FISH HABITAT RESTORATION IN THE UPPER DESCHUTES BASIN

STRATEGIC ACTION PLAN
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1. INTRODUCTION

In the spring of 2007, the historic reintroduction of anadromous fish in the Deschutes basin began with the release of 250,000 steelhead trout fry in Whychus Creek. These young fish, barely two inches in length, were the first steelhead trout to swim in Whychus Creek for more than 50 years since dams built on the Deschutes River blocked historic migrations. Soon thereafter, reintroduction efforts expanded to include Chinook salmon and, ultimately, to focus on bringing these species back to a total of 226 miles of historically anadromous habitat in the Metolius River, Whychus Creek and Crooked River watersheds. Hundreds of thousands of young fish have been released each year since 2007, marking the early phases of an ambitious program to advance recovery of dwindling Mid-Columbia steelhead and spring Chinook salmon by restoring Central Oregon runs, and populations, of these iconic species.

However, at the launch of this reintroduction program, much of the historical habitat in the Metolius River, Whychus Creek and Crooked River could not support successful spawning, rearing and migration. Dozens of small diversions blocked migration routes, the dewatering of streams for irrigation resulted in high water temperatures, and stream channelization eliminated important spawning and rearing habitat for anadromous and resident native fish alike. Loss of associated floodplain connectivity dried up lush, diverse wetland and riparian habitats, further altering the stream ecosystem but also compromising the rare and essential functions of riparian corridors. Together, the estimated cost of the required restoration along these rivers exceeded $50 million.

Recognizing that this scale of restoration would not be possible under a traditional project-by-project implementation model, the members of the Deschutes Partnership launched an ambitious effort to build a holistic, integrated program designed to fundamentally change the character of existing restoration efforts. This approach - leveraged, scalable, and tightly coordinated – is built upon collaboration, strategic integration, and the open sharing of organizational resources. Over time, this approach has increased the pace and scale of restoration work as the collective efforts of the Deschutes Partnership have brought efficiency, focus and leverage, resulting in more than $25 million in restoration investments. This work is accomplished through a niche-based division of effort wherein the watershed councils implement large-scale stream restoration, fish passage and fish screening projects; the Deschutes River Conservancy acquires water to restore instream flow; and the Deschutes Land Trust secures key properties for permanent land conservation and restoration.

To date, the Deschutes Partnership has restored more than 60 cfs instream, protected eight miles and 2,200 acres of land through conservation programs, removed 17 fish passage barriers, screened numerous diversions, and restored habitat along more than 12 miles of river and stream. While this progress has been tremendous, there remains important work to be done. Reintroduction success has progressed more slowly than originally hoped, significant fish passage barriers remain, high water temperatures persist, and important habitat still needs to be protected and restored if resident and anadromous fish populations are to thrive in these

watersheds over the long term. As the Deschutes Partnership enters its second decade, the member organizations have reaffirmed their commitment to this large scale restoration effort to fully restore the suite of physical and biological conditions necessary to support strong native fish populations and restore the ecological benefits of healthy stream corridors. This includes removing every fish barrier, screening every diversion, providing flow sufficient for successful spawning and rearing, protecting key habitats, and restoring adequate habitat quantity and quality for viable fish populations.

The work of the Deschutes Partnership is designed to implement theThe *Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment* (ODFW 2010) ("*Recovery Plan*"). This Recovery Plan identifies recovery of the historical Crooked River, Metolius River and Whychus Creek runs as critical to the recovery of the Mid-Columbia ESU. The Deschutes Partnership developed this Strategic Action Plan (SAP) based on the priorities listed in the *Recovery Plan* and nearly a decade of working together in collaboration. This SAP outlines a portfolio of integrated actions that, when complete, will result in the restoration of critical conditions for successful spawning and rearing of salmon, steelhead, and native trout, create significant ecological uplift, and buoy ecological resilience in the 226 miles of river and stream that comprise the reintroduction area of the upper Deschutes Basin.

2. OUTCOMES

The Deschutes Partnership is focused on protecting and restoring stream systems in the Metolius River, Whychus Creek and Crooked River[1] to benefit native resident fish, support the ongoing reintroduction of anadromous fish, and enhance overall watershed conditions. Accordingly, the strategies outlined here are designed to achieve specific outputs (*e.g.*, streamflow) and outcomes (*e.g.*, temperature reductions to meet water quality standards) that will cumulatively address the known limiting factors for native fish in these watersheds.

The Partnership designed its goals, objectives, activities, outputs and outcomes to address the limiting factors described in the *Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment* (ODFW 2010) (hereafter "*Recovery Plan")* and other conservation and restoration plans.

The Deschutes Partnership will:

1) Land Conservation: Protect 27.1 stream miles and 1,106.25 floodplain acres (FP acres) of high quality spawning and rearing habitat in Whychus Creek, the Metolius River and the Crooked River by 2025;

[1] The Deschutes Partnership is working to restore anadromous fish habitat in historic habitats below Bowman and Ochoco dams, an area commonly known as the lower Crooked River and its tributaries. In the remainder of this document, we will use the term "Crooked River" to describe this focus area.

2) Stream, Riparian and Floodplain Habitat: Restore the physical habitat conditions necessary to support successful spawning and rearing along 26 river miles in Whychus Creek, the Metolius River and the Crooked River by 2040;

3) Streamflow: Restore stream flow sufficient to support successful spawning and rearing in Whychus, McKay, and Ochoco Creeks and the Crooked River by 2035;

4) Fish Passage: Restore volitional fish passage in Whychus Creek, Lake Creek and the lower Crooked River by 2022;

5) Fish Screening: Install fish screens on all irrigation water withdrawals in Whychus Creek, the Metolius River and the Crooked River by 2030; and

6) Outreach: Engage the community in the focal watershed to promote increased awareness about the reintroduction of salmon and steelhead, and to recruit the support necessary for the Deschutes Partnership to accomplish the restoration objectives.

The Deschutes Partnership expects these outcomes will address limiting factors described in the *Recovery Plan* and contribute to viable populations of resident fish as well as reintroduced salmon and steelhead in the focal watersheds. However, because migratory fish that spawn in these areas are subject to significant impacts outside the scope of this SAP (*e.g.*, predation in the ocean and on the Columbia River, dams on the Columbia River, harvest, climate change, ocean conditions, *etc.*), fish populations in the focal watersheds are not an accurate indicator of near-term restoration success. Instead, by identifying specific outcomes designed to address limiting factors, the Deschutes Partnership can track its restoration effectiveness closely over time and implement adaptive management to ensure it creates the desired outcomes.

3. SCOPE AND VISION

3.1. Geographic Scope

The geographic scope of this SAP includes the 226 miles of historic habitat for salmon and steelhead located in the Whychus Creek, Metolius River (primarily Lake Creek and the mainstem Metolius) and lower Crooked River systems (See attached maps).

The Deschutes Partnership selected this focus area because it:

a) Is the focal area for the ongoing salmon and steelhead reintroduction effort led by the Confederated Tribes of Warm Springs (Tribes), the Oregon Department of Fish and Wildlife, and Portland General Electric (PGE) as part of the relicensing of the Pelton-Round Butte dams on the Deschutes River,

b) Includes most of the historic anadromous fish habitat in the upper Deschutes Basin, and
c) Reflects a manageable scale where experience has shown that demonstrable restoration progress can be achieved and significant outcomes realized.

The Partnership evaluated a variety of scale alternatives, from the smallest scale (*e.g.,* Lake Creek or McKay Creek) to the largest scale (*e.g.,* all of the anadromous portions of the upper and lower Deschutes River basin) but these were eliminated because they would not achieve the specific objectives of the Deschutes Partnership's work.

Land ownership in the focal watershed is summarized in Table 1.

Table 1. Land Ownership

	Metolius River	Whychus Creek	Crooked River
Federal	68%	75%	29%
Tribal	28%	0%	0%
State	<1%	0%	3%
Private	4%	25%	68%

The Deschutes River Conservancy and Deschutes Land Trust have established programs throughout the entirety of this geographic scope. The two watershed councils, in contrast, focus on their respective sub-geographies: The Crooked River Watershed Council on the Crooked River and the Upper Deschutes Watershed Council on Whychus Creek and the Metolius River. The Partnership allocates operations and coordination roles among the member organizations. This approach has proven to work well over the past decade because the different organizations fill unique niches, and maintain individual programmatic strengths and community connections commensurate with the scale of their work.

The diversity of social, political, biological and physical conditions within this focal area allows the Deschutes Partnership to continue building on the experience of the past decade where creative combinations of approaches can be assembled to match unique on-the-ground circumstances. This promotes continuous learning, helps compare and contrast approaches, and supports long-term adaptive management.

3.2. Vision

The Deschutes Partnership envisions successful community-supported restoration that results in floodplain, riparian and aquatic conditions sufficient to support sustainable spawning and rearing of salmon and steelhead in the Metolius River, Whychus Creek and Crooked River.[2]

[2] The focal species in the Crooked River and Whychus Creek are steelhead and Chinook. In the Metolius River, the focal species are Chinook and sockeye.

The Deschutes Partnership will consider its efforts successful when the rivers flow with clean, abundant water, fish can migrate without impediment or risk of entrainment, and the watersheds provide floodplain habitats where native vegetation, wetlands and other communities support a productive, resilient stream corridor. The Deschutes Partnership envisions this work being accomplished in a community context, where the restoration approaches are uniquely tailored to align with local values, local economies, and evolving land use. Outreach and community involvement create local momentum, connection, and support to ensure long-term stewardship activities that maintain the restoration value over time. Monitoring and long-term evaluation informs adaptive management and continuous learning.

Operationally, the Deschutes Partnership envisions a well-managed, efficient collaborative that leverages resources to accomplish restoration at a pace and scale commensurate with the magnitude of the restoration need. Partners implement projects in a programmatic context, where they build cumulative outcomes over time and achieve efficiencies through thoughtful coordination and planning. This approach is built upon several guiding principles shared among the four core organizations, including:

1) Clearly defined programmatic niches: Each partner has identified its core competencies that represent their greatest potential contribution to river restoration and stewardship. By focusing work in these core disciplines, the partnership maintains efficiency in program delivery.

2) Integrated planning, implementation and fundraising: Although each partner organization remains an independent organization, all of the partners are committed to an integrated approach to planning, implementation and fundraising because the success of each organization is dependent upon the success of the others. This philosophy ensures that the suite of collective activities meets the individual as well as the common goals of each organization and, ultimately, accomplishes on the ground restoration as effectively as possible.

3) Community-supported restoration: The Deschutes Partnership works to understand, foster, and sustain community support for the restoration efforts to help ensure their long-term sustainability and to avoid the development of new problems for watershed management.

4) Resource sharing: The members of the Deschutes Partnership work together to support, advise, peer review, and assist one another by freely sharing resources and expertise to elevate the quality of each others' work.

This vision includes the Deschutes Partnership working within mutually-supportive networks of local, state, federal, tribal and private partners. The partners nurture and sustain these multi-stakeholder networks as they build networks of collaborators for individual project implementation. Over the longer term, these networks are built and maintained by the boards of directors of each of the four core member organizations through their inclusion of a broad cross-

section of the community. In total, the more than 80 diverse stakeholders that make up the boards of directors for these four organizations help ensure consistency, stability and balance, ensuring longevity and resiliency for the Deschutes Partnership as a whole.

4. PARTNERSHIP STRUCTURE AND GOVERNANCE

4.1. Partnership Approach and Philosophy

The four core implementation partners have worked together since 2006 in a formal, structured partnership built upon a vision of collaboration, leverage, strategic integration and the open sharing of organizational resources. The partners seek to thrive under a model that embodies the spirit of high impact organizations, as summarized in the following quote from a recent study of effective partnerships:

> Although most non-profits pay lip service to collaboration, many of them really see other groups as competition for scarce resources. But high-impact organizations help their peer success, building network of nonprofit allies and devoting remarkable time and energy to advancing their fields. They freely share wealth, expertise, talent and power with other nonprofits not because they are saints, but because it's in their self-interest to do so. (McLeod and Crutchfield, 2007)

The Deschutes Partnership is committed to the belief that the common objective – restoration of conditions for successful anadromous fish reintroduction – is one that can be accomplished only if each member organization is successful in its mission and niche. Therefore, each partner must work to ensure one another's success and no partner can be successful at the expense of another.

At the programmatic level, each member of the Partnership focuses on playing a specific role in the overall effort based on their unique expertise, capacity and areas of focus. The resulting programs included in the Partnership are:

1) Land conservation;
2) Streamflow restoration;
3) Stream, riparian and floodplain restoration;
4) Fish passage and screening;
5) Outreach; and
6) Monitoring.

The distribution of roles among the partners is as follows:

Partner	Experience	Roles
Upper Deschutes Watershed Council	The UDWC has led restoration, monitoring and outreach programs in Central Oregon since 1996. The UDWC has successfully implemented more than $20 million in programs since its founding, manages a long-term watershed monitoring program, and currently works with approximately 3,000 people per year in its outreach programs.	Whychus / Metolius: Stream restoration Fish passage Fish screening Outreach Monitoring All watersheds: Partnership coordination
Crooked River Watershed Council	The CRWC was established in 1994 and chartered by the Crook County Court in 1997. The council focuses on habitat conservation in a working lands context. Fish passage and screening are top priorities for the focus area. The council has implemented watershed projects totaling over $12 million since 2000, monitored water quality at over 30 fixed sites and provided watershed outreach to the service area impacting an average of over 200 people and students per year	Crooked River: Stream restoration Fish passage Fish screening Outreach Monitoring
Deschutes River Conservancy	The DRC was founded in 1996 with a mission of restoring streamflow and improving water quality in the Deschutes basin. The DRC has completed over $35 million in flow restoration projects and manages a total annual flow restoration volume exceeding 80,000 acre-feet of water.	All watersheds: Streamflow Outreach
Deschutes Land Trust	The DLT was organized in 1995 with a mission of working cooperatively with landowners to protect wildlife habitat and scenic views in the Deschutes basin through land acquisition and stewardship. The Land Trust manages 15 preserves and conservation easements totaling 7,752 acres.	All watersheds: Land conservation Outreach

4.2. Governance

The members of the Deschutes Partnership have worked together since 2006 and have developed a strong sense of what is necessary for successful collaboration. After years of testing and refining various ways to approach partnership governance, the core governance principles of the Deschutes Partnership were signed into an MOU in June 2014 to formalize the decision-making and structure of the partnership. This MOU defines mutual goals, objectives and vision, roles and

responsibilities of each member, sharing of resources, technical niches, and a consensus-based decision-making process.

5. PROFILE OF THE FOCUS AREA

5.1. Physical Geography

The reintroduction area includes 226 miles of rivers and streams in Whychus Creek, Metolius River and Crooked River watersheds within the upper Deschutes River basin of Central Oregon. The Metolius River and Whychus Creek watersheds drain from the east slopes of the Cascade crest and flow in a north and north-easterly direction to their confluence with the Deschutes River. Elevations range from 10,497 at the peak of Mt. Jefferson to 1,940 feet at Lake Billy Chinook.

On the east side of the reintroduction area, the Crooked River drains from the Ochoco mountains and flows in a west and north-westerly direction through the community of Prineville before joining the Deschutes River at Lake Billy Chinook. The lower Crooked River, where Crooked River reintroduction is focused, drains from Ochoco and Prineville Reservoirs, with McKay Creek as one of the key tributaries for fisheries restoration. Elevations in the Crooked River drainage range from 5,925 feet in the Ochoco Mountains to 1,942 feet at the confluence with Lake Billy Chinook.

5.2. Water Resources

In the Whychus Creek and Metolius River watersheds, water is sourced from springs and snow/glacial melt systems with a small amount from direct precipitation. The high permeability of the surrounding landscape leads to high infiltration and subsurface transport of water (USFS 1998, Gannett *et al* 2001), and springs located throughout these two watersheds may increase stream flows significantly during certain times of the year.

While water diversions have a very small impact on the hydrology of the Metolius River watershed, irrigators cumulatively divert up to 90% of the water from Whychus Creek at several points upstream of the City of Sisters. These diversions result in a highly modified stream flow regime that varies greatly depending on the season and the reach. As a result, Whychus Creek is 303(d) listed for exceeding the 18°C/64°F state temperature standard for juvenile salmon and trout rearing and migration. Stream flow restoration efforts since 1999 by the Deschutes River Conservancy and Three Sisters Irrigation District have increased base flows in Whychus so the stream no longer runs dry in summer months. Efforts to restore stream flow in Whychus Creek are ongoing.

The Crooked River system is fed primarily by snowmelt from the Ochoco Mountains, but also receives flow from rainfall and springs. The majority of flow in the watershed is stored in two reservoirs (Ochoco Reservoir on Ochoco Creek and Prineville Reservoir on the mainstem Crooked River). Reservoir and irrigation operations have highly altered the hydrograph of the Crooked River and major tributaries, resulting in degraded stream conditions that impact habitat for fish

and other aquatic species. The Crooked River and major tributaries McKay Creek and Ochoco Creek are all 303(d) listed for stream temperature exceeding the 18°C/64°F state criteria for salmon and trout rearing and migration, among other criteria. With the passage of the Crooked River Collaborative Water Security and Jobs Act in late 2014, new opportunities exist for significant stream flow restoration in McKay Creek.

5.3. Biotic Systems

On the east slopes of the Cascades and in the Ochoco Mountains, forest management over the 20th century — characterized by fire suppression and the selective harvest of large trees — altered forest structure and fire behavior in the three focal area watersheds. In the Crooked River watershed, the simultaneous introduction of livestock grazing and the advent of fire suppression contributed to western juniper expansion and conversion of grasslands to juniper woodlands. In lower-gradient floodplain reaches near the population centers of Sisters and Prineville, agricultural land conversion has resulted in extensive stream channelization and reduced stream channel function, floodplains, swamps, and meadow habitats. Invasive non-native plant species further threaten upland, floodplain and riparian habitats.

Key native fish species include anadromous summer steelhead and spring Chinook salmon (Whychus Creek, Crooked River), sockeye salmon (Lake Creek / Metolius River), bull trout, and redband trout. The historic sockeye salmon run through Lake Creek was one of only two sockeye runs in the state of Oregon. Anadromous populations disappeared with the elimination of fish passage at the Pelton, Round Butte, and lesser dams throughout the system; resident populations have been dramatically reduced as a result of flow alterations and loss and degradation of stream and off-channel habitat.

Although flow management for irrigation in the Whychus Creek and Crooked River watersheds creates a highly altered hydrograph with associated impacts to stream ecosystems, current restoration efforts, including stream flow, stream channel, and floodplain restoration, as well as provision of fish passage, and screening of irrigations diversions, will substantially improve stream conditions for native fish populations.

5.4. Local Communities and Human Population

Native American peoples inhabited or fished, hunted, and foraged in the Whychus Creek, Metolius River, and Crooked River watersheds for thousands of years prior to European settlement. The Tribes reserve harvest and gathering rights and continue these traditional uses throughout the reintroduction area.

European settlement following fur trapping began in the Crooked River watershed as early as 1830. Development of timber and grazing resources in the Whychus Creek watershed spurred settlement beginning in 1865, and Camp Sherman on the Metolius River was settled as a vacation retreat by ranchers from Sherman and Morrow counties in the 1890s.

The City of Sisters, on Whychus Creek, grew steadily through the 20th century and continues to experience rapid population growth, with the population more than doubling between 2000 and 2010, from 938 to 2,039. Despite the pace of growth, the City of Sisters has taken steps to make development within and around the city consistent with the conservation, maintenance, and protection of forest lands, natural resources, scenic areas, open spaces, and air and water quality.

The City of Prineville represents the major population center in the Crooked River watershed, with a population of 9,250 in 2010, a 20% increase since 2000. Ninety-five percent of the population of the Crooked River Basin is concentrated in the Lower Crooked River Sub-basin where reintroduction is focused.

In the Metolius River watershed, extensive protection and predominately public land ownership has limited growth, with a population of 233 in Camp Sherman as of 2010.

5.5. Local Economy

Timber and grazing economies in the Whychus Creek watershed gave way over the last century to light industry, tourism, and residential uses of former farm and ranch lands, although agriculture remains an important part of the local economy and character. The City of Sisters anticipates that jobs will double between 2000 and 2025, with approximately 20% of new jobs in goods production, and 80% in services, including wholesale and retail trade, government, construction, and mining.

In contrast to the Whychus Creek watershed, timber, grazing, and irrigated agriculture remained the primary economic drivers in the Crooked River watershed into the late 20th century. Timber has declined since the 1980s, while new industries in tourism and data management / internet have grown.

Tourism, consistent with the scenic and recreation values of the Metolius, constitutes the economy of the Metolius basin. The U.S. Forest Service puts the number of recreation-related visits for hunting, angling, and day use at several hundred thousand per year. Nine public campgrounds as well as several private lodges benefit from the influx of recreationists.

6. CONSERVATION NEED

For more than 100 years, the rivers of the upper Deschutes basin were managed almost exclusively for the purposes of irrigation water delivery and flood control. In some places, such as Whychus Creek and McKay Creek, this meant that many miles of creek were channelized in an attempt to reduce flooding, and portions of creek ran completely dry during the summer months when over-appropriated water rights dewatered the creeks. As a result, fish populations declined,

riparian and wetland communities dried up, and fisheries restoration was written off as virtually impossible.

Since the early 1990s, however, local organizations, including the members of the Deschutes Partnership, have brought stream flow back to dry creeks, opened many miles of habitat for migrating fish and restored hundreds of acres of floodplains. While significant restoration progress has been achieved, important conservation needs remain.

6.1. Stream Flow and Water Quality

While stream flow in the Metolius River watershed is not heavily impacted by diversions, stream flow alterations remain a major factor limiting fish production in Whychus Creek and the Crooked River. Irrigators cumulatively divert up to 95% of the water from Whychus Creek at several points upstream of the City of Sisters, and McKay Creek (a tributary to the Crooked River) often runs dry during the peak of irrigation season.

These diversions result in a highly modified stream flow regime that varies greatly depending upon the season and the reach. Low stream flow affects many aspects of ecological function, including water temperature, dissolved oxygen, reduced spawning habitat, and a variety of physical processes (*e.g.*, sediment transport, channel morphology, *etc*.). Late summer temperatures throughout the reintroduction area exceed the maximum temperature standard established by the State of Oregon to protect native fish. Reduced water availability in the summer limits the growth of riparian vegetation, reducing habitat for terrestrial and aquatic wildlife and contributing to increased erosion along the stream banks. These changes in vegetation patterns and bank stability can alter spawning and rearing habitat, streamside wetlands and other components of the ecosystem.

In the Crooked River, operations of the Ochoco and Prineville reservoirs further modify stream flows. These operations impact both the seasonality of flow and certain water quality parameters, such as dissolved gas, turbidity, and temperature. Operational releases for flood control purposes have impacted the lower Prineville valley in terms of floodplain connectivity, stream velocity, bank erosion, and riparian vegetation expression.

6.2. Fish Passage and Protection

Unscreened or impassable irrigation diversions threaten resident and anadromous fish because they block up and downstream migration and may trap fish in irrigation canals. As recently as 2007, more than 30 permanent or seasonal fish passage barriers associated with irrigation diversions blocked upstream fish passage the Whychus Creek, Metolius River and Crooked River watersheds. Although the Deschutes Partnership has since reduced this number to fewer than 15, passage at the remaining barriers is one of the highest conservation needs in this SAP.

While most unscreened diversions are in the form of small pumps, there are more than 50 unscreened diversions remaining in the Whychus Creek, Metolius River and Crooked River watersheds that require screening to avoid direct loss of fish.

6.3. Stream, Riparian and Floodplain Habitat

More than 150 years of channel manipulation throughout Whychus Creek and the Crooked River left miles of streams channelized and disconnected from the floodplain. Poorly managed livestock grazing, urban development, beaver trapping, irrigation diversions and other activities have also altered stream and floodplain function. Cumulatively, these activities have reduced pool frequency, shade, in-stream structure and other important habitat components. Restoring stream and floodplain function in these degraded areas is critical to restoring self-sustaining runs of salmon and steelhead.

6.4. Land Conservation

With rapidly expanding human population and increasing development pressure along the rivers and streams in Central Oregon, protecting the integrity of the floodplain environment is increasingly important. The greatest needs are in the historically productive, low-gradient reaches of Whychus and McKay creeks, where channelization has pushed the creek to the valley edge, opening former floodplain areas to development. Development of these areas would permanently restrict the opportunities for floodplain restoration and curtail the recovery of productive spawning and rearing habitat.

6.5. Community Support

Voluntary conservation and restoration can succeed only within a context of community understanding, awareness, support and buy-in. Ten years ago when reintroduction was not widely understood, local community leaders (*e.g.*, City Councilors, City Managers, County Commissions, key landowners, *etc*.) rarely talked about watershed restoration as a long-term part of the community's vision and values. The partners have changed this sentiment significantly in the past decade by connecting Central Oregon communities to their streams through tours, presentations, on-the-ground stewardship, sustained press coverage and other techniques. While the partners have made great progress thus far, increasing the pace and scale of our efforts depends on continued and expanded community buy-in. Sustained, continuous outreach is critical to ensure communities understand and support the work necessary to make reintroduction successful.

7. CONSERVATION AND RESTORATION TARGETS

The Deschutes Partnership is focused on addressing the limiting factors described in Sections 8.2.3 and 8.2.4 of the *Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment* (ODFW 2010), including:

- Degraded riparian communities
- Degraded floodplain connectivity and function
- Degraded channel structure and complexity
- Degraded water quality (temperature)
- Altered hydrologic processes
- Altered sediment routing
- Impaired fish passage

In addition to the information from the *Recovery Plan*, the Deschutes Partnership is working with finer-scale information (*e.g.*, updated inventories of diversions, improved streamflow-temperature relationship modeling, *etc*.) developed over the past several years by the members of the Partnership, the Tribes, PGE, U.S. Forest Service, Oregon Department of Fish and Wildlife and others. The Deschutes Partnership continually refines this information as it gains additional knowledge through its own monitoring and intensive monitoring done by PGE and the Tribes under the terms of their Pelton-Round Butte operating license.

Although these limiting factors have been identified within the context of anadromous fish reintroduction and the *Recovery Plan*, the restoration benefits extend well beyond salmon and steelhead. Specifically, restoration improves water quality, habitat for resident fish, wildlife habitat, wetland conditions and other elements in the focal watersheds.

8. OUTCOMES AND SMART GOALS AND OBJECTIVES

8.1. Land Conservation

Land conservation outcomes, goals, objectives and actions include:

1. **Land Conservation Outcome**: Protect 27.1 stream miles and 1,106.25 floodplain acres (FP acres) of high quality spawning and rearing habitat in Whychus Creek, the Metolius River and the Crooked River by 2025.

    1.1. **Whychus Creek Land Conservation SMART Goal**: Work cooperatively with willing landowners to permanently protect 3.6 river miles and 173.95 floodplain acres between the City of Sisters (RM 21.3) and the Deschutes River (RM 0) by 2025, using conservation easements or, where appropriate, fee purchases. Projects may also protect associated conservation values, including wetlands and upland habitat, as consistent with OWEB's established acquisition priorities.

1.1.1. **Objective**: Protect 2.2 river miles and 127.9 floodplain acres in the Meadow Reach (RM 19.6 to 15.7) through conservation easements or fee purchases on remaining priority properties by 2025.

1.1.1.1. **Action:** Protect 0.8 miles / 59.8 FP acres by 2017.
1.1.1.2. **Action:** Protect 0.1 miles / 2 FP acres by 2019.
1.1.1.3. **Action:** Protect 0.4 miles / 11.7 FP acres by 2019.
1.1.1.4. **Action:** Protect 0.9 miles / 54.4 FP acres by 2025.

1.1.2. **Objective**: Protect 1.4 river miles and 46.05 floodplain acres in the Canyon Reach (RM 15.6 to RM 7.8) through conservation easements or fee purchases on remaining priority properties by 2025.

1.1.2.1. **Action:** Protect .04 miles / .3 FP acres by 2018.
1.1.2.2. **Action:** Protect .28 miles / 8.8 FP acres by 2020.
1.1.2.3. **Action:** Protect .33 miles / 9.65 FP acres by 2021.
1.1.2.4. **Action:** Purchase 2 miles / 100 FP acres by 2025.
1.1.2.5. **Action:** Protect .62 miles / 23.8 FP acres by 2025.
1.1.2.6. **Action:** Protect .12 miles / 3.5 FP acres by 2025.

1.1.3. **Objective**: Establish community preserve at Rimrock Ranch (2 miles/100 FP acres) by 2025.

1.2. **Metolius River Land Conservation SMART Goal**: Work cooperatively with willing landowners to protect 3.9 miles and 198.1 floodplain acres of high priority spawning and rearing habitat on Lake Creek and the Metolius River mainstem by 2025, using conservation easements or, where appropriate, fee purchases. Projects may also protect associated conservation values, including wetlands and upland habitat, as consistent with OWEB's established acquisition priorities.

1.2.1. **Objective**: Protect 2.76 river miles and 66.05 floodplain acres on lower Lake Creek by 2025.

1.2.1.1. **Action**: Protect 0.20 miles, 6.2 FP acres by 2019.
1.2.1.2. **Action**: Protect 0.07 miles, 2.6 FP acres by 2021.
1.2.1.3. **Action**: Protect 0.05 miles, 2.5 FP acres by 2021.
1.2.1.4. **Action**: Protect 0.04 miles, 1 FP acre by 2023.
1.2.1.5. **Action**: Protect 0.04 miles, 1.2 FP acres by 2023.
1.2.1.6. **Action**: Protect 0.05 miles, 1.5 FP acres by 2023.
1.2.1.7. **Action**: Protect 0.11 miles, 2.8 FP acres by 2025.
1.2.1.8. **Action**: Protect 0.26 miles, 8.6 FP acre by 2023.
1.2.1.9. **Action**: Protect 0.12 miles, 3.9 FP acres, by 2025.

1.2.1.10. **Action**: Protect 0.39 miles, 13.15 FP acres by 2025.
1.2.1.11. **Action**: Protect 1.03 miles, 20.3 FP acres by 2025.
1.2.1.12. **Action**: Protect 0.4 miles, 2.3 FP acres by 2025.

1.2.2. **Objective**: Protect 1 mile and 120 floodplain acres on the Metolius River mainstem by 2025.

1.2.2.1. **Action**: Secure fee title or conservation easement on 0.1 mile (one side), 30 FP acres by 2021.
1.2.2.2. **Action**: Protect 0.4 miles, 10 FP acres by 2025.
1.2.2.3. **Action**: Protect 0.5 miles (one side), 80 FP acres by 2025.

1.3. **Crooked River Land Conservation SMART Goal**: Work cooperatively with willing landowners to permanently protect 19.6 miles of stream habitat and 734.2 floodplain acres along McKay Creek, the lower Crooked River, and Ochoco Creek by 2025, using conservation easements as a primary tool, and limited fee purchases where appropriate to meet restoration goals. Projects may also protect associated conservation values, including wetlands, prime and important soils, and upland habitat, as consistent with OWEB's established acquisition priorities.

1.3.1. **Objective**: Protect 1.97 miles and 67.6 floodplain acres on lower McKay Creek by 2025 to support implementation of McKay Creek Restoration and Prioritization Plan and related conservation strategies.

1.3.1.1. **Action**: Secure fee title to .5 miles, 36.6 FP acres by 2019.
1.3.1.2. **Action**: Protect .35 miles and 11.16 FP acres by 2021.
1.3.1.3. **Action**: Protect .15 miles and 2.64 FP acres by 2021.
1.3.1.4. **Action**: Protect .11 miles and 4.01 FP acres by 2021.
1.3.1.5. **Action**: Protect .22 miles and 7.02 FP acres by 2023.
1.3.1.6. **Action**: Protect .37 miles and 14.73 FP acres by 2023.
1.3.1.7. **Action**: Protect .08 miles and 2.06 FP acres by 2023.
1.3.1.8. **Action**: Protect .69 miles and 25.98 FP acres by 2023.

1.3.2. **Objective**: Protect 8 miles and 355 floodplain acres on middle McKay Creek by 2025 to support implementation of McKay Creek Restoration and Prioritization Plan and related conservation strategies.

1.3.2.1. **Action**: Protect 2 miles and 100 FP acres by 2017.
1.3.2.2. **Action**: Protect 1 mile and 26.55 FP acres by 2019.
1.3.2.3. **Action**: Protect 1.75 miles and 101 FP acres by 2019.
1.3.2.4. **Action**: Protect .75 miles and 37 FP acres by 2021.
1.3.2.5. **Action**: Protect .5 miles and 11.5 FP acres by 2021.
1.3.2.6. **Action**: Protect 2 miles and 79 FP acres by 2021.

1.3.3. **Objective**: Protect 6 miles and 160 floodplain acres of the Crooked River in lower Prineville Valley by 2025 to preserve floodplain restoration opportunities identified through Lower Crooked River Assessment or related efforts.

1.3.3.1. **Action**: Protect 6 miles and 160 FP acres by 2025.

1.3.4. **Objective**: Protect 1.6 miles and 42.19 floodplain acres on the lower 2 miles of Ochoco Creek by 2025 to facilitate stream restoration, possibly in connection with other community objectives (*e.g.*, greenspace or trail plans).

1.3.4.1. **Action**: Protect .40 miles and 3.12 FP acres by 2025.
1.3.4.2. **Action**: Protect .16 miles and 3.11 FP acres by 2025.
1.3.4.3. **Action**: Protect .64 miles and 30.5 FP acres by 2025.
1.3.4.4. **Action**: Protect .39 miles and 5.46 FP acres by 2025.

1.3.5. **Objective**: Protect 2 miles and 109.4 floodplain acres on Ochoco Creek between Prineville and Ochoco Reservoir by 2025 to facilitate stream restoration, possibly in connection with other community objectives (*e.g.*, greenspace).

1.3.5.1. **Action**: Protect .53 miles and 18 FP acres by 2025.
1.3.5.2. **Action**: Protect 1.13 miles and 74 FP acres by 2025.
1.3.5.3. **Action**: Protect .31 miles and 17.4 FP acres by 2025.

8.2. Stream, Riparian and Floodplain Habitat

Stream, riparian and floodplain habitat restoration outcomes, goals, objectives and actions include:

2. **Stream Habitat Outcome**: Restore the physical habitat conditions necessary to support successful spawning and rearing along 26 river miles in Whychus Creek, the Metolius River and the Crooked River by 2040.

2.1. **Whychus Creek Stream Habitat SMART Goal**: Restore stream, riparian and floodplain habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along 8.5 miles and on 410 floodplain acres of Whychus Creek on the lands permanently protected by the Deschutes Land Trust.

2.1.1. **Objective**: Restore 5.9 miles and 284 floodplain acres of Whychus Creek in the Canyon Reach (Whychus Canyon Preserve) by 2022 per the *Whychus Canyon Restoration Plan (2014)*.

2.1.1.1. **Action**: Complete Phase I (Reach 4) implementation by 2017 (0.92 miles and 44.6 acres of stream, riparian and floodplain restoration).

2.1.1.2. **Action**: Complete Phase II (Reach 3) implementation by 2018 (0.61 miles and 29.6 acres of stream, riparian and floodplain restoration).

2.1.1.3. **Action**: Complete Phase III (Reaches 1 & 2) implementation by 2019 (2.1 miles and 101.8 acres of stream, riparian and floodplain restoration).

2.1.1.4. **Action**: Complete Phase IV (Reach 6) implementation by 2021 (1.23 miles and 59.6 acres of stream, riparian and floodplain restoration).

2.1.1.5. **Action**: Complete Phase V (Reach 5) implementation by 2022 (0.99 miles and 48 acres of stream, riparian and floodplain restoration).

2.1.2. **Objective**: Restore 2.6 miles and 126.1 acres of Whychus Creek in the Meadow Reach by 2029.

2.1.2.1. **Action**: Develop a comprehensive stream restoration vision for this reach by 2023.

2.1.2.2. **Action**: Complete Phase I implementation by 2025 (1.7 miles and 82.4 acres of stream, riparian and floodplain restoration).

2.1.2.3. **Action**: Complete Phase II implementation by 2027 (0.4 miles and 19.4 acres of stream, riparian and floodplain restoration).

2.1.2.4. **Action**: Complete Phase III implementation by 2029 (0.5 miles and 24.2 acres of stream, riparian and floodplain restoration).

2.2. **Metolius River Stream Habitat SMART Goal**: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along Lake Creek and Metolius River by 2029.

2.2.1. **Objective**: Enhance riparian and in-stream woody material along 1.5 miles of properties permanently protected by the Deschutes Land Trust by 2029.

2.2.1.1. **Action**: Develop a restoration implementation sequencing plan to align land acquisition actions with subsequent restoration implementation by 2022.

2.2.1.2. **Action**: Implement sequenced restoration projects per the plan above by 2029.

2.3. **Crooked River Stream Habitat SMART Goal**: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along 16 miles of McKay Creek, the lower Crooked River, and Ochoco Creek by 2040.

2.3.1. **Objective**: Restore stream habitat in the McKay Creek watershed as identified in the McKay Strategy by 2040.

2.3.1.1. **Action**: Coordinate final design development with landowners and partnering agencies, secure funds, and implement projects in priority order by 2028.

2.3.1.2. **Action**: Implement projects that have funding support and meet the priority criteria as specified in the McKay Strategy by 2040.

2.3.2. **Objective**: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) in the lower Crooked River by 2028.

2.3.2.1. **Action**: Work with agencies, landowners and interested public to design projects that meet multiple resource objectives, protect prime agricultural soils, and that can be permitted by 2022.

2.3.2.2. **Action**: Secure funding to implement projects identified in the Lower Crooked River Action Plan by 2028.

2.3.3. **Objective**: Identify and document conservation needs in Ochoco Creek watershed and complete priority projects by 2040.

2.3.3.1. **Action**: Engage Ochoco Creek landowners to develop a priority action plan for habitat improvements to support reintroduction goals on Ochoco Creek.

2.3.3.2. **Action**: Secure funding to design, permit, and implement priority projects identified in the Ochoco Habitat Restoration Plan by 2040.

8.3. Stream Flow

Stream flow restoration outcomes, goals, objectives and actions include:

3. **Stream Flow Outcome**: Restore stream flow sufficient to support successful spawning and rearing in Whychus, McKay, and Ochoco Creeks and the Crooked River by 2035.

3.1. **Whychus Creek Stream Flow SMART Goal**: Protect a minimum of 27 cfs of instream flow (wet water) in Whychus Creek along its entire length from headwaters to the confluence with the Deschutes River by 2025.

3.1.1. **Objective**: : Complete the piping of the Three Sisters Irrigation District canal system to restore 1.67 cfs instream along 23.5 miles of Whychus Creek between the district's diversion and the mouth by 2019.

3.1.1.1. **Action**: Complete the piping of Phase 8 to restore 1.0 cfs instream by 2018.

3.1.1.2. **Action**: Complete the piping of Phase 9 to restore 0.67 cfs instream by 2019.

3.1.2. **Objective**: Maintain annual water leasing program to restore 4 cfs instream along 23.5 miles of Whychus Creek from Three Sisters Irrigation District's diversion to the mouth each year.

3.1.2.1. **Action**: Lease water rights annually from 250 acres in Three Sisters Irrigation District to restore 4 cfs in Whychus Creek.

3.2. **Crooked River Stream Flow SMART Goal**: Protect spring and early summer stream flows of 11.2 cfs in McKay Creek, summer stream flows of 5 cfs in Ochoco Creek, and late spring through early fall stream flows of at least 26.1 cfs in the Crooked River through water transactions to meet target flow rates during critical times of year by 2035.

3.2.1. **Objective:** Permanently protect stream flows of up to 8.2 cfs along 2.5 miles of McKay Creek from Ochoco Irrigation District's canal crossing to Allen Creek by 2021.

3.2.1.1. **Action**: Execute landowner agreements, develop final designs, and initiate administrative processes necessary to eliminate irrigation diversions from McKay Creek between Ochoco Irrigation District's canal crossing (RM 5.5) and Allen Creek (RM 8) by providing Ochoco Irrigation District water rights to associated lands. Complete by 2017.

3.2.1.2. **Action:** Eliminate irrigation diversions from McKay Creek between Ochoco Irrigation District's canal crossing (RM 5.5) and Allen Creek (RM 8) by providing Ochoco Irrigation District water rights to up to 235 acres. Transfer up to 3.2 cfs of corresponding water rights instream to benefit fish and wildlife. Complete by 2019.

3.2.1.3. **Action:** Eliminate irrigation diversions from McKay Creek between Ochoco Irrigation District's canal crossing (RM 5.5) and Allen Creek (RM 8) by providing Ochoco Irrigation District water rights to up to 284 acres. Transfer up to 5.0 cfs of corresponding water rights instream to benefit fish and wildlife. Complete by 2021.

3.2.1.4. **Action:** Execute landowner agreements, develop final designs, and initiate administrative processes necessary to eliminate irrigation diversions from McKay Creek between Allen Creek (RM 8) and the Ochoco National Forest Boundary (RM 12) by providing Ochoco Irrigation District water rights to associated lands. Complete by 2023.

3.2.1.5. **Action**: Eliminate irrigation diversions from McKay Creek between Allen Creek (RM 8) and the Ochoco National Forest Boundary (RM 12)

by providing Ochoco Irrigation District water rights to up to 168 acres. Transfer up to 2.8 cfs of corresponding water rights instream to benefit fish and wildlife. Complete by 2027.

3.2.2. **Objective:** Maintain annual water leasing program to restore 5 cfs along 9 miles of Ochoco Creek from Ochoco Dam to the mouth each year.

3.2.2.1. **Action**: Lease water rights annually from 400 acres in Ochoco Irrigation District to protect 5 cfs in Ochoco Creek. Complete annually.

3.2.3. **Objective:** Restore stream flows of at least 26.1 cfs along 23 miles of the Crooked River from North Unit Irrigation District's pumps to the mouth by 2035.

3.2.3.1. **Action:** Develop water transactions under the North Unit Water Supply Program to restore at least 26.1 cfs in the Crooked River from North Unit Irrigation District's pumps to the mouth. Complete by 2026.

3.2.3.2. **Action:** Implement water transactions under the North Unit Water Supply Program to restore at least 26.1 cfs in the Crooked River from North Unit Irrigation District's pumps to the mouth. Complete by 2035.

8.4. Fish Passage

Fish passage outcomes, goals, objectives and actions include:

4. **Fish Passage Outcome**: Restore volitional fish passage in Whychus Creek, Lake Creek and the lower Crooked River by 2022.

4.1. **Whychus Creek Fish Passage SMART Goal**: Restore year-round fish passage along the entire length of Whychus Creek from RM 0 (confluence with the Deschutes River) to RM 39 (the upstream most natural barrier) by 2018.

4.1.1. **Objective**: Restore fish passage at the McCallister diversion by 2018.

4.1.1.1. **Action**: Evaluate future of diversion and irrigation water use to determine whether the diversion should be upgraded to include passage/screening or decommissioned altogether. Complete by 2016.

4.1.1.2. **Action**: Implement proposed action (from above) by 2018.

4.2. **Metolius River Fish Passage SMART Goal**: Restore year-round fish passage along the 5.5 miles of Lake Creek between Suttle Lake and the Metolius River by 2018.

4.2.1. **Objective**: Complete the construction of a fish passage solution at the Barton/Allen Diversion (Diversion 1 & 2) by 2017.

4.2.1.1. **Action**: Install new Barton diversion (Diversion 2) by 2015.
4.2.1.2. **Action**: Install new Allen diversion (Diversion 1) by 2017.

4.2.2. **Objective**: Address fish passage in the North Fork of Lake Creek through screening or barrier removal by 2018 (see Action 5.2.2.2).

4.2.2.1. **Action**: Based on results of Action 5.2.2.2, develop plans to either screen the North Fork or address individual passage barriers. Complete by 2016.
4.2.2.2. **Action**: Implement the projects identified in Action 5.2.2.2 by 2018.

4.3. **Crooked River Fish Passage SMART Goal**: Restore year-round fish passage at all existing artificial barriers in the lower Crooked River by 2022.

4.3.1. **Objective**: Construct fish passage facilities at each of the three remaining barriers by 2022.

4.3.1.1. **Action**: Construct a fish ladder at Opal Springs dam (RM 7.0) on the lower Crooked River by 2019.
4.3.1.2. **Action**: Implement fish passage project at Prineville Country Club (PCC) site on Ochoco Creek (RM 8) by 2020
4.3.1.3. **Action:** Implement fish passage project at Edmunds diversion site on McKay Creek (RM 14.5) by 2022

8.5. Fish Screening

Fish screening outcomes, goals, objectives and actions include:

5. **Fish Screening Outcome**: Install fish screens on all irrigation water withdrawals in Whychus Creek, the Metolius River and the Crooked River by 2030.

5.1. **Whychus Creek Fish Screening SMART Goal**: Eliminate the risk of fish entrainment in irrigation canals or other diversions by fully screening all diversions along Whychus Creek to meet state and federal criteria by 2022.

5.1.1. **Objective**: Address the lack of fish screen at the McCallister diversion by 2018.

5.1.1.1. **Action**: (See Action # 4.1.1.1, above) - Evaluate future of diversion and irrigation water use to determine whether the diversion should be

upgraded to include passage/screening or decommissioned altogether. Complete by 2016.

5.1.1.2. **Action**: (See Action # 4.1.1.2, above) - Implement proposed action (from above) by 2018.

5.1.2. **Objective**: Eliminate the two existing diversions at the Whychus Canyon Preserve by 2022.

5.1.2.1. **Action**: Decommission the former Remund Diversion in conjunction with the stream restoration project implementation in 2019 (See Action 2.1.1.2 above).

5.1.2.2. **Action**: Decommission the Rimrock Ranch Diversion in conjunction with the stream restoration project implementation in 2022 (See Action 2.1.1.5, above).

5.1.3. **Objective**: Screen two remaining irrigation pumps on Whychus by 2022.

5.1.3.1. **Action**: Install pump screens on Bradley and Diversion #9 by 2022.

5.2. **Metolius River Fish Screening SMART Goal**: Eliminate the risk of fish entrainment at diversions by fully screening all diversions along the 5.5 miles of Lake Creek between Suttle Lake and the Metolius River by 2018.

5.2.1. **Objective**: Complete the construction of a fish screen at the Barton/Allen Diversion (Diversion 1 & 2) by 2017.

5.2.1.1. **Action**: Implement Barton (Diversion 2) new fish screen installation by 2015.

5.2.1.2. **Action**: Implement Allen (Diversion 1) new fish screen installation by 2017.

5.2.2. **Objective**: Eliminate the risk of fish entrainment in irrigations canals and pumps in the North Fork of Lake Creek by 2018.

5.2.2.1. **Action**: Evaluate the impact of the North Fork on fish populations by 2016.

5.2.2.2. **Action**: Analyze the trade-off between screening the head of the North Fork vs. each of the nine individual diversions along the North Fork. Complete by 2016.

5.2.2.3. **Action**: Based on the results of Actions #5.2.2.1 and 5.2.2.2, implement selected projects by 2018.

5.2.3. **Objective:** Eliminate the risk of fish entrainment in irrigation canals and pumps in the South Fork of Lake Creek by 2021.

5.2.3.1. **Action:** Assess and develop a plan to screen two remaining irrigation diversions on the South Fork of Lake Creek as needed

5.2.3.2. **Action:** Implement plan developed under Action 5.2.3.1. to screen or decommission two remaining irrigation diversions on the South Fork Lake Creek.

5.3. **Crooked River Fish Screening SMART Goal**: Eliminate the risk of fish entrainment at diversions by fully screening all diversions in McKay Creek, lower Crooked River and Ochoco Creek by 2030.

5.3.1. **Objective**: Eliminate the risk of fish entrainment at 40 active diversions on McKay Creek, lower Crooked River and Ochoco Creek by 2030.

5.3.1.1. **Action:** Inventory fish screening needs in McKay Creek, lower Crooked River and Ochoco Creek by 2017.

5.3.1.2. **Action**: Design and install fish screens at 20 active diversions in the focus area beginning in 2017 and completed by 2022.

5.3.1.3. **Action**: Design and install fish screens at the remaining ~20 active diversions in the focus area beginning in 2022 and completed by 2030.

8.6. Outreach

Outreach outcomes, goals, objectives and actions include:

6. **Outreach Outcome**: Engage the community in the focal watershed to promote increased awareness about the reintroduction of salmon and steelhead and to recruit the support necessary for the Deschutes Partnership to accomplish the restoration objectives.

6.1. **Outreach SMART Goal:** Expand community awareness and engagement in native fish reintroduction and restoration efforts in Whychus Creek, the Metolius River, and the Crooked River.

6.1.1. **Objective**: Conduct at least 10 annual outreach and engagement activities that utilize a diversity of approaches to connect with community members in Prineville, Sisters, Redmond, and Camp Sherman.

6.1.1.1. **Action**: Offer at least six community presentations/meetings per year to inform community leaders and civic groups about restoration efforts and recruit landowners to participate in restoration actions described above.

6.1.1.2. **Action**: Coordinate 5 hands-on stewardship projects annually for at least 200 students and 10 teachers from the communities of Camp Sherman, Sisters, and Redmond (specific activities determined year-by-year based on school needs and restoration project timelines).

6.1.1.3. **Action**: Facilitate watershed education activities for all Crook County elementary schools (specific activities determined year-by-year based on school needs).

6.1.1.4. **Action**: Conduct five stewardship hikes with 50 community members annually on conserved or properties.

6.1.1.5. **Action**: Lead five restoration tours annually to share project success stories and recruit new landowners for future restoration projects.

9. FUNDING NEEDS: ESTIMATED COSTS AND LEVERAGE OPPORTUNITIES

The following table summarizes the estimated total costs for each of the primary goals described in Section 8, above. Please note that the FIP funding values shown below do not include an anticipated $250,000 to $300,000 per biennium for partnership capacity and effectiveness monitoring, both of which are important to achieving and tracking the goals/outcomes described. The FIP funding values presented below include on funding for the 2016-2021 FIP initiative period, not the entire duration of this plan.

Outcome 1: Land Conservation

Partner	Goal	Potential Funding Partners	2016-2021 FIP Funding
Deschutes Land Trust	Whychus Creek: Work cooperatively with willing landowners to permanently protect 3.6 river miles and 173.95 floodplain acres between the City of Sisters (RM 21.3) and the Deschutes River (RM 0) by 2025, using conservation easements or, where appropriate, fee purchases. Projects may also protect associated conservation values, including wetlands and upland habitat, as consistent with OWEB's established acquisition priorities.	NRCS Pelton Fund Private donors	$1,000,000
Deschutes Land Trust	Metolius River: Work cooperatively with willing landowners to protect 3.9 miles and 198.1 floodplain acres of high priority spawning and rearing habitat on Lake Creek and the Metolius River mainstem by 2025, using conservation easements or, where appropriate, fee purchases.	NRCS Pelton Fund Private donors	$750,000

	Projects may also protect associated conservation values, including wetlands and upland habitat, as consistent with OWEB's established acquisition priorities.		
Deschutes Land Trust	Crooked River: Work cooperatively with willing landowners to permanently protect 19.6 miles of stream habitat and 734.2 floodplain acres along McKay Creek, the lower Crooked River, and Ochoco Creek by 2025, using conservation easements as a primary tool, and limited fee purchases where appropriate to meet restoration goals. Projects may also protect associated conservation values, including wetlands, prime and important soils, and upland habitat, as consistent with OWEB's established acquisition priorities.	NRCS Pelton Fund Private donors	$1,525,000

Outcome 2: Stream Habitat

Partner	Goal	Potential Funding Partners	2016-2021 FIP Funding
Upper Deschutes Watershed Council	Whychus Creek: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along 8.5 miles of Whychus Creek on the lands permanently protected by the Deschutes Land Trust.	Pelton Fund NFWF TNC NFF	$2,325,000
Upper Deschutes Watershed Council	Metolius River: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along Lake Creek and Metolius River by 2029.	Pelton Fund NFWF TNC NFF	$0 Activities will occur outside 6-year FIP window
Crooked River Watershed Council	Crooked River: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along 16 miles of McKay Creek, the lower Crooked River, and Ochoco Creek by 2040.	Pelton Fund NFWF TNC NFF	$0 Activities will occur outside 6-year FIP window

Outcome 3: Stream Flow

Partner	Goal	Potential Funding Partners	2016-2021 FIP Funding
Deschutes River Conservancy	Whychus Creek: Protect a minimum of 27 cfs of instream flow (wet water) in Whychus Creek along its entire length from headwaters to the confluence with the Deschutes River by 2025.	NFWF Pelton Fund BOR	$502,000
Deschutes River Conservancy	Crooked River: Protect spring and early summer stream flows of 8.2 cfs in McKay Creek, summer stream flows of 5 cfs in Ochoco Creek, and late spring through early fall stream flows of at least 51 cfs in the Crooked River through water transactions to meet target flow rates during critical times of year by 2035.	NFWF Pelton Fund BOR OWRD	$1,803,000

Outcome 4: Fish Passage

Partner	Goal	Potential Funding Partners	2016-2021 FIP Funding
Upper Deschutes Watershed Council	Whychus Creek: Restore year-round fish passage along the entire length of Whychus Creek from RM 0 (confluence with the Deschutes River) to RM 39 (the upstream most natural barrier) by 2018.	Pelton Fund NFWF TNC NFF	$250,000
Upper Deschutes Watershed Council	Metolius River: Restore year-round fish passage along the 5.5 miles of Lake Creek between Suttle Lake and the Metolius River by 2018.	Pelton Fund NFWF TNC NFF	$175,000
Crooked River Watershed Council	Crooked River: Restore year-round fish passage at all existing artificial barriers in the lower Crooked River by 2022.	Pelton Fund NFWF TNC NFF	$2,230,000

Outcome 5: Fish Screening

Partner	Goal	Potential Funding Partners	2016-2021 FIP Funding
Upper Deschutes Watershed Council	Whychus Creek: Eliminate the risk of fish entrainment in irrigation canals or other diversions by fully screening all diversions along Whychus Creek to meet state and federal criteria by 2022.	Pelton Fund NFWF ODFW	$125,000
Upper Deschutes Watershed Council	Metolius River: Eliminate the risk of fish entrainment at diversions by fully screening all diversions along the 5.5 miles of Lake Creek between Suttle Lake and the Metolius River by 2018.	Pelton Fund NFWF ODFW	$215,000
Crooked River Watershed Council	Metolius River: Eliminate the risk of fish entrainment at diversions by fully screening all diversions in McKay Creek, lower Crooked River and Ochoco Creek by 2030.	Pelton Fund NFWF ODFW	$0 Activities will occur outside 6-year FIP window

Outcome 6: Outreach

Partner	Goal	Potential Funding Partners	2016-2021 FIP Funding
All Partners	All watersheds: Expand community awareness and engagement in native fish reintroduction and restoration efforts in Whychus Creek, the Metolius River, and the Crooked River.	Title II Funding Private foundations Private donors	$300,000

10. EVALUATING SUCCESS

The following table outlines the anticipated baseline and effectiveness monitoring for each SMART Goal described in Sections 8 and 9, above.

SMART Goal	Baseline Monitoring	Effectiveness Monitoring
Land Conservation		
Whychus Creek SMART Goal: Work cooperatively with willing landowners to permanently protect 3.6 river miles and 173.95 floodplain acres between the City of Sisters (RM 21.3) and the Deschutes River (RM 0) by 2025, using conservation easements or, where appropriate, fee purchases. Projects may also protect associated conservation values, including wetlands and upland habitat, as consistent with OWEB's established acquisition priorities.	Inventory number of stream miles and acres protected prior to first conservation transaction (2000) and prior to launch of this SAP (2015).[1]	Update inventory and report progress toward SMART Goal. [1]
Metolius River SMART Goal: Work cooperatively with willing landowners to protect 3.9 miles and 198.1 floodplain acres of high priority spawning and rearing habitat on Lake Creek and the Metolius River mainstem by 2025, using conservation easements or, where appropriate, fee purchases. Projects may also protect associated conservation values, including wetlands and upland habitat, as consistent with OWEB's established acquisition priorities.	Inventory number of stream miles and acres protected prior to first conservation transaction (2000) and prior to launch of this SAP (2015). [1]	Update inventory and report progress toward SMART Goal. [1]

Crooked River SMART Goal: Work cooperatively with willing landowners to permanently protect 19.6 miles stream habitat and 734.2 floodplain acres along McKay Creek, the lower Crooked River, and Ochoco Creek by 2025, using conservation easements as a primary tool, and limited fee purchases where appropriate to meet restoration goals. Projects may also protect associated conservation values, including wetlands, prime and important soils, and upland habitat, as consistent with OWEB's established acquisition priorities.	Inventory number of stream miles and acres protected prior to first conservation transaction (2000) and prior to launch of this SAP (2015). [1]	Update inventory and report progress toward SMART Goal. [1]
Stream Habitat		
Whychus Creek SMART Goal: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along 8.5 miles of Whychus Creek on the lands permanently protected by the Deschutes Land Trust.	Inventory number of stream miles remaining in channelized condition prior to first stream channel restoration project (2008) and prior to launch of this SAP (2015). [2] Rate stream habitat quality prior to first stream channel restoration project in 2008 (using 1997-1998 HabRate ratings as baseline). [2]	Update number of miles of stream habitat restored. [2] Update HabRate habitat quality ratings 5-15 years post-project completion. [3]
Metolius River SMART Goal: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along Lake Creek and Metolius River by 2029.	Establish photopoints of riparian vegetation on acquisition of parcels. [2] Survey in-stream woody material on acquisition of parcels within 1.5 miles to be protected. [2]	Repeat photopoints one,five, and ten years post-project completion. [2] Repeat woody material surveys one, five, and ten years post-project completion. [2]

Crooked River SMART Goal: Restore stream habitat (including the suite of channel and floodplain conditions required for successful spawning and rearing) along 16 miles of McKay Creek, the lower Crooked River, and Ochoco Creek by 2040.	Inventory number of stream miles remaining in channelized condition prior to first stream channel restoration project and prior to launch of this SAP. [4] Rate stream habitat quality prior to first stream channel restoration project in using 1997-1998 HabRate ratings as baseline.[4]	Update number of miles of stream habitat restored. [4] Update HabRate habitat quality ratings 5-15 years post-project completion. [3]
Stream Flow		
Whychus Creek SMART Goal: Protect a minimum of 27 cfs of instream flow (wet water) in Whychus Creek along its entire length from headwaters to the confluence with the Deschutes River by 2025.	Whychus Creek instream water rights inventory (DRC database). [5] 2009 Whychus Creek annual 30-day minimum and May and August monthly median flow. [5] 2000 Stream temperature data. [2] 2005 Macroinvertebrate data. [2]	Track instream water rights annually using DRC database. [5] Track trend in Whychus Creek annual 30-day minimum and May and August monthly median flow. [5] Track trend in July 7DMAX temperatures at Sisters City Park and Road 6360. [2] Collect, analyze, and report on macroinvertebrate community data. [2]
Crooked River SMART Goal: Protect spring and early summer stream flows of 8.2 cfs in McKay Creek, summer stream flows of 5 cfs in Ochoco Creek, and late spring through early fall stream flows of at least 51 cfs in the Crooked River through water transactions to meet target flow rates during critical times of year by 2035.	McKay Creek instream water rights inventory (DRC database). [5] 2015 McKay Creek April, May and June monthly median flow. [5] Ochoco Creek instream water rights inventory (DRC database). [5] 2014 Ochoco Creek July monthly median flow.[5]	Track instream water rights annually using DRC database. [5] Track trend in McKay Creek April, May and June monthly median flow. [5] Track instream water rights annually using DRC database. [5] Track trend in Ochoco Creek July monthly median flow. [5]

Fish Passage		
Whychus Creek SMART Goal: Restore year-round fish passage along the entire length of Whychus Creek from RM 0 (confluence with the Deschutes River) to RM 39 (the upstream most natural barrier) by 2018.	2009 UDWC passage barrier inventory. [2]	Update number of barriers removed and remaining, and report increase in habitat connectivity. [2]
Metolius River SMART Goal: Restore year-round fish passage along the 5.5 miles of Lake Creek between Suttle Lake and the Metolius River by 2018.	2009 UDWC passage barrier inventory. [2]	Update number of barriers removed and remaining, and report increase in habitat connectivity. [2]
Crooked River SMART Goal: Restore year-round fish passage at all existing artificial barriers in the lower Crooked River by 2022.	CRWC passage barrier inventory. [4]	Update number of barriers removed and remaining, and report increase in habitat connectivity. [4]
Fish Screening		
Whychus Creek SMART Goal: Eliminate the risk of fish entrainment in irrigation canals or other diversions by fully screening all diversions along Whychus Creek to meet state and federal criteria by 2022.	2009 UDWC fish screen inventory. [2]	Update number of diversions screened and remaining unscreened diversions. [2] Update total diversion rate, cumulative unscreened diversion rate, and reduction in unscreened diversion rate (cfs). [2]
Metolius River SMART Goal: Eliminate the risk of fish entrainment at diversions by fully screening all diversions along the 5.5 miles of Lake Creek between Suttle Lake and the Metolius River by 2018.	2009 UDWC fish screen inventory. [2]	Update number of diversions screened and remaining unscreened diversions. [2] Update total diversion rate, cumulative unscreened diversion rate, and reduction in unscreened diversion rate (cfs). [2]

Crooked River SMART Goal: Eliminate the risk of fish entrainment at diversions by fully screening all diversions in McKay Creek, lower Crooked River and Ochoco Creek by 2030.	CRWC fish screen inventory. [4]	Update number of diversions screened and remaining unscreened diversions. [4] Update total diversion rate, cumulative unscreened diversion rate, and reduction in unscreened diversion rate (cfs). [4]
Outreach		
SMART Goal: Expand community awareness and engagement in native fish reintroduction and restoration efforts in Whychus Creek, the Metolius River, and the Crooked River.	Inventory total number of annual outreach and engagement activities hosted by Deschutes Partnership organizations prior to launch of this SAP (2015). [2]	Update number of annual Deschutes Partnership outreach and engagement activities. [2]

Organizations responsible for monitoring include the following:

[1]Deschutes Land Trust
[2]Upper Deschutes Watershed Council
[3]Portland General Electric and Confederated Tribes of Warm Springs
[4]Crooked River Watershed Council
[5]Deschutes River Conservancy

11. ADAPTIVE MANAGEMENT

Within the broad scope of restoration programs implemented by the Deschutes Partnership, there will continue to be many opportunities for ongoing learning and refinement at the project, program, organizational and partnership levels. These opportunities will be addressed individually over time as they arise using the communication and consensus processes employed by the Deschutes Partnership over the past decade. Some key areas where learning will likely continue include:

Partnership Structure and Operations

Although the Deschutes Partnership's existing structure works well for the types of projects and funding used today, it is possible that changes in the future may require new approaches to collaboration, sharing of resources, division of labor or other aspects of the partnership work. The Deschutes Partnership's existing governance model is flexible enough to allow changes to be integrated over time.

Internal Change

If partner organizations undergo change in staffing, board of directors, capacity or other key factors, the Deschutes Partnership will respond by stepping up to help address limiting factors. For example, if there are gaps in staffing, other members of the Deschutes Partnership may be able to share staff resources for a limited time to cover a dip in capacity. Or, if there is major Board of Directors turn-over, the other members of the partnership may need to engage with the new board of directors through a series of meetings to help maintain alignment for the partnership as a whole. Over the past decade, the Deschutes Partnership has faced some of these challenges and been largely successful at coming together to share resources, help one another, and maintain positive partnership momentum.

Restoration Needs

Specific restoration needs and targets may change over time, especially those that are affected by climate change (*e.g.*, streamflow restoration). For these restoration programs, the Deschutes Partnership will use ongoing monitoring as well as new modeling (*i.e.*, the Deschutes Basin Study's Climate Change Analysis) to make predictions about how instream flow restoration targets may need to evolve under changing climatic circumstances.

Stream Restoration techniques

Along Whychus Creek, restoration of the channelized reaches is a high priority and an important step in creating the type of spawning and rearing habitat needed for returning salmon and steelhead. However, the approach to this kind of "stream re-meandering" restoration can take many forms and use a variety of techniques that follow different schools of thought. The Upper Deschutes Watershed Council and its U.S. Forest Service restoration advisors have used several different techniques over the past 10 years of restoration implementation and witnessed important advantages and disadvantages with different techniques. As monitoring of these sites

continues, the designs and approaches for new restoration projects will likely be refined to optimize ecological outcomes and cost effectiveness within the range of site conditions present throughout the watershed.

Regardless of the specific learning opportunity or new information available, the Deschutes Partnership is committed to a flexible, adaptive approach because the long-term objectives can only be accomplished if continual improvement is part of the strategy.

12. SUSTAINABILITY

The Deschutes Partnership formed in 2006 and has sustained a high-functioning partnership continuously since that time. This success has been in large part due to a flexible approach to continued learning and adaptation that enables the partnership to sustain major changes in funding, emerging issues, staff turnover and other unexpected changes. Over the years, the partners have come to understand how political, social, funding and technical issues can converge to either increase or decrease the pace of our collective restoration work. Based on this perspective and assuming that funding continues to be available, we believe 35 years (*i.e.*, 2005-2040) is a likely timeframe for achieving the major outcomes envisioned for the life of this partnership.

Although a 35-year timeframe is much longer than envisioned among most conservation and funding organizations, it is consistent with emerging thinking from leading northwest conservation organizations that are starting to promote 50-year visions for watershed restoration. These long-term approaches are still relatively short when compared to the 100+ years of channel manipulation, water withdrawals and habitat loss that has led to the degraded conditions present in Whychus Creek, the Crooked River and portions of the Metolius River watershed. In addition, this 35-year timeline is complementary to the long-term investment strategy being implemented through the Pelton Mitigation Fund, which was established to help address the habitat factors limiting the establishment of wild salmon and steelhead runs above the Pelton-Round Butte dams. The Pelton Fund will make its final distribution in 2021, funding projects through approximately 2030.

The pace and scale of restoration is likely to vary between the focal watersheds that are being addressed by the Partnership. In Whychus Creek, the suite of large capital projects will be mostly completed by 2025. In the Crooked River, by contrast, capital projects will continue over a longer duration because they are ramping up more gradually over time. These differences reflect the different needs of the watersheds, different community contexts and unique restoration histories in each watershed.

13. LITERATURE CITATIONS

Grant, Heather McLeod and Leslie Crutchfield. 2007. Creating High Impact Nonprofits. Stanford Social Innovation Review. Fall.

ODFW. 2010. Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment. Oregon Department of Fish and Wildlife. February.

TNC. 2007. Conservation Action Planning: Developing Strategies, Taking Action and Measuring Success at Any Scale. The Nature Conservancy. 18 p.

APPENDIX A Conservation Action Planning

The *Strategic Action Plan* describes in specific detail the Deschutes Partnership's proposed restoration actions, ecological outputs and ecological outcomes to be completed in the SAP geography. The Deschutes Partnership identified and selected the priority actions, outputs and outcomes described in the Strategic Action Plan based on two primary sources of information:

First, the Deschutes Partnership specifically designed the *Strategic Action Plan* to focus on the limiting factors described in the *Recovery Plan* that covers the upper Deschutes Basin (See: *Conservation and Recovery Plan for Oregon Steelhead Populations in the Middle Columbia River Steelhead Distinct Population Segment* [ODFW 2010]). This *Recovery Plan* outlines the identified limiting factors by watershed (Section 8 of the *Recovery Plan*) as well as a series of strategies and actions to address those factors (Section 9 of the *Recovery Plan*). These strategies and actions are aligned directly with the proposed actions in the *Strategic Action Plan* and, for many proposed actions, the *Recovery Plan* has already identified members of the Deschutes Partnership by name as the primary implementers for those strategies and actions. Recognized core competencies and niche differentiation among partner organizations allow for easy identification of a lead partner organization for a given project according to geography and project type.

Second, the Deschutes Partnership worked to further refine the strategies and actions from the *Recovery Plan* using a specific Conservation Action Planning logic framework that works backwards from the desired conservation outcomes to develop a model for watershed restoration. This approach was needed because the *Recovery Plan* is several years out of date and does not acknowledge much of the work completed in the past six years nor does it address the fine level of detail needed to plan specific restoration actions. The Conservation Action Planning process followed existing protocols (see *Conservation Action Planning: Developing Strategies, Taking Action and Measuring Success at Any Scale* [TNC 2007]), summarized as follows:

1. Identify "conservation outcomes or targets"
2. Identify "threats" to those conservation targets
3. Identify "contributing factors" to those threats
4. Identify specific "actions" that reduce the "threats" or alter the "contributing factors"
5. Identify "strategies" that deliver these "actions"
6. Build "results chains" that document the linkages between the strategies, actions, contributing factors, threats, and ultimately, the conservation targets
7. Assign monitoring activities to assess the changes over time

This specific Conservation Action Planning tool was employed using software called *Miradi* (see www.miradi.org), generating a complex graphical model that illustrates the linkages between the elements described above. This approach was first introduced to the Deschutes Partnership through the Bonneville Environmental Foundation's (BEF) Model Watershed Programs in 2009 and, after using this tool / approach in Whychus Creek with BEF, the Deschutes Partnership expanded its use to all of its focal watersheds. This tool is currently used in BEF's Model

Watershed Programs around the Northwest. The resulting conceptual model identifies and maps relationships among factors contributing to watershed degradation and actions anticipated to effectively mitigate or eliminate those factors within the watershed as a whole, including factors and actions outside of the scope of Deschutes Partnership actions or the SAP. This comprehensive assessment of watershed health and factors affecting it allows restoration partners to articulate a shared understanding of watershed dynamics while clearly defining the work to be accomplished by Deschutes Partnership organizations.

Together, the *Recovery Plan* and *Conservation Action Planning* helped the Deschutes Partnership identify the suite of actions necessary to achieve the desired ecological outputs and outcomes. From this point, the partners then worked together to align implementation priorities based on estimates of sequencing, leverage opportunities, project readiness and other key factors.