the change is a transfer or a lease, it will not be authorized if other instream or out-of-stream water right holders are injured as a result of the change.

In addition to transfers, there are a number of other innovative management methods that can provide some flexibility and alternatives. For example, water users with existing water rights can enter into private signed agreements to rotate water and make the most economical use of a limited supply. Other examples of permanent and temporary options include dry year options and forbearance agreements.

(d). Non-Traditional Water Supply Techniques

Planning groups should consider alternative or non-traditional supplies, such as the use of rainwater, stormwater, greywater, or desalinated water as a management strategy.

For example, some Oregon communities have installed purple pipe as a means to use reclaimed water for golf courses or other greenways. Such installations require a parallel system of infrastructure, alongside traditional wastewater and stormwater pipes. The ability to use reclaimed water for non-potable uses means that large amounts of water can by-pass the treatment facility process, usually reserved for potable water supplies. (Refer to IWRS Action 10C for more information).

Desalination is a technique that allows communities to address water scarcity by treating brackish groundwater or saltwater. Both inland and coastal communities may wish to undertake desalination projects to meet their water needs. Such projects would need to seek approval through existing regulatory pathways, and where appropriate, planning groups may need to identify policy gaps that create barriers to desalination projects. The identification of these barriers would allow the state to pursue policy changes, if needed, so that desalination can occur where appropriate, without jeopardizing existing water rights and identified beneficial uses.

(e). Infrastructure

Water infrastructure needs are many and growing. As water and wastewater systems age, maintenance becomes a greater challenge and cost. Many of the diversion, conveyance, storage, and other infrastructure in Oregon are more than 100 years old and in need of repair or replacement. As communities grow and technologies improve, the need for modern infrastructure continues to grow as well. Developing regional partnerships among water providers and wastewater utilities can be a key component to a successful infrastructure program.

Planning groups should consider taking stock of water-related infrastructure in the community to determine whether maintenance or upgrades are necessary and whether plans are in place to save for and invest in maintenance needs. A thorough structural review should be undertaken to assess the integrity of structures to withstand disturbances, such as earthquakes or large flood events. In addition, the planning group may want to evaluate whether reservoir storage capacity has been reduced, by sedimentation for example, or for public safety reasons. Doing so could help expand water supplies or provide greater system reliability during dry years. (Refer to IWRS Action 7A and 7B for more information).

(f). Watershed & Habitat Restoration

Planning groups will need to consider actions to improve and maintain the ecological health of the planning area. Watershed restoration efforts have been occurring throughout Oregon for many years, providing the habitat needed to support fish, wildlife, and a variety of ecosystem services, such as recycling nutrients back into the soil and therefore, improving water quality.

The Integrated Water Resources Strategy contains four recommended actions to improve or maintain the health of Oregon's ecosystems: improve watershed health, resiliency, and capacity for natural storage; develop additional instream protections; prevent and eradicate invasive species; and protect and restore instream habitat and access for fish and wildlife. In particular, removing fish passage barriers and screening diversions are key actions to consider. Planning groups can look to the IWRS for other tools to consider during plan development.

Oregon's network of watershed councils, soil and water conservation districts, and non-profit conservation organizations are at the forefront of on-the-ground restoration projects. Planning groups should consider building upon the expertise and strategic action plans of these local organizations.

(g). Instream Flow Protections

The protection and maintenance of instream flows are necessary to support ecosystem health. Oregon's instream flow policy in OAR 690-410-0030 recognizes that benefits are provided by water remaining where it naturally occurs.

Protecting streamflows that are needed to support public uses is a high priority for the state. The long-term goal of the state's policy is to establish an instream water right on every stream, river and lake that can provide significant public benefits. Where streamflows have been depleted to the point that public uses have been impaired, methods to restore the flows should be developed and implemented. These activities must be consistent with the preservation of existing rights, established duties of water, priority dates, and with the principle that all of the waters within the state belong to the public to be used beneficially without waste.

Many watersheds throughout the state contain protections for instream flows through instream water rights, permit conditions, by-pass conditions, scenic waterway designations, and biological opinions. There are a number of tools available to meet instream flows needs, including streamflow measurement and management, transferring senior water rights instream, leasing water temporary instream, and regulating in favor of senior instream water rights. Streamflow restoration projects should seek cooperation and coordination between instream water interests and out-of-stream water users. The Water Resources Department and the Department of Fish and Wildlife have jointly identified priority areas for streamflow restoration throughout the state.

A place-based plan should identify opportunities for meeting instream flow needs. If instream flow requirements do not exist for a particular stream, river, or lake within the planning area, or if conflicting federal or state targets exist, the planning group may want to consult and seek recommendations from the Oregon Department of Fish and Wildlife on how to proceed in determining the appropriate instream flow. (Refer to IWRS Action 11B for more information on instream protections).

(h). Water Quality Protections

The Integrated Water Resources Strategy contains recommended actions to improve and protect water quality for the benefit of many uses, such as drinking water, ecosystem health, aquatic life, agriculture, and industry.

Some of the state's water quality priorities are set forth in water quality management plans (e.g., Senate Bill 1010 plans, Forest Practices Act, TMDLs and associated implementation plans) and groundwater protection plans. Ultimately, a place-based plan should identify opportunities for protecting and improving water quality in the planning area. This could be through the implementation of existing plans, undertaking actions in basin assessments, or developing new tools and collaborative strategies among community partners. Planning groups should consider potential pollutant sources and their potential solutions, such as using low impact development to mitigate stormwater impacts, using community outreach and grants to fix leaky septic systems, and using take-back programs to avoid toxic and pharmaceutical contamination of water supplies. Below are two examples from the Integrated Water Resources Strategy that demonstrate how to protect and improve water quality and public health:

Drinking Water

Planning groups should identify actions to address drinking water quality needs by considering collaborative source water protection strategies and various treatment technologies. Drinking water protection should focus on both large municipal systems, as well as community or individual drinking water systems.

Toxics and Other Pollutants

The IWRS recommends a number of ways to reduce toxics and other pollutants. The Oregon Department of Environmental Quality and its partners are pursuing many of these recommendations, with implementation being carried out at the local or community level. Planning groups should evaluate what strategies are in place within their community, such as the promotion of pesticide collection events, pharmaceutical take-back programs, the use of integrated pest management techniques, reducing cyanotoxins in fresh and marine waters, or raising public awareness.

(i). Monitoring

Expanding monitoring efforts to better understand water quantity, water quality, ecological issues, and program effectiveness is a key recommendation of the 2012 IWRS. Planning groups may need to install measurement devices or include monitoring as part of plan development, or the group may recommend increasing monitoring efforts as a management tool. Place-based planning efforts could help identify additional data needs, which can include monitoring and evaluating: streamflow (e.g. adding real-time capabilities), groundwater levels, water use, water quality, habitat conditions, and watershed functions. Several types of monitoring needs are described in the 2012 IWRS.

Development of new data or monitoring tools should be compatible with and available to partners, including state agencies. Oregon DEQ has resources available for local entities that are monitoring water quality conditions within their watershed, including directions for quality assurance, sampling, and analysis. The place-based plan should include a description of any current or proposed monitoring activities occurring in the watershed. Refer to Appendix C for monitoring standards and other related resources.

Planning Step 5: Plan Adoption & Implementation

On occasion, the planning group may be asked to present or share information with the Oregon Water Resources Commission, primarily to provide feedback on the use of these guidelines and to give Commission members an opportunity to offer recommendations and general input.

A place-based plan should be completed within a reasonable time frame. For the purposes of piloting these guidelines, plans are expected to be completed within three years of initiating the planning process. The state recognizes, however, that communities are at different stages of planning; some communities have already initiated discussions, collected data, or conducted assessments, whereas others are in the very early stages of organizing themselves. For these reasons, it is important to work with state agencies throughout the planning process to adjust completion timeframes, if needed.

Planning group members should formally approve their plan. Individual planning members should seek an affirmative vote from their respective governing boards or commissions to confirm any funding or political commitments made by the planning group.

The Department, working closely with the IWRS Project Team Agencies—namely the Oregon Department of Environmental Quality, Oregon Department of Fish and Wildlife, and the Oregon Department of Agriculture—will conduct an inter-agency review of each place-based plan during the final stages of plan development. The Water Resources Commission will ultimately make the final decision about whether to formally accept a place-based plan as a component of the Integrated Water Resources Strategy. More specifically, the Commission will decide whether the plan adheres to these guidelines and the statewide goals and objectives of meeting instream and out-of-stream water needs, including water quantity, water quality, and ecosystem needs.

Implementation of a place-based plan will likely involve various partners and result in a suite of projects and/or long-term programs. Some projects may need additional analyses (e.g., feasibility studies) that are beyond the scope of a place-based plan. It is very likely that permits or some type of state or federal approval will be needed for certain projects, as well as funding, likely from multiple sources. Planning groups may need to develop a more detailed implementation strategy, agreement, or workplan to ensure that all of the hard work of creating the integrated water resources plan is carried out by various public and private partners.

Appendix A: Guiding Principles from Oregon's Statewide Strategy

The fifty-year vision and guiding principles from the 2012 Integrated Water Resources Strategy are reproduced below as a reference for planning groups. The guiding principles were developed to help shape the development and implementation of the Strategy. These principles should serve as a constant reminder to recognize the public interest in water, to include a meaningful process for public involvement, and to maintain a balanced representation of all interests.

Accountable and Enforceable Actions

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

Balance

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

Collaboration

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

Conflict Resolution

Be cognizant of and work to address long-standing conflicts.

> Everywhere in our State, we see healthy waters, able to sustain a healthy economy, environment, and cultures & communities.
>
> Healthy waters…are abundant and clean. A healthy economy…is a diverse and balanced economy, nurturing and employing the state's natural resources and human capital to meet evolving local and global needs, including a desirable quality of life in urban and rural areas. A healthy environment…includes fully functioning ecosystems, including headwaters, river systems, wetlands, forests, floodplains, estuaries, and aquifers. Healthy cultures and communities…depend on adequate and reliable water supplies to sustain public health, safety, nourishment, recreation, sport, and other quality of life needs.
>
> A Fifty-Year Vision for Oregon's Water Future
> Policy Advisory Group
> 2012 Integrated Water Resources Strategy

Facilitation by the State

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

Incentives

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

Implementation

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

Interconnection/Integration

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

Public Process

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

Reasonable Cost

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

Science-Based, Flexible Approaches

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

Streamlining

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

Sustainability

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

Appendix B: The Convener's Role & Responsibilities

The following information contains excerpts from the Policy Consensus Initiative's document entitled, "The Role of a Convener." For the full version or to find more information or resources visit: http://www.policyconsensus.org/publicsolutions/ps_6.html.

The Convener

A convener is a person—typically a well-known public leader with credibility and stature—who brings a diverse group of people together to resolve a problem collaboratively. Experience over the past 25 years has demonstrated that conveners are often essential to achieving successful outcomes in collaborative processes, especially when the solutions reached require action by multiple sectors and levels of government.

Conveners get people involved in finding effective solutions together; they do not seek to impose their own solutions. Experience has shown that [public officials] and other respected civic leaders can be very effective as conveners or co-conveners of collaborative processes, so long as they act in impartial ways. By virtue of their office, elected leaders have the power to convene people from a variety of sectors to work on public problems. Other respected leaders, by virtue of the credibility and social capital they have built in their communities, regions, or states, also have the power to convene. When leaders serve as conveners or co-conveners of collaborative processes, the outcomes of these processes are more likely to receive support and to be formally adopted and implemented.

Selecting a Convener

The process for selecting a convener needs to be transparent, so that the parties and the public understand who made the selection. During the assessment, the parties should be asked who would make a good convener. The purpose of the question is not to have the parties choose the convener, but rather to understand their perceptions about the kind of person who is needed to gain the cooperation of all interests in working toward a solution.

The most important criteria for selecting a convener is that the person be highly respected and statesmanlike—someone with a reputation for serving the public interest, with no particular ax to grind or perspective to push on the issue at hand. Sometimes people will come to the table primarily because of the convener's status—because the stature of the convener makes them feel they are doing something important and worthwhile.

Best Practices for a Convener

To be effective, conveners should abide by the following key guidelines:

1. Be inclusive.

Conveners should be sure that a wide variety of people from different perspectives are involved. They should welcome participants from all interests—not just those with obvious interests, but also those with the economic, political, or technical resources that will help make for successful outcomes.

2. Establish a neutral meeting place.

When the issue is complex and divisive, the convener must establish an impartial process and a safe space for people to open up about their beliefs and opinions. It is often helpful to get assistance from an experienced facilitator to plan and conduct the process.

3. Be impartial to the solution.
Participants must believe that the convener is not predisposed to one side or another and is trying to find a solution that all sides can embrace. The convener may need to work in a bipartisan fashion with a co-convener from the other side of the aisle, to ensure the perception of impartiality.

4. Direct, rather than dominate, the discussions.
The convener must enable people to talk with each other, rather than talking only to the convener. It is often useful for someone else to facilitate the discussions so the convener can listen and ask questions. Besides, conveners will rarely have time to run all of the meetings.

5. Frame the meeting and the issue.
The convener must establish a purpose for each meeting and help to ensure that the issue is framed in a way that enables all people to work together productively. Defining and naming the issue jointly can ensure that everyone is willing to contribute to the solution.

6. Keep people moving and working together.
The convener should provide feedback to the group on their progress. Where institutional impediments or red tape crop up, the convener should consider using his or her own capabilities to overcome them.

7. Demonstrate ongoing visible commitment.
The convener can help keep participants at the table by demonstrating that they care about the progress the group is making. Even if the convener cannot be present at every meeting, he or she should send signals demonstrating on-going interest.

8. Make sure there is an outcome.
The convener can help a group get to closure by establishing timetables for the process and reminding people of those timetables. The best outcome involves written agreements that spell out an action and implementation plan, including specifying different people's responsibilities.

Appendix C: Technical Resources & Publications

This appendix is a starting point for planning groups looking for pertinent data and information, technical reports, statewide or regional plans and assessments, and agency contacts.

Public Process, Meetings

Oregon's Public Meeting Laws – Reference Guide (2010)
http://www.open-oregon.com/wp-content/uploads/2010/06/publicMEETINGSreader.pdf

Oregon Attorney General's Public Records and Meetings Manual (2011)
http://www.doj.state.or.us/pdf/public_records_and_meetings_manual.pdf

Policy Consensus Initiative's Resources for Leaders and Conveners
http://www.policyconsensus.org/publicsolutions/ps_6.html

Environmental Justice in Oregon, It's the Law (2008)
https://law.lclark.edu/live/files/17291-38-2collin

Water Quantity Data

Near Real-Time Streamflow Data
http://apps.wrd.state.or.us/apps/sw/hydro_near_real_time/

Historical Streamflow and Lake Level Data
http://apps.wrd.state.or.us/apps/sw/hydro_report/

Monthly Water Use Data
http://www.oregon.gov/owrd/pages/wr/water_use_report.aspx

Groundwater Level Data
http://www.oregon.gov/owrd/pages/gw/well_data.aspx

Groundwater Studies and Publications
http://www.oregon.gov/owrd/pages/gw/gw_pubs.aspx

Critical Groundwater Areas (Map)
http://www.oregon.gov/owrd/pages/gw/gw_critical_allocations.aspx

Water Availability Database
OWRD's model for estimating water availability can provide useful information on whether any new water is available during different months of the year to support future uses.
http://apps.wrd.state.or.us/apps/wars/wars_display_wa_tables/MainMenu1.aspx

Water Rights Database
http://www.oregon.gov/owrd/pages/WR/wris.aspx

Water Rights Maps (GIS themes)
http://www.oregon.gov/owrd/Pages/maps/index.aspx

Water Quality Data

Wastewater Permits Database
http://www.deq.state.or.us/wq/sisdata/sisdata.asp

Water Quality Monitoring Data
http://deq12.deq.state.or.us/lasar2/

The Oregon Water Quality Index
http://www.deq.state.or.us/lab/wqm/wqimain.htm

Impaired Water Bodies
http://www.deq.state.or.us/wq/assessment/assessment.htm

Designated Beneficial Uses for Water Quality
http://www.deq.state.or.us/wq/standards/uses.htm

Groundwater Management Areas for Water Quality
http://www.deq.state.or.us/wq/groundwater/gwmas.htm

Ecological Data

Fish Distribution Data
https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishdistdata

State Species Sensitive List
http://www.dfw.state.or.us/wildlife/diversity/species/sensitive_species.asp

Streamflow Restoration Priority Areas (Maps)
https://nrimp.dfw.state.or.us/nrimp/default.aspx?pn=streamflowmaps

Salmon and Steelhead Recovery Tracker
http://www.odfwrecoverytracker.org/

Instream Water Rights in Oregon (Map)
http://filepickup.wrd.state.or.us/files/Publications/Place_Based_IWRS/ISWR_SWW_Map.JPG

ODFW's Compass Tool
Online mapping that displays passage barriers and status
https://nrimp.dfw.state.or.us/compass/

2013 Statewide Fish Passage Priority List
ODFW's statewide inventory of fish passage barriers, prioritized for enforcement, based on the needs of native migratory fish
http://www.dfw.state.or.us/fish/passage/

Fish Screening Information
http://www.dfw.state.or.us/fish/screening/index.asp

DSL's Technical Resources for Wetlands
http://www.oregon.gov/dsl/WETLAND/Pages/technical_resources.aspx

Watershed assessments funded by OWEB
http://www.oregon.gov/OWEB/MONITOR/pages/watershedassessments_linked.aspx

Monitoring-Related Resources (see also water quality / quantity sections, above)

Measurement and Computation of Streamflow, Volumes 1 & 2: USGS Water Supply Paper 2175
http://pubs.usgs.gov/wsp/wsp2175/

Stage Measurement at Gaging Stations (2010)
http://pubs.usgs.gov/tm/tm3-a7/

Discharge Measurements at Gaging Stations (2010)
http://pubs.usgs.gov/tm/tm3-a8/

DEQ's Volunteer Water Quality Monitoring Resources
http://www.deq.state.or.us/lab/wqm/volmonresources.htm

Climate Change Resources

IPCC Fifth Assessment Report (2013)
http://www.ipcc.ch/report/ar5/

Northwest Climate Assessment Report (2013)
http://occri.net/wp-content/uploads/2013/11/ClimateChangeInTheNorthwest.pdf

Oregon's Climate and Health Profile (2014)
https://public.health.oregon.gov/HealthyEnvironments/climatechange/Pages/Climate-and-Health-Profile.aspx

DLCD's Website: Planning for Climate Change
http://www.oregon.gov/LCD/CLIMATECHANGE/Pages/index.aspx

Natural Hazards: Drought, Floods, Earthquakes etc.

AWRA's Proactive Flood and Drought Management Applied Strategies (2013)
http://www.awra.org/news/AWRA_report_proactive_flood_drought_final.pdf

Oregon Resilience Plan (2013)
http://www.oregon.gov/OMD/OEM/osspac/docs/Oregon_Resilience_Plan_Final.pdf

Oregon's Natural Hazard Mitigation Plan (2015)
In addition to the statewide Natural Hazard Mitigation Plan, hazard plans developed by cities and counties may also be useful in understanding past hazard events in a community.
http://www.oregon.gov/LCD/HAZ/pages/NHMP.aspx

Oregon Hazards Explorer
http://oregonexplorer.info/hazards

Infrastructure

OWRD's Dam Inventory
http://apps.wrd.state.or.us/apps/misc/dam_inventory/default.aspx

Oregon Association of Clean Water Agencies
http://www.oracwa.org/c-energy.html

Pacific Northwest Seismic Network
http://pnsn.org/earthquakes/recent

U.S. Army Corps of Engineers National Inventory of Dams
http://geo.usace.army.mil/pgis/f?p=397:12

Statewide or Regional Plans & Assessments

Oregon's Integrated Water Resources Strategy
http://www.oregon.gov/OWRD/pages/law/integrated_water_supply_strategy.aspx

Oregon Conservation Strategy (ODFW)
http://www.dfw.state.or.us/conservationstrategy/read_the_strategy.asp

Oregon Plan for Salmon and Watersheds (OWEB)
http://www.oregon.gov/OPSW/pages/index.aspx

Conservation and Recovery Plans (ODFW)
http://www.dfw.state.or.us/fish/CRP/conservation_recovery_plans.asp

TMDLs in Oregon (DEQ)
This site contains links to Total Maximum Daily Load and Water Quality Management Plan documents prepared for water bodies in Oregon designated as water quality limited on the 303(d) list.
http://www.deq.state.or.us/wq/tmdls/tmdls.htm

Agricultural Water Quality Management Plans (SB 1010)
http://geo.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=e48e9d32e854458a8079b10852c3100b

DEQ Basin Assessments
Basin assessments have been completed for the North Coast, Deschutes, Rogue, and Powder River Basins.
http://www.deq.state.or.us/wq/watershed/watershed.htm

OWRD Basin Programs
Some stream systems are only classified for certain uses during certain times of the year. These classifications are used, in conjunction with other laws or rules, to determine whether the state can allow new uses of water. Basin programs exist for most of the state's major drainage basins, and are described in Oregon Administrative Rules Chapter 690, Division 500 – 520.

North Coast Basin Program	[Available here]
Willamette Basin Program	[Available here]
Sandy Basin Program	[Available here]
Hood Basin Program	[Available here]
Deschutes Basin Program	[Available here]
John Day Basin Program	[Available here]
Umatilla Basin Program	[Available here]
Grande Ronde Basin Program	[Available here]
Powder Basin Program	[Available here]
Malheur Lake Basin Program	[Available here]
Owyhee Basin Program	[Available here]
Malheur Lake Basin (Provision)	[Available here]
Goose & Summer Lakes Basin Program	[Available here]
Rogue Basin Program	[Available here]
Umpqua Basin Program	[Available here]
South Coast Basin Program	[Available here]
Mid-Coast Basin Program	[Available here]
Columbia River Basin Program	[Available here]
Middle Snake River Basin Program	[Available here]

Contacts

Integrated Water Resources State Agency Contacts:

OWRD: Alyssa Mucken, alyssa.m.mucken@state.or.us; 503-986-0911 (Salem)

ODEQ: Wade Peerman, wade.peerman@state.or.us; 503-229-5046 (Portland)
Heather Tugaw, heather.tugaw@state.or.us; 541-776-6091 (Medford)
Smita Mehta, smita.mehta@state.or.us; 541-278-4609 (Pendleton)

ODFW: Danette Faucera, danette.l.faucera@state.or.us; 503-947-6092 (Salem)

ODA: Margaret Matter, mmatter@oda.state.or.us; 503-986-4561 (Salem)

Watershed Councils
http://www.oregon.gov/OWEB/GRANTS/docs/councilcapacity/June_2014_Map_Watershed_Councils.pdf

Soil and Water Conservation Districts
http://geo.maps.arcgis.com/apps/Viewer/index.html?appid=9cee1a8b865140d5b71253975fb7fe6d

DEQ's Basin Coordinators
http://www.deq.state.or.us/wq/tmdls/docs/basincoordinators.pdf

OWRD's Watermasters in Oregon
http://www.oregon.gov/owrd/pages/offices.aspx#Region/Watermaster_Map

Appendix D: Quick Guide for Place-Based Planning

The appendix is a short list of the place-based planning elements. It provides the general topic areas and key points to consider while developing a place-based plan.

Planning Step 1: Building a Collaborative &Integrated Process

Place-Based Planning Under the IWRS
- Adhere to fundamentals
- Follow IWRS Guiding Principles

Define the Planning Scale
- Establish the geographic planning scale
- Correspond with existing basins
- Watershed-based

Convene the Process
- Public official or of similar stature
- Adhere to basic principles (See App. B)
- Notify OWRD of planning initiation

Involve Agency Partners
- Technical contacts
- Guidance; support
- Seek federal participation

Invite and Involve Diverse Interests
- A balance of interests from different sectors
- Define responsible parties
- Include all persons potentially affected

Employ a Public Process
- Must be an inclusive and transparent process
- Seek consensus
- Develop communication strategy/plan
- Follow Public Meetings law

Planning Step 2: Characterize Water Resources, Water Quality, & Ecological Issues

Describe the Place
- Economic, social, cultural characteristics
- Unique features or attributes
- Physical and landscape characteristics:
  - Major rivers & tributaries
  - Aquifer systems and springs
  - Estuaries and bays
  - Reservoirs and lakes
  - Conveyance systems
  - Hydrology (rain, snow or spring fed systems), etc.

Surface & Groundwater Quality/Quantity
- Availability
- Existing protections
- OWRD basin programs
- Beneficial uses (water quality)
- Impaired water bodies
- Groundwater management areas (water quality)
- Total maximum daily loads
- Permitted discharges

Ecological Health of the Watershed
- Key species & habitats
- Historical and current fish species
- ESA STE species; ODFW sensitive species
- Limiting factors

Planning Step 3: Quantify Existing & Future Needs/Demands

Existing and Future Needs/Demands
- Instream and out-of-stream
- Quantity, quality, & ecosystems
- Future pressures (e.g., population, land-use, etc.)

Out-of-Stream Needs
- Agricultural uses (irrigated and non-irrigated)
- Municipal uses
- Industrial uses
- Domestic uses

Instream Needs
- Meeting existing targets (water rights, scenic waterways flows, etc.)
- Fish and wildlife, water quality, recreation, etc.

Climate Change & Natural Hazards
- Human and natural risks
- Infrastructure and built environment risks
- Drought, floods, seismic, other natural hazards
- Multi-year, worst-case scenario

Planning Step 4: Develop Integrated Solutions for Meeting Long-Term Water Needs

Efficiency & Conservation Measures
- Allocation of Conserved Water; on-farm activities
- Infrastructure upgrades
- Household level conservation programs

Built & Natural Storage
- Capacity & operations
- Above & below
- Natural storage (forests, floodplains, wetlands, snowpack)

Transfers & Rotation Agreements
- Permanent transfers
- Temporary transfers
- Instream leases
- Rotation or forbearance agreements

Non-Traditional Techniques
- Recycled or reclaimed water projects
- Graywater, rainwater, stormwater
- Desalination

Infrastructure
- Aging water and wastewater systems
- Energy efficiencies
- Storage capacities
- Safety (e.g., seismic, flood risk)
- Regional partnerships
- Long-term maintenance strategies

Watershed & Habitat Restoration
- Improve/maintain ecological health
- Utilize existing plans/efforts (e.g. Oregon Plan)
- Fish passage barriers/screening

Instream Flow Protections
- New instream water rights
- Streamflow restoration priorities
- Improved measurement/monitoring
- Consult with ODFW

Water Quality Protections
- Pollution reduction strategies
- Nonpoint source projects
- Source water protection
- Toxics (e.g., nutrients reduction)
- Education and outreach

Monitoring
- Measurement (streamflows/water use)
- Program Effectiveness
- Quality assurance
- Shared information

Planning Step 5: Plan Adoption & Implementation

Review Process
- Three-year completion timeframe
- Seek input from WRC
- Inter-agency review

Adoption
- Planning members adopt
- Seek approval from boards/commissions
- Submit to WRC for acceptance process
- Develop workplan/implementation strategy

Oregon
John A. Kitzhaber, MD, Governor

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MEMORANDUM

January 30, 2015

TO: John Kitzhaber, Governor
Peter Courtney, President of the Senate
Tina Kotek, Speaker of the House
Representative Brian Clem, Chair, House Committee on Rural Communities, Land Use and Water
Senator Chris Edwards, Chair, Senate Committee on Environment and Natural Resources
Oregon Water Resources Commission

FROM: Tom Byler, Director

SUBJECT: Report of the Senate Bill 839 Task Force on Seasonally Varying Flows

Attached is the executive summary of the report of the Senate Bill 839 (2013) Task Force on Seasonally Varying Flows. A copy of the full report (matrix and narrative) has also been included for your convenience.

If you have questions, please contact Racquel Rancier, Senior Policy Coordinator, at racquel.r.rancier@state.or.us or 503-986-0828.

cc: 78th Legislative Assembly
Legislative Administrator
Beth Reiley, Committee Administrator
Beth Patrino, Committee Administrator
Richard Whitman, Governor's Natural Resources Policy Advisor

Executive Summary
Report of the Senate Bill 839 Task Force on Seasonally Varying Flows

Background

In 2013, the Oregon Legislature passed Senate Bill 839 establishing a Water Supply Development Account to provide loans and grants for water resource projects that have economic, environmental, and community benefits.

Before the Water Resources Department and Commission can begin developing rules and issuing grants and loans, SB 839 required the Governor, in consultation with Legislative leadership, to appoint a "Seasonally Varying Flows Task Force" that would create and submit a report to the Oregon Legislature, Governor, and Water Resources Commission. This memo serves as the report required by SB 839 in accordance with ORS 192.245.

Purpose

The role of the task force was to recommend a method to determine which flows are appropriate for storage and which are necessary to leave in the stream to fulfill an instream purpose.

As defined in Section 1 of the bill, "seasonally varying flows," means:

> The duration, timing, frequency and volume of flows, identified for the purposes of determining conditions for a new or expanded storage project, that must remain instream outside of the official irrigation season in order to protect and maintain the biological, ecological, and physical functions of the watershed downstream of the point of diversion, with due regard given to the need for balancing the functions against the need to store water for multiple purposes.

Task Force Members

The Seasonally Varying Flows Task Force met eight times throughout 2014 to develop and recommend a methodology. The following are the individuals who were appointed to the Task Force:

Dr. Leslie Bach, The Nature Conservancy
Mr. JR Cook, Northeast Oregon Water Association
Ms. Katie Fast, Oregon Farm Bureau
Dr. Tim Hardin, Oregon Department of Fish and Wildlife
Ms. Teresa Huntsinger, Oregon Environmental Council
Dr. Bill Jaeger, College of Agricultural Sciences – Applied Economics, Oregon State University
Dr. Valerie Kelly, Oregon Water Science Center, U.S. Geological Survey (Retired)
Mr. Richard Kosesan, Water for Life
Mr. Mark Landauer, Special Districts Association of Oregon
Mr. Curtis Martin, Oregon Cattlemen Association
Mr. Paul Matthews, Tualatin Valley Water District
Ms. Kimberley Priestley, WaterWatch of Oregon
Mr. Eric Quaempts, Confederated Tribes of the Umatilla Indian Reservation
Mr. Gil Riddell, Association of Oregon Counties
Ms. Tracy Rutten, League of Oregon Cities
Ms. April Snell, Oregon Water Resources Congress
Mr. Jeff Stone, Oregon Association of Nurseries

Ms. Dawn Wiedmeier, U.S. Bureau of Reclamation
Mr. Joe Whitworth, The Freshwater Trust

Task Force Report – Decision Matrix and Narrative

The types of water resources projects that are the focus of this work are certain water storage projects that are seeking public funding under SB 839. The report that resulted from the Seasonally Varying Flows Task Force revolves around a decision matrix, intended to help funding applicants and the state determine: (1) how much of an impact a project may have on its surroundings, and (2) how much information already exists about the hydrological, biological, and hydraulic / physical conditions of the proposed location.

Once these two factors have been determined, the decision matrix helps identify what additional information is needed, if any, and the methods for data collection and data analysis necessary to establish seasonally varying flows for each water storage project. An accompanying narrative provides background, definitions and instructions to help the applicant and state understand how the matrix is to be used. The narrative and matrix were approved by the task force without opposition.

The decision matrix and accompanying narrative are available online. Copies can also be obtained by emailing Racquel Rancier at racquel.r.rancier@state.or.us.

Conclusion

The Water Resources Commission must now consider the Seasonally Varying Flows Task Force's recommendations in adopting rules that establish the seasonally varying flows methodology. SB 839 directs the Commission to adopt Seasonally Varying Flows rules in time for them to take effect on January 1, 2015. Since it is not possible to meet this timeframe, the Governor's Office has submitted 2015 legislation (HB 2400) to modify the timelines to reflect the delivery of the task force report and to allow time for the rules to be developed. The rulemaking is expected to start early in 2015 with the rules being brought to the Water Resources Commission for consideration later in the year.

SB 839 Matrix to Select Methods for Development of Seasonally Varying Flow Prescriptions

When Is a Seasonally Varying Flow Prescription Required?

FOR above and below ground water storage projects that require a water right authorization and are seeking SB 839 funding, AND that are: impounding on a perennial stream, or diverting from a stream supporting STE species, or ≥ 500 acre feet…

The project will need a **Seasonally Varying Flow Prescription**, determining the duration, timing, frequency and volume of flows, (including ecological baseflow) necessary for protection and maintenance of biological, ecological, and physical functions. Note that this flow prescription does not replace other environmental review required by rule (e.g. Division 33).

How Hard Would One Have to Work to Develop an Seasonally Varying Flow Prescription?

Methods and effort necessary to develop flow prescriptions are related to the level of impact of the project and the availability of information. Use the two sets of questions below to determine the effort one would expend to determine a flow prescription. Projects with lesser ecological impacts and more available information will require less intensive study approaches than those with greater ecological impacts and less available information.

Step 1: What Is the Ecological Impact of the Proposed Project?

Questions to Discern Ecological Impact of Project (Circle Yes or No for each question)	
Is this project diverting from a stream supporting sensitive, threatened, or endangered species?	Yes or No
Is the impoundment located in-channel?	Yes or No
Does the impoundment or proposed project have an impact on sensitive habitat/process?	Yes or No
Of the remaining available water in the basin, is the project proposing to divert more than half?	Yes or No
Is a majority of available water already developed in the basin?	Yes or No

Impact of Project Score	
If Yes to any questions = Significant If No for all questions = Minimal	Significant or Minimal

+

Step 2: What Information about Streamflow Functions Is Already Available?

Functional Bands	Questions to Discern Availability of Information about Streamflow Functions (Circle Yes or No for each question)		Availability of Information Score Yes = Sufficient No = Insufficient
Hydrological Band	Are there sufficient long-term data* to understand the natural hydrograph?	Yes or No	Sufficient or Insufficient
	Is there sufficient information* to understand climate driven shifts to the flow regime?	Yes or No	Sufficient or Insufficient
	Is there sufficient information* about water availability?	Yes or No	Sufficient or Insufficient
Biological Band	Is there sufficient information* about all species present at/below the point of diversion and their lifecycle needs?	Yes or No	Sufficient or Insufficient
Hydraulic / Physical Processes Band	Are there habitat studies that provide sufficient information* to understand the relationship between selected habitat features and streamflow?	Yes or No	Sufficient or Insufficient
	Are there geomorphological studies or data that provide sufficient information* to understand the relationship between sediment transport and streamflow?	Yes or No	Sufficient or Insufficient
	Are sufficient* stream data available to describe stream complexity and floodplain connectivity?	Yes or No	Sufficient or Insufficient
	Are sufficient* water quality data available, particularly related to temperature?	Yes or No	Sufficient or Insufficient

=

Step 3: Combine Scores of Steps 1 and 2

Combined Scores from Steps 1 and 2 for Each Question (e.g. Minimal, Sufficient)

Step 4: Determine Which Study Methods to Use to Address Each of the Functional Band Questions

Resulting "Impact of Project" and "Availability of Information" Scores	Resulting SVF Study Methods Used to Develop Flow Prescription (see narrative for a description of data sources and a description of study methods)
Minimal, Sufficient	**Data Collection**: Field visits, and/or literature and expert review **Analysis:** Existing models and/or calculations
Minimal, Insufficient	**Data Collection:** Field work, field visit, and/or literature and expert review **Analysis:** Develop models, scientific expert workshop, existing models and/or calculations
Significant, Sufficient	**Data Collection**: Field work, field visits, and/or literature and expert review **Analysis:** Develop models, scientific expert workshop, existing models and/or calculations
Significant, Insufficient	**Data Collection**: Field investigations/study, scientific expert workshop, field work, field visits, and/or literature and expert review **Analysis:** Develop models, scientific expert workshop, existing models and/or calculations

* "Sufficient" information means enough scientific information collected using standard biological, hydrologic, or hydraulic methods to develop the recommended flow prescription. Level of effort creating a flow prescription should correspond to how the project relates to its biological and physical setting. As the proposed project increases in water requested relative to water available, risk to ecosystem functions, and complexity, so too will the level of detail necessary to develop a flow prescription. This approach responds to the economic feasibility realities noted in SB 839.

SVF Task Force December 15th, 2014

SB 839 Matrix to Select Methods for Development of SVF Flow Prescriptions
Description and Implementation

Introduction

Senate Bill 839 (2013) established a Water Supply Development Account in order to provide a public cost match to Oregonians seeking to develop water resources projects.

For water storage projects (above and below ground) that require a water right authorization and are seeking public funding under SB 839, the bill sets forth specific requirements. These requirements are triggered by water storage projects that are: impounding surface water on a perennial stream, or diverting from a stream supporting sensitive, threatened, or endangered (STE) fish species, or diverting more than 500 acre-feet of surface water annually. (Sect. 13(1)).

The bill specifies that for such storage projects, the state must determine whether seasonally varying flows (SVFs) have been established for the stream. If SVFs have not been established, the state must establish SVFs before awarding public funding. (Sect. 13(2)).

It is important to note that before a flow prescription study method is identified, the project will be scoped using standard OWRD storage application criteria and that all projects will adhere to existing rules and regulations (e.g., Division 33). Every proposed project that does not yet hold a water right will be initiated using the standard OWRD application process. The applications include information about the storage project (e.g., source of water, dam height/ composition, primary outlet works, etc.) and information about how the stored water will be used (e.g., place of use, type of use, water management, etc.). The review of these applications will include an analysis of available water according to the 50 percent exceedence criteria.

Seasonally Varying Flows (SVFs) – as defined in Senate Bill 839 – mean the duration, timing, frequency and volume of flows, identified for the purpose of determining conditions for a new or expanded storage project, that must remain instream[1]... in order to protect and maintain the biological, ecological and physical functions of the watershed downstream of the point of diversion, with due regard given to the need for balancing these functions against the need to store water for multiple purposes. (Sect. 1(2)).

More specifically, the functions that must be protected, according to the bill, include but are not limited to: stream channel development and maintenance; connectivity to floodplains; sediment transport and deposition; migration triggers for upstream

[1] The ellipses [...] refer to text removed at the recommendation of the task force. The phrase "outside of the official irrigation season" should be deleted. Instead, the methodology described here specifies that the approval process for these projects should rely on the Department's determination of "when water is available for storage" in order to be consistent with the methods the state uses to evaluate and permit water storage projects.

movement of adult fish and downstream movement of fry and juvenile fish; fish spawning and incubation; juvenile fish rearing; and adult fish passage. (Sect. 19(4)).

The following narrative describes the methods the SVF Task Force recommends that the Water Resources Commission approve for the development of SVFs. The narrative focuses on the methods that will be used to develop a flow prescription that describes the necessary duration, timing, frequency and volume of flows, including the necessary floor flow, (i.e., ecological baseflow), that must be protected instream to protect and maintain biological, ecological, and physical functions.

The fundamental drivers for choosing an appropriate SVF method are the likely ecological impact to the site (i.e., attributes of the project relative to the attributes of the site), and how much information already exists about the ecological flow functions of proposed stream.[2]

Note that this approach responds to the economic feasibility realities noted in SB 839 (i.e., Many of the functional benefits to watersheds from water storage will not occur unless a new water storage project is financially feasible; and new water storage will not be appropriate or feasible in many locations).

SB 839 Matrix and Narrative: Determination of Flow Prescription Methods

The worksheet titled the "SB 839 Matrix to Select Methods for Development of SVF Prescriptions" and its supporting narrative (SB 839 Matrix), were compiled in order to identify the level of effort and subsequent study methods necessary for the SB 839 SVF prescription process. The SB 839 Matrix uses a series of questions to scope a given project's likely ecological impact and assess the quantity and quality of available information about ecological flow functions. The answers to these questions direct the user to the recommended study method (i.e., data collection and analysis) for a given project.

The SB 839 Matrix also relates questions about specific ecological data and analysis to streamflow functional bands discussed within the bill: Biological, Hydrological, and Hydraulic/Physical Processes. These bands are the basis for the development of a flow prescription and relate directly to the streamflow functions listed in the bill (Sect. 19(4)). Table 1 identifies the specific streamflow functions and where they will be addressed within each of the streamflow function bands. Ultimately, the completed studies and analyses for each band will be used to determine the necessary flow prescription.

[2] The level of effort required to create a flow prescription should correspond to how the project relates to its biological and physical setting. As the proposed project increases in water requested relative to water available, risk to ecosystem functions, and complexity, so too will the level of detail necessary to develop a flow prescription.

Streamflow Function Bands	Streamflow Functions Listed in SB 839							
	stream channel development and maintenance	connectivity to floodplains	sediment transport and deposition	migration triggers for upstream movement of adult fish	migration triggers for downstream movement of fry and juvenile fish	fish spawning and incubation	juvenile fish rearing	adult fish passage
Biological Band				x	x	x	x	x
Hydrological Band	x	x	x	x	x	x	x	x
Hydraulic / Physical Processes Band	x	x	x			x	x	x

Table 1. Comparison of streamflow functions listed in SB 839 and the streamflow function bands. The "X" under each streamflow function indicates which streamflow function bands will provide analysis or information for the streamflow needs of that function.

Application of the SB 839 Matrix

The following steps are used to implement the SB 839 Matrix:

Step 1) What is the Level of Ecological Impact of the Proposed Project?
Start at the column titled, "Questions to Discern Impact of Project." These questions are intended to identify proposed projects that are more likely to interfere with the biological, ecological, and physical functions protected by SB 839. Answers to the following questions will help determine whether the project is likely to have minimal or significant impact at the project site and what level of effort should go into creating an SVF flow prescription[3]:

- Is this project diverting from a stream with sensitive, threatened, or endangered species?
- Is the impoundment located in-channel?
- Does the impoundment or proposed project have an impact on sensitive habitat/process?
- Of the remaining available water in the basin, is the project proposing to divert more than half?
- Is a majority of available water already developed in the basin?

Once each question in the column "Questions to Discern Ecological Impact of Project" has been answered Yes ("Y") or No("N"), move to the box titled, "Impact of Project Score." Here, if any of the above questions were answered "Yes," then circle "Significant." If all answers to the above questions were "No," then circle "Minimal." This is the impact score for the project.

[3] Scoping must be done at the outset in collaboration with the technical review team and at other decision points along the way, so that money and resources can be focused on projects that are going to be successful.

Step 2) <u>What Type of Information is Already Available?</u>
Next, move to the column titled, "Questions to Discern Availability of Information about Streamflow Functions." "Sufficient" information means enough scientific information collected using standard biological, hydrologic, or hydraulic methods to develop the recommended flow prescription. Answers to the following questions are used to summarize the availability of scientific data sets and analysis:

Hydrological Band:

① Are there sufficient long-term data to understand the natural hydrograph?
② Is there sufficient information to understand climate driven shifts to the flow regime?
③ Is there sufficient information about water availability?

Biological Band:

④ Is there sufficient information about all species present at/below the point of diversion and their lifecycle needs?

Hydraulic / Physical Processes Band:

⑤ Are there habitat studies that provide sufficient information to understand the relationship between selected habitat features and streamflow?
⑥ Are there geomorphological studies or data that provide sufficient information to understand the relationship between sediment transport and streamflow?
⑦ Are sufficient stream data available to describe stream complexity and floodplain connectivity?
⑧ Are sufficient water quality data available, particularly related to temperature?

Acceptable scientific data sets and analysis collected using standard biological, hydrologic, or hydraulic methods may come from public, private, and non-profit sources and should meet appropriate quality assurance standards. Reliable sources of publically available information include:

- Hydrological Band: Oregon Water Resources Department, US Geologic Survey Oregon Water Center, US Army Corps of Engineers, National Weather Service, Oregon Climate Service, Northwest River Forecast Center, Bureau of Reclamation, University System of Oregon.

- Biological Band: Oregon Department of Fish and Wildlife, US Fish and Wildlife, National Oceanic and Atmospheric Administration, Oregon Watershed Enhancement Board/Watershed Councils of Oregon, University System of Oregon.

- Hydraulic / Physical Processes Band: Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Oregon Department of Gems and Mineral Industries, Oregon Department of State Lands, Oregon Department of Forestry, US Army Corps of Engineers, US Geologic Survey Oregon Water Center, Federal Emergency Management Administration,

Oregon Watershed Enhancement Board/Watershed Councils of Oregon, University System of Oregon.

Once each question has been answered Yes ("Y") or No ("N"), move to the column titled, "Availability of Information Score." Here, mark for each question whether the availability of information is sufficient or insufficient. If "Yes" was circled in "Questions to Discern Availability of Information," then circle "Sufficient." If "No" was circled, then circle "Insufficient."

Step 3) Combine Scores of Steps 1 and 2

Next, move to the column in the main matrix titled, "Combined Scores from Steps 1 and 2." Here, combine the "Availability of Information Score" and the "Impact of Project Score" into a single box. For example, if the "Impact of Project Score" was "Minimal," and the "Availability of Information Score" was "Sufficient", then write "Minimal, Sufficient." There will be a total of eight combined scores. A description of the meaning of these combined scores can be found in Table 2 of this narrative.

Step 4) Determine Which Study Methods to Use

Once the combined scores for each question have been identified, the table to the right of the main matrix can be used to identify likely "Resulting SVF Study Methods Used to Develop Flow Prescription" (also see Table 2). These study methods consist of two categories: 1) Data Collection Methods, and 2) Analysis Methods. Each study method category consists of a spectrum from simplest to most complicated method and each method is inclusive of all simpler methods listed before it. The two Resulting SVF Study Methods categories are as follows:

Data Collection Methods (listed in order from simplest to most complicated; each entry is inclusive of all simpler methods):

- *Literature and expert review*: collection of information and data from existing scientific literature and opinions from science subject experts;
- *Field visits (3-30 days)*: collection of additional data; likely used to supplement existing data, though not enough for extensive model development;
- *Field work (1-6 months)*: collection of additional data; likely used to supplement existing data and may be enough to build/calibrate site specific models;
- *Scientific expert workshop (6-12 months)*: a workshop consisting of scientific experts may be used to derive a best professional opinion relating data to streamflow functions and identifying additional data sources;
- *Field investigation/study (1-3 years)*: a scientific study related to the monitoring and/or measurement of a flow function in order to determine the necessary flow prescription.

Analysis (listed in order from simplest to most complicated; each entry is inclusive of all simpler methods):

- *Calculations*: application of basic analytical approaches; gives general understanding of flow function needs;
- *Existing models*: utilization of existing models (e.g. PHABSIM) that may require inputs of field or other data;
- *Scientific expert workshops*: peer-reviewed, group assessment of flow function needs and development of flow prescriptions;
- *Develop and run models*: creation and utilization of a model for a specific site or basin.

With study methods identified, a study plan can be determined and executed at a level acceptable to OWRD. Once complete, a flow prescription can be developed. OWRD, in consultation with the Oregon Department of Fish and Wildlife and affected Tribes, may approve the flow prescription or determine that water cannot be diverted from the channel in a method consistent with the language from SB 839. (Sect. 13(3)).

Resulting "Impact of Project" and "Availability of Information" Scores	**Combined Score Descriptions**	**Resulting SVF Study Methods** (see narrative Step 6 for details)
Sufficient, Minimal	Data are available and impact is limited. Simplest approach; minimal field visits and general analysis	**Data Collection**: Field visit, and/or literature and expert review **Analysis:** Existing models and/or calculations
Insufficient, Minimal	Impact remains small, however data is unavailable. Additional site-based data collection is necessary, though analysis remains general.	**Data Collection:** Field work, field visit, and/or literature and expert review **Analysis:** Develop models, scientific expert workshop, existing models and/or calculations
Sufficient, Significant	Despite sufficient data, significance of impact requires careful review and analysis. Supplementary data collection and detailed analysis.	**Data Collection**: Field work, field visits, and/or literature and expert review **Analysis:** Develop models, scientific expert workshop, existing models and/or calculations
Insufficient, Significant	Data is not available and the project will likely have a large impact on ecosystem functions. Most complicated approach; significant data collection and field work and detailed analysis.	**Data Collection**: Field investigations/study, scientific expert workshop, field work, field visits, and/or literature and expert review **Analysis:** Develop models, scientific expert workshop, existing models and/or calculations

Table 2. This table expands on "Step 4: Determine Which Study Methods to Use to Address Each of the Functional Band Questions," presented in the SB 839 Matrix. The additional column, "Combined Score Descriptions," offers a simple description of the score and the effort required to collect and analyze the relevant scientific data.