

OWEB Focused Investment Partnership

Proposed Priority Focusing on Salmon and Steelhead Reintroduction in the Deschutes River basin

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1. Proposed Priority Description

The proposed priority is the restoration needed to support spawning, rearing and migration for the reintroduced anadromous fish upstream of the Pelton Round Butte dams on the Deschutes River. Specifically, this includes the restoration of streamflow, stream, wetland and riparian habitat, passage/screening, and other activities needed for successful reintroduction of Chinook salmon, sockeye salmon and steelhead trout into 226 miles of historical anadromous fish habitat in the Metolius River, Whychus Creek and Lower Crooked River.¹ These species were extirpated from these rivers in the 1960s with the construction of the Pelton Round Butte dam complex on the Deschutes River but, with the recent construction of passage facilities at these dams, these species are currently being reintroduced to their historic habitat. On-the-ground reintroduction efforts began in spring 2007 with the release of 500,000+ fry into these watersheds and, since this time, has continued with regular outplanting of fish with the intent of building self sustaining runs over time.

The anticipated ecological outcomes operate at two levels:

First, on-the-ground restoration is focused on restoring the physical, biological and chemical conditions necessary for successful spawning, rearing and migration of reintroduced anadromous fish. When successful, this restoration effort will result in watershed conditions, including water quality, streamflow, habitat conditions, migratory corridors, access and other factors, sufficient to support successful spawning, rearing and migration of self-sustaining populations of the three target species. Specific indicators of the physical, biological and chemical conditions (e.g., water temperature, area of available rearing habitat, miles of accessible spawning habitat, etc.) can be monitored over time to evaluate when specific targets (e.g., 18°C maximum summer temperature, etc.) have been achieved.

¹ The Lower Crooked River refers to the reaches of the Crooked River and Ochoco Creek below Bowman and Ochoco dams, respectively, as well as the primary tributaries in this portion of the watershed (e.g., McKay Creek).

The second level of outcomes is focused on the fish populations themselves, which function as a targeted biological response to the restored physical conditions described above as well as other conditions outside of the reintroduction area (e.g., Columbia River, Pacific Ocean, etc). For this outcome, the measure of success will focus on numerical targets for critical life stages (e.g., number of spawning adults in each watershed, number of smolts from each watershed, etc.).

This priority area's geographic focus is 226 miles of rivers and streams that historically supported anadromous fish populations in the Metolius River, Whychus Creek and Lower Crooked River watersheds (see attached map). This area includes portions of Jefferson, Crook and Deschutes Counties, including the primary communities of Prineville, Sisters and Camp Sherman.

2. Significance to the State

Over the past decade, the reintroduction of federally-listed Threatened anadromous fish in the Deschutes basin has garnered regional and national attention because it includes opportunities for significant, large-scale ecological restoration with clearly defined, accountable outcomes. When successful, the restoration of salmon and steelhead runs, including Suttle Lake's sockeye run that is one of only two sockeye runs in Oregon, will be a major achievement for Pacific Northwest fisheries and continue to highlight Oregon as a leader in effective watershed scale restoration.

The effort also highlights innovative collaborations between non-profits, irrigators, agencies, funders and other groups, and illustrates what can be accomplished when holistic, integrated strategies are in place. Although the reintroduction is ongoing, the work thus far has been very successful, with major accomplishments in streamflow restoration, habitat restoration and large-scale land conservation. The reintroduction in the Deschutes is an emerging story of success and collaboration, with lessons learned and collaborative models that can be applied throughout the arid west where the traditional conflict-based approaches to watershed management have repeatedly proven to be unsuccessful and costly.

Over the long term, the successes in the Deschutes Basin, both in collaborative models as well as ecological outcomes, will provide an opportunity to declare success in watershed restoration on a grand scale and to celebrate the community-based restoration model so fundamental to Oregon's vision for collaborative restoration.

3. Limiting Factors

Primary factors that limit successful spawning, rearing and migration for salmon and steelhead in the Metolius River, Whychus Creek and Crooked River are:

Streamflow

Many of the rivers and streams in the Deschutes basin are over-appropriated, meaning that more water rights have been granted than can be served by the available water. The result is that many critical reaches, including Whychus Creek, McKay Creek and the Crooked River, are subject to highly modified flow conditions during certain times of the year. In Whychus Creek, for example, the creek used to run completely dry during the peak of the irrigation season when all of the water was being diverted from the creek. The result of this kind of over-appropriation was clear: where there is not sufficient water to support spawning, rearing and/or migration, successful reintroduction is not possible. Inadequate flows are linked to elevated stream temperatures, reductions in dissolved oxygen, limited opportunities for the establishment of healthy riparian plant communities, reduced access to off-channel habitat, and diminished spawning habitat during the spring and early summer.

While significant progress has been made over the past 10 years and restoration projects mean that Whychus Creek no longer runs dry, there is much work yet to be done. Instream flow targets have not yet been met in most rivers and streams, and continued efforts to permanently restore streamflow are critically important if reintroduction is expected to be successful.

Water Quality

Most of Whychus Creek and the Crooked River systems do not currently meet Oregon Department of Environmental Quality's water quality standards designed to protect resident and anadromous fish. While there are problems with several water quality parameters (e.g., bacteria, pH, dissolved oxygen, etc.), the most persistent issue of concern is stream temperature because many of the important spawning, rearing and migration reaches do not meet state temperature standards at critical time periods through the season. High summer water temperatures have been studied extensively and these conditions are typically caused by significant reductions in streamflow; when streamflows are reduced during irrigation season, the remaining instream water heats quickly. In some reaches, the temperatures exceed the 24°C lethal temperature for some fish species.

Where streamflow restoration efforts have been successful over the past decade, water quality conditions have steadily improved. However, more progress is needed before critical stream reaches regularly meet state water quality standards.

Fish Passage Barriers & Unscreened Diversions

Unscreened or impassable irrigation diversions pose significant threats to successful reintroduction because they block up and downstream migration or threaten to trap fish in irrigation canals. Passage and screening projects have been a top priority for restoration partners over the past decade and significant progress has been made. More than a dozen remaining barriers and unscreened diversions in Lake Creek (a

tributary to the Metolius River important for Chinook and sockeye salmon), Whychus Creek, McKay Creek and the Crooked River need to be addressed before reintroduced fish can reach all 226 miles of habitat in the reintroduction area. One barrier in particular, the Opal Springs dam on the Crooked River, has a total project cost of nearly \$8 million for fish passage but is critical for reintroduction because it currently blocks access to the 105 miles of reintroduction area in the Crooked River system.

Stream and Floodplain Habitat

More than 150 years of channel manipulation throughout Whychus Creek and the Crooked River has left miles of stream channelized and disconnected from the floodplain, leading to the loss of wetland, riparian areas and instream fish habitat. In Whychus Creek alone, nearly 50% of the total stream length was channelized in the 1960's, resulting in the loss of nearly all of the key floodplain habitat in the lower portion of the watershed. Restoration efforts over the past five years have been successful at restoring critical side channel, wetland, and floodplain habitat at key sites along the creek (e.g., Camp Polk Meadow Preserve) but more than eight miles of additional habitat needs to be restored before Whychus Creek reaches its full potential for spawning and rearing.

Stream and floodplain function is critical because the long-term success of the reintroduction program will depend in large part upon the ability of Whychus Creek, the Metolius River and the Crooked River to support spawning and rearing of salmon and steelhead. Quality spawning and rearing habitat requires healthy stream function, including abundant pools, recruitment and maintenance of appropriate spawning gravels, and sufficient off-channel habitat which adds complexity currently missing.

Relevant documents that discuss the reintroduction, limiting factors and restoration needs include:

- Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan (National Marine Fisheries Service 2008)
- Reintroduction and Conservation Plan for Anadromous Fish in the Upper Deschutes River Sub-basin, Oregon. Edition 1: Spring Chinook Salmon and Summer Steelhead (Oregon Department of Fish and Wildlife and Confederated Tribes of the Warm Springs Reservation 2008)
- Deschutes Subbasin Plan (Northwest Power and Conservation Council 2004)

4. Threats and Benefits

There are a variety of threats that contribute to the limiting factors described above, including:

Dams and diversions

Although significant progress has been made over the past decade, there are numerous dams and diversions in these watersheds that hinder migration, have unscreened intakes that entrain fish and divert streamflow. Continued diversion of summer streamflow is a challenge that continues to limit the ecological health of some of the important stream reaches in Whychus Creek and the Crooked River, especially when low summer flow results in high water temperatures that may limit migration or reach lethal levels during the summer.

Climate change

Given the importance of instream flow and water demands that frequently exceed supply, changes to the hydrograph resulting from climate change are significant threats. While difficult to directly address on a local level, projects and programs that add resiliency to the system over time (e.g., floodplain storage, wetland habitat, etc.) may serve to buffer against the most severe of possible impacts.

Development

Many of the low gradient valleys important for floodplain restoration are also prime areas for development. In Whychus Creek as well as portions of the Crooked River, development pressure in these areas remains a threat because it limits restoration potential. In some portions of these watersheds, effective stream restoration is not possible because homes have been built in the floodplain right along the banks of the river. Effective restoration will require land conservation efforts that protect floodplains for their valuable ecological functions.

Resistance to change

Another key challenge is the general resistance to change, in particular as it relates to water use and irrigation diversions. While each situation is different, there have been many cases over the past five years where the installation of a technically simple and relatively inexpensive fish screen has required three to four years of dialogue with local water users to build trust, share information and ultimately reach a point where the user becomes comfortable that the implementation of a project. This kind of social barrier, while common in the arid west, prevents a threat to restoration progress.

If the threats described above are not addressed, the reintroduction of anadromous fish in the Deschutes basin will not be successful because the existing limiting factors will continue

to prevent the establishment of viable populations in the Metolius River, Whychus Creek and Crooked River. While some of the threats exist along a continuum and limit the amount of available habitat or the quality of available habitat, there are others that are more distinct and must be addressed in their entirety (e.g., the continued operation of a dam that blocks 100% of fish passage).

Collaborative watershed restoration has become a core part of the natural resources management culture in Central Oregon as diverse groups continue to solve common problems. This approach has helped avoid traditional “fish vs. farmers” conflicts common in the arid west and created a new standard for successful collaboration. If concerted efforts to support reintroduction do not maintain momentum, some of the existing collaborations could break down because Endangered Species Act regulations will remain but the resources, capacity and willingness to develop creative solutions may wane if regulatory conflicts emerge.

Over the past six years, a consortium of local partners have been working with OWEB’s Special Investment Program, resulting in significant progress being made on many of the limiting factors and threats in these watersheds. Over this time,

- 12 unscreened diversions have been addressed (with 55 remaining);
- 12 fish passage barriers have been addressed (with eight remaining);
- 54 cfs has been permanently protected instream (with 73 remaining);
- 2,210 acres of high quality habitat has been permanently preserved (with 1,000 remaining)
- 5½ miles of high quality spawning and rearing habitat has been restored (with 14 remaining)

The tremendous progress over the past decade has been possible because the local partnerships and relationships are strong, local communities are working toward solutions, and investments from core funders have been significant.

Local partners have developed cost estimates for the remaining restoration worked needed to achieve the desired outcomes described in Section 1 of this proposal. The estimated total cost to fix all of the unscreened/impassable diversions, protect and restore the necessary floodplain habitat, and restore the needed instream flow through the entire 226-mile reintroduction area is approximately \$36 million. Although this is a very significant amount of funding, it is feasible if spread out over a 20-year period.

5. Opportunities

Over the past decade, local partners have developed a suite of output and outcome indicators that can be tracked over time to measure success. Short-term (six-year) output indicators include measures of specific restoration action output, including:

- Amount of instream flow restored
- Miles of channelized stream / side channels restored
- Acres of floodplain protected and restored
- Number of miles of habitat opened by removing fish passage barriers
- Percentage of diverted flow through unscreened vs. screened diversions

Long-term (20-year) outcome indicators focus on evaluating the ecological integrity of the systems as well as the status of the restored fish. These include:

- Water quality that meets state criteria or other site-specific criteria
- Macroinvertebrate and fish habitat indices/models reflect the role of temperature and sediment indicate “good” habitat through the reintroduction reaches (e.g., Predator model, HabRate model)
- Fish population targets of specific life stages meet established reintroduction benchmarks

Meaningful changes to the quality, quantity and accessibility of habitat for reintroduced fish will require the following types of conservation and restoration actions:

- Land conservation through conservation easements and/or fee title acquisition;
- Irrigation diversion retrofits or removal to allow fish passage and to include fish screening;
- Streamflow restoration through water leasing, acquisition and conservation; and
- Stream channel and floodplain restoration.

Given that the reintroduction efforts are focused in three distinct watersheds, it would be possible to divide the restoration efforts into discrete geographic areas for the purposes of a long-term phased implementation approach. While the restoration needs are similar in concept across the three watersheds (e.g., fish passage, streamflow restoration, etc.), each watershed has its own unique ecological/hydrological conditions, specific restoration approaches, political and social context, and associated costs and timeframes for restoration.

There is already a very strong network of local partners working to support anadromous fish reintroduction in Central Oregon. These include the Deschutes Partnership (a group of implementation partners comprised of the Upper Deschutes Watershed Council, Crooked River Watershed Council, Deschutes Land Trust, and Deschutes River Conservancy working together since 2006) as well as many other partners engaged in restoration efforts. Some of these other partners include ODFW, USFS, USFWS, ODEQ, OWRD and local irrigation districts.

The reintroduction of anadromous fish has proven to be a catalytic event, leading to the emergence of new partnerships, the completion of many restoration projects and new funding for restoration efforts. This has occurred largely because there is broad community support for reintroduction and local communities, municipalities, agencies and NGOs have mobilized to support successful reintroduction. This momentum has led to an accelerated pace and scale of restoration over the past five years.

The reintroduction of anadromous fish has proven to be an engaging and exciting issue for members of the public because it captures their imagination and represents a compelling opportunity to participate in very tangible restoration in their own communities. This engagement presents important educational opportunities because people generally want to be involved in the restoration effort, and therefore, want to learn about how they can help through their own stewardship efforts. This has created, and will continue to create in the future, many important opportunities for education and outreach across diverse populations throughout the Metolius River, Whychus Creek and Crooked River watersheds.

When the reintroduction of fish listed under the Endangered Species Act first began in 2007, there were widespread concerns that newly arriving Threatened species would bring conflict and division in communities. In fact, the opposite has occurred as diverse interest groups have come together to support reintroduction and protect Threatened fish from harm while simultaneously supporting existing agricultural and municipal needs. Thus, the regulatory protections in place have helped catalyze creative solutions, attract financial resources, and create a common direction for collaborative efforts. Moving into the future, it is expected that the collaboration between regulators and various stakeholders will continue bring about positive change.

There are already many local, state, regional and national resources being invested in supporting reintroduction. These include a variety of different sources, such as:

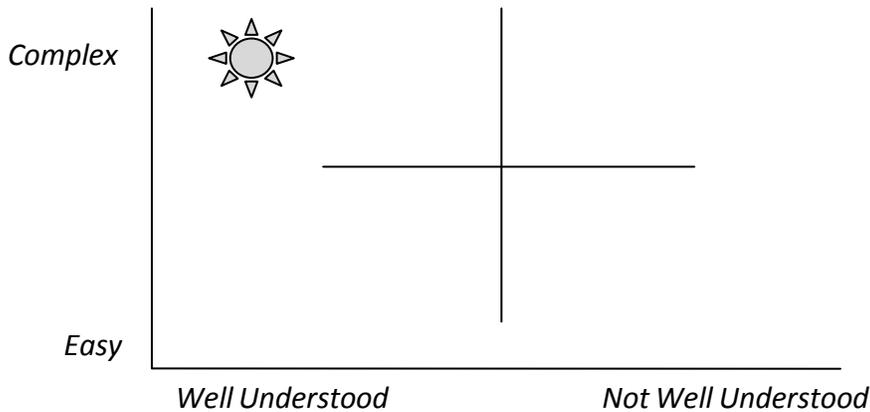
- Tribes (e.g., Confederated Tribes of the Warm Springs Reservation)
- Funders (e.g., OWEB, Pelton Fund, National Fish and Wildlife Foundation, Bonneville Environmental Foundation, etc.)
- Agencies (e.g., Oregon Department of Fish and Wildlife, US Fish and Wildlife Services, US Forest Service, etc.)
- Non-profit organizations (e.g., Watershed Councils, Deschutes River Conservancy, Deschutes Land Trust, etc.)
- Water users (e.g., irrigation districts, municipalities, etc.)

The momentum already in place among these groups is significant and has already been leverage to accomplish major restoration outcomes. In the future, this momentum is expected to continue to grow as successes bring new energy, opportunity and involvement.

There are a variety of economic benefits associated with successful reintroduction. Recreation and tourism as well as in-migration motivated by quality of life are major drivers of the Central Oregon economy. The achievement of ecological objectives in this priority area will create new recreational opportunities and enhance the area’s profile and reputation as an excellent place to live. This trend will support sustained economic growth and vitality. Additionally, proactive interventions in the near term to re-establish viable fish populations may assist in maintaining the agricultural sector in the region relative to Endangered Species Act implications.

6. Matrix

While some aspects of the reintroduction efforts are not well understood (e.g., why returning fish may favor one tributary over another), the scope, scale and type of restoration needed to support spawning, rearing and migration in the Metolius River, Whychus Creek and Crooked River is well understood. Specifically, there is general consensus on the limiting factors and needed restoration as described in Section XX above. The work needed to make these improvement – i.e., the land deals, water rights negotiations, restoration designs, etc. – are individually very complex because they operate within complex regulatory, political, social, cultural, and economic environments that make win-win voluntary solutions very nuanced and delicate.



7. Supporting Partners

Many local, state, tribal and federal agencies and organizations are engaged in the effort to successfully reintroduce salmon and steelhead in the Deschutes basin:

Non-Profit / Districts

- Upper Deschutes Watershed Council (UDWC)
- Crooked River Watershed Council (CRWC)
- Deschutes Land Trust (DLT)
- Deschutes River Conservancy (DRC)

Trout Unlimited (TU)

Soil and Water Conservation Districts (SWCDs)

Irrigation Districts

Federal / Tribal

Bureau of Land Management (BLM)

Confederated Tribes of the Warm Springs Reservation (CTWS)

National Marine Fisheries Service (NMFS)

US Forest Service (USFS)

US Fish and Wildlife Service (USFWS)

State

Oregon Department of Fish and Wildlife (ODFW)

Oregon Department of Environmental Quality (ODEQ)

Oregon Water Resources Department (OWRD)

Oregon Watershed Enhancement Board (OWEB)

Corporate / Private / Utility

Portland General Electric (PGE)

Deschutes Valley Water District (DVWD)

