



DESCHUTES RIVER BASIN

BUILDING FORMAL COLLABORATIVES TO LEVERAGE FEDERAL FUNDING

Watershed Context

The Deschutes River watershed is located in the high desert of north central Oregon, on the eastern side of the Cascade Mountain range. More than a century ago, federal and state policies encouraged the settlement of central Oregon by facilitating access to land and irrigation water. The water made possible the diverse agricultural sector that shaped the region along with timber harvesting and milling. However, this water development also resulted in the alteration of many rivers and streams that were left with low or altered flows. Over the past quarter century, irrigation districts, governmental entities, the Confederated Tribes of Warm Springs and conservation groups have collaborated to implement projects and transactions that restored significant flows to basin rivers and streams and that aide groundwater users (through establishment of a pioneering groundwater mitigation program). This effort has been centered around the Deschutes River Conservancy, a nonprofit conservation group established in 1996 with the goal of restoring streamflow and water quality in the watershed using proactive, collaborative, and market-based approaches.

Characterization of the Watershed

At 10,400 square miles, the Deschutes River basin is the second largest watershed in Oregon after the Willamette Basin on the opposite side of the Cascade Mountains to the west. The basin is 170 miles long in a north-south direction and 125 miles wide at its longest east-west extension. The mainstem Deschutes collects snowmelt runoff from tributary streams originating in the Cascades as well as from tributaries flowing from the Ochoco Mountains, in particular the Crooked River, and from the Columbia Plateau. Groundwater also significantly contributes to the mainstem Deschutes and some tributary flow – springs originating from the basin’s unique geology historically kept streamflows almost steady throughout the year. The Deschutes Basin narrows to only a few miles at its mouth where it discharges into the Columbia River. (“Deschutes River Basin” 1961)

The high desert plateau and floodplains of the Deschutes Basin are generally privately owned with the headwaters and uplands typically under federal ownership. The US Forest Service holds about 32% of the land in the watershed and the US Bureau of Land Management (BLM) holds another 14%. The reservation of the Confederated Tribes of Warm Springs makes up about 10% of the basin, located in the lower Deschutes. (“Deschutes River Basin” 1961)

Even though the Deschutes is a snowmelt driven system, the geological setting of the upper basin results in significant infiltration of precipitation and large groundwater contributions to river flows that tend to moderate seasonal variations in flows relative to other rivers in the western United States. Despite this moderating influence, variations in weather and other contributions did result in some seasonal and inter-annual variability, with mainstem summer flow ranging from approximately 300 to 800 cubic feet

per second (cfs), depending on hydrologic conditions. (Basin Study Work Group 2019)

The hydrology of both the upper Deschutes and Crooked rivers was substantially altered by the construction of federally authorized storage reservoirs in the early 20th century to hold and supply water for downstream agricultural use managed by multiple irrigation districts. More specifically, in the upper Deschutes, a dam was placed on the existing Crescent Lake and both Crane Prairie and Wickiup reservoirs were constructed. In the Crooked River, Ochoco and Prineville reservoirs were constructed. (Basin Study Work Group 2019)

The Upper Deschutes River basin (upstream of Lake Billy Chinook Reservoir) is the focus of this case study and was also the subject of a Bureau of Reclamation Basin Study completed in 2019 (Figure 1). Through this study, local stakeholders identified water needs for “the three legs of the stool” required to support achievable and sustainable water management in the Upper Deschutes. These three legs are agricultural water uses by eight irrigation districts, instream water needs for ecological objectives that are affected by low and altered streamflows that result from storage of water and diversions for agricultural uses, and municipal and quasi-municipal water users that generally rely on groundwater sources. (Deschutes County, home to both the cities of Bend and Redmond, is one of the fastest growing counties in the United States.) (Basin Study Work Group 2019)

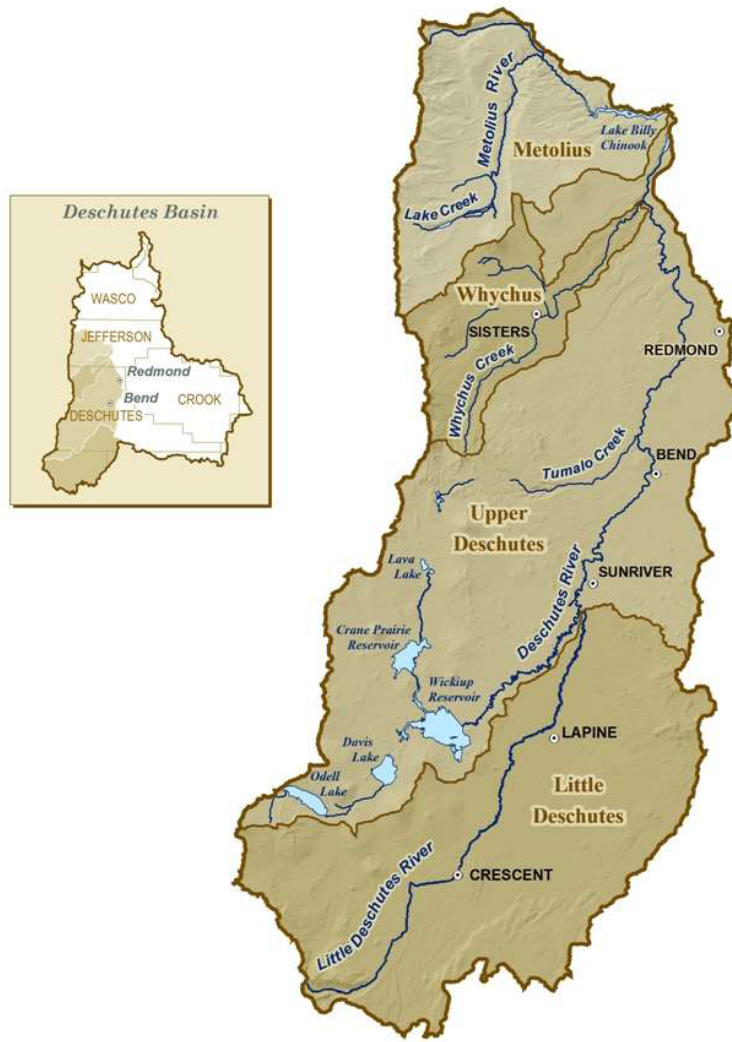


Figure 1. Map of the Upper Deschutes River watershed upstream of Lake Billy Chinook.

The focal species of conservation efforts in the Deschutes Basin include bull trout, redband trout, summer steelhead, Chinook Salmon and the Oregon Spotted Frog. Flow targets for these species and their habitats are prescribed in the Deschutes River Basin Habitat Conservation Plan. In particular, stakeholders are focused on meeting the instream water needs for ecological objectives associated with these species that are affected by low and altered streamflow. With the installation of improved fish passage around the dam complex at Lake Billy Chinook and a robust reintroduction program, anadromous fish species have reestablished historical habitat in the Upper Deschutes. (Basin Study Work Group 2019)

Through the recently completed Basin Study, stakeholders both characterized water supply and demand conditions, as well as defined and described water management options for meeting the three legs of the stool into the future. Three main water management options (and related tools) were evaluated for addressing identified water shortages. These were water conservation, market-based approaches for reallocation of supply and enhanced/relocated storage. As shown in Figure 2, the Basin Study included an assessment of water management option scenarios for meeting all demands, including rough budget estimates. (Basin Study Work Group 2019)

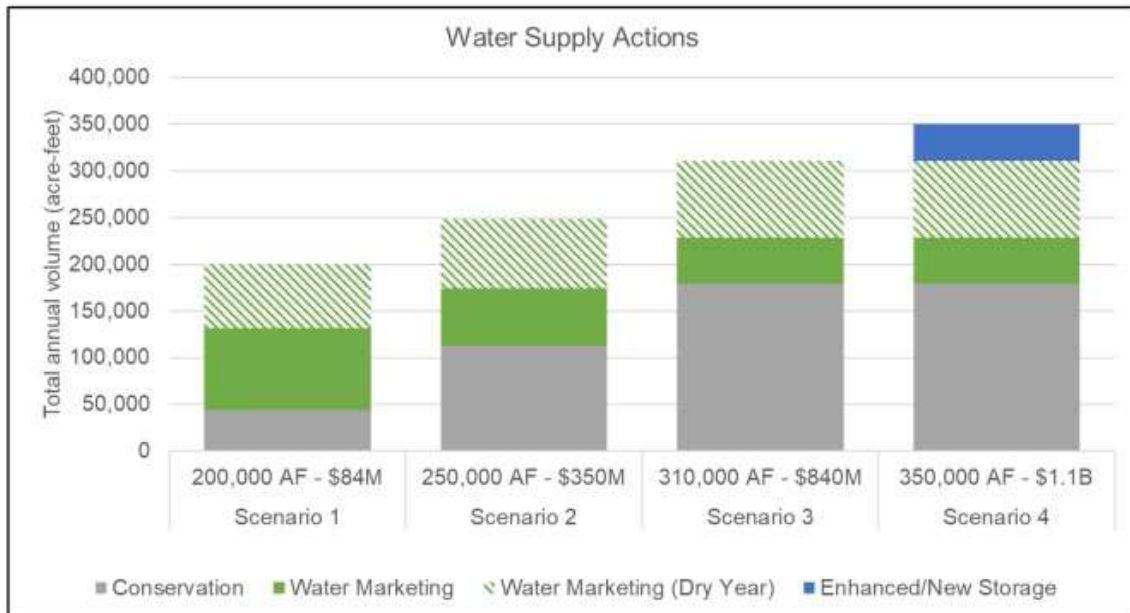


Figure 2. Water Management Scenarios (Volume and Cost). Source: Deschutes Basin Study

Agencies / Entities Interviewed

Deschutes River Conservancy (DRC) is a non-profit organization based in Bend, Oregon. Founded in 1996 as a collaborative, multi-stakeholder organization, the DRC’s Board of Directors makes decisions by consensus and is comprised of key public and private interests including agriculture, local government, state and federal government, hydro-power, tribes, and environment. The DRC is dedicated to restoring streamflow and improving water quality in the Deschutes River Basin. Its board and staff embrace the values of justice, equity, diversity and inclusion, recognizing that a healthy environment and inclusive communities are deeply interconnect. (Deschutes River Conservancy n.d.)

Deschutes Land Trust (DLT)’s mission is to conserve and care for the lands and waters that sustain Central Oregon, so local communities and the natural world can flourish together for generations to come. The land trust works with willing landowners who voluntarily want to conserve their land. The land trust also cares for more than 17,000 acres in Central Oregon for now and into the future.

Coalition of Partners

Collaboration is an important principle of the land and water restoration work that DRC and the DLT do in the Deschutes Basin. They work with broad categories of partners – from private landowners and irrigation districts to municipalities and public agencies.

Local Agricultural Partners Given its focus on flow restoration, DRC's most critical partners are the eight irrigation districts in the Upper Deschutes, including individual patrons, board members and staff. DLT's primary agricultural partners are individual landowners that individually irrigate in the floodplain of tributary streams such as Whychus Creek (a subwatershed of particular interest to the DLT). (Fitzpatrick and Bellis, Natasha 2022)

Tribal Partner As the original peoples of the Deschutes Basin, the Confederated Tribes of the Warm Springs is at the heart of efforts to restore and protect the watershed. The Warm Springs are represented on the boards of directors of both DRC and DLT and are active in restoration efforts both on and off of their reservation. (Fitzpatrick and Bellis, Natasha 2022)

Public Agency Partners DRC and DLT partner with a wide range of federal, state and local agency partners in the Deschutes. At the federal level, the Bureau of Reclamation and Natural Resources Conservation Service work closely with irrigation water managers and individual agricultural producers, investing federal funds into water conservation actions and projects. The Forest Service and BLM are active in uplands restoration on both public lands and adjacent private lands. The US Fish and Wildlife Service and National Marine Fisheries Service have jurisdiction for recovery of listed species in the watershed, including both anadromous and resident fish as well as the Oregon Spotted Frog. Numerous state agencies are active in the Deschutes, including the Oregon Department of Environmental Quality (water quality) and Water Resources Department (water quantity). The Oregon Watershed Enhancement Board invests significant state funds into land and water restoration activities in the watershed. At the local level, the city of Bend and other municipal water providers are active partners of both the DRC and DLT. (Fitzpatrick and Bellis, Natasha 2022)

Other Partners In addition to working broadly with irrigation districts private landowners and a diverse array of public agencies, both DRC and DLT collaborate with a number of other stakeholders with an interest in the basin. One of the most significant of these partners is Portland General Electric (PGE). The private utility holds a co-license to generate hydroelectric power from the Lake Billy Chinook reservoir with the Warm Springs Tribes. PGE invests substantial earnings into restoration efforts as part of a mitigation agreement that is part of the license issued by the Federal Energy Regulatory Commission. Other important partners include both the Crooked River and Upper Deschutes River watershed councils, the Deschutes Soil Water Conservation District (SWCD), conservation groups like Trout Unlimited and WaterWatch of Oregon and several local angler and recreation groups. A number of these entities actively participate in various forums that are building on the Basin Study to develop and implement a place-based plan for future water management and reallocation. (Fitzpatrick and Bellis, Natasha 2022)

Priority Conservation Issues and Efforts

Conservation Issues The primary conservation issue that drives much of the work in the Deschutes River watershed is the population decline of various species due to the storage, alteration and use of the natural hydrograph. This substantial modification of natural flows, combined with the impacts of climate change on snowpack, runoff and aquifer levels, has resulted in water shortages inadequate to meet the current and future needs of agriculture, municipalities or important species. Under the Basin Study, participating stakeholders determined that overall median annual water supply shortages totaled 135,000 acre-feet, increasing to 350,000 acre-feet in dry years. When higher flows for the Oregon Spotted

Frog are included, shortages are more in the range of 200,000 to 500,00 acre-feet. Because most water rights in the Deschutes are for irrigation, the shortage is most acute for instream flow needs as shown in Figure 3. Nonetheless, water supply is inadequate to meet the needs of junior priority irrigation rights, many of which are held by the most productive agricultural lands located in Jefferson County, Oregon adjacent to Lake Billy Chinook. Due to a groundwater mitigation plan in place to protect flows in the lower Deschutes River, Central Oregon municipalities cannot obtain new groundwater rights to increase supply without purchasing a mitigation credit that is generated through restoration of instream flows in the Upper Deschutes Basin. Thus, a portion of the supply needed by important aquatic species will also enable municipalities to satisfy their future demand.

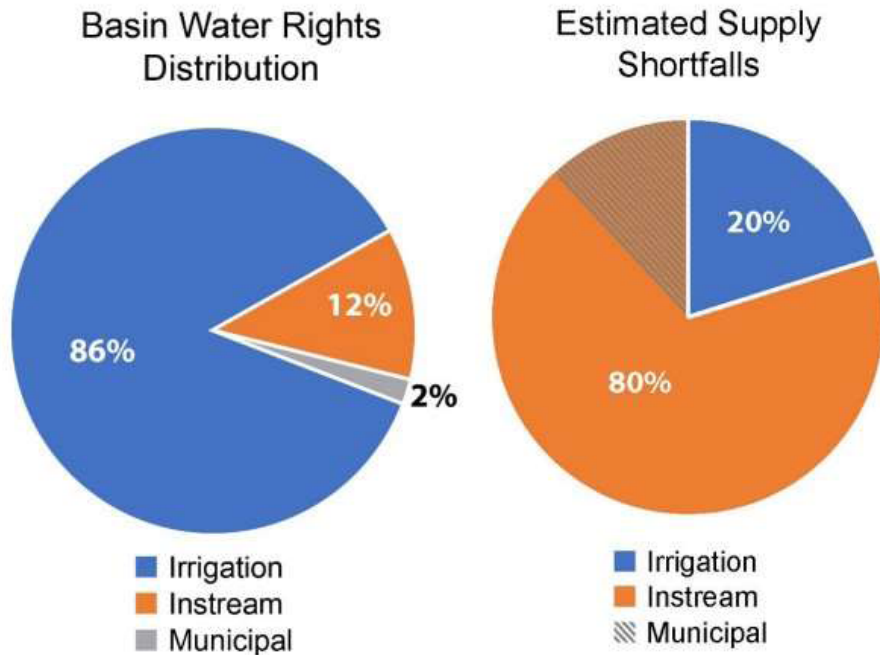


Figure 3. Water Rights Distribution and Estimated Supply Shortfalls in Deschutes Basin. Source: Deschutes Basin Study

The DLT works to address conservation needs indirectly related to the issue of inadequate streamflow. From their perspective, the conservation issues that drive much of our work is habitat alteration associated with channelization (usually tied to ag production) and habitat loss due to development. In particular, they are acquiring and restoring riparian and upland habitats that are critical for improving the degraded hydrograph, particularly given the impact of climate change on snowpack and runoff. They are also focused on conserving and connecting large landscapes to protect topographically diverse ranges of habitats to ensure species survival and ability to migrate in a climate-changed future. The local watershed councils work closely with the two federal land holding agencies to support implementation of restoration projects on public lands.

Strategic Approach In addition to quantifying current and future water supply and demand, the basin study working group (BSWG) was also tasked with developing analyzing potential strategies that could address identified imbalances and evaluate potential water management tools, and combination of tools, in terms of effectiveness, cost, environmental impact, risk, stakeholder response, and other factors. The BSWG also defined broad goals for water management strategies in the basin and arrived at the so-called “three legs of the stool”:

- Increase streamflows and improved water quality for the benefit of fish, wildlife, and people;

- A reliable and affordable water supply to sustain agriculture; and
- A safe, affordable and high-quality water supply for municipal and quasi-municipal water users.

Importantly, the BSWG endorsed the concept that all three of these broad goals should be valued and pursued in parallel. (Basin Study Work Group 2019) The BSWG evaluated water conservation options, market-based incentives, options involving new or enhanced water storage, and other more focused approaches when proposing various strategic options for meeting future water demands through reallocation and other mechanisms. Water conservation options included piping canals, piping privately-owned irrigation laterals, and upgrading on-farm infrastructure. All are proven as effective tools for saving water in the Deschutes, though significant project costs and coordination needs affects what projects can actually be implemented and when. The BSWG estimated that 200,000 acre-feet could be saved through canal piping (at \$5,000-6,000/acre-foot), 35,000 acre-feet from private lateral piping (at \$1,000/acre-foot), and 64,000 acre-feet through on-farm improvements (at \$9,700/acre-foot). (Basin Study Work Group 2019)

Market-based water management options involve the use of price incentives to change water use behavior through actions such as leasing and water right transfers. The effectiveness of this type of approach for restoring flows in the Middle Deschutes River below Bend has been demonstrated by transfers that have resulted in 50 cfs permanently instream. Market-based options include temporary leasing and the transfer of water rights by fallowing lands, as well as voluntary reductions in the volume of water used per acre. These tools are tested approaches and are available for use in the near-term and at relatively low costs (ranging from \$91-\$910/acre-foot). It was estimated that an additional 160,000 acre-feet annually could be reallocated at an average cost of \$400/acre-foot. (Basin Study Work Group 2019)

The BSWG also evaluated potential approaches for managing water storage for existing reservoirs in the Upper Deschutes and the possibility of relocating or enhancing storage facilities to help address water supply shortages. The primary objective of these storage options was to increase operational flexibility that could benefit instream flow conditions. While this strategy was not ruled out, it is of secondary priority due to relative cost and complexity of implementing. BSWG prioritized the most viable storage options as saving up to 40,000 acre-feet at an average cost of \$5,000/acre-foot. (Basin Study Work Group 2019)

Project Types and Scale Despite being the most expensive strategy, the eight irrigation districts have prioritized canal piping to both improve their water management abilities and reallocate water savings to help meet both instream and junior priority agricultural water demands. While the DRC has been supporting irrigation district piping projects for decades, these projects have been accelerated through a partnership with the Farmers Conservation Alliance (FCA), a nonprofit organization based in Hood River, Oregon. FCA works with irrigation districts throughout the west to modernize water delivery systems in pursuit of water management outcomes that benefit both agriculture and the environment. FCA launched its irrigation modernization program in 2015, taking a comprehensive approach to modernizing irrigation conveyance systems, from developing the piping strategy, getting it funded, and helping implement the project. Canal piping projects are authorized through approved watershed plans that are required to receive funding through the NRCS Watershed Protection and Flood Prevention Program (PL-566). (FCA writes these detailed plans for its partner irrigation districts.) To date, the participating districts have invested over \$50M in canal piping projects that have yielded over 50 cfs in water savings for reallocation. These numbers grow if all the past projects pre-FCA are included as well. The districts anticipate expending upwards of \$400M to pipe over 500,000 linear feet of open canal.

Concurrently, the DRC has been working with the largest irrigation district in the Deschutes Basin, the Central Oregon Irrigation District (COID), to demonstrate the efficacy of building off of the large canal piping projects to tie in private lateral piping and on-farm water application efficiency projects that save more water. DRC and COID also tested a voluntary market-based water market in 2022 that builds on the

long-term annual water leasing program for patrons seeking to put their water rights to another beneficial use in lieu of active irrigation. DRC's priority is to work with the irrigation districts to significantly expand use of these tools given that they are much more cost-effective than piping and will be easier to manage as the canals become pressurized.

Funding

Stakeholders in the Deschutes Basin, led by the DRC, have been at the forefront of securing a broad range of both state and federal public funding sources, as well private funding from major donors and foundations, in support of their land and water restoration efforts (Table 1).

Program	Federal Source(s)	State Source(s)	Other Source(s) - Private, Foundation, Local	Example Project	Funding Received
Water Conservation	NRCS - RCPP, EQIP; American Rescue Plan Act	OWEB	Portland General Electric - Pelton Round Butte Fund	On-Farm Efficiency Water Conservation Investment project	\$1,450,000
Irrigation Modernization	NRCS - PL-566, RCPP	n/a	n/a	Smith Rock Irrigation Modernization and Conservation Project	\$2,600,000
Water Marketing	BPA - Columbia Basin Water Transactions Program; BOR - WaterSMART: Water Marketing Strategy Grants	OWEB	Portland General Electric - Pelton Round Butte Fund	Deschutes Basin Streamflow Restoration (CBWTP)	\$249,828
Basin Study	BOR - WaterSMART: Basin Studies	OWRD	n/a	Upper Deschutes Basin Study	\$1,500,000
Water Quality Improvement	US EPA - Clean Water State Revolving Fund	ODEQ (through EPA Section 9), OWEB	Portland General Electric - Pelton Round Butte Fund, Patagonia	Lower Deschutes Water Quality Study	\$2,650,000 (total from Pelton Fund, for 57 projects)
Wildfire Prevention & Restoration	USFS -Collaborative Forest Landscape Restoration Program	n/a	n/a	Deschutes Collaborative Forest Project	\$673,000

Table 1. DRC funding source summary with example projects and funding amounts.

Federal Funding Sources In its early years, DRC was authorized to receive direct congressional appropriations through the Bureau of Reclamation. The authority expired after the first decade or so but was recently taken back up by DRC. Oregon Senator Jeff Merkley introduced legislation in February of 2022 that would reauthorize DRC to directly receive congressional appropriations. Despite the lack of this authority in recent years, DRC and others have secured substantial federal funding for their efforts.

DRC and partners have received funding from Bureau of Reclamation, USFS, USFWS, NRCS and Bonneville Power Administration (through NFWF). Reclamation money has primarily come through a variety of WaterSMART programs, including Water and Energy Efficiency Grants, Water Marketing Strategy Grants, Basin Studies, Drought Resiliency and Cooperative Watershed Management Program. Reclamation has also provided substantial in-kind services to the Deschutes through technical support and assistance. These grants have allowed Deschutes stakeholders to both advance planning and implement projects. DRC also plans to submit a proposal for another grant through Reclamation's new Environmental Water Resources Projects program. USFWA funding has been awarded to the Upper Deschutes Watershed Council for restoration project implementation.

Substantial NRCS funding has been invested into irrigation district canal piping through the PL 566 program, with eligibility requirements satisfied by the Farmers Conservation Alliance. NRCS has also awarded a Regional Conservation Partnership Program in the Deschutes to support on-farm irrigation improvements to tie into canal and private lateral piping projects. NRCS has provided substantial Environmental Quality Incentive Program payments through the Deschutes SWCD to landowners to improve on-farm irrigation practices. The US Forest Service, another Department of Agriculture agency,

has also provided support to the Upper Deschutes Watershed Council for restoration project implementation. Increasingly, US Forest Service funding for fire prevention and restoration practices on both public and private lands has been made available through the Deschutes Forest Stewardship Collaborative.

For the past two-decades, DRC has received significant annual programmatic funding support from the Bonneville Power Administration (Department of Energy) through grants made by the National Fish and Wildlife Foundation under the Columbia Basin Water Transactions Program. DRC has also been eligible to apply for funding to support landowner payments for water transactions and has successfully secured several million dollars for this purpose over the past 20 years.

State Funding Sources The Oregon Water Resources Department (OWRD) provided \$750,000 to match Reclamation's investment of an equal amount of funding to support development of the basin study. OWRD has supported other planning processes and both external and internal capacity to generate a place-based water management plan that is currently under development in the Deschutes Basin. Basin stakeholders have received some funding from the Oregon Department of Environmental Quality (through EPA's section 9 program) to fund water quality improvement projects in the Crooked River Basin and see this funding source as ripe for expanding for use throughout the Upper Deschutes. The Oregon Watershed Enhancement Board has invested substantial state funding into habitat, water quality and water quantity projects in the Deschutes Basin over the past 25 years, both through a focused investment program in the Deschutes and for directly for individual projects and water transactions.

Other Funding Sources - Private, Local, Foundation Being at the center of a rapidly growing community that is surrounded by natural splendor has allowed DRC and DLT to tap into funding from local businesses, private donors and regional foundations. Part of their approach to fundraising is to demonstrate to funders the coordinated approach to watershed restoration being undertaken by many diverse stakeholders in a coordinated manner. They also present private funders with the opportunity to leverage substantial amounts of public funds.

Challenges, Opportunities, and Lessons Learned

Water management issues in the Deschutes Basin are no different than most other western water watersheds; they are complicated, sometimes contentious, and always of great importance to many community members and entities. The DRC demonstrates the impact that a well-established and respected organization, at the center of water management in a basin for a long period, can have on progress and impact. Most significantly, DRC and its partners have shown that a commitment to community-based assessment and planning can illuminate a clear direction forward and attract substantial public and private funding for project development and implementation.

Like other locally based conservation organizations, DRC started slow upon its founding in 1996. Given that it was a multi-stakeholder collaborative, early leaders took the time to build a common vision for future restoration of the watershed. They also, started slow on project development and implementation, deferring to other entities to do the on-the-ground work while it established a workable mission and role in the watershed. Beginning in the late-1990s, DRC began developing flow restoration projects and transactions with individual ranchers as well as irrigation districts in the basin. These efforts accelerated after the creation of the CBWTP brought substantial funding to DRC starting in 2002, resulting in progress by select irrigation districts to begin piping their open canals in order to save water that could be reallocated to critical reaches of the Deschutes River and its tributaries.

However, a result of increased irrigation district capacity to pursue funding to implement high-profile and expensive canal piping projects was a balkanization of flow restoration efforts in the Deschutes, with the DRC losing its center role. This also meant the waning of a coordinated vision for how best to achieve

balanced water management in the basin. Fortunately, a Basin Study Work Group starting in 2014, which was accelerated by Reclamation and OWRD funding for a water conservation assessment, brought all stakeholders back to the table to systematically assess supply and demand needs and develop strategies for balancing future allocations. This collective step forward means that DRC and other stakeholders are more strategically pursuing funding for implementation of a common vision rather than simply chasing funds for individual projects. Other western watersheds would benefit from taking such a coordinated and strategic approach, recognizing that it takes time and trust that can best be generated by having an entity at the center of the action for a consistent and long-period of time.

References

Basin Study Work Group. 2019. "DRAFT FINAL Upper Deschutes River Basin Study." Bureau of Reclamation. <https://www.deschutesriver.org/PROVISIONAL%20Draft%20Final%20Report%20U%20Deschutes%20Basin%20Study%2020190701.pdf>.

"Deschutes River Basin." 1961. State Water Resources Board.

Deschutes River Conservancy. n.d. "Middle Deschutes River." Deschutes River Conservancy. Accessed January 11, 2021. <https://www.deschutesriver.org/what-we-are-doing/focus-reaches/middle-deschutes/>.

Fitzpatrick, Kate, and Bellis, Natasha. 2022. Personal Communications, Deschutes River Conservancy and Deschutes Land Trust.

