KEY FINDINGS

A **Scenarios indicate that water supply needs can be met**; this will require significant financial and cultural investment in multiple water supply tools.

B **Integrating water conservation and marketing activities** will reduce costs and timelines of implementation.

C **It is optimal to combine permanent projects, like piping, with flexible tools that can be increased in dry years, like leasing.**

POTENTIAL FUTURE ACTIONS

1. Use study results to **inform continued implementation of solutions** and a basin water management plan.
2. **Leverage funding** to implement projects and programs.
3. **Pursue integration of water supply tools to achieve efficient water management outcomes.**
4. **Develop or clarify pathways** to move water efficiently between districts, to protect water in the Upper Deschutes River and to reliably generate mitigation for groundwater pumping.
5. **Continue to provide opportunities for collaboration.** This may lead to the most durable solutions.

https://www.deschutesriver.org/what-we-are-doing/upper-deschutes-basin-study/basin-study-documents/

Basin Study materials and additional, detailed technical information relevant to potential future planning efforts are available:

These documents address:

- Documentation of the Basin Study Process
- Hydrology, Modeling and Climate Change Assessments
- Flow-Ecology and Flow-Temperature Assessments
- Evaluation of Water Supply Tools and Scenarios
- Evaluation of Legal and Policy Factors

BASIN STUDY WORK GROUP MEMBERS

Arnold Irrigation District
Avion Water Company
Bend Paddle Trail Alliance
Central Oregon Cities Organization
Central Oregon Flyfishers
Central Oregon Irrigation District
City of Bend
City of La Pine
City of Madras
City of Prineville
City of Redmond
Coalition for the Deschutes
Confederated Tribes of Warm Springs
Crooked River Watershed Council
Deschutes County
Deschutes River Conservancy
Deschutes Soil and Water Conservation District
Deschutes Water Alliance
Lone Pine Irrigation District
Native Reintroduction Network
Natural Resources Conservation Service
North Unit Irrigation District
Ochoco Irrigation District
Oregon Department of Agriculture
Oregon Dept. of Environmental Quality
Oregon Water Resources Department
Portland General Electric
Swalley Irrigation District
Three Sisters Irrigation District
Trout Unlimited
Tumalo Irrigation District
U.S. Bureau of Reclamation
U.S. Fish and Wildlife Service
U.S. Forest Service
Sunriver Anglers
Upper Deschutes Watershed Council
Water for Life
WaterWatch of Oregon

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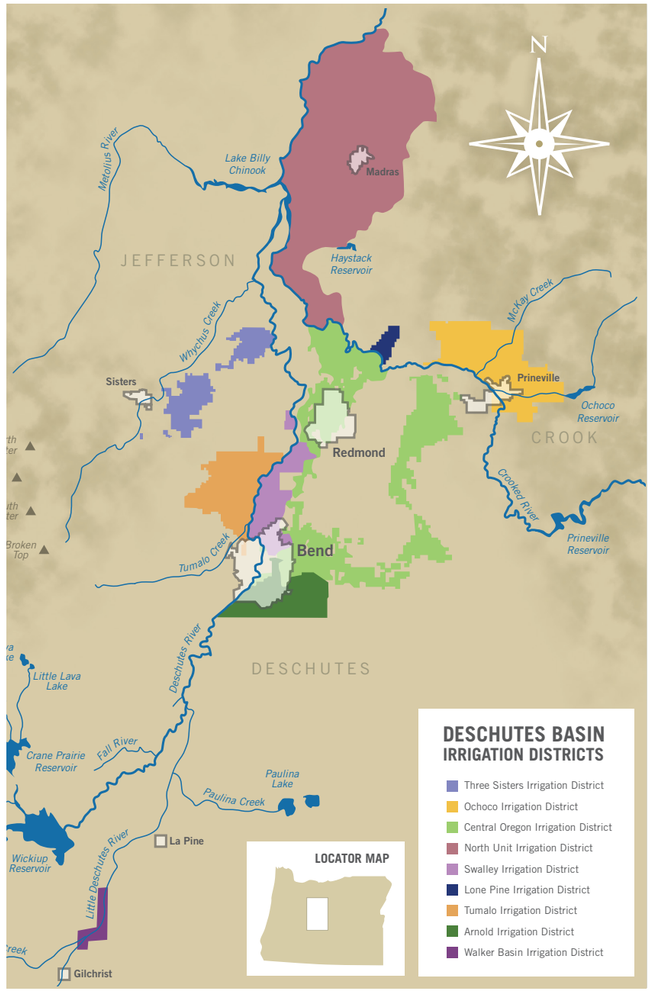
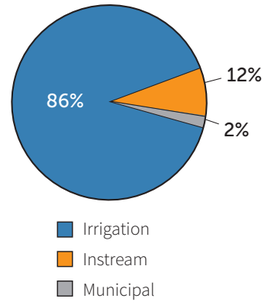
THE UPPER DESCHUTES BASIN STUDY

Water for agriculture, rivers & cities

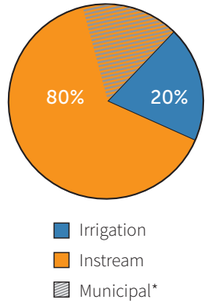


In the Deschutes Basin, we are focused on meeting water needs for rivers and communities today and into the future. Estimated water supply shortages range upwards of 200,000 acre-feet to meet demands for agricultural use and instream flow; the basin's municipal water providers are projected to need up to 16,000 acre-feet of water protected instream for groundwater pumping mitigation. The Study began in May 2015 and was completed in February 2019, at a cost of $1.5 million. Reclamation and the Oregon Water Resources Department each funded 50 percent of the study costs.

BASIN WATER RIGHTS DISTRIBUTION



ESTIMATED SUPPLY SHORTFALLS



These pie charts show the current water rights in the basin, and the estimated projected water supply shortage by interest.

**Municipal demand is overlaid on instream demand because water for mitigating groundwater pumping is dedicated instream.*

The Basin Study looked at options for meeting water supply goals that could help secure and maintain:

- *improved streamflow and water quality for the benefit of fish, wildlife and people*
- *a reliable and affordable water supply to sustain agriculture*
- *a safe, affordable, and high quality water supply for urban communities*

The Water Supply Tools

The Study evaluated a variety of tools that could be used to generate water supply to meet needs. Water conservation infrastructure, market-based solutions, and optimizing storage facilities offer the most significant opportunities. Each tool has unique opportunities and challenges/barriers; combining available tools should lead to the most efficient outcomes. For example, piping canals facilitates the ability to increase on-farm efficiency and water marketing activities.

WATER CONSERVATION INFRASTRUCTURE & IMPROVEMENTS

Water conservation actions such as piping and upgrading farm efficiencies are proven tools for restoring flows in the Deschutes. Significant additional opportunities exist, but project costs and coordination needs will affect what can actually get done.

Actions that increase efficiency of irrigation water delivery and use:

- *Piping district canals*
- *Piping smaller private laterals*
- *On-farm infrastructure upgrades*

MARKET-BASED SOLUTIONS

Market-based approaches using price incentives can provide water supply at a relatively low cost. Larger volumes of water would involve increasing costs; some approaches may face policy, operational, and other challenges.

Tools that use price incentives to change water use behavior:

- *Temporary lease of water rights*
- *Voluntary reduction in water use per acre*
- *Permanent water transfers*

STORAGE

Storage concepts looked at optimizing or relocating existing storage to increase accessibility and flexibility of water.

Storage concepts included:

- *Relocating existing storage in Wickiup Reservoir closer to North Unit Irrigation District (NUID). This would allow for higher winter flows in the Upper Deschutes while improving NUID's access to stored water. Challenges include cost and permitting; years of investigation and studies would be necessary before any particular project could be advanced.*
- *Regaining the storage space lost to sedimentation in Prineville Reservoir through structural modification. This would increase storage capacity for irrigation and fish and wildlife water. Challenges include permitting requirements.*

SUPPLY (AF)	200,000	164,000	40,000
TOTAL COST	$986M	$65M	$200M
AVG $/AF	$4,930	$398*	$5,000

** While market-based approaches look remarkably cost-effective, irrigation district operational constraints currently limit this opportunity in some cases. Pairing these approaches with district-wide measurement and management systems and infrastructure upgrades (piping) can open up opportunities to scale these approaches.*

Water Management Scenarios & Modeling

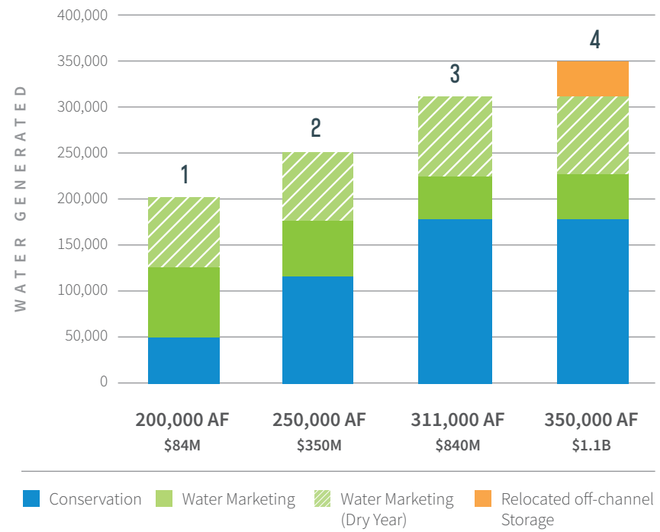
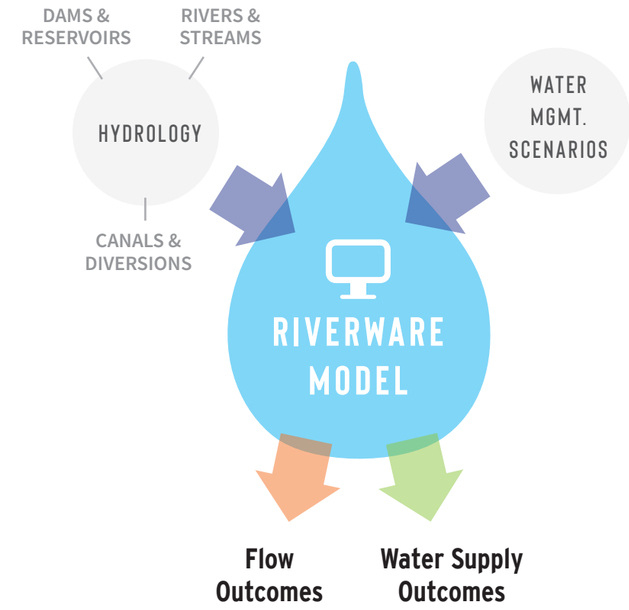
The Basin Study Work Group evaluated four hypothetical water scenarios for the ability to meet water needs, costs and other attributes. The scenarios were run through a hydrologic model, ***RiverWare,*** which enables us to understand how changing water management variables will impact water supplies in the future. To develop each scenario, the water supply tools *(water conservation infrastructure, market-based solutions, and storage)* were combined in different ways to evaluate their ability to fulfill water supply needs, such as irrigation demands and instream flow objectives.

- **Scenarios 1 & 2** were designed to try to meet state instream water rights goals.
- **Scenarios 3 & 4** were designed to try to meet higher flows that may provide additional ecological benefit.
- **All scenarios** were designed to improve water reliability for North Unit Irrigation District, a district that holds junior water rights.
- **All scenarios** included tools that may generate mitigation for groundwater pumping.
- **All scenarios** were designed to meet needs in average years and add additional temporary dry year tools, as needed, in dry years.

Scenario Results

1. All of the scenarios met most instream flow objectives and out of stream demands in most years.
2. These scenarios are reliant on a significant reduction in irrigation demand using the water supply tools. *(~17-49% reduction from average demand)*

WATER MANAGEMENT SCENARIOS



WATER RESOURCES MODELING