Upper Klamath Special Investment Partnership

Accomplishments Summary Report

Klamath Watershed Partnership

The Klamath Tribes

UKWUA Upper Klamath Water Users Association

The Nature Conservancy

Klamath Soil & Water Conservation District

Klamath Basin Rangeland Trust

U.S. Fish & Wildlife Service

Oregon Watershed Enhancement Board
April 2016

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Background

In January 2012, the OWEB Board authorized the Upper Klamath Special Investment Partnership (UKSIP). The overarching goal of the UKSIP is to contribute to chemical, thermal, and physical aquatic conditions that will benefit fish populations and water quality in the Upper Klamath Basin by reestablishing, improving, and sustaining the ecological and hydrologic connectivity of aquatic ecosystems. This report provides an overview of the progress made by the UKSIP from 2012 to 2015.

At the outset of the UKSIP, the partnership's area encompassed the Upper Klamath Basin, an area defined as the catchment above the Link River Dam, including Upper Klamath Lake with its tributaries, and Spencer Creek, which drains directly to the Klamath River. This program area is outlined in red on the adjacent map. For the 2013-2015 biennium, the implementing partners focused their efforts on four sub-basins: Cascade Tributaries, Sprague River Valley Bottom, Upper Klamath Lake Fringe Wetlands, and Wood River, which are also shown on the adjacent map.

Strategic Partners

The Upper Klamath SIP implementation partners, known as the Upper Klamath Conservation Action Network (UKCAN), include:

- Klamath Basin Rangeland Trust (KBRT) — now part of Trout Unlimited
- Klamath County Soil and Water Conservation District (KSWCD)
- Klamath Watershed Partnership (KWP)
- The Klamath Tribes (TKT)
- The Nature Conservancy (TNC)
- Upper Klamath Water Users Association (UKWUA)
- U.S. Fish and Wildlife Service (USFWS)

When OWEB launched the UKSIP, it joined with National Fish and Wildlife Foundation's (NFWF) *Upper Klamath Basin Keystone Fisheries Initiative*. In 2008, NFWF released a 10-year business plan designed to restore watershed conditions within the Upper Klamath Basin, including hydrologic connectivity, in an effort to increase the distribution and abundance of Lost River sucker, shortnose sucker, and redband trout. In addition to NFWF, the Bureau of Land Management (BLM), US Forest Service (USFS) and USFWS, while not core funders of the UKSIP, have been important partners due to the technical assistance and restoration funding they provide in the Upper Klamath Basin. Other strategic partners during the course of the SIP investment included:

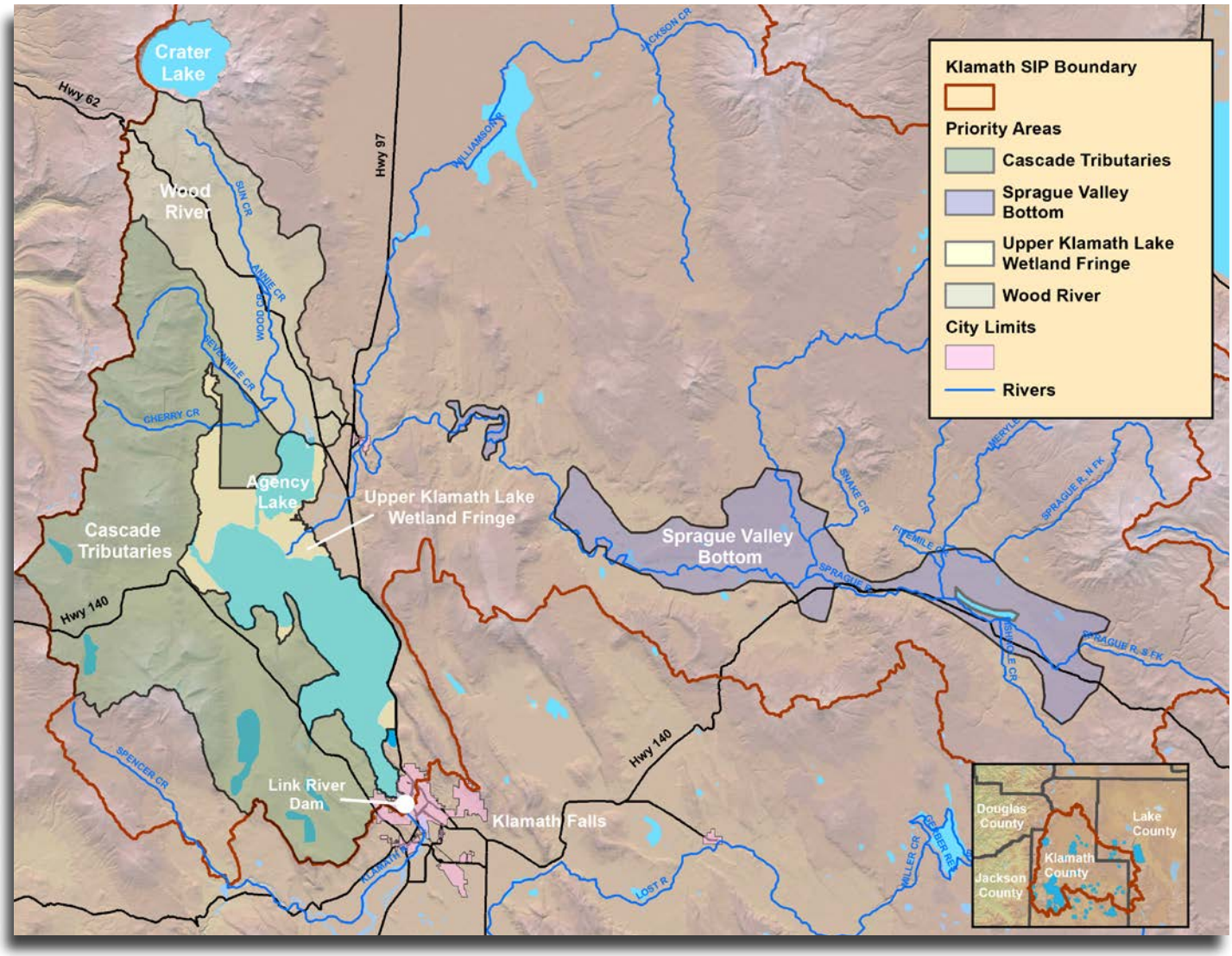
- Balance Hydrologics, Inc.
- Natural Resources Conservation Service (NRCS)
- Oregon Department of Fish and Wildlife (ODFW)
- Sustainable Northwest
- U.S. Bureau of Reclamation (USBOR)
- U.S. Geological Survey (USGS)

Desired Ecological Outcomes

UKSIP's desired ecological outcomes were designed to result in improved hydrologic connection between riverine systems and associated floodplains, reduced external loading of nutrients into Upper Klamath Lake, and reduced water temperatures. The partners identified the following specific outcomes:

- Recover state and federally listed fish in the Upper Klamath Basin (e.g., Lost River and shortnose suckers, bull trout, and redband trout).
- Improve water quality.
- Prepare the Upper Klamath Basin aquatic ecosystems to support re-establishment of anadromous salmonids.

While stream flow restoration during the UKSIP timeframe has been essential to meeting these desired ecological outcomes, these funds were focused only on restoration activities due to the small amount of the UKSIP award. The UKCAN partners were eligible to pursue funding from the OWEB Water Acquisition Program and the accomplishments achieved with that funding are included in this report.




Sevenmile Creek surveying

Applying a Scientific Framework

Water-quality monitoring has been an important focus of the implementing partners. TKT began long-term monitoring in Upper Klamath and Agency lakes in 1990, and in the Sprague, Wood, and Williamson river watersheds in 2001. Additional monitoring data from other partners, including KBRT, Oregon Department of Environmental Quality (ODEQ), ODFW, TNC, USBOR, USGS, and several universities, provide a basis for identifying restoration priorities and evaluating changes in agricultural practices and restoration actions.

The UKSIP has helped fund two water quality monitoring efforts by TKT. One monitoring grant allowed the Tribes and USGS to resume continuous, real-time monitoring of turbidity and suspended sediment concentrations (SSC) in the Sprague and Williamson river basins. The other grant is helping TKT refine their understanding of nutrient loading in the Sprague and Wood rivers and in Sevenmile Creek. These monitoring efforts are key to facilitating trend analyses for determining the effectiveness of past restoration activities and for prioritizing future restoration activities.

UKSIP technical assistance funding has helped UKCAN partners identify future restoration actions to improve water quality and fish habitat. One project that is in progress will develop a list of ideal locations for water-quality improvements by mapping the hydrologic network and identifying potential nutrient sources. Another project is helping UKCAN partners continue to develop the Sprague Basin Restoration Opportunities Analysis, which will present a framework for identifying restoration opportunities in the Sprague River Basin.

Measuring Progress: Fish Screening and Passage

Lost River suckers, shortnose suckers, redband trout, bull trout, and Klamath lamprey are all impacted by a wide range of human-created fish barriers and entrainment hazards. The *UKSIP 2013 Needs Assessment* identified priority fish screens and barriers to be addressed by 2019. The UKCAN partners have made limited but important progress in screening those priority diversions that pose the greatest risks for fish entrainment and in restoring access to significant amounts of fish habitat. The gauges below reflect the targets established in the Needs Assessment and progress made during the UKSIP timeframe.

Limiting Factors

- Barriers to fish movement, primarily irrigation diversion structures.
- Poor connectivity that blocks access to habitat for both juvenile and adult fish.
- Unscreened diversions and poorly functioning fish screens.

Objectives

- Eliminate entrainment of larval and juvenile fish species.
- Provide reliable fish passage and install fish screens at priority irrigation diversions.

Actions Taken

- Installed fish screens on irrigation pumps and canals.
- Replaced poorly functioning fish screens.
- Removed fish barriers (e.g., culverts).
- Developed fish bypass channels.


Sevenmile Creek during construction

Progress toward Outputs and Ecological Outcomes

Fish Screening

Number of fishscreens installed: *Baseline: 2* *SIP Progress: 8* *Ecological Goal: 15*

The UKCAN partners have reduced the risk of fish entrainment by installing six fish screens on priority diversions in the Sprague River, Wood River, and Sevenmile Creek watersheds. These projects have successfully screened a total of 130 cubic feet per second (cfs) of water diverted for irrigation.

Fish Passage

Number of fish barriers removed: *Baseline: 16* *SIP Progress: 21* *Ecological Goal: 30*

The UKCAN partners have improved passage at five fish barriers in the South Fork Sprague River, Sevenmile Creek, and Wood River watersheds. These projects have successfully created access to an additional 70.5 miles of fish habitat.

Highlight: Lower Sevenmile Creek Fish Passage

Constructed fish bypass channel

Located upstream of the Upper Klamath National Wildlife Refuge, Sevenmile Creek is a tributary to Agency Lake that contains some of the best remaining stream habitat, and the cleanest and coldest water due to numerous freshwater springs in the Upper Klamath Basin. The area is home to the Lost River sucker, shortnose sucker, bull trout, native redband trout and the federally listed Oregon spotted frog. In 2014, KBRT partnered with USFWS and three private landowners to provide fish passage at the largest barrier on Sevenmile Creek. The project constructed a fish bypass channel (above) around a diversion dam (main photo). Two constructed inlet structures allow the channel to meet passage criteria for both species of sucker and redband trout. The completed project improved fish access to over 21 stream miles, including cold-water habitats. The project is a showcase for collaborative restoration and continued productivity of private ranch-lands.

Existing diversion structure

Measuring Progress: Habitat Restoration

A century of land-use alterations have reduced and degraded floodplain habitat used by fish and wildlife, including riparian and wetland fringe habitats. Nearly all the lake's tributary streams and their associated riparian habitats and floodplain wetlands have been altered or degraded by human activities. More than 40,000 acres of lake-fringe wetlands along the shore of Upper Klamath Lake have been diked, drained, and converted to agriculture. The loss of these productive habitats has greatly impacted suckers and other wetland-dependent species.

Limiting Factors

- Excessive sedimentation.
- Loss of productive fringe wetlands around Upper Klamath Lake.
- Habitat degradation including loss of available cover, bank destabilization, and lack of floodplain connectivity.
- Habitat fragmentation causing reduced genetic exchange.

Objectives

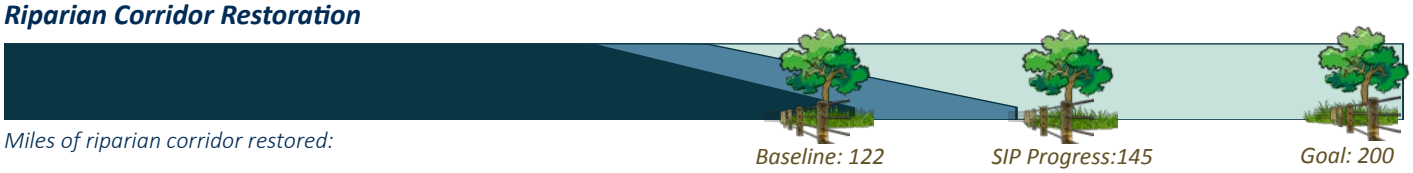
- Restore the wetland habitats along the fringes of Upper Klamath Lake.
- Improve riparian and grazing management practices.
- Restore connectivity and process to channelized reaches of priority streams.

Actions Taken

- Installed riparian fencing and off-stream watering facilities for livestock.
- Controlled invasive vegetation and planted native trees and shrubs.
- Removed and notched levees.
- Added log and rock structures and augmented instream gravel.
- Re-meandered existing straightened channels and constructed new channels.

Progress toward Outputs and Ecological Outcomes

Riparian Corridor Restoration



The UKCAN partners fenced and planted approximately 14 riparian stream miles in the Wood, Sprague, Sycan, and Williamson river watersheds. In addition, the partners enhanced instream habitat in the Sprague and Wood river watersheds by placing boulders and large woody debris along nine stream miles.

Lake Fringe, Wetlands, and Floodplain Restoration

The UKCAN partners have restored 639 acres of riparian and floodplain habitat, and 21 acres of wetlands have been enhanced or created in the Wood, Sprague, Sycan, and Williamson river watersheds to improve habitat.

Highlight: Sun Creek Historic Channel Reconnection

Beginning the reconnection process along Sun Creek's historic channel in a forested portion of the watershed

A portion of the historic floodplain that will be reconnected to Sun Creek

Sun Creek originates on the southern slopes of Crater Lake National Park and was historically a tributary to the Wood River in the Upper Klamath Basin. Within the park, Sun Creek is in fairly pristine condition, and a population of federally threatened bull trout inhabits this upstream portion of the creek. However, the downstream portion flows through private property and has been heavily impacted by agricultural land use.

In 2014, KBRT received an OWEB grant to reconnect Sun Creek to the Wood River along its historic channel, creating a migratory corridor for the isolated bull trout population, and also expanding available habitat for redband trout already present in Wood River. The reconnection also included the installation of a screen to prevent fish entrainment in irrigation ditches along the lower creek. When the project is complete, the riparian area will be fenced and revegetated with native trees and shrubs to decrease nutrient loading, increase stream shading, and over time, provide a natural source of instream wood. Concurrent projects funded by USFWS and NRCS that will further benefit Sun Creek include acquiring permanent instream water transfers in the new channel and installing irrigation efficiency improvements. Effectiveness monitoring is underway. The partners will measure fish distribution and will conduct spawning surveys and geomorphic assessments.

Measuring Progress: Water Quality and Streamflow

Land-use alterations — agriculture, logging, ranching, and urbanization — have impacted water quality and altered the hydrologic regime throughout the basin. This imbalance, compounded in recent years by drought, has had serious consequences for fish and wildlife habitat. Irrigation diversions within the watershed have partially or completely dewatered critical streams, while return flows are often too warm or nutrient laden to provide adequate instream conditions for listed and threatened species.

Limiting Factors

- Excessive thermal and nutrient loading.
- Reduced instream flow.
- Lack of fish access to essential habitat.

Objectives

- Improve water quality and access to habitat for sensitive aquatic species.
- Improve riparian and grazing management practices.
- Eliminate the direct return of warm water from irrigation ditches into stream systems.
- Improve irrigation efficiencies.
- Increase instream flows.
- Secure long-term leases or purchase water rights from willing sellers.

Actions Taken

- Constructed small diffuse-source treatment wetlands.
- Installed riparian fencing and off-stream watering facilities for livestock.
- Controlled invasive vegetation and planted native trees and shrubs.
- Converted instream water leases to permanent instream transfers of water rights.

Progress Toward Outputs and Ecological Outcomes

Water-Quality Improvement

Many restoration activities contribute to improving water quality. For example, the riparian and lake fringe and wetlands restoration activities described in the preceding section improve water quality and provide fish and wildlife habitat. The installation of two treatment wetlands in Sevenmile Creek by UKCAN partners is helping reduce the amount of nutrients reaching Upper Klamath Lake, while creating important habitat for wetland species. The UKCAN partners have treated 271 acres of pastureland in the Sprague River and Sevenmile Creek watersheds to minimize impacts to water quality.

A recent analysis of UKL tributaries water-quality trends from 1992 to 2010 indicate that recent reductions in nutrient concentrations are likely a result of restoration actions and watershed management and grazing strategies aimed at reducing nutrient input in Agency Lake tributaries, as well as implementation of wetland restoration projects at Agency Lake Ranch and Wood River Ranch. An updated analysis of 2010 to 2015 data will help in characterizing the effects of recent restoration actions including those funded under the UKSIP.

Streamflow Restoration

UKCAN partners have implemented three streamflow restoration projects to permanently transfer 6,969 acre feet of water for instream purposes to improve water quality and benefit fish species in the Sprague River and Deming, Cherry, Fourmile, and Sevenmile creeks. These projects have helped the partners achieve nearly half the targeted amount of water to be added to base flows, as called for in upper basin restoration plans.

Highlight: South Fork Sprague River and Deming Creek Flow Restoration

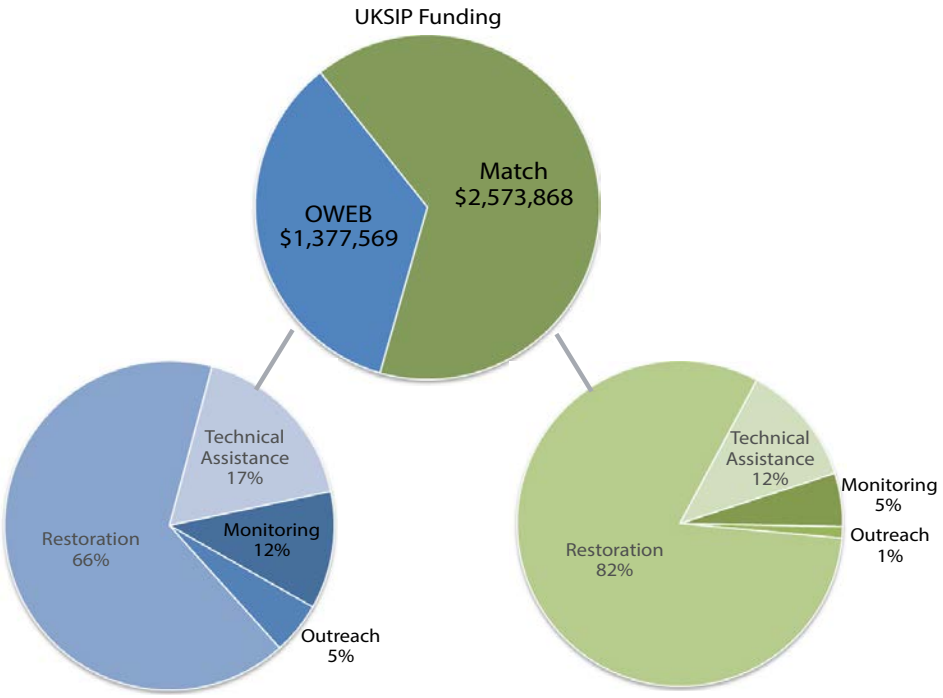
View of South Fork Sprague River Channel Realignment; the newly completed South Fork Sprague River is on the left and the former flow path of the South Fork Sprague River is on the right.

Deming Ranch is located on the South Fork Sprague River, which supports ESA-listed shortnose and Lost River suckers and redband trout. The river had previously been straightened and bermed, constraining high flows in the channel. This activity resulted in bank erosion that contributed phosphorous and nitrogen to Upper Klamath Lake, influencing algae growth and impacting water quality. In 2012, Deming Ranch Land and Cattle LLC, in partnership with USFWS, received an OWEB grant to build a new channel for 1.3 miles of the South Fork Sprague River at its confluence with Deming Creek to address these impacts (see photo above). The project also contributed to UKCAN's desired water quality ecological outcome by implementing livestock grazing improvements on 220 acres of irrigated pasture.

With completion of the new channel, KBRT successfully collaborated with the landowner on streamflow restoration. An OWEB water acquisition grant, awarded in 2014, permanently transferred an instream water right for Deming Creek of more than 1,600 acre-feet of water. This resulted in an instream savings of more than 13 cfs. The increased instream flows benefit listed and sensitive fish species on seven miles of Deming Creek and 2.5 miles of South Fork Sprague River.

Summary of Contributions

The total UKSIP investment made by OWEB is over $1.37 million, with the partners leveraging another $2.57 million, bringing the total investment from 2012 to 2015 to nearly $4 million. In addition, UKCAN partners successfully acquired $1.68 million dollars from OWEB's Water Acquisition Program during this timeframe to implement their streamflow restoration priority actions. These combined funding sources were integral to achieving the accomplishments described in this report. UKSIP technical assistance and outreach grants made up one-quarter of the funding received and were instrumental in recruiting interested landowners, identifying priority areas for restoration, and designing projects.



Separately Leveraged Projects

The UKCAN partners have implemented additional projects during the UKSIP timeframe with other funding sources that have enabled them to make progress towards meeting their desired ecological outcomes. Below are three examples of those separately leveraged projects.

- TNC acquired from willing sellers a 1,900-acre parcel at the north end of Upper Klamath Lake that includes an NRCS Wetland Reserve Program easement. NRCS, working with TNC, has completed restoration of the property's wetland and riparian habitat. Future work will focus on connecting the property to the lake and restoring lake-fringe habitat.
- TKT is implementing a sucker egg incubation and larval release program in historically important spawning sites in the upper basin. This will encourage return of adult suckers to suitable spawning sites that have been under-used due to a lack of connectivity.
- KWP received funding from ODFW and USFWS to install a fish screen on a diversion from Fishhole Creek, a tributary to the South Fork Sprague River, as well as funding from the Gray Family Foundation, Sustainable Northwest, and USFS to sponsor several outreach events.

Local Economy and Community Outcomes

UKCAN encourages the use of local contractor services and sources for materials and labor wherever possible. Local contractors have been used on restoration projects to accomplish work related to engineering, excavation, well-drilling, and building livestock exclusion fencing. Additionally, with the help of UKSIP funding, TKT provides stable, permanent, and relatively well-paying jobs for local technicians and tribal youth interns to perform monitoring.

UKSIP technical assistance funding helped KSWCD and NRCS develop ranch management plans to assist 12 landowners to convert 1,200 acres of poorly irrigated pasture and cropland to dryland grasses. UKSIP funding also helped KWP offer landowner outreach workshops to promote UKCAN restoration objectives while meeting landowners' specific needs. Workshops have addressed such topics as rangeland and pasture management, irrigation efficiencies, and beaver management.

KWP Rangeland and Pasture Management workshop attendees

Reflections

Lessons Learned: Funders' Perspective

- The scale of the restoration geography should align with the scale of the investment.
- Smaller scale partnership investments may not be able to support all activity types needed to achieve desired ecological outcomes. In these cases, a diversity of funding sources is necessary.
- Governance structure and organizational decision-making processes are important to successful partnerships.
- Broader policy and management issues can affect the interest and willingness of landowners to engage in restoration and conservation work.
- Set realistic expectations about the time lag between restoration actions and the recovery of highly imperiled species. While many of the investments made to date are likely to play an important role in the long-term trajectory of these species, many interacting stressors need to be addressed at a sufficient scale to expect to see measurable demographic changes in these species.
- Program design should anticipate the need to adapt to changes in local capacity and focus as the program matures.

Lessons Learned: Implementing Partners' Perspective

- Devote time to understanding landowners' needs and concerns, and work with them to provide natural resource improvements, while maintaining or improving current agricultural or ranching operations.
- Plan for staff turnover so that programmatic and institutional knowledge is not lost and can be passed on to new staff members.
- Implement both pre-project monitoring and effectiveness monitoring to assess restoration actions. The former establishes a baseline for comparing conditions pre- and post-implementation, and the latter is essential for assessing trends.
- Recognize that large-scale ecological effects likely will not occur in the short term.
- Apply adaptive management based on past experiences and lessons learned.

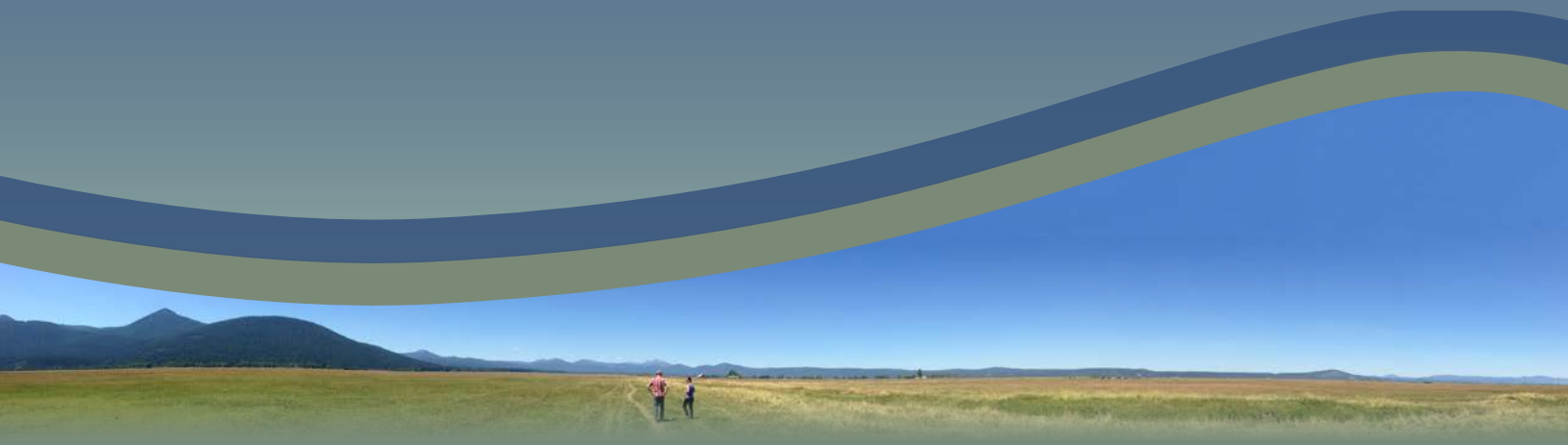
Partners discussing plans for a fish passage project

Recommendations for OWEB Board Consideration

- The Board's continuing support of the Upper Klamath Basin restoration community will be essential to leveraging additional funds, improving coordination among partners, and accelerating the pace and scope of restoration in the upper basin.
- Partners recommend that the Board consider extending the timeframe of future partnership investments to up to a decade to maximize restoration effectiveness and momentum with the community, while working toward improved functions and processes.

Looking Ahead

Partners continue to share a common goal of leveraging funds in priority areas to increase the quality, pace, and scale of restoration in the Upper Klamath Basin. This requires the establishment of restoration objectives that meet ecological needs, as well as the needs of individual landowners. In an area with such a diversity of interests and limited water resources, the best opportunities lie in collaboration. Several UKCAN partners recently received a NRCS Regional Conservation Partnership Program national award to address water quantity and quality in the region. UKCAN members are also working with partners from the Lower Klamath Basin to coordinate and address restoration needs around water-quality issues. The partners are committed to continuing to meet and establish goals, while working together for the best ecological and social outcomes in the entire Klamath Basin.



Special thanks for contributing to this report to Bill Lehman (Klamath Watershed Partnership), Joe Watkins and Brian Quick (Klamath SWCD), Megan Skinner (Klamath Tribes), Heather Hendrixson (TNC), Nell Scott and Tony LaGreca (Trout Unlimited), and Sue Mattenberger and Jared McKee (USFWS).

Ken Fetcho, OWEB's Effectiveness Monitoring Coordinator, and Wendy Hudson (retired) produced the report. Troy Wirth, OWEB's GIS and Technology Specialist, created the map. Eric Hartstein, UKSIP Coordinator, also provided valuable input along the way. OWEB staff is grateful for the contributions of photos and reflections from the program's implementing and funding partners.

We also thank our principal funding partners, NFWF and USFWS, without whom this program could not have succeeded to the extent it has.

Photo credits: Chris Galloway Construction, KBRT, KWP, TKT, TNC, and USFWS.

For more information on the UKSIP, contact Eric Williams, Grant Program Manager, at eric.williams@state.or.us or (503) 986-0047 .

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