Kate Brown, Governor

OREGON WATERSHED ENHANCEMENT BOARD
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Agenda Item R supports OWEB's Strategic Plan priority #3: Community capacity and strategic partnerships achieve healthy watersheds.

MEMORANDUM

TO: Oregon Watershed Enhancement Board

FROM: Leah Tai, Partnerships Coordinator
Lisa Appel, Conservation Outcomes Specialist
Renee Davis, Deputy Director/Technical Services Manager

SUBJECT: Agenda Item R – Focused Investment Partnership (FIP) Program Monitoring and Progress Tracking
January 22-23, 2020 Board Meeting

I. Introduction

At the January board meeting, Robert Warren from BEF will join OWEB staff to provide a presentation about the ongoing Implementation FIP monitoring and progress tracking work, including discussion of the generic ecological theory of change for each board-adopted FIP priority, progress monitoring frameworks for each of the five second cohort of FIP initiatives, and progress tracking reports for the six first cohort of FIP initiatives.

II. Background

Since 2016, OWEB has been working in partnership with Bonneville Environmental Foundation (BEF) on OWEB's FIP program development and assessment. A FIP is an OWEB investment that addresses a Board-identified priority of significance to the state, achieves clear and measurable ecological outcomes, uses integrated and results-oriented approaches as identified through a strategic action plan, and is implemented by a high-performing partnership. Since April 2016, the board has awarded BEF $439,649 for FIP monitoring, including assistance with the development of tools to enhance FIP program understanding and identify effective ways to measure progress towards outcomes at various scales and timeframes. OWEB staff meet regularly with BEF to coordinate on the use of these monitoring, progress tracking, and adaptive management tools, which communicate FIP progress to partners, the board, and the public. Attachment A provides a schematic to illustrate the unique role of each product.

III. FIP Ecological Priority Theories of Change

The FIP program is premised on partnerships pursuing programmatic restoration initiatives that address one of the seven board-adopted ecological priorities for focused investments. In order to enhance broad understanding of these priorities, BEF worked with OWEB staff to develop diagrams depicting the generic ecological theory of change for each of the seven priorities. These theories of change (Attachment B) illustrate the connections between habitat and/or species limiting factors that are being addressed by the priority, and the conservation

strategies, outputs, and outcomes that may be targeted by FIP partnerships as they implement their initiatives.

IV. Progress Monitoring Framework

BEF worked with each FIP initiative to develop a progress monitoring framework that provides a consistent structure for measuring and communicating progress toward achieving implementation objectives and predicted ecological results. In 2017, BEF piloted progress monitoring frameworks for the first cohort of FIP initiatives, and presented this information to the board at the October 2017 meeting. In 2019, BEF engaged with the second cohort of FIP initiatives to collaboratively construct their progress monitoring frameworks. In addition to tracking progress, these frameworks inform both monitoring and adaptive management.

The progress monitoring frameworks for each of the second cohort of FIP initiatives are found in Attachment C. The key elements of the progress monitoring frameworks are a results chain and a cross-walk matrix. The results chain is a graphical model of the partnership's theory for how strategies are expected to produce long-term ecological impacts. The cross-walk matrix details key objectives of the partnership related to implementation and ecological outcomes, along with associated metrics that can be monitored to measure progress.

As part of the framework development, BEF reviewed and overlaid existing monitoring plans and approaches. This work lays the foundation for subsequent discussions between OWEB and the FIP partners to identify potential monitoring gaps or needs and may lead to refinements in existing monitoring approaches. Identifying and addressing these knowledge gaps helps to strengthen each partnership's ability to describe and communicate their progress.

V. Progress Tracking Reports

Progress tracking reports are a tool to communicate the progress and evolution of each FIP initiative as they proceed with strategic action plan implementation, outcomes monitoring, and adaptive management of the partnership. The reports summarize context of the partnerships' work and synthesize actions to provide a high-level portrait of progress.

Staff coordinated with each partnership to produce the biennium 1 reports for each of the six FIP initiatives awarded in 2016. It is expected that the reporting template will evolve over time as staff, board, and partnerships provide feedback and new content is generated. Future biennium reports for the first cohort, along with subsequent cohorts, will share monitoring results as analysis takes place and near-term outcomes emerge. At the January board meeting, staff will present the progress tracking reports for the first FIP initiative cohort (Attachment D).

VI. Recommendation

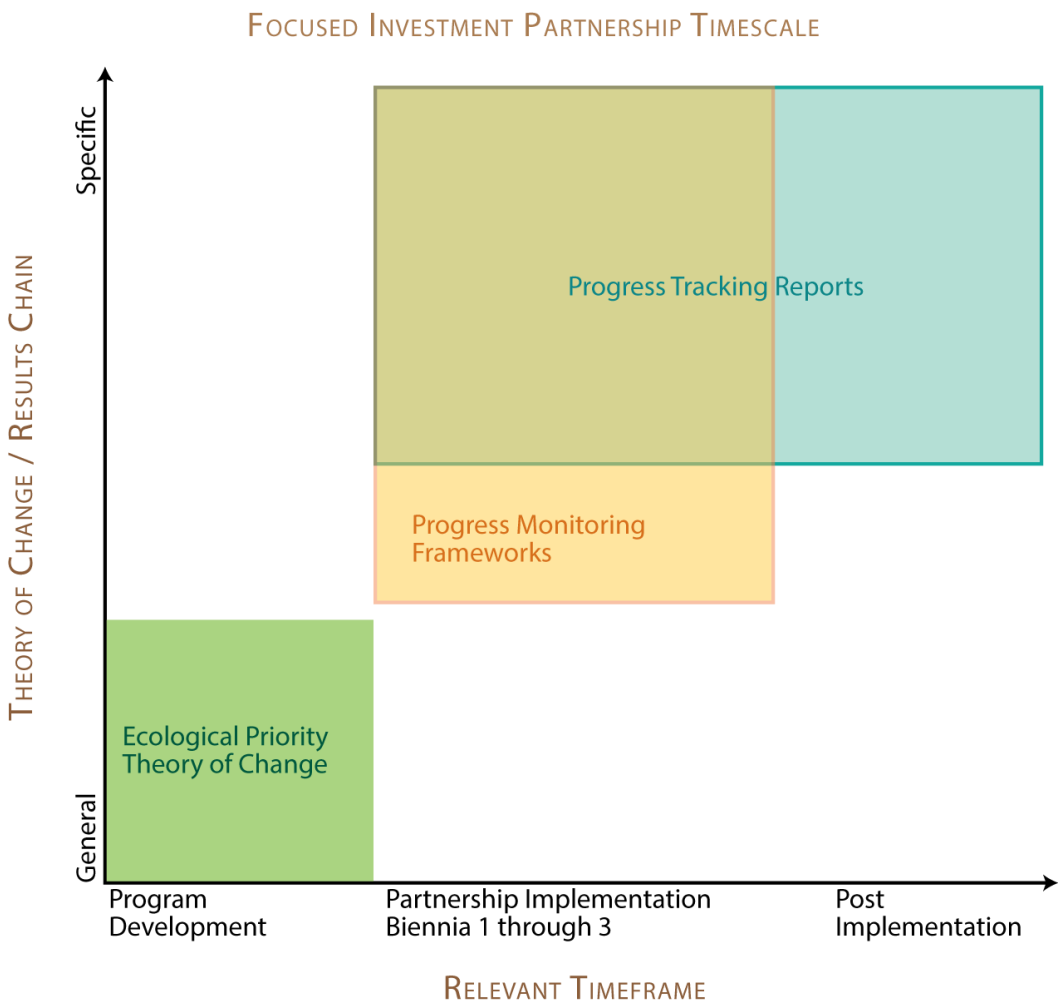
This is an informational item only.

Attachments

Attachment A. Schematic of FIP tools
Attachment B. Ecological Priority Theory of Change for the 7 FIP Board-Adopted Priorities
Attachment C. Progress Monitoring Frameworks for 5 Implementation FIPs awarded in 2019
Attachment D. Progress Tracking Reports for 6 Implementation FIPs awarded in 2016

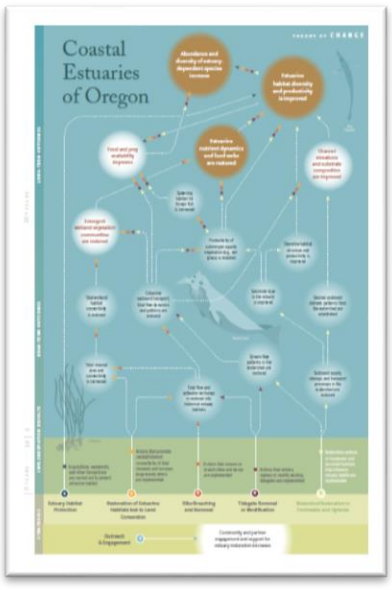
FIP Program Monitoring and Progress Tracking
Schematic of FIP tools

Attachment A

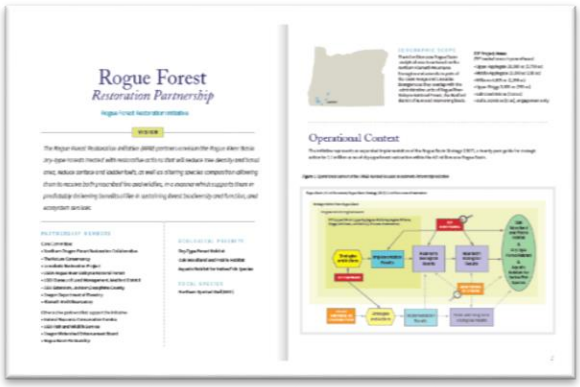


Example thumbnails for each tool:

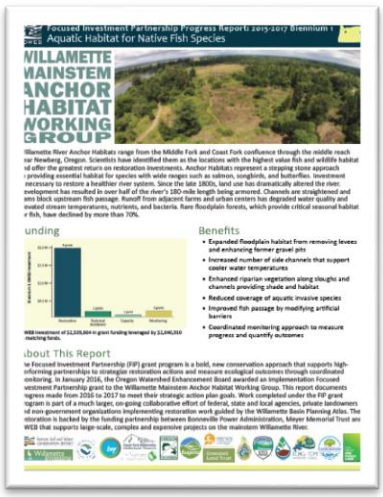
Ecological Priority Theory of Change



Progress Monitoring Framework



Progress Tracking Report



THEORY OF CHANGE

Aquatic Habitat

for Native Fish Species

Steelhead

LONG-TERM OUTCOMES

Native fish become more abundant

Stream habitat becomes more diverse

Amount of diverse, high-quality aquatic habitat increases

Spatial distribution of native fish increases

Gravel, sand and silt are sorted and deposited

Stream temperature and water quality improve

Juvenile fish mortality from irrigation infrastructure is reduced

Groundwater rises close to the floodplain surface

Stream processes and forms are restored

Mature trees die and fall into the stream

Riparian plant community structure and function is improved

Fish can access more habitat

Stream flow throughout the year becomes more similar to natural conditions

Floodplains are flooded more often and over a greater area

Native riparian forest communities are more diverse

Abundance of invasive plant species is reduced

NEAR-TERM OUTCOMES

20+ YEARS

10

0 YEARS

IMPLEMENTATION RESULTS

Stream and floodplain habitat is protected from development and degradation

Land is preserved in priority areas

Stream habitat projects addressing key limiting factors are implemented

Native trees and shrubs are planted on the floodplain

Levees and revetments are removed from floodplain areas

Lateral side-channels are reconnected

Invasive weed treatments are applied

Irrigation systems are modernized

Water rights transactions to keep more water in streams are completed

Artificial structural barriers to fish passage are removed

Fish screens are installed to keep fish out of irrigation diversions

STRATEGIES

1 **Easements & Acquisitions**

2 **Restore Channels**

3 **Riparian Restoration**

4 **Floodplain Reconnection**

5 **Control Invasive Weeds**

6 **Restore Stream Flow**

7 **Barrier Removal**

8 **Install Fish Screens**

9 **Outreach & Engagement**

Stakeholder outreach activities to increase awareness are planned and implemented

Community leaders and stakeholders become informed about watershed health and restoration needs

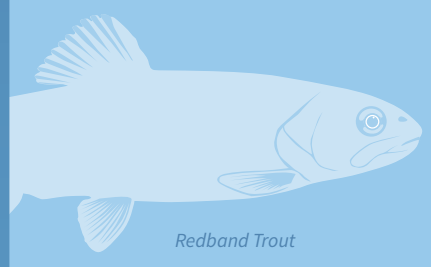
Community leader and stakeholder engagement increases

Outreach and engagement foster public values that recognize the importance of healthy streams and enable implementation of restoration strategies.

This graphic was developed by **Bonneville Environmental Foundation** to support **OWEB's Focused Investment Partnerships** grant program, February 2019.

THEORY OF **CHANGE**

Closed Lakes Basin Wetlands



LONG-TERM OUTCOMES

Migratory bird populations increase

Native vegetation provides food for migratory bird populations and other wildlife

Flood irrigated wetlands and wet meadows support wetland birds

Diversity and abundance of native wet meadow plant species increases

Native fish density and diversity increases

Native aquatic vegetation and invertebrate populations recover

Water quality including salt and nutrient concentrations supports healthy wetland and wet meadow ecosystems

Wetlands and wet meadow habitat increases

Extent of invasive plant populations is reduced

NEAR-TERM OUTCOMES

Water clarity and other water quality parameters improve

Seasonal water availability increases

The economic viability of ranching improves

IMPLEMENTATION RESULTS

- Carp abundance is reduced
- Carp control measures are evaluated and improved
- Wetland habitats are restored and existing wetlands are managed to support migratory wetland birds
- Wetland restoration and management actions are evaluated and improved
- Flood irrigation practices optimize habitat values for migratory water-bird species and forage production.
- Aging and inefficient diversions and irrigation infrastructure are replaced with efficient flood-irrigation systems

STRATEGIES

1. **Control Invasive Carp Populations in Aquatic Systems**
2. **Restore or Manage Wetland Habitats**
3. **Promote Flood Irrigation of Wetlands and Wet Meadows**
4. **Outreach & Engagement**

Community and partner engagement and support for use of carefully managed flood irrigation increases

0 YEARS ..... 10 ..... 20+ YEARS

This graphic was developed by **Bonneville Environmental Foundation** to support **OWEB's Focused Investment Partnerships** grant program, September 2019.

THEORY OF **CHANGE**

Coastal Estuaries of Oregon

LONG-TERM OUTCOMES

Abundance and diversity of estuary-dependent species increase

Estuary habitat diversity and productivity is improved

Bay Pipefish

Estuary nutrient dynamics and food webs are restored

Food and prey availability improves

Channel elevations and substrate composition are improved

Habitat for forage fish is increased

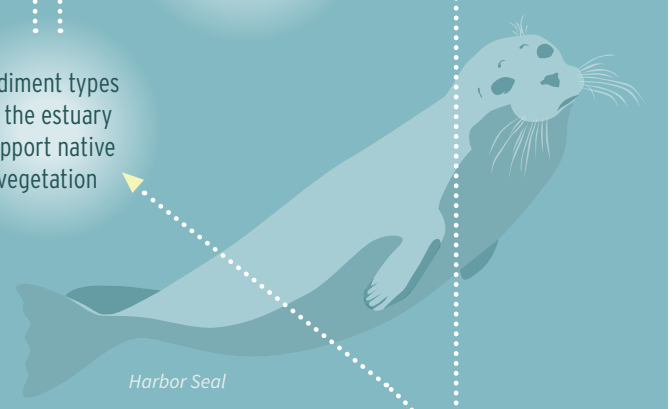
Emergent wetland vegetation communities are restored

Productivity of submerged aquatic vegetation (e.g., eel-grass) is restored

Shoreline habitat structure and productivity is improved

NEAR-TERM OUTCOMES

Sediment types in the estuary support native vegetation



Harbor Seal

Tidal wetland habitat connectivity is restored

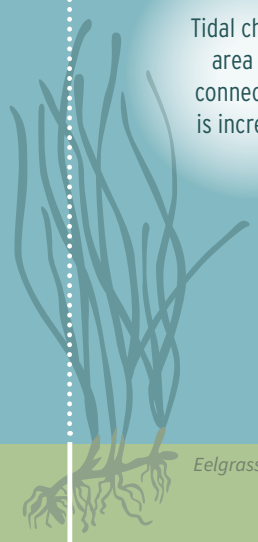
Estuary sediment and nutrient transport and tidal flow dynamics and patterns are restored

Stream flow patterns in the watershed are restored

Sediment supply, storage, and transport processes in the watershed are restored

Tidal channel area and connectivity is increased

Tidal flow and saltwater exchange are restored in historical estuary habitats



Eelgrass

IMPLEMENTATION RESULTS

Acquisitions, easements, and other transactions are carried out to protect estuary habitat

Actions that re-establish tidal channel connectivity and increase woody structure are implemented

Actions that remove or breach dikes and levees are implemented

Actions that remove, replace, or modify existing tidegates are implemented

Restoration actions in freshwater and terrestial habitats that influence estuary health are implemented

STRATEGIES

1 **Estuary Habitat Protection**

2 **Restoration of Estuarine Habitats lost to Land Conversion**

3 **Dike Breaching and Removal**

4 **Tidegate Removal or Modification**

5 **Watershed Restoration in Freshwater and Uplands**

Outreach & Engagement 6 → Community and partner engagement and support for estuary restoration strategies increases

0 YEARS ..... 10 | 0 ..... 20+ YEARS

This graphic was developed by **Bonneville Environmental Foundation** to support **OWEB's Focused Investment Partnerships** grant program, December 2019.

THEORY OF **CHANGE**

Coho Habitat and Populations along the Coast of Oregon

LONG-TERM OUTCOMES

Coho salmon population performance at freshwater and estuarine life stages improves

Amount and quality of coho spawning and rearing habitat increases

Spatial structure and life history diversity of coho salmon increases

Food diversity and quantity for juvenile coho salmon increases

Marine derived nutrient inputs delivered by returning adult salmon in freshwater increase

Productivity of freshwater systems increases

Aquatic habitat diversity, quantity, and stability increases

Estuarine habitat diversity and productivity improves

NEAR-TERM OUTCOMES

Supply, storage, and transport of sediments is restored to desired levels

Fine sediment levels in spawning gravels is reduced

Productivity of emergent and submerged aquatic vegetation is restored

Tidal wetland habitat area and connectivity is restored and water quality is improved

Stream temperature is reduced and dissolved oxygen levels increase

Flow in stream channels and natural floodplain increases

Sediment storage in floodplains increases

Distribution and abundance of off-channel habitats and cold-water refuges increases

Estuary sediment transport, tidal flow dynamics and patterns, and salinity are restored

Streambank channel stability improves

Streambank shading increases

Floodplain reconnected to stream channel

Wood structure within the channels is increased

Natural sediment dynamics are restored

Tidal flow is restored into historic estuary habitats

Extent of riparian areas increases and composition improves

Stream flow is sufficient to meet the needs of salmon

Water storage in riparian areas increases

Passage and movement of juvenile and/or adult coho salmon improves

IMPLEMENTATION RESULTS

Projects to reconnect stream channels to floodplains are implemented

Management actions on dams and other diversions to restore natural flow are implemented

Stream habitat restoration projects are implemented

Projects to stormproof or decommission roads are implemented

Native planting and non-native vegetation control actions are implemented in riparian areas

Conversion of old-growth to young, managed forests is reduced

Management actions in young forests that support aquatic ecosystems are implemented

Projects to remediate artificial barriers to fish passage are implemented

Actions that remove/breach dikes, levees, and tidegates are carried out

STRATEGIES

1 Reconnect Floodplains

2 Restore Stream Flow

3 Restore Habitat in Stream Channels

4 Forest Road Repair or Decommission

5 Riparian Restoration

6 Forest Management that Supports to Healthy Aquatic Habitats

7 Remove Fish Passage Barriers

8 Estuary Restoration

9 Outreach & Engagement → Community and partner engagement and support for coho salmon habitat restoration restoration increases

0 YEARS ..... 10 | 0 ..... 20+ YEARS

This graphic was developed by **Bonneville Environmental Foundation** to support **OWEB's Focused Investment Partnerships** grant program, December 2019.

THEORY OF **CHANGE**

Dry-Type Forest Habitat

LONG-TERM OUTCOMES

Mosaic of diverse dry forest habitats sustains all species, including those dependent on old complex forests

Resilience of dry forest to drought, extreme fire, insects and disease is increased

Forest habitat connectivity and soil productivity is preserved

Water quality and aquatic habitat conditions are maintained

NEAR-TERM OUTCOMES

Mosaic and diversity of habitats is increased

Meadow habitat is restored

Growth of legacy trees accelerates to achieve mature forest characteristics

Risk, frequency, and severity of wildfire shifts toward desired conditions

Sediment input into aquatic environments is reduced

Soil erosion and risk of mass wasting is reduced

Vegetation that crowds oaks and prevents branching is reduced

Overall proportion of open canopy in old forests is increased

Establishment, growth and vigor of fire-resistant species is increased

Severe outbreaks of forest insects and disease are reduced

White-headed woodpecker

Tree and fuels density is reduced

Proportion of invasive species are reduced in forest habitats

Rocky Mountain Elk

IMPLEMENTATION RESULTS

Existing and potential open forest habitat is identified and thinned

Fuels are reduced on ridges and midslopes where potential for re-storing open old forest habitat and reducing high severity fire is greatest

Prescribed burning treatments are applied in potential open forest habitat sites and native plants are seeded or planted if appropriate

Priority habitats with highest risk of invasive species are treated

STRATEGIES

1 **Protect Existing Complex Forest**

2 **Strategic Thinning**

3 **Prescribed Fire**

4 **Promote Native Understory Vegetation**

5 **Outreach & Engagement**

- Community engagement describing the benefits of ecological thinning and prescribed fire is delivered to stakeholders
- Successful forest restoration outcomes are showcased within the community

Community support for and understanding of ecological thinning and prescribed fires improves

Prescribed fire, thinning and other strategies are used proactively

0 YEARS ..... 10 | 0 ..... 20+ YEARS

This graphic was developed by **Bonneville Environmental Foundation** to support **OWEB's Focused Investment Partnerships** grant program, June 2019.

THEORY OF **CHANGE**

Oak Woodland *and* Prairie Habitat

LONG-TERM OUTCOMES

20+ YEARS

Oak-prairie habitat structure is improved

Oak-prairie connectivity and soil productivity is preserved

Resilience of oak woodland/prairie ecosystems to climate change, extreme fire, insects and disease is increased

Oak woodland/ prairie habitats support stable populations of dependent species

NEAR-TERM OUTCOMES

Rate of oak and prairie habitat loss and fragmentation is reduced

Young oak recruitment increases

Growth and recruitment of large-diameter legacy trees is increased

Frequency and severity of wildfire shifts toward desired range

Vegetation competing with existing and potential future legacy trees is reduced

Shading of oak trees and seedlings is reduced

Open prairie habitat expands

Landscape proportion of open canopy is increased

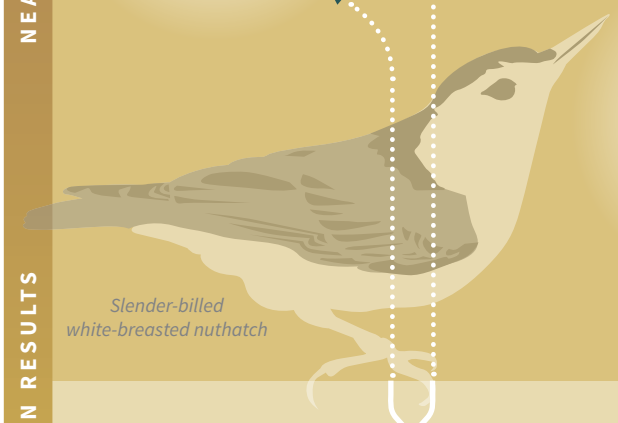
Density of invasive species (prairies), understory trees, and encroaching conifers (oak woodlands) is reduced

Existing dense growth of small shrubby oaks is reduced

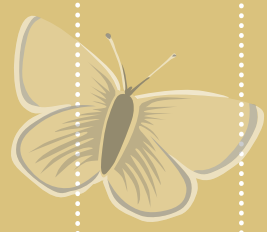
Recruitment and abundance of native, fire-resistant and fire-dependent species is increased

Severe outbreaks of forest insects and disease are reduced

Establishment of invasive species is reduced



Slender-billed white-breasted nuthatch



Fender's Blue Butterfly

IMPLEMENTATION RESULTS

0 YEARS 10

Oak woodland habitat is protected from conversion to other uses.

Cooperative incentive programs for private landowners are implemented

Prescribed burning treatments are applied in potential open forest habitat sites

Existing and future legacy trees are identified and protected

Potential open forest habitat sites are identified and thinned and native understory is planted

Restoration sites are managed to reduce establishment of invasive species

1 **Cooperative Incentive Programs**

2 **Prescribed Fire**

3 **Protect and Promote Complex Mature Forest**

4 **Strategic Thinning and Other Fuels Reduction**

5 **Invasive Species Control**

STRATEGIES

Outreach & Engagement 5

Outreach and engagement connects communities to oak-prairie ecosystems to promote understanding of their value and function → Community support for oak-prairie preservation and restoration increases → **Community support for conservation strategies including prescribed fire, thinning and restoration increases**

Information describing incentive programs to protect and improve oak woodland and prairie habitat is provided to land owners → Best practices that support or expand oak woodland and prairie habitats are adopted on private lands. → **Oak woodland and prairie habitat on private working lands increases and is protected**

This graphic was developed by **Bonneville Environmental Foundation** to support **OWEB's Focused Investment Partnerships** grant program, May 2019.

THEORY OF **CHANGE**

Sagebrush/Sage-Steppe Habitat

LONG-TERM OUTCOMES

Size and spatial extent of sage-grouse populations is increased

Movement of sage-grouse between vital resources, breeding locations and populations is enhanced

Sage-grouse habitat connectivity is increased and maintained

Connectivity of desired plant communities is increased across the landscape

Habitat providing nesting cover and food for sage-grouse is restored

Greater sage-grouse

Post-fire plant community recovery favors desired plant species

Native and desired plant species outcompete invasive grasses

Avian predator populations are reduced to natural ranges

The frequency of high-intensity fires is reduced

Woodland type plant communities decrease

Mortality of sage-grouse and other native species is reduced

NEAR-TERM OUTCOMES

Extent of perennial bunch grasses and forbs is increased and their condition is improved

Suppressed understory vegetation and water resources are released

Artificial avian predator perches and food resources are reduced

IMPLEMENTATION RESULTS

Treatments to control invasive grasses and prevent their spread are implemented

Grazing management plans are developed and carried out

Juniper are removed from sage-grouse habitat

Artificial food sources, nesting and perching structures, and avian predators are identified and reduced

Fences in high risk collision areas are marked

Wildlife escape ramps are installed in livestock watering troughs

1 **Control Invasive Grasses & Weeds**

2 **Support Sustainable Grazing Practices**

3 **Remove Juniper**

4 **Reduce Human Influenced Mortality**

STRATEGIES

5 **Outreach & Engagement**

Landowner outreach to increase awareness of sage-grouse habitat enhancement programs is conducted

Private landowner enrollment in voluntary sage-grouse habitat enhancement programs increases

Outreach and engagement foster public values that recognize the importance of sage-grouse habitats and enable the implementation of the above strategies.

0 YEARS ..... 10 ..... 20+ YEARS

This graphic was developed by **Bonneville Environmental Foundation** to support **OWEB's Focused Investment Partnerships** grant program, February 2019.

Baker Sage-grouse
Local Implementation Team

Baker Comprehensive Sage-grouse Threat Reduction

VISION

The Local Implementation Team (LIT) will work in a collaborative spirit to engage land-owners and managers to enhance sage-grouse habitat within the Baker LIT Planning Area, with the aim to reverse local sage-grouse population declines.

PARTNERSHIP MEMBERS

Core partners:

- Oregon Department of Fish and Wildlife
- Tri-County Cooperative Weed Management Area
- Natural Resources Conservation Service
- US Fish and Wildlife Service
- Bureau of Land Management
- Baker County
- Powder Basin Watershed Council
- Private Landowners

Other active partners that support the Initiative:

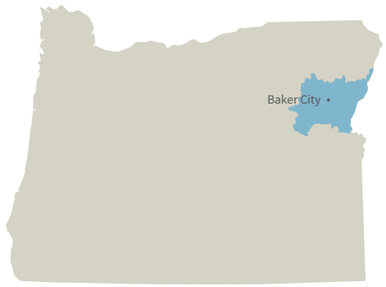
- OSU Extension
- Confederated Tribes of the Umatilla Indian Reservation
- The Nature Conservancy
- Other LIT members

ECOLOGICAL PRIORITY

Sagebrush / Sage-steppe Habitat

FOCAL SPECIES

Greater sage-grouse



GEOGRAPHIC SCOPE

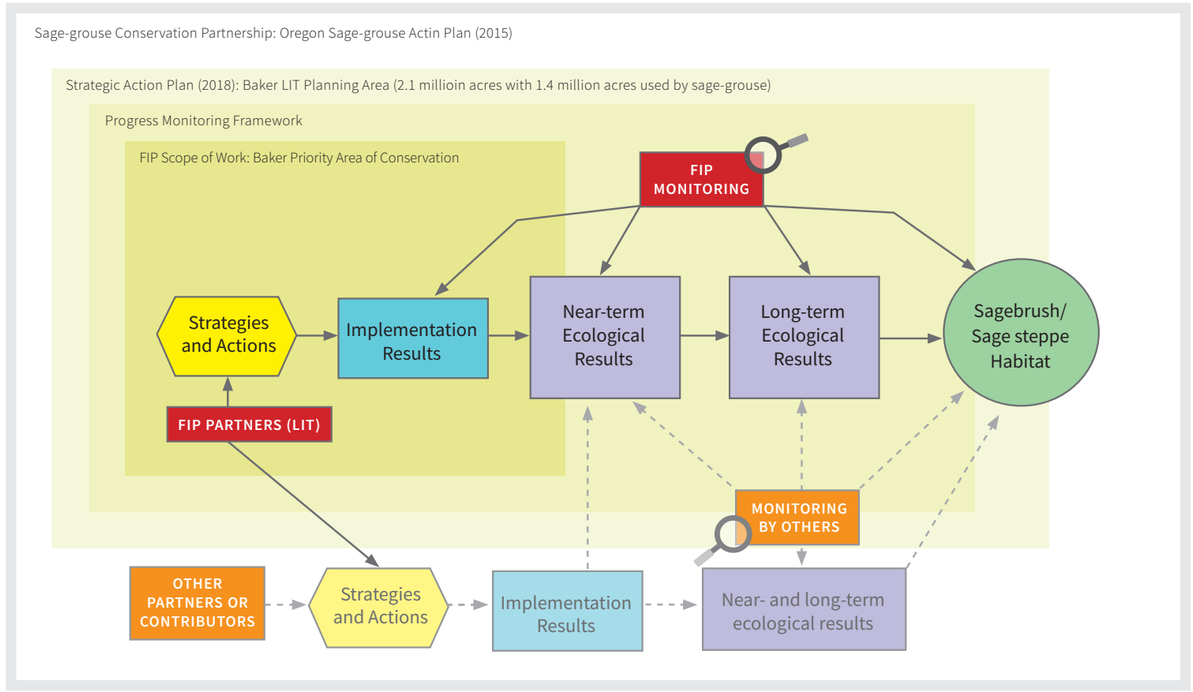
The overall geography of the Initiative is the 2.1 million acres of the Baker Local Implementation Team (LIT) Planning Area (owned by a mix of private, BLM, and USFS). The USFS portion is typically avoided by sage-grouse, bringing the total area of primary interest of the LIT to 1.4 million acres, 73% of which is privately owned.

Within this area the FIP is primarily concerned with the Baker Priority Area of Conservation which is considered to be the most strategically important area for sage-grouse conservation in Baker County. Of secondary importance are sage-grouse habitat corridors and other locations that support thriving leks particularly near Unity, OR. Effort may expand into this area after work is completed in the Baker Priority PAC.

Operational Context

Local Implementation Teams have been established throughout the range of sage-grouse in the state to play a key role in developing local strategic plans and coordinating conservation efforts (per the 2015 Sage-grouse Action Plan). As described above, the Baker LIT's area of interest is the Baker LIT Planning Area and the focus of the FIP scope of work is the sub-area defined as the Baker Priority Area of Conservation.

Figure 1: *Operational context of the OWEB-funded Focused Investment Partnership Initiative*



Theory of Change.

SITUATION

Sage-grouse populations in Baker County have declined by approximately 75% since 2005 and have not exhibited a recovery similar to what has been observed in populations throughout the remainder of Oregon. Habitat loss is the primary threat to sage-grouse in the state, resulting from three interrelated mechanisms: juniper encroachment, invasive annual grasses, and wildfire.

Threats potentially impacting the Baker sage-grouse include the following:

- Juniper encroachment
- Invasive annual grasses
- Wildfire/altered fire regimes
- Native forbs and grasses
- Sagebrush cover
- Crested wheatgrass seedings
- Development / infrastructure
- Sagebrush elimination / agricultural conversion
- Fragmentation
- Improper grazing management
- Recreation
- Isolated or small population size
- Free-roaming equids
- Drought
- West Nile virus
- Excessive flooding
- Predation
- Hunting
- Insecticides
- Sagebrush defoliator
- Other noxious weeds

APPROACH

The results chain *(Figure 2)* articulates the partnership's theory of change by displaying the relationships between strategies, implementation outputs, and near- and long-term ecological outcomes partners predict will occur in response to strategy implementation.

Numbered results identified in *Figure 2* are those the partnership has selected to be part of a progress monitoring approach. Measuring these results over time will allow the partnership to evaluate progress in both the near (e.g. 6-year FIP timeframe) and long term, and to identify where key uncertainties might exist with regards to confidence of predicted outcomes or relationships between results.

Each numbered implementation result is associated with the corresponding objective in the Strategic Action Plan *(Tables 1 and 2)*. For intermediate ecological outcomes, objectives are included if identified; however, for many ecological results, the degree to which they will be achieved may be mediated by circumstances outside the FIP's control (e.g. drought, fire, etc.) Given this complexity, continued assessment and planning will be required to support development of specific, measurable objectives for the desired ecological outcomes.

The narrative below summarizes the resulting theory of change. Implementation outputs and ecological outcomes prioritized for monitoring during the six-year FIP timeline are indexed to correspond to the results chain *(Figure 2)* and measuring progress tables *(Tables 1 and 2)*.

STRATEGIES

The Strategies contained in the Strategic Action plan are designed to address the major ecological problems and limiting factors identified in the Baker PAC Comprehensive Threat Reduction Plan and the Oregon Sage-grouse Action plan (listed above). The overarching ecological outcome is an increase in the quantity and quality of sage-grouse habitat and ultimately an increasing and stable Baker sage-grouse population. Each of the outcomes, goals, objectives, and conservation actions in the FIP's Strategic Action Plan and Work Plan have been carefully considered as incremental steps toward achieving this ecological outcome. *(See Figure 2. Results chain for the Baker Comprehensive Sage-grouse Threat Reduction Initiative)*

STRATEGIES

1 Promote awareness and enrollment in voluntary habitat conservation programs

This strategy consists of the development and implementation of public outreach activities designed to promote greater public awareness of the status of sage-grouse and factors currently impacting the viability of Baker populations. Outreach is also intended to raise awareness of actions that can contribute to recovery and voluntary/incentive habitat improvement programs available to landowners interested in carrying out conservation actions on private land.

Theory of Change.
The interest and willingness of private landowners to participate in voluntary habitat conservation programs will increase[1] as their understanding about the status of sage-grouse populations and actions they can take to reduce current threats is improved. Landowner participation can be further enhanced as they become aware of financial incentive programs, technical support that is available to plan and implement actions, and success stories of other landowners participating in habitat improvement programs.

2 Prevent, treat, and adaptively manage invasion by invasive annual grasses and other noxious weeds

Activities occurring as part of this strategy include a step-wise approach for prioritizing areas where treatments should be applied and the development and implementation of effective techniques for treating invasive annual grasses and other noxious weeds[2] in those areas. For all treatment types monitoring will be conducted to determine treatment effectiveness and inform adaptive management.

To prevent continued spread of undesirable vegetation, partners will install an OHV wash station at the Virtue Flat OHV staging area[3], provide public education highlighting the ways weeds can be spread and their impact on native vegetation, and conduct Early Detection and Rapid Response activities including roadside spraying, weed surveys, and spot treatments.

Theory of Change.
Invasive annual grass and noxious weed treatments[2] will reduce the extent and abundance of invasive and noxious weeds[14], promoting recovery and reconnection of lost habitat through establishment of sagebrush/sage-steppe plant communities (including native bunchgrass and forb diversity) that are suitable for providing cover and winter food for sage-grouse[15] and supporting breeding, brood rearing, and all other life history stages of sage-grouse[16]. Reducing the extent and abundance of invasive annual grasses and other noxious weeds also reduces the risk of loss of sage-grouse habitat to wildfires.

3 Protect, enhance, and expand extent and connectivity of areas with adequate sagebrush cover

This strategy consists of a number of activities to protect, enhance and expand the extent and connectivity of areas with adequate sagebrush cover. Activities may include the development and implementation of a strategic fuel break plan[4], the development of site-specific plans to restore sagebrush on fire-affected lands[5] and increase native herbaceous diversity[8], the reduction of juniper in priority areas[6], and the development and implementation of grazing plans compatible with sage-grouse[7].

Theory of Change.
Strategic fuel breaks[4] reduce the spread of fire and therefore prevent the loss of sage-grouse habitat to wildfire. Strategic fuel breaks also provide safe staging areas making suppression efforts safer and more effective – thus reducing loss when wildfires occur.

The implementation of site-specific project plans that include herbicide treatments, seeding[8], and grazing management[7] will contribute to reducing habitat loss and fragmentation and therefore to the development of native herbaceous diversity in areas that may have adequate sagebrush cover but lack perennial grasses and sage-grouse preferred forbs.

The longer-term ecological outcome of these results is a sagebrush plant community that has sufficient quantity and quality to support cover and winter food for sage-grouse[15] and all other life history stages including breeding and brood rearing[16].

A reduction of juniper[6] used by predatory ravens will reduce rates of predation on sage-grouse nests, increasing nesting success and therefore the overall productivity and stability of sage-grouse populations. Juniper removal also decreases fire risk, releases understory vegetation, decreases habitat fragmentation, contributes to suitable mesic habitat, and increases water availability.

4 Address key information gaps

This strategy involves the systematic acquisition of data to inform ongoing and future strategies related to West Nile virus, mesic habitat, raven-sage-grouse dynamics and anthropogenic subsidies, and reserve forage opportunities or grass banks.

New information will promote:

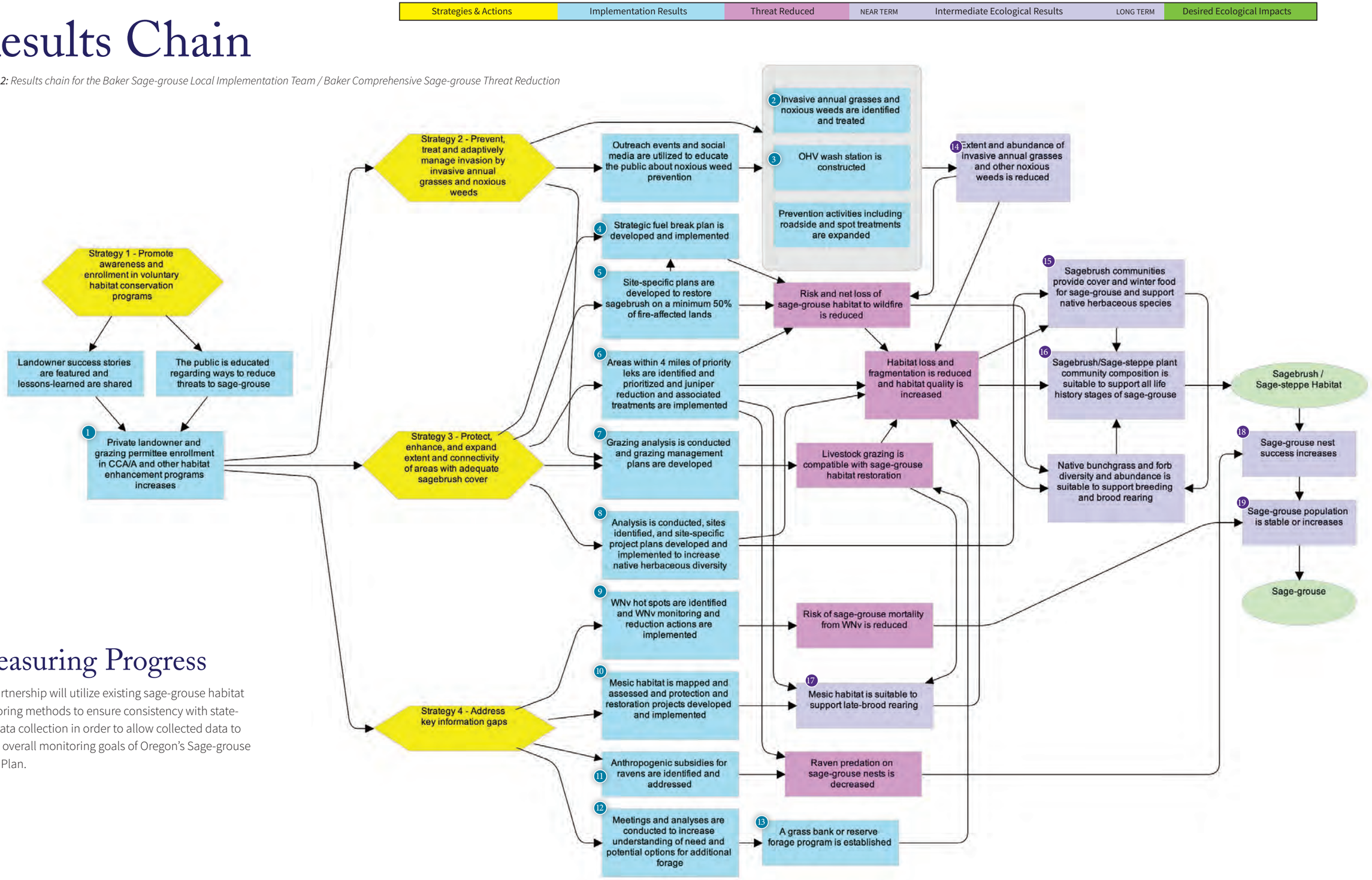
- identification of West Nile virus hot spots where voluntary reduction strategies can be focused[9];
- identification of location and quality of mesic habitat where protection, enhancement and maintenance actions can be effectively implemented[10];
- understanding of raven-sage-grouse dynamics and influence of anthropogenic subsidies (e.g. food sources, nesting and perching structures, and water sources) that may be boosting raven populations[11]; and
- assessment of opportunities and barriers to development of a "grass bank" and/or alternative forage sources for livestock[12,13].

Theory of Change.
Developing effective strategies to address these issues will help to minimize sage-grouse mortality from West Nile virus and raven nest predation, support restoration and maintenance of mesic habitat important for late-brood rearing and facilitate treatment success with alternative grazing options when rest from livestock is required.

Superscript numbers [1-19] can be cross referenced on the Results Chain diagram and the Implementation Progress/Ecological Progress tables on the following pages.

Results Chain

Figure 2: Results chain for the Baker Sage-grouse Local Implementation Team / Baker Comprehensive Sage-grouse Threat Reduction



Measuring Progress

The partnership will utilize existing sage-grouse habitat monitoring methods to ensure consistency with state-wide data collection in order to allow collected data to inform overall monitoring goals of Oregon's Sage-grouse Action Plan.

OUTPUTS

Implementation Progress

Table 1. Implementation results objectives and metrics. The result numbers correspond to results shown in the results chain (Figure 2) and theories of change.

IMPLEMENTATION RESULTS	OBJECTIVES	METRICS
1 Private landowner and grazing permittee enrollment in CCA/A and other habitat enhancement programs is increased	**Objective 2-1-1:** By 2025, increase private landowner enrollment in state, federal, and local voluntary/incentivized sage-grouse habitat enhancement programs (e.g. Farm Bill, Tri-County CWMA, Powder Basin Watershed Council, ODFW, Baker County Weed Department) by 25%.	# of landowners enrolled in habitat enhancement programs
	Objective 2-2-1: Annually, complete a minimum of 3 CCAA site specific plans leading to landowner enrollment in the CCAA.	# of CCAA SSPs completed
	Objective 2-2-2: By 2025, complete a minimum of 5 CCA site specific plans leading to permittee enrollment in the CCA.	# of CCAA SSPs completed
2 Invasive annual grasses and noxious weeds are controlled	**Objective 3-1-1:** Implement invasive annual grass treatments and use monitoring techniques to determine required adaptive management actions on 25,000 acres in the Baker LIT Planning Area.	Acres of land treated
	Objective 3-1-2: Implement other noxious weed treatments and use monitoring techniques to determine required adaptive management actions on 25,000 acres in the Baker LIT Planning Area.	Acres of land treated
3 OHV wash station is constructed	**Objective 3-2-1:** Develop an OHV wash station facility at the Virtue Flat staging area by 2025.	OHV wash station facility completed
4 Strategic fuel break plan is developed and implemented	**Objective 3-3-1:** Increase awareness of the effect of wildfire on sage-grouse habitat, as well as wildfire prevention and initial response techniques by holding a special issue Baker LIT meeting by December 2019.	# of meetings held
5 Site-specific plans are developed to restore sagebrush on a minimum 50% of fire-affected lands	**Objective 3-3-2:** If wildfire reduces existing sagebrush cover, develop post-fire restoration plans that include sagebrush restoration (e.g. planting of sagebrush plugs) on a minimum of 50% of fire-affected lands.	% or fire-affected lands with pots-fire restoration plans
	Objective 3-3-3: Implement Goal 2-2 to increase enrollment in CCAA and CCA within the Baker LIT Planning Area which requires enrollees to agree prevent further habitat loss or fragmentation of enrolled acres.	# of landowners enrolled in CCA and CCAA
6 Juniper reduction and associated treatments are implemented on prioritized areas	**Objective 3-4-1:** Reduce all encroaching juniper within 4 miles of priority leks within the Baker LIT Planning Area to <2% canopy cover by 2025.	Acres of land within 4 miles of priority leks treated
7 Grazing analysis is conducted and grazing management plans compatible with sage grouse are developed for new CCAA and FIP project properties	**Objective 3-5-1:** All new CCAA enrolled properties will undergo a grazing analysis to assess compatibility with sage-grouse habitat requirements.	# of enrolled properties completed grazing analysis
	Objective 3-5-2: All properties on which FIP funded projects will be implemented will undergo a grazing analysis to assess compatibility with sage-grouse habitat requirements.	# of enrolled properties completed grazing analysis
8 Analysis is conducted, sites identified, and site-specific project plans developed and implemented to increase native herbaceous diversity	**Objective 3-6-1:** By 2020, identify areas within the Baker LIT Planning Area that have adequate sagebrush cover, are not dominated by invasive weeds, but are without herbaceous diversity consisting of sage-grouse preferred bunchgrasses and forbs.	Acres identified lacking herbaceous diversity
	Objective 3-6-2: By 2025, implement projects on 5% of areas identified in Objective 3-6-1.	Acres identified lacking herbaceous diversity
9 WNv hot spots are identified and WNv monitoring and reduction strategies are implemented	**Objective 4-1-1:** By 2020, add additional mosquito sampling sites so that WNv surveillance occurs in an evenly distributed manner across the PAC and the Baker LIT Planning Area.	# of mosquito sampling sites added
	Objective 4-1-2: By 2021, map any detected WNv "hot spots" within the Baker LIT Planning Area.	Completion of maps identifying WNv hot spots
	Objective 4-1-3: By 2022, implement best practice WNv reduction strategies in all identified "hot spots".	# of identified WNv hotspots where best practices are implemented
10 Mesic habitat is mapped, habitat assessments conducted, mesic habitats protected, and restoration projects developed and implemented	**Objective 4-2-1:** By 2020, develop a map displaying the location and quality of mesic habitat within the Baker LIT Planning Area.	Development of map displaying location and quality of mesic habitat
	Objective 4-2-2: By 2021, update the Baker TRP to include mesic habitat protection and restoration projects (e.g. fencing, off-spring water developments, floodplain reconnection, elevation of water table, enhanced beaver habitat, beaver dam analogs).	Baker TRP updated to include mesic habitat protection and restoration projects
	Objective 4-2-3: By 2025, protect 70% of functioning mesic areas prioritized in Objective 4-2-2.	% of prioritized mesic habitat protected
	Objective 4-2-4: By 2025, implement projects to improve function of 15% of mesic resources within critical or potential sage-grouse summer habitat.	% of priority mesic resources where projects have been implemented
11 Anthropogenic raven food sources, nesting and perching structures, and water sources are identified and removed	**Objective 4-3-1:** By 2020, identify 100% of raven subsidies (e.g. food sources, nesting and perching structures, water sources) within the Baker LIT Planning Area.	% of raven subsidies identified
	Objective 4-3-2: By 2025, reduce 25% of anthropogenic subsidies identified in Objective 4-3-1.	% of raven subsidies identified
	Objective 4-3-3: Support sage-grouse nest success and population trend monitoring to evaluate effectiveness of subsidy removal.	Monitoring actions implemented
12 Meetings are held and analyses conducted to increase understanding of need and potential options for additional forage	**Objective 4-4-1:** By 2021, increase the Baker LIT's understanding of the issue and potential options to address the need for alternative forage.	Completion of assessment regarding alternative forage options
13 A grass bank is established	**Objective 4-4-2:** By 2025, provide at least one alterative grazing option that is supported by local stakeholders and will allow landscape level treatment of threats to sage-grouse in the Baker LIT Planning Area.	Selection of one or more alternative grazing options

OUTCOMES

Ecological Progress

Table 2. Ecological results potential objectives and potential metrics. The result numbers correspond to results shown in the results chain (Figure 1) and theories of change.

Given the complexity of ecosystems, continued assessments and planning will be required to support development of specific, measurable objectives for desired ecological outcomes. Objectives in this table are italicized to reflect that they may be refined in the future.

LIMITING FACTOR REDUCTION OR INTERMEDIATE ECOLOGICAL RESULTS	WORKING OBJECTIVES	POTENTIAL METRICS
14 Extent and abundance of invasive annual grasses and other noxious weeds is reduced	*By 2025, address invasive annual grasses and other noxious weeds on 25,000 acres Baker LIT Planning Area in accordance with the priority geographies outlined within the LIT Governance Document. (Goal 3-1)*	Baseline and post-treatment data collected per Oregon State Action Plan and CCA/AA and/or BLM nested frequency and AIM methods
15 Sagebrush/Sage-steppe plant communities provide cover and winter food for sage-grouse and support native herbaceous species		
16 Sagebrush/sage steppe plant communities including native bunchgrass and forb diversity and abundance are suitable to support all life history stages of sage-grouse	*By 2025, improve herbaceous diversity in 5% of identified depleted sagebrush habitats by increasing perennial grass and sage-grouse preferred forb abundance (Goal 3-6)*	Baseline and post-treatment data collected per Oregon State Action Plan and CCA/AA and/or BLM nested frequency and AIM methods
17 Mesic habitat is suitable to support late-brood rearing	*By 2025, identify, maintain, and enhance mesic habitat within the Baker LIT Planning Area which is an important late brood-rearing habitat component for sage-grouse (Goal 4-2)*	Baseline and post-treatment data collected per Oregon State Action Plan and CCA/AA and/or BLM nested frequency and AIM methods
18 Sage-grouse nest success increases	*By 2025, increase sage-grouse nest success and population trend within the Baker LIT Planning Area by reducing nest depredation from ravens through a 25% reduction in raven subsidies (Goal 4-3)*	Sage-grouse nest success
19 Sage-grouse population is stable or increases		Lek surveys (population trends)

Status & Trends

ECOLOGICAL PRIORITIES	
Sagebrush / Sage-Steppe Habitat Greater Sage-grouse	Monitoring the status and trends of ecological priority habitats and focal species will include coordination with agencies or conservation organizations operating at the appropriate landscape or population scales. FIP partners will work with these entities to establish a process for integrating their monitoring framework with existing status and trends monitoring programs (if they occur) or to establish an approach for identifying key ecological attributes that should be measured to document and communicate change in the status and trajectory of ecological priority habitats and focal species populations.

Clackamas Partnership

Restoration for Native Fish Recovery

VISION & MISSION

Vision: *The Clackamas Partnership envisions healthy watersheds that sustain native fish and wildlife populations, diverse habitats, and thriving human communities.*

Mission: *The Clackamas Partnership collaborates on coordinated aquatic, riparian and floodplain restoration, conservation, and habitat protection actions to enhance watershed health, support the recovery and sustainability of native fish populations, and contribute to the region's economic and social vitality.*

PARTNERSHIP MEMBERS

Core Partners:

- Clackamas River Basin Council
- Greater Oregon City Watershed Council
- North Clackamas Watersheds Council
- Johnson Creek Watershed Council
- Clackamas Soil and Water Conservation District
- Metro
- US Forest Service
(Mt Hood National Forest, Clackamas Ranger District)
- Confederated Tribes of Warm Springs
- North Clackamas Parks & Recreation District
- Oregon Department of Fish and Wildlife

Supporting Partners:

- Clackamas County Water Environment Services
- Clackamas River Water Providers
- Oregon Dept of Environmental Quality
- Oregon Parks and Recreation Dept.
- Portland General Electric

ECOLOGICAL PRIORITY

Aquatic Habitat for Native Fish Species

FOCAL SPECIES

Chum salmon

Coho salmon

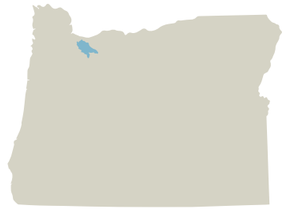
Fall Chinook salmon

Spring Chinook salmon

Steelhead

Bull trout

Pacific lamprey



GEOGRAPHIC SCOPE

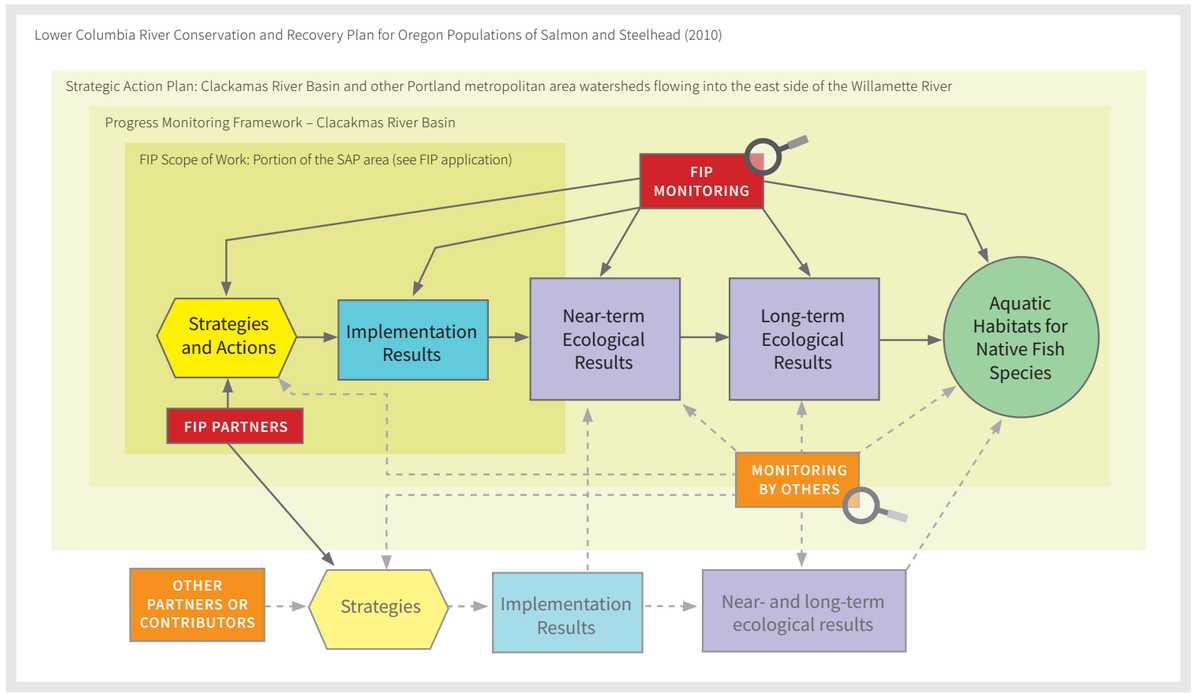
The Clackamas Partnership's FIP Initiative's geography, or Geographic Area, covers a portion the Partnership's Strategic Plan Area. The Geographic Area encompasses the Willamette and Clackamas River reaches; lower Clackamas River tributaries (e.g., Clear, Deep, and Eagle Creek Watersheds); and Willamette River tributaries (Abernethy, Kellogg-Mt. Scott, Johnson Creek and other urban tributaries). The Geographic Area includes three Clackamas River reaches and one Willamette River reach:

- **Upper Clackamas River and Floodplain Reach** – Clackamas River headwaters downstream to Oak Grove Fork *(31.7 miles)*
- **Middle Clackamas River and Floodplain Reach** – Confluence of Oak Grove Fork downstream to River Mill dam *(29.3 miles)*
- **Lower Clackamas River and Floodplain Reach** – River Mill Dam downstream to the confluence of the Willamette River *(23.3 miles)*
- **Lower Willamette River and Floodplain Reach** – Willamette Falls downstream to and including the confluence of Johnson Creek *(9.2 miles)*

Operational Context

The Clackamas Partnership's Restoration for Native Fish initiative is built on the content and actions outlined in the Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead (2010) and contributes to the goals and objectives associated with the Clackamas Population area. Work included in the FIP Scope of Work extends through 2025 and is limited to one specific set of actions (Strategy 1: Habitat Restoration) and to the area described above in the Geographic Scope. Members of the Partnership and others carry out actions in areas outside the scope of the FIP that also contribute to desired ecological outcomes within the larger Clackamas River basin. For example, limiting factors related to harvest, hatcheries, and hydropower are not directly tied to the Partnership's activities because they are addressed through PGE's FERC licensing obligations or State fish management objectives.

Figure 1: Operational context of the OWEB-funded Focused Investment Partnership Initiative



Theory of Change.

SITUATION

The Clackamas River basin's streams, floodplains, and riparian vegetation have been significantly degraded by a variety of land use activities, including timber harvest, urban and rural development, clearing for agriculture, construction of dams, channelization, and flood control levees, and removal of wood in stream and river channels. Historical and current land uses have impaired aquatic habitat diversity, complexity, and connectivity, and therefore the function of aquatic, floodplain, and riparian habitats within the Plan Area.

Factors limiting the productivity of native fish populations included in the Strategic Action Plan include:

- Habitat access (impaired upstream passage) imposed by small dams and diversions
- Hydrograph/water quantity (altered hydrology) due to upslope land uses, impervious surfaces, including stormwater, flashy flows, and altered groundwater recharge
- Physical habitat quality (impaired gravel recruitment) due to large dams impacting gravel movement and spawning habitat downstream
- Physical habitat quality (impaired habitat complexity and diversity, including access to off channel habitat) including:
    - Degraded riparian areas and large wood recruitment
    - Isolated side channels and off-channel habitats
    - Degraded channel structure and complexity, including lack of large wood
    - Degraded floodplain connectivity and function
    - Channelization and hardening of streambanks and channels
    - Invasive species (riparian / terrestrial)
- Water quality (elevated water temperature) from large reservoirs
- Water quality (toxins) from urban and industrial practices, including stormwater

APPROACH

The results chain ***(Figure 2)*** articulates the partnership's theory of change by displaying the relationships between strategies, implementation results (outputs), and near- and long-term ecological results (outcomes) partners predict will occur in response to strategy implementation that will ultimately lead to achieving goals associated with the partnership's ecological priorities.

Numbered results identified in *Figure 2* are those the partnership has selected to be part of a progress monitoring approach. Measuring these results over time will allow the partnership to evaluate progress in both the near (e.g. 6-year FIP timeframe) and long term, and to identify where key uncertainties might exist with regards to confidence of predicted outcomes or relationships between results, or where and to what extent externalities beyond the scope of this partnership (i.e., ocean conditions impact on target species, weather patterns, land-use decisions, etc.) impact the linkage between outputs and longer-term outcomes.

Each numbered implementation result is associated with the corresponding objective in the Strategic Action Plan *(Tables 1 and 2)*. For intermediate ecological outcomes, objectives are included if identified; however, for many ecological results, the degree to which they will be achieved is not yet well understood. Given this complexity, continued assessment and planning will be required to support development of specific, measurable objectives for the desired ecological outcomes.

The narrative below summarizes the resulting theory of change. Implementation outputs and ecological outcomes prioritized for monitoring during the six-year FIP timeline are indicated by superscript to correspond to the results chain *(Figure 2)* and measuring progress tables *(Tables 1 and 2)*.

STRATEGIES

Strategies in the Clackamas Partnership's Restoration for Native Fish Recovery Strategic Action Plan seek to:

- **address the limiting factors and threats** for the Clackamas salmon, steelhead, Pacific lamprey, and bull trout populations;
- **prioritize habitat restoration and protection** using current science and information contained in regional and local plans; and
- **demonstrate project outcomes** by tracking habitat performance measures tied to the Lower Columbia River Conservation and Recovery Plan for Oregon Populations of Salmon and Steelhead (2010) and monitoring and evaluating habitat and fish response.

The Partnership's actions fall within three main integrated strategic programs including:

Strategy 1- Habitat Restoration,
Strategy 2 – Habitat Protection, and
Strategy 3 – Promoting Land Use and Landowner BMPs.

In addition, the Partnership has developed an approach and program for Landowner and Stakeholder Outreach and for Monitoring and Evaluation. The work included in the FIP Scope of Work and therefore the theory of change elements below is focused only on Strategy 1 – Habitat Restoration.

1 Habitat Restoration

Partners work collaboratively and with landowners to implement habitat restoration projects including: removal or remediation of barriers to fish passage[1]; placement of large wood[2]; enhancement and connection of confluence habitats; restoration and reconnection of side- and off-channel habitats[3] including alcoves, wetlands and floodplains[4]; and removal of invasive species[5]. Where appropriate, streambanks will be revegetated, regraded, or otherwise improved in conjunction with the actions listed above.

Theory of Change.
Generally, habitat restoration projects are designed to increase connectivity, quantity, and quality of stream, floodplain and riparian habitats[13]. In combination, the outcomes of these projects are expected to meet all freshwater life history requirements of viable and resilient populations of native fish species and other aquatic species and reduce the Clackamas Population limiting factors as described in the situation section above.

Barrier removal projects[1] will increase access to the full range of habitats[6] required by native fish including cold-water tributaries, floodplains, side channels, and off-channel wetlands. With access to previously disconnected habitats the spatial distribution of spawning adults and rearing juveniles will expand, individual survival and fitness will improve, and population scale life history diversity and productivity will improve.

Barrier removals[1] and actions to improve or restore side channel habitat and access[3] will also increase hydrologic connectivity[8] promoting floodwater inundation in some areas and hence floodplain function[11]. Enhanced connectivity of side channel and floodplain habitats to rivers and streams will expand available juvenile fish rearing opportunities. Restored floodwaters recharge groundwater and permit slower discharge of cooler water[10] during low flow periods.

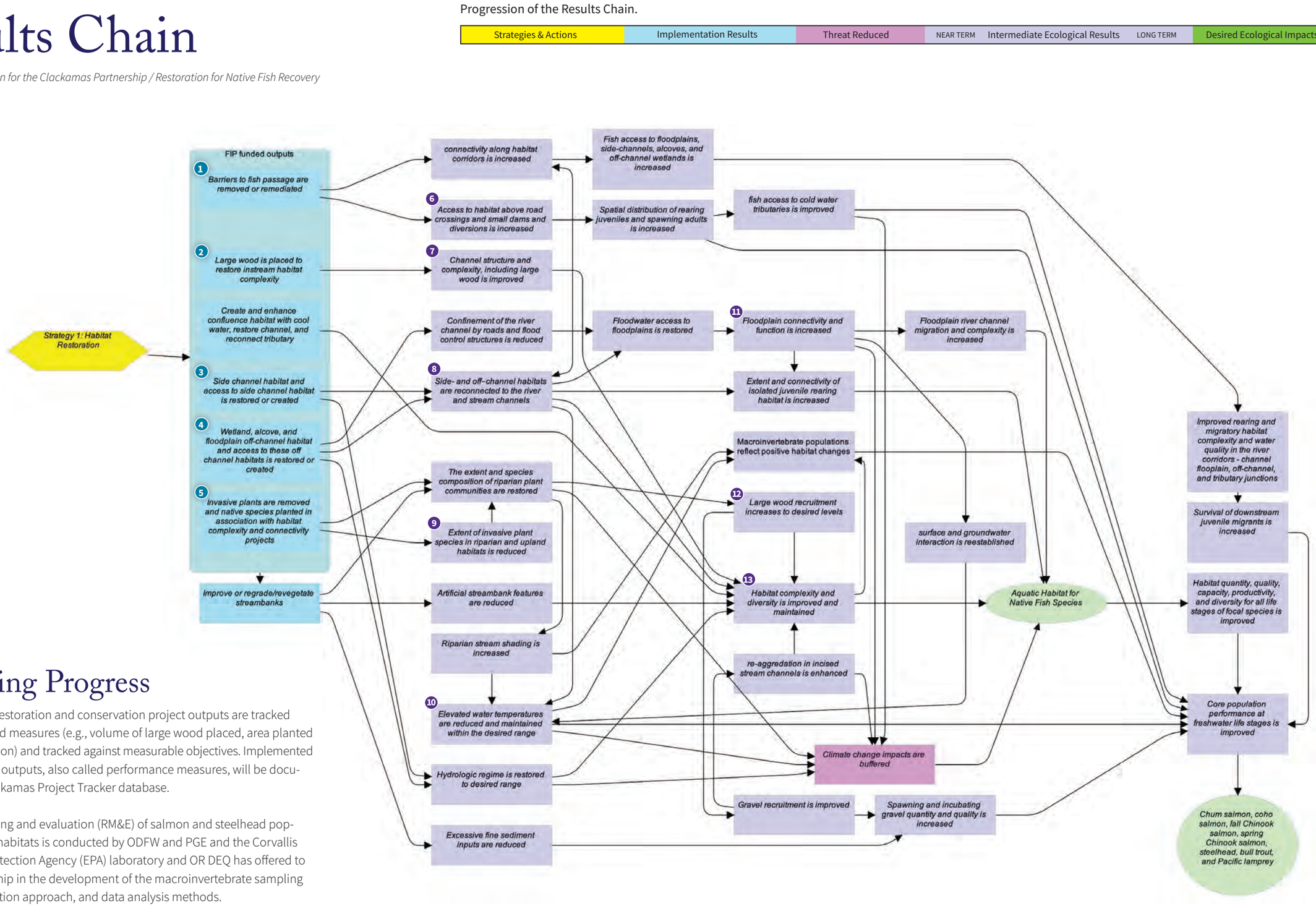
Removal of invasive plans and reestablishment of native riparian vegetation[5] increases stream shade, keeping water temperatures cool.

Large wood placed instream[2] promote sediment deposition and provides cover, building new, complex habitats for fish and aquatic organisms including macroinvertebrates. Over longer timeframes restored riparian areas become a natural source for large woody material[12].

Superscript numbers [1-21] can be cross referenced on the Results Chain diagram and the Implementation Progress/Ecological Progress tables on the following pages.

Results Chain

Figure 2: Results chain for the Clackamas Partnership / Restoration for Native Fish Recovery



Measuring Progress

The Partnership's restoration and conservation project outputs are tracked through established measures (e.g., volume of large wood placed, area planted with native vegetation) and tracked against measurable objectives. Implemented restoration project outputs, also called performance measures, will be documented in the Clackamas Project Tracker database.

Research, monitoring and evaluation (RM&E) of salmon and steelhead populations and their habitats is conducted by ODFW and PGE and the Corvallis Environmental Protection Agency (EPA) laboratory and OR DEQ has offered to assist the Partnership in the development of the macroinvertebrate sampling design, data collection approach, and data analysis methods.

OUTPUTS

Implementation Progress

Table 1. Implementation results objectives and metrics. The result numbers correspond to results shown in the results chain (Figure 2) and theories of change.

IMPLEMENTATION RESULTS (OUTPUT)	OBJECTIVES	OUTPUTS/ PERFORMANCE METRICS
1 Barriers to fish passage are removed or remediated	***By 2021:*** **Obj. 6.1.** Remove a passage barrier and increase fish access in Kelly Creek, an important cold-water tributary, by 1.8 miles ***By 2023:*** **Obj. 6.2.** Remove a passage barrier and increase fish access in Mitchell Creek, an important cold-water tributary, by 1.4 miles ***By 2025:*** **Obj. 6.3.** Identify and address additional fish passage barriers	Miles of stream channel habitat made accessible to fish species by barrier removal or remediation
2 Large wood is placed to restore instream habitat complexity	***By 2021:*** **Obj 1.1.** Place large wood within 1.24 miles of off-channel habitat **Obj. 2.1.** Place large wood within 400 feet of off-channel or floodplain habitat **Obj. 3.1.** Place large wood in 600 feet of N.F. Deep Creek channel **Obj. 3.4.** Place large wood in 4,000 feet of Richardson Creek channel and floodplain **Obj. 4.1.** Place large wood in 1,500 feet of Middle Reach river channel **Obj. 5.1.** Place large wood in 5,574 feet of Newell and Abernethy Creek channels **Obj. 5.2.** Place large wood in 1,000 feet of lower Johnson Creek channel **Obj. 5.3.** Place large wood in 3,500 feet of upper Johnson Creek channel or floodplain? **Obj. 5.6.** Place large wood in 3,000 feet of Mt. Scott Creek channel or floodplain ***By 2023:*** **Obj. 1.4.** Place large wood within 3.2 miles of off-channel habitat **Obj. 1.5.** Place large wood within 0.9 miles of floodplain habitat **Obj. 3.7.** Place large wood in 17,500 feet of Clear Creek channel and floodplain **Obj. 3.9.** Place large wood in 5,000 feet of N.F. Deep Creek channel **Obj. 4.3.** Place large wood in 5,500 feet of the Middle Reach river channel habitat **Obj. 5.10.** Place large wood in 300 feet of upper Johnson Creek channel and floodplain ***By 2025:*** **Obj. 1.9.** Place large wood within 2 miles of off-channel habitat **Obj. 3.10.** Place large wood in 3,500 feet of tributary channels and floodplain **Obj. 3.12.** Place large wood in 3,000 feet of tributary channels **Obj. 4.6.** Place large wood in 5,500 feet of the Middle or Upper Reach river channel habitat **Obj. 5.12.** Place large wood in 500 feet of tributary channel and floodplain ***By TBD:*** **Obj. 2.3.** Place large wood within off-channel or floodplain habitats	Linear feet of stream with large wood placement, categorized by: 1) placement location: in channel (at or below OHW) or floodplain (above OHW); and 2) volume of wood (yd3) placed per length of stream.
3 Side channel habitat and access to side channel habitat is restored or created	***By 2021:*** **Obj. 1.3.** Multiple projects: Increase side channel access in 2,000 feet of channel **Obj. 3.3.** Increase N.F. Deep Creek side channel access in 150 feet of channel ***By 2023:*** **Obj. 1.7.** Multiple projects: Increase side channel access in 2.0 miles of channel **Obj. 4.5.** Increase side channel access in 0.6 miles of Upper Reach channel ***By 2025:*** **Obj. 1.11.** Multiple projects: Increase side channel access in 2,000 feet of channel	Linear feet of side channel created or re-connected
4 Wetland, alcove, and flood-plain off-channel habitat and access to these off-channel habitats is restored or created	***By 2021:*** **Obj. 3.6.** Increase off-channel wetland area and access by 2.3 acres along Richardson Creek **Obj. 5.5.** Increase off-channel wetland area by 7.0 acres along upper Johnson Creek **Obj. 5.8**. Increase off-channel wetland area by 7.6 acres along Mt. Scott Creek ***By 2023:*** **Obj. 1.8.** Increase off-channel wetland area and access by 1.0 acres along the Clackamas River **Obj. 3.8.** Increase off-channel wetland area and access by 1.4 acres along Clear Creek ***By 2025:*** **Obj. 1.12.** Increase off-channel wetland area and access by 1.0 acres along the Clackamas River **Obj. 3.11.** Increase off-channel wetland area and access by 2 acres along tributary channels	Area in acres of off-channel wetland habitat
5 Invasive plants are removed and native species planted as an element of habitat complexity and connectivity projects	***By 2021:*** **Obj. 1.2.** Multiple projects: Control invasives and plant native floodplain vegetation on 25.5 acres **Obj. 3.2.** Control invasives and plant native riparian vegetation on 3 acres along N.F. Deep Creek **Obj. 3.5.** Control invasives and plant native riparian vegetation on 30 acres along Richardson Creek **Obj. 4.2.** Plant native riparian vegetation for 500 feet along the Middle Reach river channel **Obj. 5.4.** Plant 7 acres of native riparian vegetation along upper Johnson Creek **Obj. 5.7.** Plant 7.6 acres of native riparian vegetation along Mt. Scott Creek ***By 2023:*** **Obj. 1.6.** Multiple projects: Control invasives and plant native floodplain vegetation on 12.0 acres **Obj. 4.4.** Control invasives and plant native floodplain vegetation on 40 acres along the upper Clackamas River Reach **Obj. 5.9.** Control invasives and plant native riparian vegetation on 0.7 acres along upper Johnson Creek ***By 2025:*** **Obj. 1.10.** Multiple projects: Control invasives and plant native floodplain vegetation on 25.0 acres **Obj. 5.11.** Control invasives and plant native riparian vegetation on 3 acres of tributaries	Acres of streamside / floodplain invasive species removal Linear feet of streamside / floodplain invasive species removal Acres of riparian / flood-plain planted with natives Linear feet streamside / floodplain planted with natives

OUTCOMES

Ecological Progress

Table 2. Ecological results, potential objectives, and potential metrics. The result numbers correspond to results shown in the results chain (Figure 1) and theories of change. Given the complexity of ecosystems, continued assessments and planning will be required to support development of specific, measurable objectives for desired ecological outcomes. Objectives in this table are italicized to reflect that they may be refined in the future. (Items in parentheses are monitoring activities that are not included in current monitoring grant application. Partners are applying for additional funds to cover these metrics.)

LIMITING FACTOR REDUCTION OR INTERMEDIATE ECOLOGICAL RESULTS	WORKING OBJECTIVE	POTENTIAL METRIC
6 Access to habitat above road crossings and small dams and diversions is increased	*Removing barriers and increasing access will increase spatial distribution of rearing juveniles and spawning adults.*	Fish use as indicated by environmental DNA
7 Channel structure and complexity, including large wood is improved	*Projects will improve habitat characteristics and processes, and fish habitat capacity. Restoration will Increase channel complexity to make progress toward LCR Plan delisting goal of 62.5 miles of large wood placement at 20m3 of large wood per 100m of stream in 7 miles of target areas; benthic conditions produce less sediment-tolerant and therefore more sediment-sensitive macroinvertebrate communities*	Fish use and density at installed habitat structures; Macroinvertebrate IBI or other metric as determined in consultation with ODEQ; ODFW benchmarks for channel structure and complexity (AQI)
8 Side- and off channel habitats are reconnected to the river and stream channels	*Improving and re-connecting off-channel habitat to river and stream channels will improve fish access and habitat capacity, increasing juvenile rearing and adult spawning.*	Fish presence and density; Length of side and off-channel habitats reconnected
9 Extent of invasive plant species in riparian and upland habitats is reduced	*Invasive plant species are replaced with natives on targeted riparian and upland habitat acres, increasing shade and improving habitat complexity.*	60% (or 1200 or more stems per acre) of native plant species established on 100 or more acres
10 Elevated water temperatures are reduced and maintained within the desired range	*Restoration projects will contribute to water temperatures reaching desired temperatures for aquatic species and human use and minimally maintain temperatures through 2030*	Macroinvertebrate temperature optima (Monitor stream thermal profile via UAS (drones))
11 Floodplain, wetland and alcove connectivity is increased	*Access to increased habitat and capacity will result from restoration projects. An increase in floodplain and wetland connectivity and function will improve fish productivity and restore natural processes.*	(Increase in floodplain / wetland connectivity, when & if funding is available to monitor) (Increased frequency of inundation when & if funding is available to monitor)
12 Large wood recruitment increases to desired levels	*Projects will improve instream habitat and habitat complexity for all life stages and increase productivity.*	Macroinvertebrate sampling results (TBD in consultation with ODEQ metric); ODFW AQI
13 Habitat complexity and diversity is improved and maintained	*Off-channel habitat complexity supports objectives of the Lower Columbia River Plan e.g., increase in miles of side channel and increased acreage of off-channel wetland for use by ESA-listed species and other native aquatic species.*	Macroinvertebrate sampling results (TBD in consultation with ODEQ metric); ODFW AQI Evidence of fish presence and use from ODFW AQI monitoring of juvenile fish presence

ECOLOGICAL PRIORITIES

Aquatic Habitat for Native Species

Native salmonid species:

Chum salmon
Coho salmon
Fall Chinook salmon
Spring Chinook salmon
Steelhead
Bull trout
Pacific lamprey

Status & Trends

Monitoring the status and trends of ecological priority habitats and focal species will include coordination with agencies or conservation organizations operating at the appropriate landscape or population scales. FIP partners will work with these entities to establish a process for integrating their monitoring framework with existing status and trends monitoring programs (if they occur) or to establish an approach for identifying key ecological attributes that should be measured to document and communicate change in the status and trajectory of ecological priority habitats and focal species populations.

John Day Basin *Partnership*

John Day Basin Native Fish Habitat Initiative

VISION

A John Day Basin with clean water and healthy watersheds sufficient to provide for the sustainable ecological, economic, and cultural well-being of the basin.

PARTNERSHIP MEMBERS

Steering Committee

Soil and Water Conservation Districts:
- Gilliam Co. SWCD

Watershed Councils:
- South Fork John Day Watershed Council

Conservation Groups:
- The Freshwater Trust

Tribal Entities:
- Confederated Tribes of the Warm Springs Reservation
- Confederated Tribes of the Umatilla Indian Reservation

State and Federal Agencies:
- Oregon Dept. of Fish and Wildlife
- Umatilla National Forest
- Natural Resources Conservation Service

Partner Organizations

Blue Mountain Forest Partners
Blue Mountain Land Trust
Bonneville Power Administration
Burns Paiute Tribe
Confederated Tribes of the Umatilla Indian Reservation
Confederated Tribes of the Warm Springs Reservation
Gilliam County Soil & Water Conservation District
Gilliam East John Day Watershed Council
Grant Soil & Water Conservation District
Mid John Day-Bridge Creek Watershed Council
Monument Soil & Water Conservation District
North Fork John Day Watershed Council
Oregon Department of Agriculture
Oregon Department of Fish & Wildlife
Oregon Department of Parks & Recreation
Ritter Land Management Team
Sherman County Soil & Water Conservation District
South Fork John Day Watershed Council
The Freshwater Trust
Trout Unlimited
U.S. Department of Agriculture, Forest Service, Malheur National Forest
U.S. Department of Agriculture, Forest Service, Umatilla National Forest
U.S. Department of Agriculture, Forest Service, Wallow-Whitman National Forest
U.S. Department of Agriculture, Natural Resource Conservation Service
U.S. Department of Interior, Bureau of Land Management
U.S. Department of Interior, Bureau of Reclamation
U.S. Department of Interior, Fish & Wildlife Service
Wheeler County Soil & Water Conservation District

ECOLOGICAL PRIORITY

Aquatic Habitat for Native Fish Species

FOCAL SPECIES

Middle Columbia summer steelhead

Middle Columbia Bull trout

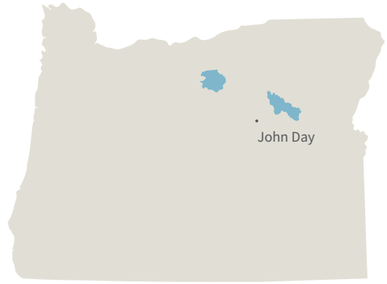
Middle Columbia River spring Chinook salmon

Pacific lamprey

Western brook lamprey

Westslope cutthroat trout

Redband trout



GEOGRAPHIC SCOPE

The John Day Basin Partnership's geography encompasses the entire John Day River Basin. The John Day River Basin spans 8,100 sq. mi. and with ~284 undammed miles, the John Day is the longest, free-flowing river in Oregon.

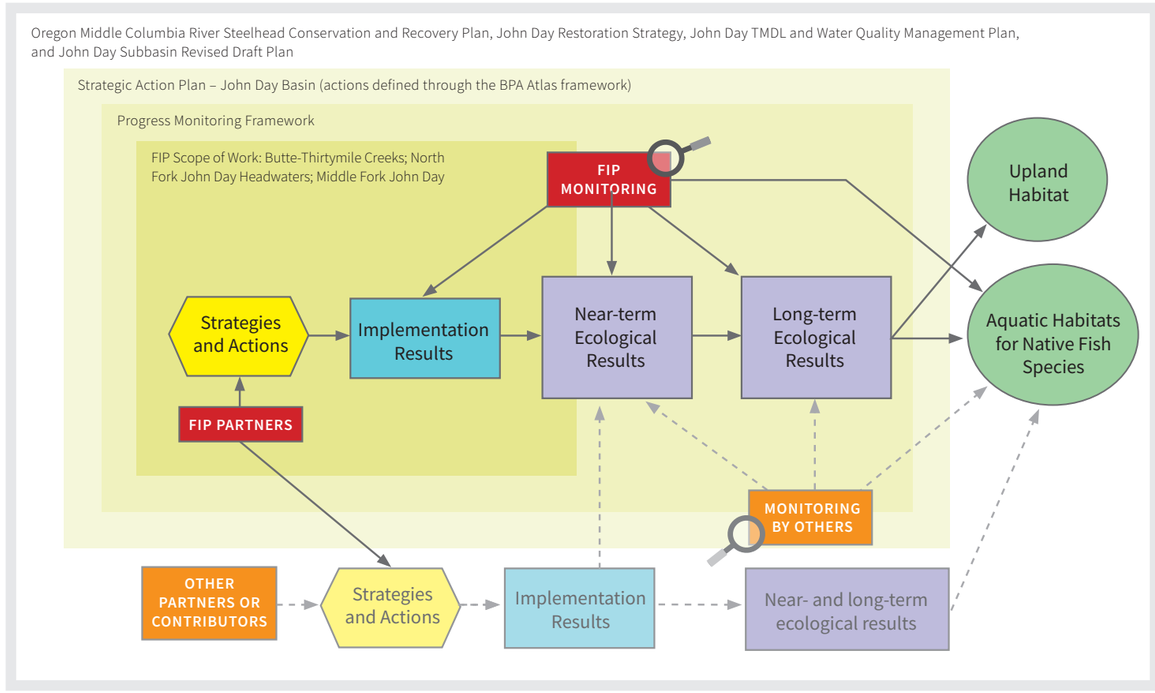
The Partnership's Initiative Geography includes ***three priority focus areas*** (Initiative watersheds) within the basin:

1 Butte-Thirtymile Creeks in the Lower Mainstem John Day;
2 North Fork John Day Headwaters; and
3 the mid-upper Middle Fork John Day.

Operational Context

The John Day Native Fish Habitat Initiative is nested within a larger regional recovery effort described in the Oregon Middle Columbia River Steelhead Conservation and Recovery Plan (ODFW; NMFS), Recovery Plan for the Coterminous United States Population of Bull Trout (USFWS), the John Day River Restoration Strategy (CTWSRO), the John Day TMDL and Water Quality Management Plan (ODEQ), and the John Day Subbasin Revised Draft Plan (NWPCC). While the geographic scope of the Strategic Action Plan encompasses the entire John Day Basin, actions occurring in the 6-year FIP scope of work are focused in three subwatersheds – Butte-Thirtymile Creeks; North Fork John Day Headwaters; and Middle Fork John Day. Projects in these watersheds as well as the larger basin have been identified by the BPA Atlas framework (Figure 1).

Figure 1: *Operational context of the OWEB-funded Focused Investment Partnership Initiative*



Theory of Change

SITUATION

The John Day River Basin is a highly valued and unique region rich in natural resources, wild fisheries, small communities, native cultures, and unmatched viewsheds. It is the third longest free-flowing river in the continental US and its native fish populations are relatively free from hatchery influences.

A broad array of historical and present-day land and water use practices (e.g. mining, logging, livestock grazing, fire suppression, river channel and riparian modifications, irrigation water withdrawals, and invasive species introductions) and a changing climate have altered the condition and function of the aquatic and upland ecosystems of the John Day River Basin. An important result has been a substantial reduction in the productivity and status of native fish populations and the subsequent listing of many species under state and/or federal protections (e.g. Federal Endangered Species Act, Oregon sensitive-critical species). This situation has motivated landowners, tribes, communities, resource agencies, and conservation organizations to come together and collaboratively take action to improve land use practices and plan, design, and implement projects that address the following key limiting factors:

- Altered hydrology *(low instream flows)*
- Degraded water quality *(elevated temperature, dissolved oxygen, bacteria, sedimentation, biological criteria)*
- Degraded floodplain and channel structure *(pools, connectivity, diversity)*
- Degraded riparian communities
- Impaired fish passage
- Altered sediment routing
- Altered condition of upland habitats

APPROACH

The results chain (Figure 2) articulates the partnership's theory of change by displaying the relationships between strategies, implementation results (outputs), and near- and long-term ecological results (outcomes) partners predict will occur in response to strategy implementation that will ultimately lead to achieving goals associated with the partnership's ecological priorities.

Numbered results identified in Figure 2 are those the partnership has selected to be part of a progress monitoring approach. Measuring these results over time will allow the partnership to evaluate progress in both the near (e.g. 6-year FIP timeframe) and long term, and to identify where key uncertainties might exist with regards to confidence of predicted outcomes or relationships between results.

Each numbered implementation result is associated with the corresponding objective in the Strategic Action Plan (Tables 1 and 2). For intermediate ecological outcomes, objectives are included if identified; however, for many ecological results, the degree to which they will be achieved is not yet well understood. Given this complexity, continued assessment and planning will be required to support development of specific, measurable objectives for the desired ecological outcomes.

The narrative below summarizes the resulting theory of change. Implementation outputs and ecological outcomes prioritized for monitoring during the six-year FIP timeline are indexed to correspond to the results chain (Figure 2) and measuring progress tables (Tables 1 and 2).

STRATEGIES

1 Dedicate land and water to restoration and preservation of stream habitat

Partners will work with willing landowners to enter into contractual agreements such as conservation easements on working lands or flow agreements to protect core fish habitat[1].

Theory of Change.
Land acquisitions and conservation easements[1] promote land and water use practices that protect high-quality upland and aquatic habitat from degradation. Acquisition (lease or purchase) of water rights reduces the volume of water diverted for out of stream uses thereby increasing stream flow. Increased flow improves habitat connectivity and provides fish access to thermal refugia, buffering impacts of climate change.

2 Reconnect floodplains

This strategy consists of actions that seek to reactivate floodplains including breaching, removing, or setting back existing levees or projects to construct floodplain topography by excavating floodplain benches in new or existing channels[2].

Theory of Change.
Removing levees or other infrastructure[2] that has disconnected floodplains from river and stream channels will promote the reactivation of floodplain habitat, restore a functional hyporheic zone, and encourage reestablishment of floodplain and riparian vegetation. Increasing the connectivity and quantity of floodplain habitat (and associated seasonal wetlands and off- and side-channels) accessible to summer rearing and overwintering juvenile salmonids[8] will improve their survival throughout the year and increase the abundance of emigrating smolts and therefore the overall productivity of fish populations. Active floodplains also contribute to improving water quality by promoting the settling of fine sediments and improving surface/ground water interactions.

3 Riparian restoration and management

Riparian restoration actions will include removal of non-native plant species and revegetation of riparian areas with native plant species to establish adequate stream buffer strips[3]. This strategy also will support the design and implementation of grazing practices including installation and maintenance of livestock exclusion fencing[3] and off-stream watering systems.

Theory of Change.
Reestablishing native plant communities[3] in riparian areas (and removal of non-native plants) will promote the production of terrestrial food organisms and the input of organic material into aquatic systems that then support aquatic macroinvertebrate populations. An increase in the production of terrestrial and aquatic food resources will improve growth and survival of rearing native fish.

Functional riparian areas also aid in nutrient mediation and increase bank stability. These improved functions will reduce the input of nutrients and reduce erosion rates that deliver fine-grained sediments into streams. A reduction of sediments will reduce gravel embeddedness improving spawning gravel quality and therefore improve spawning success and egg to fry survival. Sediment mediation in riparian zones also contributes to improved sediment dynamics and composition necessary for the overall quality of diverse and complex aquatic habitats[10].

Over time, restored riparian areas also become sources for large-sized woody material that become key elements for the creation and maintenance of stream habitat. Large-sized wood complexes help sort sediment and trap organic material – also necessary functions to maintain diverse and complex habitats[10] for fish and the macroinvertebrates that provide their primary food source. Shading from restored healthy riparian zones[7] reduce direct solar radiation in streams and therefore play a role in lowering stream temperatures[9]. Finally, improved riparian areas contribute to supporting upland functions and processes and the upland species that depend on them.

Superscript numbers [1-17] can be cross referenced on the Results Chain diagram and the Implementation Progress/Ecological Progress tables on the following pages.

4 Channel modifications and side-channel/ off-channel restoration

This strategy is focused primarily on beaver restoration management[4] in areas where they are currently absent but historically present and active reconstruction of physical habitat in stream channels and associated side- and off-channel areas. These projects will create pools and riffles and restore desired stream channel configurations by reconnecting meanders where streams have been channelized and straightened.

Theory of Change.

The reintroduction of beavers[4] in appropriate locations will promote their recolonization and lead to an increase in the quantity of deep pools and reactivate side and braided channel networks. The cumulative long-term outcome of all these actions and near and medium-term results is an improvement in the diversity, complexity, and structure of aquatic habitats[10] – supporting all freshwater life history stages of native fish and the overall productivity of their populations.

Targeted pool and riffle construction will restore a more desirable distribution of these habitat types and increase summer rearing opportunities for native fish[8]. The reconstruction of stream channels and reconnection of meanders to historical configurations will reactivate side and braided channel networks and also contribute to the development of a desired distribution of riffles and pools.

5 Install large woody debris structures and rock weirs

This strategy consists of the installation of large woody debris or rock weir structures where appropriate[4].

Theory of Change.

Large woody debris complexes and rock weirs[4] will promote evolution of deep pools and riffles, increasing the quantity and distribution of these habitat features. These outcomes provide increased summer rearing habitat for fish and ultimately contribute to the increased creation and maintenance of diverse and complex aquatic habitats[10].

6 Fish passage restoration

The implementation of this strategy consists of removal or remediation of artificial barriers to fish passage[5]. Barriers include structures such as dams (including seasonal push-up dams), culverts, and irrigation diversions – where fish screens and associated bypass systems will be installed to reduce the entrainment of juvenile fish.

Theory of Change.

Removal of artificial barriers[5] to fish will improve the migratory or seasonal movement of fish and therefore increase habitat connectivity, access to thermal refugia, and the spatial distribution of native fish[8], buffering impacts of climate change.

Installation of fish screens at points of diversion will reduced entrainment and overall rates of mortality of juvenile fish – increasing the overall productivity of fish populations.

7 Water quality and water quantity impacts

This strategy consists of a variety of actions to improve water quality and water quantity. To improve water quantity, partners will negotiate and complete flow transactions with water users (through lease or purchase)[6] and collaborate with agricultural producers to design and implement irrigation efficiency projects[12]. To address water quality, the partnership will implement projects that reduce or eliminate point source (e.g. heavy metals, pesticides, herbicides, sedimentation, or other contaminants) and nonpoint source pollution (road caused sedimentation).

Theory of Change.

Flow transactions[6] and irrigation efficiency projects will increase surface flow[11] in targeted streams and contribute to restoring a more desirable hydrograph (one that more closely approaches natural conditions) and improve conditions for all life history stages for native fish. A restored hydrograph will help restore the stream temperature[9] regime thereby improving the quality of summer rearing habitat[8], including increased dissolved oxygen levels. It will also reduce the frequency and severity of scouring flows and help to maintain quality of aquatic habitats.

Road decommissioning and removal will increase floodplain connectivity and floodplain habitat which supports overwintering fish, as well as reduce road related erosion and sedimentation and the quantity of fine-grained sediments entering stream. As a result of reduced sedimentation, gravel embeddedness is reduced and the quality of spawning gravel is improved – leading to more successful spawning and greater egg to fry survival. A reduction in fine sediments will also decrease nutrient loading from agricultural runoff.

8 Implement upland restoration actions

Upland restoration actions are a critical strategy in the Partnership's ridgetop to ridgetop restoration approach. However, implementation objectives will not be defined until after upland and terrestrial scoping, mapping, and prioritization is completed. This process is planned for Fall 2019.

Partners (including agency staff) will work with private and public landowners to implement actions to restore healthy upland crop, range, and forest lands that benefit ecological and human communities. These actions include: fuels management (including thinning, prescribed fire, and fuel breaks); use of conservation tillage and cover crop practices; management to control non-native plants and juniper; and implementation of grazing and livestock Best Management Practices (BMPs) such as fencing, establishing off-stream water, and installing and maintaining riparian buffers on fish bearing streams.

Theory of Change.

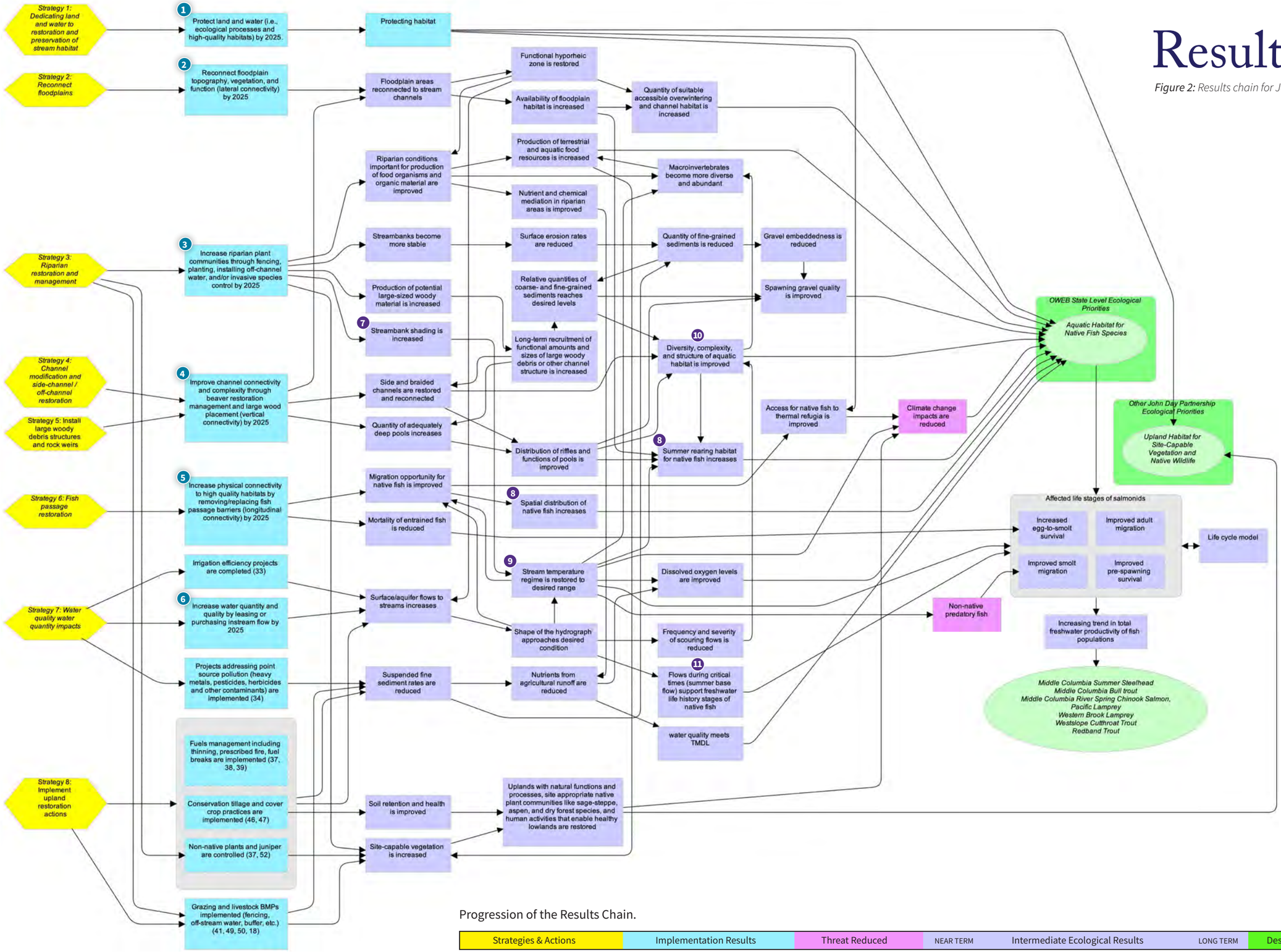
Conservation tillage and cover crop practices improve soil retention and health; controlling non-native plants and juniper allows diverse native plant communities (site-capable vegetation) to become re-established; and grazing and livestock BMPs protect and promote site-capable vegetation. Healthy, intact soil and diverse, native plant communities enable natural upland functions and processes, ultimately providing upland habitat for site-capable vegetation and native wildlife, supporting land uses compatible with healthy, functioning lowlands, and buffering impacts of climate change.

When implemented together, fuels management, conservation tillage and cover crop practices, non-native and juniper control, and grazing and livestock BMPs increase surface and aquifer flows to streams and reduce suspended fine sediment in streams.

Superscript numbers [1-11] can be cross referenced on the Results Chain diagram and the Implementation Progress/Ecological Progress tables on the following pages.

Results Chain

Figure 2: Results chain for John Day Native Fish Habitat Initiative



Progression of the Results Chain.

Strategies & Actions	Implementation Results	Threat Reduced	NEAR TERM	Intermediate Ecological Results	LONG TERM	Desired Ecological Impacts

OUTPUTS

Implementation Progress

Table 1. Implementation results objectives and metrics. The result numbers correspond to results shown in the results chain (Figure 2) and theories of change. Numbers in parenthesis indicate actions defined in the John Day Atlas.

IMPLEMENTATION RESULTS	OBJECTIVES **BY 2025**	METRICS
1 Protect land and water (i.e., ecological processes and high-quality habitats) by 2025. (1)	**Butte-Thirtymile Creeks:** water, land, and protection projects are completed **North Fork John Day Headwaters:** water, land, and protection projects are completed **Upper Middle Fork John Day:** water, land, and protection projects are completed	# or easements / acquisitions Acres protected Cfs protected Linear stream miles protected Protection timeframe
2 Reconnect floodplain topography, vegetation, and function (lateral connectivity) by 2025. (7, 8, 9,10)	**Butte-Thirtymile Creeks:** 15 miles of floodplain reconnected **North Fork John Day Headwaters:** 15 miles of floodplain reconnected **Upper Middle Fork John Day:** 15 miles of floodplain reconnected	Acres treated Linear miles of stream treated
3 Increase riparian plant communities through fencing, planting, installing off-channel water, and/or invasive species control by 2025. (17, 18, 19, 20, 21)	**Butte-Thirtymile Creeks:** 12 miles of stream treated, 30 developments/off-channel water sources **North Fork John Day Headwaters:** 15 miles of stream treated **Upper Middle Fork John Day:** 12 miles of stream treated	Linear miles of stream treated # of streambanks treated Buffer width
4 Improve channel connectivity and complexity through channel modification and side channel restoration, beaver restoration management, and large wood placement (vertical connectivity) by 2025. (3, 4, 5, 16, 28)	**Butte-Thirtymile Creeks:** 15 miles of stream treated **North Fork John Day Headwaters:** 12 miles of stream treated and 36 structures installed **Upper Middle Fork John Day:** 15 miles of stream treated and 36 structures installed	# of structures installed Linear stream miles treated # of pools and riffles created
5 Increase physical connectivity to high quality habitats by removing/ replacing fish passage barriers (longitudinal connectivity) by 2025. (22, 23, 24, 25)	**Butte-Thirtymile Creeks:** 4 barriers removed or replaced **North Fork John Day Headwaters:** 5 barriers removed or replaced **Upper Middle Fork John Day:** 5 barriers removed or replaced	# of barriers removed / replaced / screened Total stream miles made accessible to the next upstream barrier or likely limit of habitable range
6 Increase water quantity and quality by leasing or purchasing instream flow by 2025. (31)	**Butte-Thirtymile Creeks:** flow transactions completed **North Fork John Day Headwaters:** flow transactions completed **Upper Middle Fork John Day:** flow transactions completed	cfs transferred instream Total linear miles of improved for flow as measured from point of diversion to next downstream diversion or river confluence *(whichever comes first)*

Table 2. Ecological results potential objectives and potential metrics. The result numbers correspond to results shown in the results chain (Figure 1) and theories of change. Given the complexity of ecosystems, continued assessments and planning will be required to support development of specific, measurable objectives for desired ecological outcomes.

** Contributing Ecological Objectives are direct measures of the highest priority primary factors limiting summer steelhead and spring Chinook freshwater productivity in the basin.*

OUTCOMES

Ecological Progress

LIMITING FACTOR REDUCTION OR INTERMEDIATE ECOLOGICAL RESULTS	POTENTIAL OBJECTIVES	POTENTIAL METRICS
7 Streambank shading is increased	*Increase in woody species density and stream shade potential*	Percent riparian vegetation over 6ft within 60ft buffer of treatment areas (LiDAR/UAV Surveys) Percent solar access at random transects in Thirtymile Creek, Desolation Creek, Middle Fork John Day. Density of woody stems <1m and >1m tall between treatment and control locations.
8 Spatial distribution of native fish increases **8** Summer rearing for native fish increases	*Increasing trend in linear miles of juvenile summer steelhead and spring Chinook summer rearing habitat by 2025**	Linear extent (km) of the mainstem Middle Fork John Day occupied by Chinook parr during August snorkel surveys. Linear extent (km) of Thirtymile Creek occupied by juvenile steelhead during end of summer surveys. Linear extent (km) of the Desolation Creek occupied by Chinook spawning surveys during the fall and steelhead spawning surveys in Spring
9 Stream temperature regime is restored to desired range	*Decreasing trend in summer instream water temperature by 2025**	Seven-day average daily maximum temperature at long-term monitoring sites in each of the Mainstem Middle Fork John Day, Desolation Creek, Thirtymile Creek.
10 Diversity, complexity, and structure of aquatic habitat is improved	*Create an aquatic-riparian system sufficient to provide necessary stream shading, and organic material for in-stream structural and metabolic processes.* *"Increase geomorphically and seasonally appropriate sinuosity, floodplain and pool/riffle habitat, and structure to maintain habitat and provide fish cover."*	Habitat diversity index used in all three of the focal FIP geographies.
11 Flows during critical times (summer base flow) support freshwater life history stages of native fish	*Increasing trend in summer instream flow by 2025**	MFJD: July-August mean and minimum discharge at the Ritter USGS gauging station. Thirtymile Creek: percent of total stream length downstream from Hwy. 19 with surface water during July-August base flow. Desolation Creek: CTUIR installed gauging station near mouth of Desolation, pressure transducer

Status & Trends

ECOLOGICAL PRIORITIES	GOALS
Aquatic Habitat for Native Species	**1** Increasing trend in summer steelhead freshwater productivity in Butte-Thirtymile Creeks by 2025. **2** Increasing trend in summer steelhead and spring Chinook freshwater productivity in the North Fork John Day Headwaters by 2025. **3** Increasing trend in summer steelhead and spring Chinook freshwater productivity in the Upper Middle Fork John Day by 2025.

Rogue Forest
Restoration Partnership

Rogue Forest Restoration Initiative

VISION

The Rogue Forest Restoration Initiative (RFRI) partners envision the Rogue River Basin Dry-Type Forests treated with restorative actions that will reduce tree density and basal area, reduce surface and ladder fuels, as well as altering species composition allowing them to receive both prescribed fire and wildfire, in a manner which supports them in predictably delivering benefits of fire in sustaining forest biodiversity and function, and ecosystem services.

PARTNERSHIP MEMBERS

Core Committee:

- Southern Oregon Forest Restoration Collaborative
- The Nature Conservancy
- Lomakatsi Restoration Project
- USDA Rogue River-Siskiyou National Forest
- USDI Bureau of Land Management, Medford District
- OSU Extension, Jackson/Josephine County
- Oregon Department of Forestry
- Klamath Bird Observatory

Other active partners that support the Initiative:

- Natural Resource Conservation Service
- USDI Fish and Wildlife Service
- Oregon Watershed Enhancement Board
- Rogue Basin Partnership

ECOLOGICAL PRIORITY

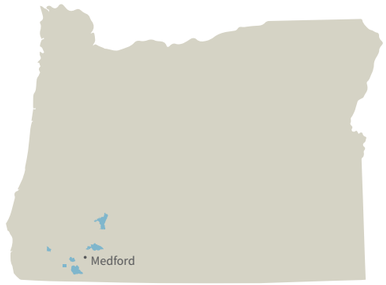
Dry-Type Forest Habitat

Oak Woodland and Prairie Habitat

Aquatic Habitat for Native Fish Species

FOCAL SPECIES

Northern Spotted Owl (NSO)



GEOGRAPHIC SCOPE

The 4.6 million acre Rogue Basin analytical area is centered on the northern Klamath Mountains Ecoregion and extends to parts of the Coast Range and Cascades bioregions as they overlap with the administrative units of Rogue River-Siskiyou National Forest, the Medford district of BLM and intervening lands.

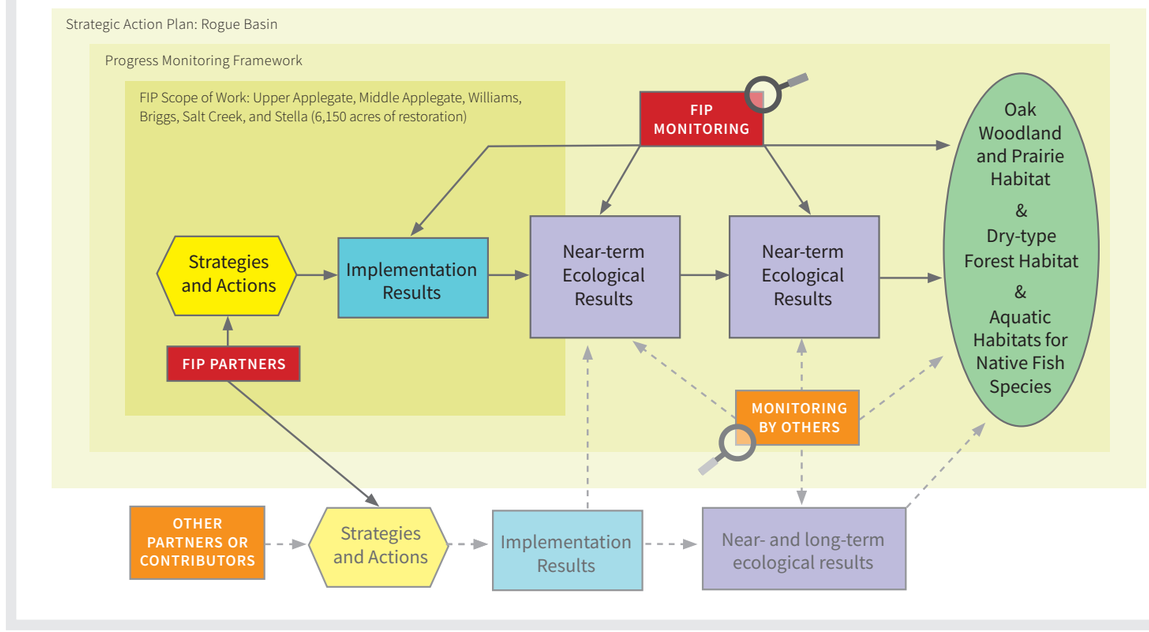
FIP Project Areas
(FIP treated areas in parentheses):

- Upper Applegate 20,000 ac (3,700 ac)
- Middle Applegate 10,000 ac (200 ac)
- Williams 6,625 ac (1,190 ac)
- Upper Briggs 3,000 ac (350 ac)
- Salt Creek 800 ac (710 ac)
- Stella 20,000 ac (0 ac), engagement only

Operational Context

The initiative represents an expanded implementation of the Rogue Basin Strategy (2017), a twenty-year guide for strategic action for 1.1 million acres of dry-type forest restoration within the 4.6 million acre Rogue Basin.

Figure 1: *Operational context of the OWEB-funded Focused Investment Partnership Initiative*



Theory of Change.

SITUATION

Widespread dry-season, lightning-ignited fire is an intrinsic part of the Dry-Type Forests of Oregon, and since time immemorial indigenous peoples' have augmented the fire pattern for a variety of desired stewardship outcomes. The discovery of gold brought settlers to the Rogue Valley during the 1850's but agriculture became the main draw during the late 19th century. The need for irrigated water to supplement rainfall for orchards and farmland shaped the landscape of the Rogue Valley as much oak savannah and woodlands were converted to agriculture. In the Rogue River Basin, the need for water control and a vibrant timber industry impacted the river systems and forests substantially.

Past clearcut timber harvest, fire suppression, and recent severe wildfires have resulted in an overabundance of young dense forests and a reduction of quality spotted owl habitat. The Rogue Basin has experienced significantly disrupted fire regimes over the last 100-150 years including lowland and mixed conifer riparian forests. Combined with extensive even-aged forest stand management and land conversion, the dry forest type and remaining oak woodland habitats in each of the sub-basins are at high risk from wildfire, insects and disease and these conditions are being exacerbated by climate change.

Strategies of the initiative endeavor to address the following limiting factors:

- Insufficient late seral forest, especially open late seral
- Insufficient public support
- Insufficient and at-risk legacy trees and snags
- Reduced Northern Spotted Owl (NSO) habitat that is at high risk from wildfire
- Insufficient private land engagement and treatment
- Upland effects on aquatic habitat
- Risk of high severity fire at spatial scales and proportions outside of natural variations
- Riparian vegetation lacks diversity
- Conifer encroachment into meadows
- Impacts from nonnative species
- Oak habitat loss and degradation

APPROACH

The results chain *(Figure 2)* articulates the partnership's theory of change by displaying the relationships between strategies, implementation results (outputs), and near- and long-term ecological results (outcomes) partners predict will occur in response to strategy implementation that will ultimately lead to achieving goals associated with the partnership's ecological and social priorities.

Numbered results identified in *Figure 2* are those the partnership has selected to be part of a progress monitoring approach. Measuring these results over time will allow the partnership to evaluate progress toward objectives and goals in both the near (e.g. 6-year FIP timeframe) and long term, and to identify areas that would benefit from future research.

Each numbered implementation result or ecological outcome is associated with the corresponding objective in the Strategic Action Plan *(Tables 1-3)*.

The narrative below summarizes the resulting theory of change. Implementation outputs and ecological outcomes prioritized for monitoring during the six-year FIP timeline are indexed to correspond to the results chain *(Figure 2)* and measuring progress tables *(Tables 1-3)*.

STRATEGIES

1 Apply forest treatments

This strategy involves the identification of appropriate sites, design, and application of stand level treatments to improve stand to landscape resiliency to climate and fire. Treatments include removal of dense vegetation to protect legacy trees, strategic ecological thinning and fuels reduction, and application of prescribed fire. Nonnative species will be mitigated with early detection and native seeding. In addition, this strategy also contains actions to manage riparian vegetation to reduce invasive plant species.

Theory of Change.
Strategic thinning of priority sites[1] will increase the overall proportion of open canopy forest at the landscape scale, increase the recruitment and vigor of fire-adapted and fire-dependent species[12], and increase the resilience of forest ecosystems to drought, extreme fire, insects and disease. Forest thinning[2, 3] will accelerate growth of retained trees into legacy trees[14], large wood, and development of late seral characteristics[13, 20]. Thinning and burning will expand or improve meadow[17] and oak habitat[16]. Restoring open forest will transition seral structural states toward the Natural Range of Variability (NRV)[20]. The long-term ecological outcome is improved landscape resiliency, protection of complex forest habitat, and restoration of late-seral closed and open forest habitat that supports dependent wildlife including NSO.

Targeted thinning and controlled burning treatments[4] will reduce wildfire intensity and subsequent fire effects, as well as climate effects, for forest habitat, NSO habitat, aquatic and riparian resources, and human communities[18, 19]. Treatments that reduce burn intensity will provide safe and effective options for fire suppression[21]. The long-term ecological outcome will be a reduced risk of disturbances outside the historic natural range of variation to dry-type forest, downstream aquatic habitats and to local communities at risk of wildfire.
Focused treatment of highest risk nonnative species and replanting with desired native species15 will reduce the impact of nonnatives on the forest ecosystem. Where planned, nonnative removal followed by native planting in riparian areas will increase riparian vegetation diversity and help promote aquatic substrate inputs more in-line with the historic range of variability while maintaining water quality and aquatic habitat conditions.

Long-term outcomes of all forest treatments will shift the frequency and severity of fire toward an acceptable range of variation, reducing the threat of abrupt forest change and connectivity caused by climate change. Additionally, a restored forest structure and function decreases risk of sediment input into aquatic systems that are beyond the natural range of variation in these physical processes.

2 Foster development of engaged citizenry

Partners will guide tours, deliver youth education programs, host workshops, maintain a social media presence, and coordinate media coverage of successful restoration efforts[5].

Theory of Change.
Outreach guided by a strategic engagement plan will educate interested citizens, establish an understanding of the ecological rationale and foundation of the partnership's strategies, and promote face-to-face opportunities to ask and answer questions[6]. The desired outcome is an increase in support for forest restoration and reintroduction of beneficial fire10 including use of prescribed fire[3, 4].

3 Deepen the partnerships among public and private land managers, tribes, local governments, and communities

Work with federal and non-industrial private landowners and engaged citizens to implement the Rogue Forest Restoration Initiative.

Theory of Change.
Working with broad partner groups including state, county, local municipalities, and tribes to implement and evaluate the RFRI will build understanding and support at multiple scales. Projects that use established restoration approaches provide opportunities to develop relationships and operationalize methods for implementing and monitoring forest restoration. Resource specialists can then apply best practices developed collaboratively on established projects to plan and implement advanced projects (e.g. Upper Applegate), leveraging experience, relationships, and approaches to increase the pace, scale, and effectiveness of restoration across the Rogue Basin[8]. The long-term desired outcome is an improvement in the capacity for collaborative partners to plan and implement forest restoration projects consistent with the Rogue Basin Strategy (RBS) and Rogue Valley Integrated Fire Plan (RVIFP).

4 Improve socioeconomic conditions and workforce capacity

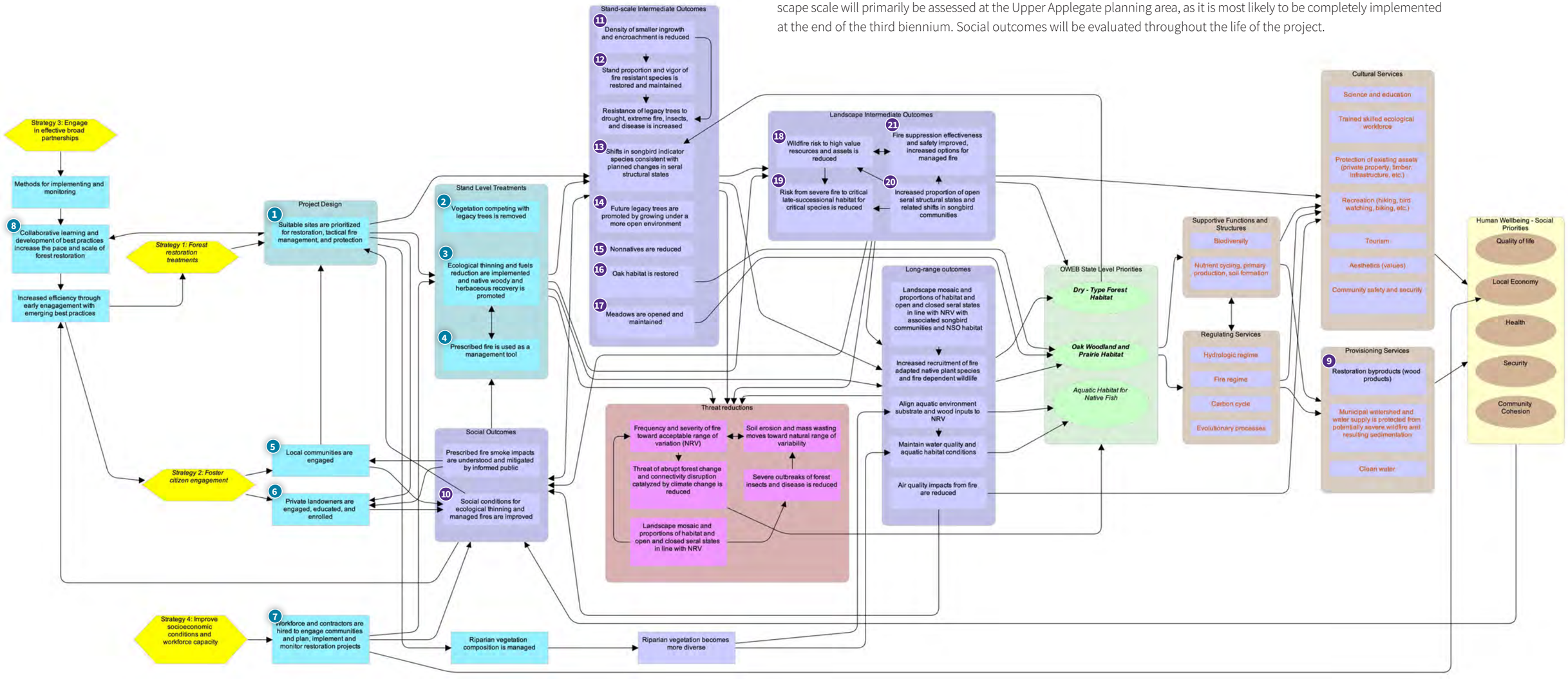
RFRI partners will hire and supervise a workforce and contractors to complete community engagement, restoration project planning, layout, implementation, monitoring, and reporting[7].

Theory of Change.
Resilient landscapes and fire-resilient communities require a knowledgeable, capable workforce and strong community support. Investments in restoration jobs will translate into economic activity, measurable by full time equivalent positions supported by the RFRI and regional multipliers. The long-term impact will be an improvement in socioeconomic conditions and workforce capacity in the Rogue Basin by generating jobs and economic activity. Sale of restoration byproduct timber produced through ecological thinning will support the local economy and generate funds for future work[9].

Superscript numbers [1-21] can be cross referenced on the Results Chain diagram and the Implementation Progress/Ecological Progress tables on the following pages.

Results Chain

Figure 2: Results chain for the Rogue Forest Restoration Initiative



Progression of the Results Chain.

Strategies & Actions	Implementation Results	Threat Reduced	NEAR TERM	Intermediate Ecological Results	LONG TERM	Desired Ecological Impacts	Ecosystem Services	Human Wellbeing

Measuring Progress

Progress toward achieving ecological and social outcomes will be determined by evaluating progress toward shorter-term goals and objectives. Treatment effects will be quantified in OWEB funded units where partners will collect data to quantify changes in forest structure, composition, and fuel characteristics. Effectiveness at achieving ecological outcomes at a landscape scale will primarily be assessed at the Upper Applegate planning area, as it is most likely to be completely implemented at the end of the third biennium. Social outcomes will be evaluated throughout the life of the project.

OUTPUTS

Implementation Progress

Table 1. Implementation results objectives and metrics. The result numbers correspond to results shown in the results chain (Figure 2) and theories of change.

	IMPLEMENTATION RESULTS (OUTPUT)	OBJECTIVE(S)	METRICS
1	Suitable federal and non-federal dry forest sites are prioritized for restoration, tactical fire management and protection to optimize benefits identified in the RBS	**Objective 1.1a:** Identify complex suitable forest habitat in the UAWRP by working with agency specialists and community members	Acres of suitable forest habitat identified in project planning
2	Vegetation competing with legacy trees is removed and yarding systems protect legacy trees	**Objective 1.1d:** Protect legacy trees and future legacy trees by thinning encroaching smaller trees and competing vegetation to reduce fuel accumulations to a less volatile fuel model, increase legacy tree vigor, and reduce vulnerability to drought, insects, and disease.	Competitive environment of legacy trees in plots
3	Ecological thinning and fuels reduction are implemented, and treated sites are managed to promote native woody and herbaceous recovery	**Objective 1.1b:** Promote development of new late-successional habitat in appropriate bio-physical settings	Acres of thinning in mid-seral stands in high relative habitat suitability settings
		Objective 1.1c: Restore open mixed conifer/hardwood forest and oak woodland in appropriate landscape settings	Acres of restored mixed conifer/hardwood forest and woodland
4	Prescribed fire is used as a management tool	**Objective 1.1f:** Following treatments, apply appropriate planting and native understory restoration, especially mitigating areas more prone to spread of non-native or noxious species	Acres of prescribed burning Acres of treated areas planted
		Objective 2.1b: Increase the potential for using low severity fire with treatments that achieve a low intensity fuel model and propensity for crown fire on 50% of the landscape	Flame length, fire suppression effectiveness, surface fire spread, torching index, crowning index
5	Local communities, partners and tribes are engaged through neighborhood meetings, field trips, workshops, direct marketing, and social media.	**Objective 3.1a, 3.2a:** Engage and educate private landowners through direct marketing, neighborhood meetings, field trips, workshops, and social media. Increase public awareness of benefits of ongoing treatment.	Number and breadth of contacts through meetings, direct marketing, & social media
6	Private landowners are engaged, educated, and enrolled	**Objective 3.1b:** 10 percent of private landowners contacted through MSOW or other RFRP effort begin to reduce fuels and stand density on their property	Landowner interest; enrollment success; percentage of contacted landowners with signed agreements
7	Hire and supervise a workforce and contractors to complete community engagement, restoration project planning, layout, implementation, monitoring, and reporting.	**Objective 5.1a:** Hire and supervise a workforce and contractors to complete community engagement, restoration project planning, layout, implementation, monitoring, and reporting.	Employed full time equivalent positions, Participants in workforce development, timber volume

	IMPLEMENTATION RESULTS (OUTPUT)	OBJECTIVES	METRICS
8	Resource specialists are co-learning, developing best practices, and more effectively planning to increase the pace and scale of forest restoration in support of the RBS.	**Objective 4.1a:** Resource specialists are co-learning, developing best practices, and more effectively planning to increase the pace and scale of forest restoration in support of the RBS.	Rate of restoration from MOU mapping project
9	Restoration byproducts (wood products)	**Objective 5.1b:** Support the local economy and generate funds for future work through sale of restoration byproduct timber	Volume of restoration timber harvested

OUTCOMES

Social Progress

Table 2. Social outcomes proposed objectives and potential metrics. The result numbers correspond to results shown in the results chain (Figure 1) and theories of change.

	SOCIAL OUTCOME	OBJECTIVE(S)	METRIC
10	Social conditions for using ecological thinning and prescribed fires are improved	**Objective 3.1a, 3.2a:** Engage and educate private landowners through direct marketing, neighborhood meetings, field trips, workshops, and social media. Increase public awareness of benefits of ongoing treatment.	Rogue Basin poll results
		Objective 3.2b: Tactical fire management options resulting from OWEB funded treatments increase support for managed fire that benefits resources and promotes safe and effective fire suppression response	Rogue Basin poll results

OUTCOMES

Ecological Progress

Table 3. Ecological results potential objectives and potential metrics. The result numbers correspond to results shown in the results chain (Figure 1) and theories of change.

	ECOLOGICAL OUTCOME	OBJECTIVE(S)	METRIC
11	Density of smaller ingrowth and encroachment is reduced	**Objective 1.1c:** Restore open mixed conifer/hardwood forest and oak woodland in appropriate landscape settings	Tree density relative to desired future condition
12	Stand proportion and vigor of fire-resistant species is restored and maintained	**Objective 1.1c:** Restore open mixed conifer/hardwood forest and oak woodland in appropriate landscape settings	Proportion of fire-resistant species
13	Shifts in songbird indicator species consistent with the planned changes in seral structural states	**Objective 1.1e:** Achieve desired conditions for wildlife habitat as measured by community shifts in the songbird indicator species associated with open forest, oak woodland, and/or a trajectory toward complex closed late seral habitat.	Field measured and modeled shifts in songbird community composition

	ECOLOGICAL OUTCOME	OBJECTIVE(S)	METRIC
14	Future legacy trees are promoted by growing under more open environment	**Objective 1.1d:** Protect legacy trees and future legacy trees by thinning encroaching smaller trees and competing vegetation to reduce fuel accumulations to a less volatile fuel model, increase legacy tree vigor, and reduce vulnerability to drought, insects, and disease.	Competitive environment of legacy trees in plots
15	Nonnatives are reduced	**Objective 1.1f:** Following treatments, apply appropriate planting and native understory restoration, especially mitigating areas more prone to spread of non-native or noxious species	Acres of non-native species mapped and controlled; acres of native species planted
16	Oak habitat is restored	**Objective 1.1c:** Restore open mixed conifer/hardwood forest and oak woodland in appropriate landscape settings	Acres of oak habitat restored
17	Meadows are opened and maintained	**Objective 1.1c:** Restore open mixed conifer/hardwood forest and oak woodland in appropriate landscape settings	Acres of meadow restored
18	Wildfire risk to high value resources and assets is reduced	**Objective 2.1a:** Reduce the predicted proportion of high severity wildfire and associated negative impacts to habitat (emphasizing complex forest habitat), water quality, and communities in the initiative landscapes.	Expected net value change for high value resources and assets Fire modeling outputs demonstrate a reduction in high severity wildfire at treatment unit and landscape scales
19	Risk from severe fire to critical late-successional habitat for critical species is reduced	**Objective 2.1a:** Reduce the predicted proportion of high severity wildfire and associated negative impacts to habitat (emphasizing complex forest habitat), water quality, and communities in the initiative landscapes.	Expected net value change for high quality complex habitat
20	Increased proportion of open seral structural states	**Objective 1.1c:** Restore open mixed conifer/hardwood forest and oak woodland in appropriate landscape settings	Proportions of seral structural states Landscape-scale shifts in songbird communities
21	Fire suppression effectiveness and safety improved, increased options for managed fire	**Objective 2.1c:** Increase tactical fire management options that allow for managed fire that benefits resources, protects residential areas, and facilitates safe and effective fire suppression	Change in suppression difficulty at the unit scale

Status & Trends

ECOLOGICAL PRIORITIES

Dry-Type Forest Habitat

Oak Woodland and Prairie Habitat

Aquatic Habitat for Native Species

Monitoring the status and trends of ecological priority habitats and focal species will include coordination with agencies or conservation organizations operating at the appropriate landscape or population scales. FIP partners will work with these entities to establish a process for integrating their monitoring framework with existing status and trends monitoring programs (if they occur) or to establish an approach for identifying key ecological attributes that should be measured to document and communicate change in the status and trajectory of ecological priority habitats and focal species populations.

Warner Basin

Aquatic Habitat Partnership

Warner Basin Fish Passage and Habitat Improvement Initiative

VISION

Streams and lakes in the Warner Basin will provide a connected watershed that provides access to the high-quality spawning, rearing, and adult holding habitats that are necessary for Warner sucker and Warner Lakes redband trout to complete their diverse life-history strategies. Addressing existing limiting factors will require a collaborative effort among WBAHP members, the local community, landowners, and water users. Recovery of Warner sucker and Warner Lakes redband trout will preserve and ensure the continued existence of the valued fish community that is unique to the Warner Basin.

PARTNERSHIP MEMBERS

Core Partners:

- Lake County Umbrella Watershed Council
- Lakeview Soil and Water Conservation District
- Oregon Department of Fish and Wildlife
- US Fish and Wildlife Service
- US Bureau of Land Management
- US Forest Service
- River Design Group

Supporting Partners:

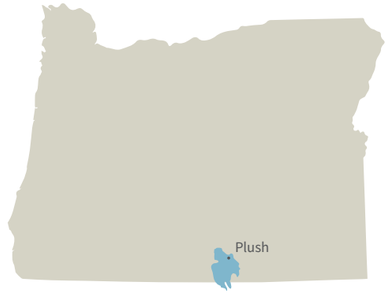
- Honey Creek Irrigators
- Adel Water Improvement District

ECOLOGICAL PRIORITY

Aquatic Habitat for Native Fish Species

FOCAL SPECIES

- Warner sucker
- Warner redband trout



GEOGRAPHIC SCOPE

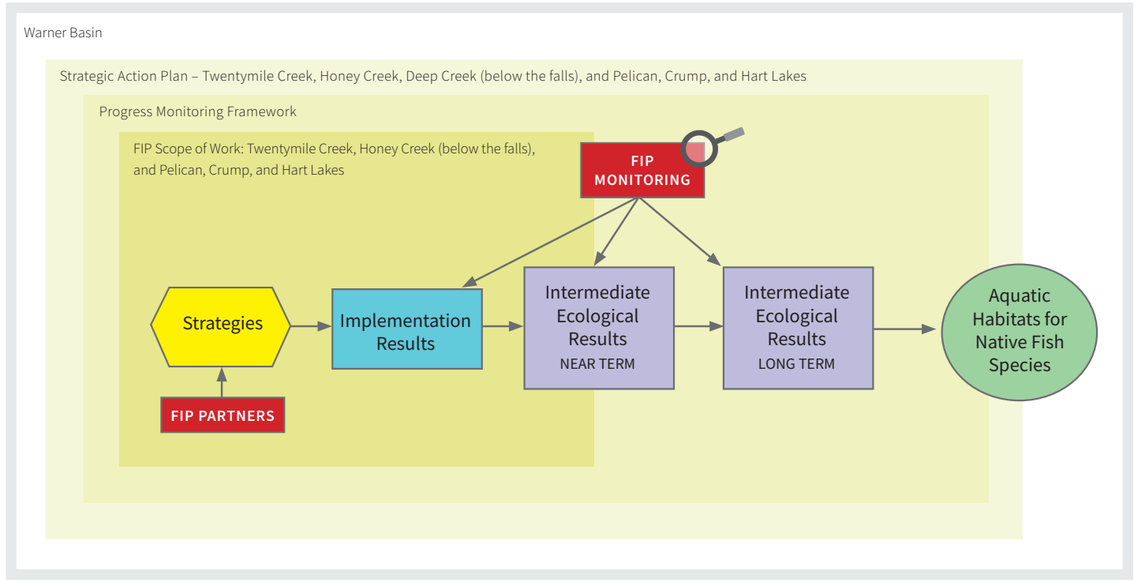
The WBAHP FIP Initiative is focused on the three main tributaries (Twentymile Creek, Deep Creek, and Honey Creek) that support Warner sucker and Warner Lakes redband trout, as well as Pelican, Crump, and Hart Lakes. The three tributaries represent over 45 miles of Warner sucker designated critical habitat and the primary stream habitat for the two species. The three lakes are the primary lakes that provide habitat for Warner sucker and Warner Lakes redband trout. The FIP Initiative geographic scope is identical to the Strategic Action Plan geographic scope.

Operational Context

The Strategic Action Plan and FIP scope of work is focused in a subarea within the larger Warner Valley including Twentymile Creek, Honey Creek, Deep Creek (below the falls), and Pelican, Crump, and Hart lakes (Figure 1.)

The initiative is also operating within the context of the Recovery Plan for the Threatened and Rare Native Fishes of the Warner Basin and Alkali Subbasin (USFWS 1998)

Figure 1: Operational context of the OWEB-funded Focused Investment Partnership Initiative



Theory of Change

SITUATION

In the late 1800s settlers altered stream networks to facilitate land draining and flood irrigation. Prior to modification, Twentymile Creek and Deep Creek drained to expansive wetlands that were likely characterized by distributary channel networks, ephemeral and perennial waterbodies, and diverse vegetation communities. To improve agricultural efficiency, the mainstem channels in the lower valleys were straightened and dredged. Irrigation diversion structures were installed to divert water from the mainstem channels into diversion channel networks in order to irrigate pasture, hay, and other livestock feed. Irrigation infrastructure is the primary modification to the historical stream network.

This history of alterations to stream networks and flow reduced connectivity among the lakes and along with habitat degradation and non-native fish interactions reduced historically abundant and widely distributed native fish populations leading to the listing of Warner sucker as threated under the Federal Endangered Species Act in 1985 and by the State of Oregon. These factors reduce or preclude the potential for a naturally functioning and resilient native fish metapopulation.

Key limiting factors or pressures that strategies are intended to address include:

- Human induced stream channel and watershed degradation
- Irrigation diversion practices
- Predation and competition from introduced fishes

APPROACH

The results chain *(Figure 2)* articulates the partnership's theory of change by displaying the relationships between strategies, implementation results, and the intermediate ecological results partners predict will occur in response to strategy implementation that will ultimately lead to restoration of the FIPs ecological priorities.

Numbered results identified in *Figure 2* are those the partnership has highlighted as part of a monitoring approach. They will allow the partnership to measure progress in both the near (e.g. 6-year FIP timeframe) and long term, and to identify where key uncertainties might exist with regards to confidence of predicted outcomes or relationships between results.

Each numbered implementation result is associated with the corresponding objective in the Strategic Action Plan *(Tables 1 and 2)*. For intermediate ecological results, objectives are included if identified; however, for many ecological results, the degree (and timeframe) to which they will be achieved is not yet well understood. Given this complexity, continued assessment and planning will be required to support development of specific, measureable objectives for the desired ecological outcomes.

The narrative below summarizes the resulting theory of change. Implementation results and ecological results prioritized for monitoring during the six-year FIP timeline are indexed to correspond to the results chain *(Figure 2)* and measuring progress tables *(Tables 1 and 2)*.

STRATEGIES

The Warner Basin Strategic Action Plan includes strategies that are intended to pursue fish passage, screening, and habitat enhancement projects that will lead to the recovery and conservation of native fish populations in the Warner Basin. These strategies are designed to address limiting factors that are based on a long record of scientific investigations completed by ODFW, USFWS, and other organizations over the past 40+ years (listed above). Recent efforts to develop collaborative relationships with landowners and irrigators have provided the Partnership with the opportunity to implement projects that will address the long-recognized issues that affect native fish in the basin.

CONSERVATION STRATEGIES

1 Restore fish passage

This strategy consists of remediating irrigation diversion structures that are partial or complete barriers to fish passage. Riparian habitat enhancement will occur at passage project sites as opportunities arise.

Theory of Change.
Implementation of fish passage projects[1] will expand connectivity of fish habitat[6] across the initiative geography. Native fish will then have the opportunity to access higher quality spawning and rearing habitat and find refuge from predation by non-native species in the lower stream reaches and lakes. Use of higher quality habitat will increase spawning success and juvenile survival and therefore contribute to healthy distribution of age classes[8] and higher numbers of native fish within individual populations[9]. Improved productivity and connectivity of individual populations promotes genetic exchange (and greater genetic diversity) and therefore improved sustainability of the metapopulation.

Enhancement of riparian areas[2] will contribute to the development and maintenance of complex and resilient instream and riparian habitats.

2 Screen unscreen diversions

This strategy focuses on the installation of fish screens at diversion structures where feasible based on evaluated conditions at each project location. As with , riparian habitat enhancement will occur at project sites as opportunities arise.

Theory of Change.
The installation of fish screens[3] will reduce or eliminate entrainment of fish into irrigation diversion systems. Reducing entrainment will improve survival rates of native fish and increase the productivity, abundance, and sustainability of individual populations and the metapopulation.

3 Increase water availability

The partnership will work with water users[4] to explore approaches to improve water availability for fish conservation[8], irrigation, and agricultural production. These approaches may include water conservation actions and efforts to increase the efficiency of irrigation systems.

Theory of Change.
An increase in water availability[9] will increase or maintain habitat connectivity and allow juvenile fish to access and rear in upper tributary reaches where non-native fish predation or competition is less likely. These outcomes will support increasing abundance and sustainability of native fish populations.

Improvements to irrigation infrastructure to improve efficiency will also improve assurances for water users to be able to exercise their water rights and will therefore support the viability of the ranching economy.

4 Reduce non-native fish populations

The partners will support the development of a non-native fish management plan that outlines approaches for reducing the impacts to native fish[5]. In addition, the partners will develop a fishery outreach and education program focused on recreational anglers[5].

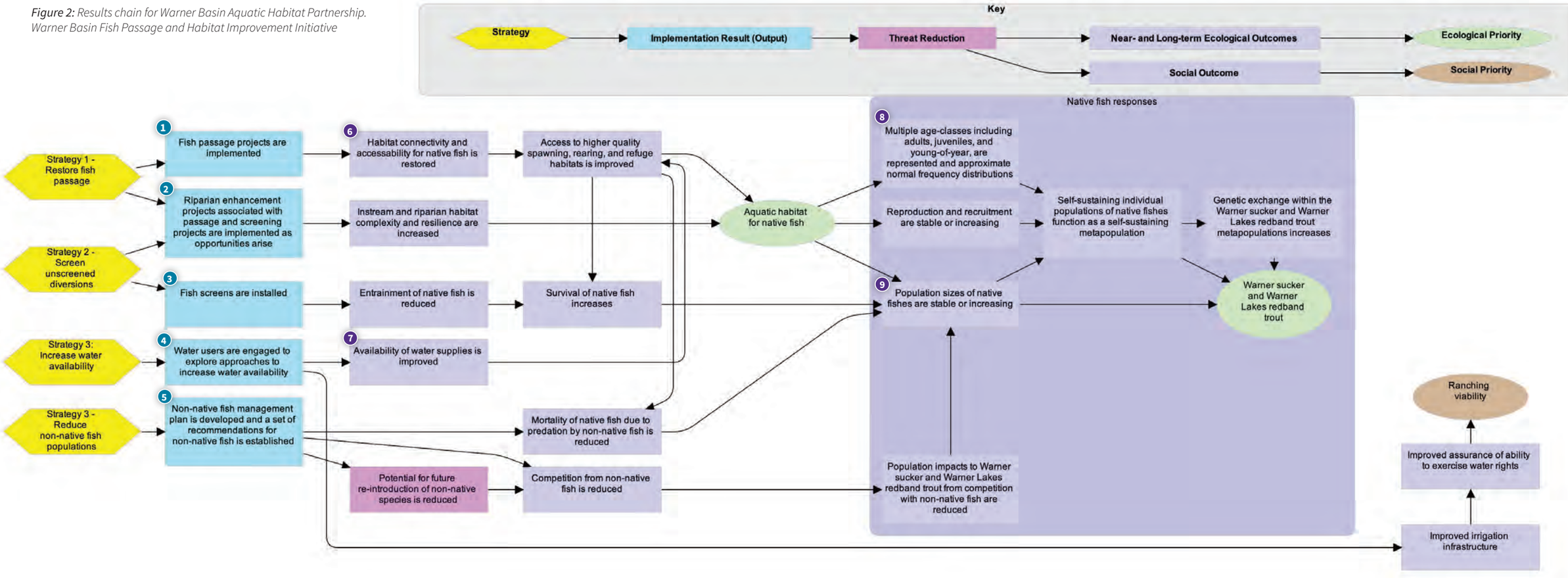
Theory of Change.
Public outreach and education efforts make information explaining the impacts of non-native fish on native fish populations available and therefore increases public understanding and interest in avoiding actions that lead to the introduction or expansion of non-native fish beyond their current range in the Warner Basin. Precluding an increase of non-native species abundance or expansion of their range will reduce potential mortality of native fish due to predation, reduce potential competition from non-native fish, and allow the gains associated with native species conservation actions to be maintained.

Superscript numbers [1-11] can be cross referenced on the Results Chain diagram and the Implementation Progress/Ecological Progress tables on the following pages.

Results Chain

Figure 2: Results chain for Warner Basin Aquatic Habitat Partnership. Warner Basin Fish Passage and Habitat Improvement Initiative

Progression of the Results Chain.



Measuring Progress

Plan success will be evaluated annual at the project level and biennially at the Plan level. Long-term monitoring will be completed at 3-yr and 5-yr post-project periods to ensure longer-term project success. Long-term monitoring to be completed beyond the life of the FIP will be funded by the partnership's member organizations.

Project-level monitoring may consist of:

1) as-built survey and project completion documentation to ensure the project was built as designed,

2) out-year monitoring including site visits and repeated photo points to see how the project site has changed, and

3) biological monitoring to be coordinated with ODFW, which may include documentation of fish passage.

Plan-level monitoring will include tracking of project progress and overall success. Plan-level monitoring will be led by LCUWC and LSWCD. Biennial monitoring reports will include a summary of goals and objectives, actions completed to-date, project and monitoring status, and future work in the subsequent biennium. Plan-level monitoring will serve as a check on the WBAHP members to ensure program accountability.

Long-term monitoring would leverage monitoring networks and studies typically administered by USFWS, BLM, and ODFW. The long-term monitoring would be used to assess how Plan goals and objectives are being met and if native fish recovery and conservation is on-track.

Table 1. Implementation results objectives and metrics. The result numbers correspond to results shown in the results chain (Figure 2) and theories of change.

OUTPUTS

Implementation Progress

	IMPLEMENTATION RESULTS	OBJECTIVES	METRICS
1	Fish passage projects are implemented	By 2021, WBAHP will complete fish passage projects at 4 diversions *(Lower Deep Creek Relict Diversion, Starve-out Diversion, Taylor Diversion and Town Diversion on Honey Creek)* (Objective 1A)	# of fish passage projects completed
		By 2025, WBAHP will complete fish passage projects at 10 diversions and 3 road crossings *(Greaser Reservoir Outlet Channel on Twentymile Creek, at O'Keefe and Middle Diversion on Deep Creek, and at JJ Diversion, Hidden Diversion, Hatchery Diversion, and East Field Diversion on Honey Creek; three road crossing fish passage concerns in the Honey Creek drainage)* (Objective 2A)	# of fish passage projects completed
2	Riparian enhancement projects associated with passage and screening projects are implemented as opportunities arise	By 2025, WBAHP will implement riparian enhancement projects in cases where opportunities emerge.	# of riparian projects completed where opportunities emerge
3	Fish screens are installed	By 2025, WBAHP will complete screening projects where feasible	# of fish screening projects completed
4	Water users are engaged to explore approaches to increase water availability	By 2025, WBAHP will meet with water users to discuss potential strategies to improve water availability (Objective 4A).	# of meetings with local community and irrigators Irrigation infrastructure review completed
5	Non-native fish management plan is developed and a set of recommendations for non-native fish is established	By 2025, WBAHP will develop a list of recommendations to address non-native fish.	Plan completion with recommendations

Table 2. Ecological results, potential objectives and potential metrics. The result numbers correspond to results shown in the results chain (Figure 1) and theories of change. Given the complexity of ecosystems, continued assessments and planning will be required to support development of specific, measurable objectives for desired ecological outcomes.

OUTCOMES

Ecological Progress

	LIMITING FACTOR REDUCTION OR INTERMEDIATE ECOLOGICAL RESULTS	POTENTIAL OBJECTIVES	POTENTIAL METRICS
6	Habitat connectivity and accessibility for native fish is restored	By 2025, WBAHP will develop a list of recommendations to address non-native fish.	Passage frequency and rate of PIT tagged fish
7	Water use efficiency and availability is increased	By 2025, water use efficiency and availability is increased through improvements to irrigation infrastructure	cfs in affected streams
8	Multiple age-classes including adults, juveniles, and young of the year, are represented and approximate normal frequency distributions	By 2025, population age class composition approaches normal frequency distributions	Population structure
9	Population sizes of native fishes are stable or increasing	By 2025, population sizes of native fish are observed to be stable or increasing	Population estimates

Status & Trends

ECOLOGICAL PRIORITIES

Aquatic Habitat for Native Species

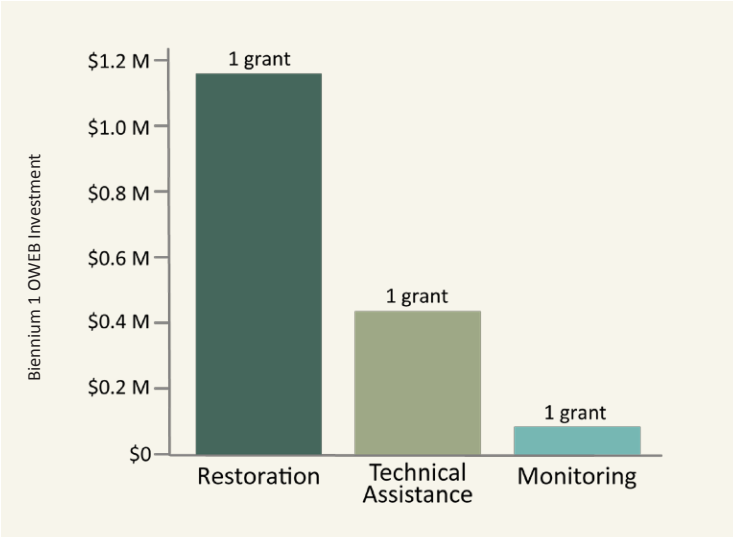
Monitoring the status and trends of ecological priority habitats and focal species will include coordination with agencies or conservation organizations operating at the appropriate landscape or population scales. FIP partners will work with these entities to establish a process for integrating their monitoring framework with existing status and trends monitoring programs (if they occur) or to establish an approach for identifying key ecological attributes that should be measured to document and communicate change in the status and trajectory of ecological priority habitats and focal species populations.

Focused Investment Partnership Progress Report: 2015-2017 Biennium 1
Dry-Type Forest Habitat

ASHLAND FOREST ALL-LANDS RESTORATION

The Ashland Forest All-Lands Restoration Partnership focuses on Dry-Type Forest Habitat outside the City of Ashland, Oregon. It encompasses 58,000 acres centered on Ashland Creek, including the City's municipal water supply. Over a century of fire exclusion and large-tree timber harvest has caused forests to become dense and less diverse. The landscape has become more prone to intense wildfires, elevating the risk to the community's water supply and wildlife habitat.

Funding



OWEB awarded $1,999,998 in funding that leveraged $1,815,459 in matching funds.

Benefits

- Reduced risk of damaging wildfires and better options to suppress them
- Improved Dry-Type forest health with old-growth trees and open areas
- Increased controlled burn acres with minimized smoke impacts
- Protected, clean and abundant drinking water and healthy streams
- Improved habitat for sensitive species, including the Pacific fisher and the Northern Spotted Owl
- Sustained local, living-wage jobs and regional workforce training
- Engaged the community and private landowners in a local, collaborative solution

About This Report

The Focused Investment Partnership (FIP) grant program is a bold, new conservation approach that supports high-performing partnerships to strategize restoration actions and measure ecological outcomes through coordinated monitoring. In January 2016, the Oregon Watershed Enhancement Board awarded an Implementation Focused Investment Partnership grant to the Ashland Forest All-Lands Restoration Partnership. This report documents progress made in their first biennium of funding (2015 to 2017) to meet their strategic action plan goals. Work completed under the FIP grant program is part of a much larger on-going collaborative effort of federal, state and local agencies, private landowners, and non-governmental organizations in the Ashland area.

Goal

Healthy forest landscape with a mosaic of complex old-growth, open forest, and oak woodlands restoring diverse habitats and increased resilience to fire, insects and disease

Strategies

- Ecological thinning, fuels reduction, and controlled fire
- Foster development of an engaged citizenry

Implementation Actions (2016-17)

Restoration

980 ACRES
ecological thinning and pile burning

20 ACRES
invasive plant removal

90 ACRES
controlled burns

1,102 ACRES
monitored for effectiveness and adaptive management

Planning

1,102 ACRES
identified for treatment

19 PLANS
for forest restoration for enrolled landowners

Outreach & Engagement

100 LANDOWNERS
contacted for forest management

60 EVENTS
Workshops and tours to increase awareness

13,000 POSTCARDS
mailed on controlled burning education and alerts

400 SUBSCRIBERS
to text message alerts

1,000+ FOLLOWERS
on social media

Near-Term Outcomes (0-10+ Years)

Stand-scale

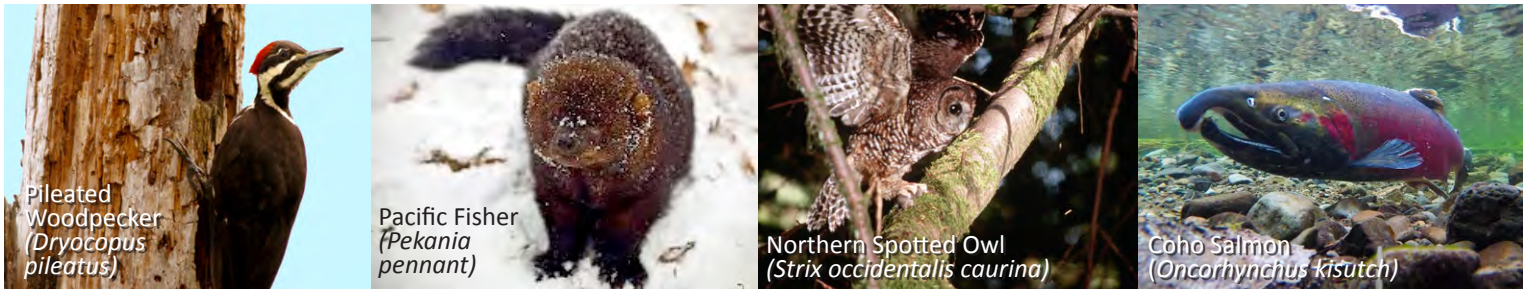
- Small tree density and fuel loads reduced, predicted fired behavior is less intense
- Prescribed fire is increasingly used as a management tool

Landscape Scale

- Wildfire risk to high-value resources and assets is reduced
- Fire suppression effectiveness and safety is improved

Long-Term Outcomes (20+ Years)

- Open and closed habitats support wildlife dependent on complex forests and oak woodlands
- Maintain water quality and aquatic habitat conditions



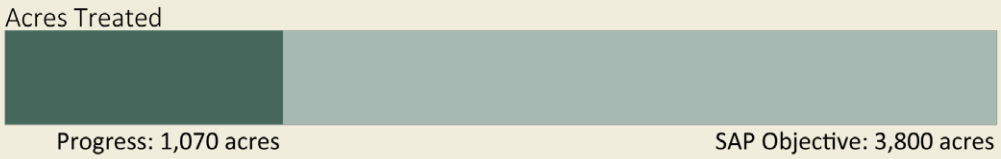
Dry-forest supports over 800 species. Ashland Forest All-Lands Restoration Initiative Partnership's work provides important habitat for species at risk. *Photos courtesy of U.S Forest Service and U.S. Geological Survey.*

Strategic Action Plan (SAP) Progress, Biennium 1

Attachment D

Strategies

Treat land with ecological thinning, fuels reduction, and controlled burns to restore open forest



Progress on metrics reflects implementation supported by OWEB funding, and does not represent all progress achieved via other funding sources.

Monitoring Approach

- Maps where treatments occur and tracks changes in habitats and species over time
- Collects pre- and post-treatment data for monitoring the effectiveness of restoring open habitats while protecting old growth
- Uses changes in fuel loads and tree canopy base height in fire behavior models to monitor effectiveness in reducing potential wildfire spread and intensity

Restoration treatments reduce forest wildfire hazard.

Ecological thinning and pile burning reduced flame length by 50%.

Ecological Thin and Pile Burn

Underburn Following Thinning

Monitoring shows that ecological thinning and subsequent underburn treatments reduce wildfire hazard. These treatments raise the canopy base height and decrease fuels to shorten the predicted flames. Shorter flame lengths are easier to control. Analysis showed a 50% reduction in flame length from thinning and pile burning, which changed the predicted wildfire behavior under dry and windy conditions from uncontrollable to controllable using bulldozers and heavy equipment. In units that were selected for underburning, flame length was reduced by an additional 55%. These much shorter flame lengths allow for direct control by firefighters.

Adaptive Management in the FIP

	Restoration		Monitoring	Engagement	
Challenges	Controlled burning and smoke concerns are weather-dependent. Inflexible schedules don't accommodate needs.	State air quality regulations and administration often constrain opportunities for controlled burning.	Locations of photo point monitoring are often inexact. Early monitoring showed that treatments were thinning and reducing fuels less than expected.	Partners considered but could not resolve how to integrate commercial tree removal in State-subsidized fuel reduction projects on private lands.	The decreasing average parcel sizes of newly-recruited properties require more outreach capacity to treat less acreage.
Lessons Learned	Public outreach on burn days reduces calls and community smoke exposure.	Landscape-level shifts in wildfire risk are meaningfully assessed after project completion.	Accurate photo-point locations and high-quality pre-treatment photos are key. Discussing monitoring results drives adaptive change.	Landowners were not comfortable covering treatment costs with commercial sale of a portion of the excess trees.	Neighboring properties are often similar enough to be grouped together as larger units.
Adaptations	Strong collaborative partnerships were essential to identify constraints, build flexibility, and leverage strengths across partnerships and other projects.	More resources were budgeted for monitoring fuels and fire-effect to support adaptive management.	Restoration thinning became more thorough and comprehensive in treated units. Effort to pile background fuels along with fuels from thinning work increased.	Greater investment in regional workforce training and development helped meet increased demand for services.	Small properties were grouped together to create more efficient design and implementation.

Ecological fuels reduction on private lands is the key additive strategy of the all-lands project, which had previously only worked on federal land. Before brush removal and thinning, dense fuels in the understory created a fire hazard. After treatment, the ground layer is open for native species and wildfire hazard is reduced.

For More Information

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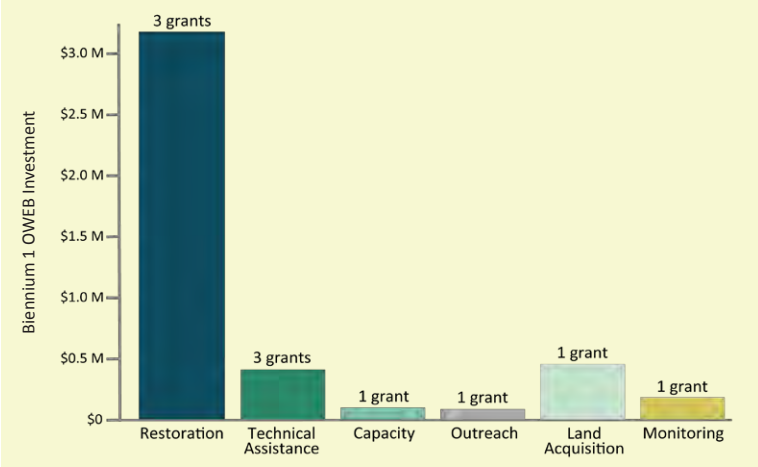
www.oregon.gov/oweb

HABITAT RESTORATION for RESIDENT and ANADROMOUS FISH in the DESCHUTES

The Deschutes Partnership is focusing on restoring habitat conditions to support the successful reintroduction of salmon and steelhead into the Whychus Creek, Metolius River, and lower Crooked River systems. Since the late 1800s, diversion of streamflow for irrigation, construction, and maintenance of irrigation infrastructure, and changes to floodplain areas and bankside vegetation have reduced the amount of habitat available to fish.

Funding



OWEB awarded $4,397,794 in funding that leveraged $11,785,301 in matching funds.

Benefits

- Protected critical spawning and rearing habitat
- Restored stream habitat
- Increased streamflow
- Eliminated fish passage barriers, allowing for greater habitat access
- Increased awareness and support for restoration through community engagement
- Coordinated monitoring approach to measure progress and quantify outcomes

About This Report

The Focused Investment Partnership (FIP) grant program is a bold, new conservation approach that supports high-performing partnerships to strategize restoration actions and measure ecological outcomes through coordinated monitoring. In January 2016, the Oregon Watershed Enhancement Board awarded an Implementation Focused Investment Partnership grant to The Deschutes Partnership. This report documents progress made from 2016 to 2017 to meet their strategic action plan goals. Work completed under the FIP grant program is part of a much larger on-going collaborative effort of federal, state and local agencies, private landowners, partners, and non-governmental organizations to restore native fish habitat in the Deschutes Basin.

Crooked River Watershed Council · Deschutes River Conservancy · The Deschutes Partnership · Upper Deschutes Watershed Council · Deschutes Land Trust

Goal

Restore stream conditions to support the successful reintroduction of salmon and steelhead into the Upper Deschutes subbasin

Strategies

- Protect spawning and rearing habitat through land conservation easements and fee purchases
- Restore stream habitat conditions necessary for successful spawning and rearing
- Restore streamflow sufficient to support successful spawning and rearing
- Restore volitional fish passage
- Reduce or eliminate risk of entrainment in irrigation infrastructure
- Engage local communities to increase awareness about and support for reintroduction efforts

Summer steelhead (*Oncorhynchus mykiss*)

Spring Chinook salmon (*Oncorhynchus tshawytscha*)

Photos by NOAA Fisheries

Implementation Actions (2016-17)

Restoration

120 MILES

of improved access to habitat in the Crooked River

2.5 CUBIC FEET per SECOND

of added stream flow from an irriation canal piping project

Planning

3 DESIGNS

for stream channel and floodplain project, pump station and pipeline, and diversion fish screening projects

Land Protection

1 STREAM MILE

protected by inclusion in the 130-acre Willow Springs Preserve

Outreach

900 COMMUNITY MEMBERS & **300** STUDENTS

took part in watershed outreach activities

Near-Term Outcomes (0-10+ Years)

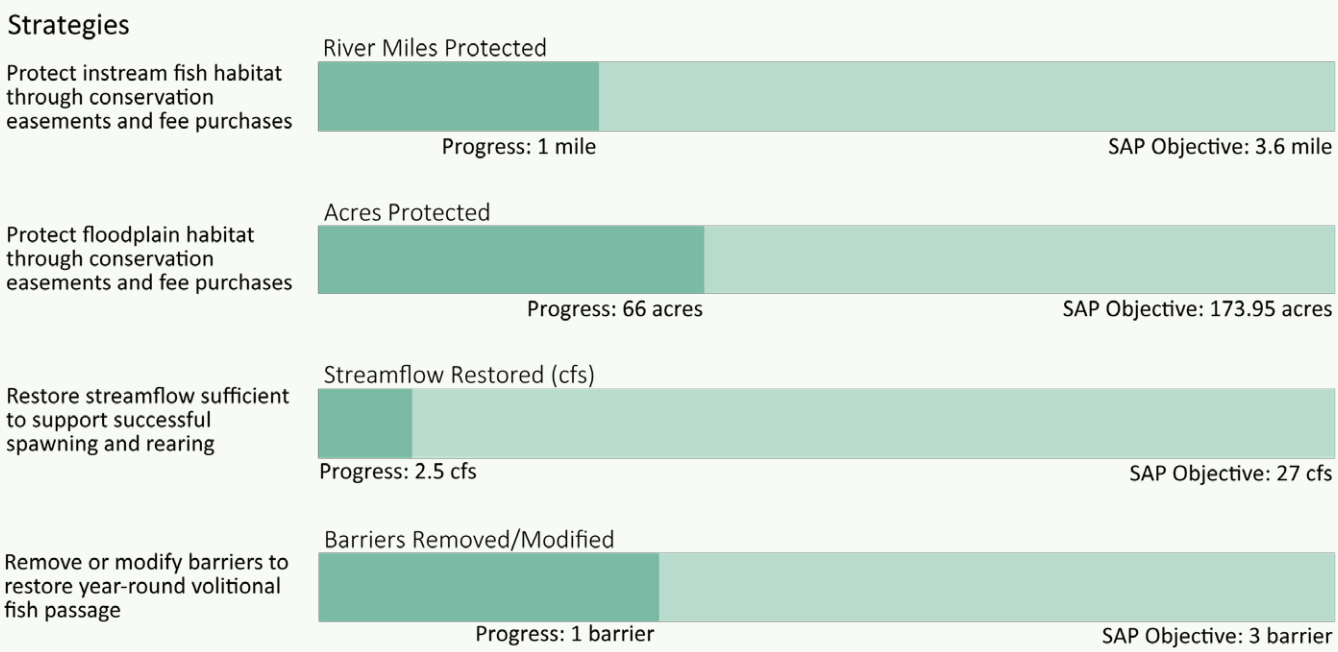
- Increased access to aquatic habitats
- Floodplain is reconnected to stream system
- Riparian vegetation improved
- Increased instream complexity
- Sediment is reduced, improving water quality
- Increased streamflow

Long-Term Outcomes (20+ Years)

- Quantity and quality of available fish habitat increases
- Fish distribution increases
- Fish mortality in irrigation infrastructure decreases
- Fish population characteristics improve

Opal Springs Dam Fish Passage Project eliminates a barrier to fish migrating up the Crooked River, opening 120 miles of river to Chinook salmon, Middle Columbia River steelhead, and other fish.

Strategic Action Plan (SAP) Progress, Biennium 1



Progress on metrics reflects implementation supported by OWEB funding, and does not represent all progress achieved via other funding sources.

Monitoring Approach

- Focuses on the core monitoring required to document progress of investments in achieving restoration outcomes at individual project sites
- Identifies indicators in response to hypotheses about the ecological outcomes of each restoration action, including stream habitat restoration, streamflow restoration, and fish passage and screening projects
- Assesses change over time through baseline and post-project data collection and analyses to determine if ecological outcomes linked to restoration actions are being achieved

Adaptive Management in the FIP

	Restoration		Monitoring		Engagement
Challenges	Funding availability, local support, and project readiness all play a role in project prioritization. These factors can be challenging to balance.	The role of Technical Review Teams in selecting and evaluating FIP projects was not clear at the program's inception.	Linking biological responses to changing physical conditions from stream restoration projects is difficult given the inherent uncertainties in ecological systems.	Adding capacity to collect, analyze, and report data for a robust monitoring program is a challenge.	Undergoing leadership transitions at partnership organizations creates uncertainty among partners.
Lessons Learned	The accelerated timeline for the Opal Springs Dam fish passage project allowed for habitat restoration to occur 3 years ahead of schedule in the Crooked River.	It is important to clarify the roles of reviewers and applicants in the FIP project review process.	Watersheds with unique characteristics require more specialized results chains that more accurately model their system.	There is an opportunity to advance the practice of monitoring in complex stream habitat restoration projects.	A strong commitment to the FIP and effective governance guidance contributed to a smooth transition in FIP leadership.
Adaptations	The scope of the Strategic Action Plan was changed to include Crooked River habitat restoration for Biennium 2 project funding.	Collaboration with OWEB's FIP staff helped refine the Technical Review Team process to match the unique funding model of the FIP program.	Local experts were engaged to develop a results chain for McKay Creek, an intermittent stream, and helped select appropriate outcomes to that system.	Methods to efficiently measure biological and hydrological conditions were identified through stakeholder engagement and leveraging funding outside the FIP program.	The monitoring strategy was presented at three conferences to contribute to a growing body of knowledge on emerging methods to monitor large, multi-faceted restoration projects.

The Three Sisters Irrigation District Main Canal Piping Project began in 2010 prior to the FIP, conserving 13.3 cfs to Whychus Creek. FIP funding enabled the partnership to complete later phases, returning an additional 2.5 cfs more to the creek.

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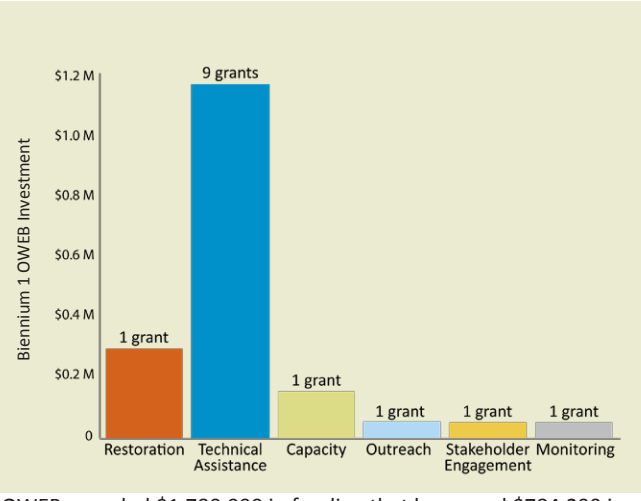
HARNEY BASIN WETLANDS INITIATIVE

The Harney Basin Wetlands Initiative focus area encompasses Malheur Lake and surrounding wetlands, including the floodplain wetlands of the Silvies River, Donner und Blitzen River, Silver Creek, and other tributaries. In total, the geographic scope encompasses 513,000 wetland acres, including the 187,000-acre Malheur National Wildlife Refuge. These wetlands provide critical habitat for Pacific and Central Flyway migratory birds. In recent decades, the expanding invasive common carp population and dynamic physical conditions have changed the Malheur shallow lake ecosystem from a clear lake with abundant aquatic plants and invertebrates to a muddy water body. The high turbidity results in a lake with nearly no submergent vegetation and fewer associated insects. As a result, the use of Malheur Lake by resident and migratory waterbirds, Redband Trout, and other native fish has declined dramatically.

Funding



OWEB awarded $1,780,000 in funding that leveraged $784,299 in matching funds.

Benefits

- Improved understanding of the distribution and behavior of invasive carp and evaluated methods to control them
- Developed model to understand unique interactions among physical environment, invasive carp, and the shallow lake ecosystem
- Enhanced understanding of water table and plant community dynamics in wet meadows
- Improved irrigation infrastructure to better manage flood-irrigated wet meadows for wildlife and agriculture
- Protected privately-owned wet meadows to maintain habitat values for migratory birds
- Engaged landowners, community groups, and partners to increase interest in and support for local conservation
- Coordinated monitoring approach to measure progress and quantify outcomes

About This Report

The Focused Investment Partnership (FIP) grant program is a bold, new conservation approach that supports high-performing partnerships to strategize restoration actions and measure ecological outcomes through coordinated monitoring. In January 2016, the Oregon Watershed Enhancement Board awarded an Implementation Focused Investment Partnership grant to the Harney Basin Wetlands Initiative Partners. This report documents progress made from 2016 to 2017 to meet their strategic action plan goals. Work completed under the FIP grant program is part of a much larger, on-going collaborative effort of federal, state and local agencies, private landowners and non-government organizations.

Goal

Enhance and restore a crucial ecosystem that is a magnet for migratory birds on the Pacific flyway while maintaining a sustainable ranching community in southeastern Oregon.

Strategies

- Control carp populations in Malheur Lake and surrounding aquatic ecosystems
- Manage wetlands/flood irrigated wet meadows on refuge and private lands
- Conduct community and partner outreach and communications

Implementation Actions

Planning

3 DESIGNS for flood irrigation infrastructure

5 LANDOWNER AGREEMENTS to support projects

Scientific Investigation

1 BASELINE SURVEY of basin-wide aquatic health

15,000 ACRES ASSESSED water table and plant community relationships

1 AQUATIC ECOSYSTEM MODEL to understand carp, wind, light, and lake dynamics related to water clarity

1 LIDAR SURVEY 42,474-acre Silver Creek watershed

Outreach & Engagement

5 SCHOOL PRESENTATIONS

39 OUTREACH EVENTS

1 COMMUNICATIONS PLAN

14 VOLUNTEER DOCENTS trained

1 WEBSITE & E-NEWSLETTER

15 INTERVIEWS with private landowners

2 VIDEOS &

5 PRINTED PRODUCTS

Near-Term Outcomes (0-10+ Years)

- Improved water clarity and quality
- Water table dynamics support emergent wetland plant communities
- Extent of reed canary grass is reduced
- Aquatic vegetation in the lake is more abundant and diverse
- Invertebrate fauna recovers
- Increased abundance of breeding and migratory birds

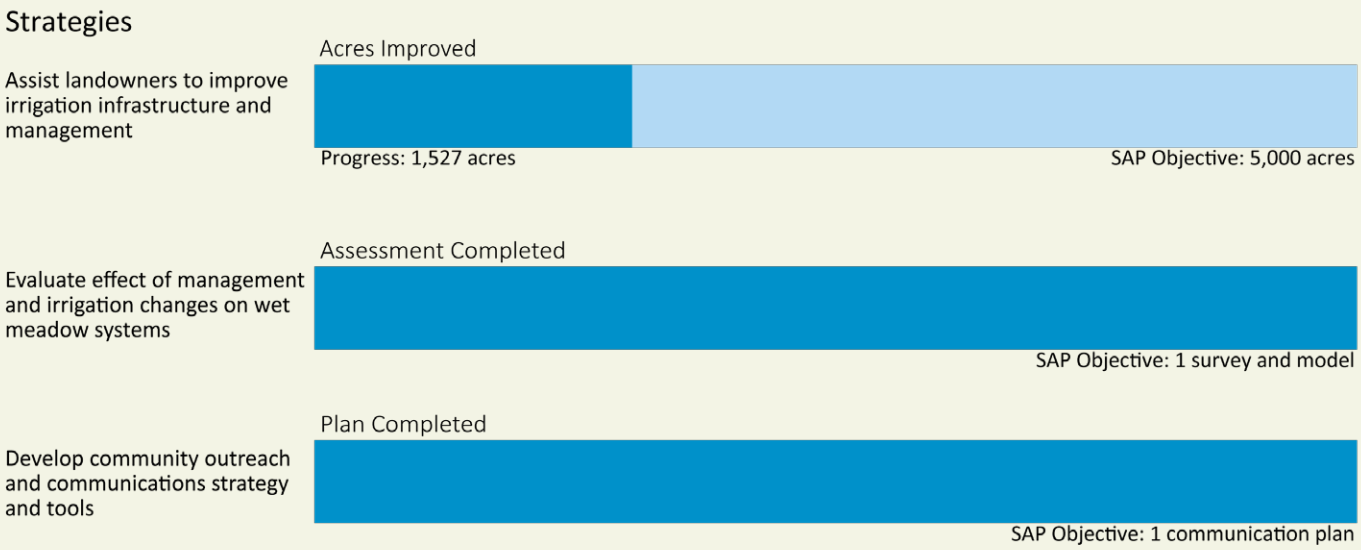
Long-Term Outcomes (20+ Years)

- Native wet meadow communities are enhanced
- Native fish density and diversity improves
- Increased survival and reproductive success of waterbirds
- Waterbird populations increase and become more stable

Northern Pintail ducks *(Anas acuta)*

Sandhill cranes *(Antigone canadensis tabida)* among cattle
Photo by Jeremy Hill

Strategic Action Plan (SAP) Progress, Biennium 1



Progress on metrics reflects implementation supported by OWEB funding, and does not represent all progress achieved via other funding sources.

Monitoring Approach

- Collect basin-wide baseline data on water quality conditions, fish and macroinvertebrate communities, and submerged aquatic vegetation cover to monitor changes over time
- Develop a model to determine the restoration strategies that will most effectively improve water clarity and quality
- Increase understanding of flood-irrigated wet meadow communities to determine the management approach that will increase habitat values, suppress invasive species and optimize agricultural production

Partners are taking a system-wide approach to modeling that helps explains how hydrology, carp control, sunlight penetration, and wind and sediment dynamics affect aquatic health. The model will integrate the results from a variety of partner investigations. U.S. Geological Survey scientists are developing a wind dynamics model to investigate how environmental variables, such as wind speed and direction, wind fetch length, and water depth relate to sediment suspension in the lake. This information is critical to identify the causes of the turbidity problem and evaluate all restoration alternatives that could mitigate it.

Adaptive Management in the FIP

	Restoration		Monitoring	Engagement	
Challenges	Determining water rights and meeting fish passage requirements caused project delays and increased costs, which created potential barriers to landowner participation.	Unique shallow lake wetland ecosystem of Malheur Lake Basin requires further study for development of effective restoration strategies.	Staff turnover created challenges for data access and project coordination.	Engaging the local community and diverse stakeholders is time-consuming and requires consistent messaging and dedication.	Local community may not be familiar with benefits of conservation to agriculture and the local economy.
Lessons Learned	Have well-informed conversations with all stakeholders at the onset of project development.	Dynamics of wind, sediment, and invasive carp impact the lake's turbidity. Controlling carp alone may not lead to desired outcomes.	Capacity funding has been critical; engage as many people as possible (including partners) to help with project logistics, coordination, and internal communication.	Events focused on migratory bird education, which attract Oregonians and out-of-state visitors, contribute to a positive public perception of restoration work.	Both landowners and the conservation community value a healthy landscape.
Adaptations	Despite water rights complexities, implementers advanced projects through a planning process and engaged with state-level regulators to develop solutions to meet regulatory requirements.	Partners conducted additional scientific investigations to better understand variables that impact water quality, including lake-level fluctuations and sediment dynamics.	Aquatic Health Coordinator was hired to ensure on-the-ground projects were tracked, and has played an instrumental role in field coordination and support.	Stories, scientific findings, and project results were shared with partners and Harney County residents; diverse stakeholders were engaged with tours and events.	Interviews with private landowners were conducted to better understand concerns and overlapping conservation and agricultural values.

To understand the relationship between hydrology and plant community type, The Wetlands Conservancy and Oregon State University's Eastern Oregon Agricultural Research Center conducted wet meadow plant surveys on public and private lands through the Silvies River Floodplain and Vegetation Project. This work included installing water wells and piezometers to measure and track variations in groundwater pressure or depth. Results will inform irrigation management decisions to achieve the desired mix of plant species. The state-and-transition model developed from data collected will illustrate the multiple pathways of plant succession, providing a toolbox for restoration, conservation, and management actions that will support the conservation of wet meadows and continued flood irrigation in the basin.

For More Information

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highdesertpartnership.org/our-initiatives/harney-basin-wetlands-initiative

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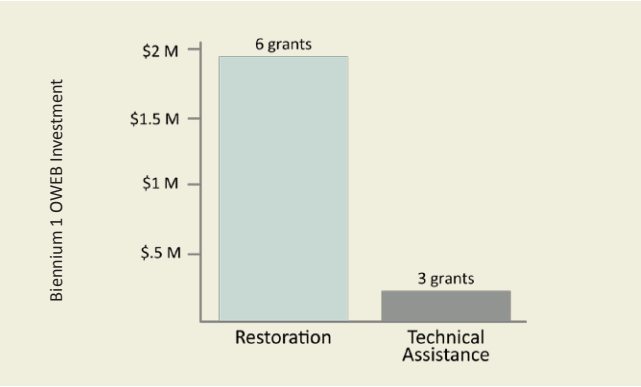
OREGON MODEL TO PROTECT SAGE-GROUSE, ALL COUNTIES

The Oregon All Counties CCAA Steering Committee is focusing on privately-owned priority habitats for Sage-Grouse occurring within Harney, Lake, and Malheur counties. Conservation measures support the design and execution of Candidate Conservation Agreements with Assurances (CCAA) in partnership with private landowners through the development of Site Specific Plans (SSP) by soil and water conservation districts. The CCAA is an agreement between the U.S. Fish and Wildlife Service (USFWS), soil and water conservation districts, and non-federal landowners, in which the landowner agrees to reduce or eliminate threats to a candidate species on lands they manage in exchange for assurances from USFWS that they will no longer face further regulatory requirements should the species become listed in the future.

Funding



OWEB awarded $2,342,727 in funding that leveraged $1,902,961,759 in matching funds.

Benefits

- Restored diverse plant communities that support all-life stages of Sage-Grouse
- Reduced risk of frequent, damaging wildfires
- Created small business opportunities for juniper removal and rangeland treatment
- Engaged private landowners in a local, collaborative solution to improve Sage-Grouse and rangeland health
- Provided technical and financial support to farmers and ranchers to implement conservation measures

About This Report

The Focused Investment Partnership (FIP) grant program is a bold, new conservation approach that supports high-performing partnerships to strategize restoration actions and measure ecological outcomes through coordinated monitoring. In January 2016, the Oregon Watershed Enhancement Board awarded an Implementation Focused Investment Partnership grant to the Oregon All Counties CCAA Steering Committee. This report documents progress made in their first biennium of funding (2015 to 2017) to meet their strategic action plan goals. Work completed under the FIP grant program is part of a much larger on-going collaborative effort of federal, state and local agencies, private landowners and non-governmental organizations to meet Oregon Sage-Grouse Action Plan goals.

Goal

Restore Oregon's private rangelands and sustain abundant populations of Sage-Grouse, where threats of wildfire, exotic annual grasses, juniper invasion, and detrimental grazing practices are minimized in a way that supports and promotes local economic and social needs

Strategies

- Execute Candidate Conservation Agreements with Assurances for private lands.

Implementation Actions (2016-17)

Restoration

м9
ESCAPE RAMPS
for Sage-Grouse

с,р8ф
ACRES
exotic annual grass treatments

1н,млс
ACRES
juniper treatment

3л.лу
MILES
marked fence

Planning

1ус,онр
ACRES
in site-specific plans for private land

1ус,он5
ACRES
in managed grazing plans

Near-Term Outcomes (0-5+ Years)

- Decrease of woodland-type conifer communities
- Invasion of exotic annual grasses is reduced

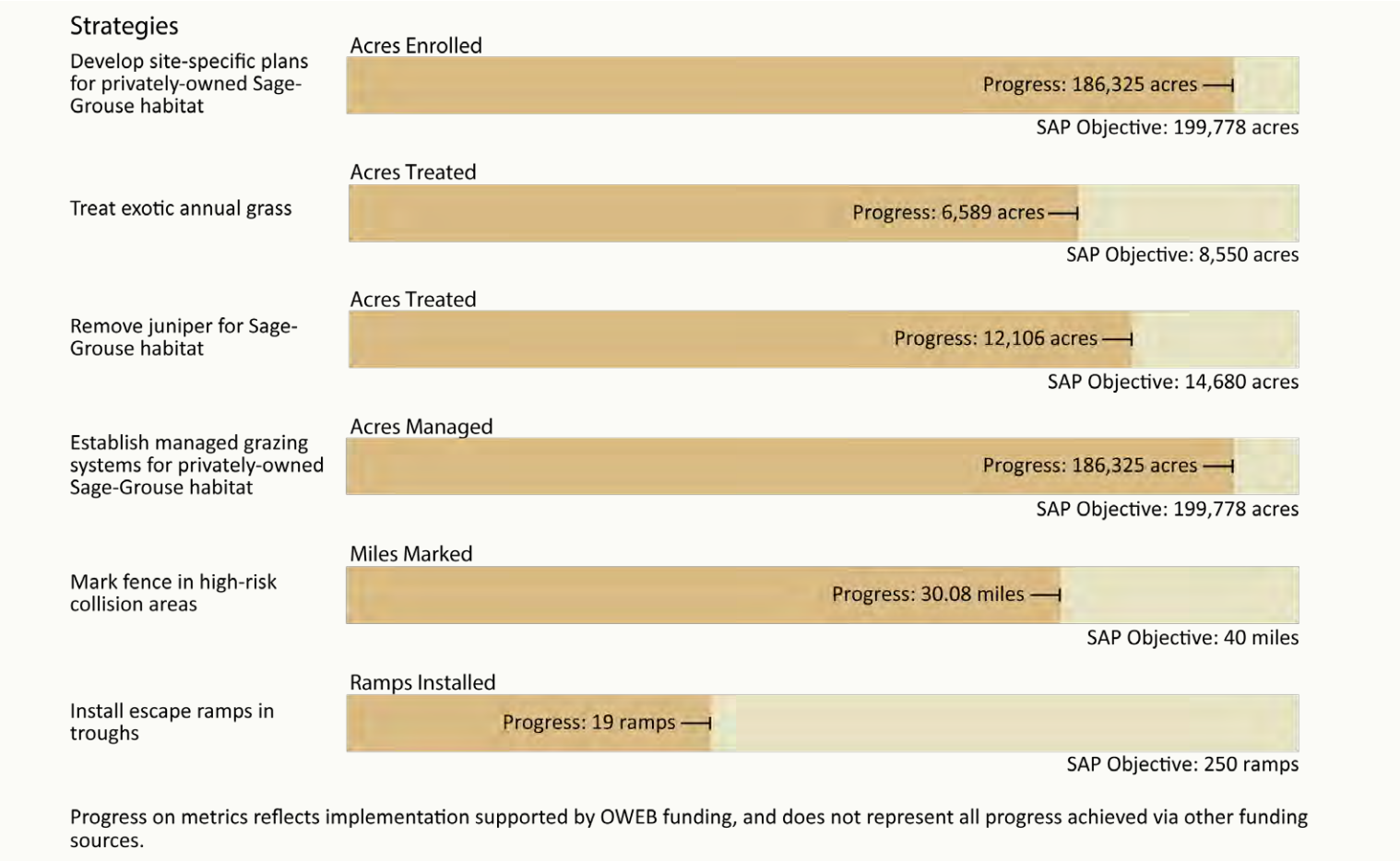
Intermediate-Term Outcomes (5-20+ Years)

- Desired plant cover of sagebrush, perennial bunch grasses, and wildflowers increases
- Less predation of Sage-Grouse by raptors perched on junipers

Long-Term Outcomes (20+ Years)

- Connectivity of habitats increases and is maintained
- Sage-Grouse population size and spatial extent increases

Strategic Action Plan (SAP) Progress, Biennium 1



Progress on metrics reflects implementation supported by OWEB funding, and does not represent all progress achieved via other funding sources.

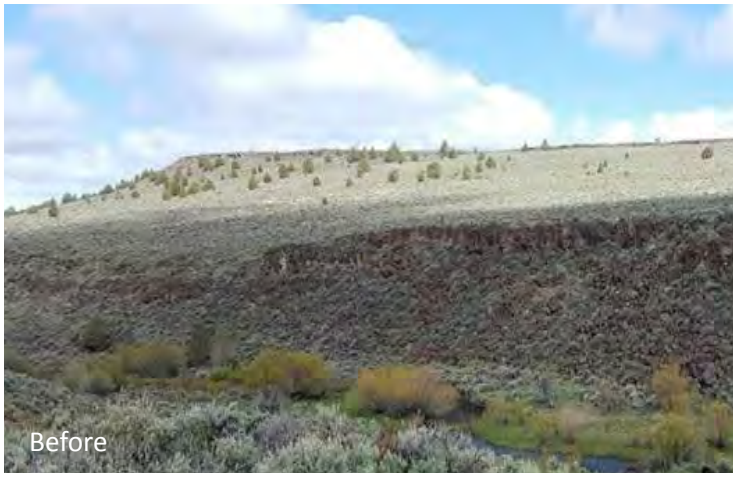
Monitoring Approach

- Completes required monitoring for CCAA on private lands, including annual monitoring
- Collects baseline ecological data
- Tracks improvements in Sage-Grouse habitat over time, including upland and riparian ecosystems, habitat expansion, and rangeland improvements
- Monitors the effectiveness of weed spraying, juniper cutting, rangeland seeding, and grazing management practices

Greater Sage-Grouse *(Centrocercus urophasianus)* are upland bird species completely dependent on sagebrush.

Adaptive Management in the FIP

	Restoration				Engagement
Challenges	Unpredictable weather conditions caused project delays.	The abbreviated timeframe of the first biennium created challenges for planning and contracting.	Grant budgets had to be adjusted because of inaccurate assumptions about contractor costs, creating an extra step in the project management process.	It was difficult to balance staff workloads to meet the diverse needs of stakeholders.	It was challenging to find enough time for multiple landowner meetings and site visits to work out project details.
Lessons Learned	Be prepared for any scenario during fieldwork. Poor weather and equipment failure can happen.	Completed SSPs ensured shovel-ready projects. New interest was generated as landowners became aware of the FIP's ability to provide technical and financial assistance.	It is optimal to perform bid tours and receive bids prior to building the project budget.	Landowners are not all the same. Take time to work with them in a customized way. Discuss timelines and requirements during the project development phase.	Communication between implementers and landowners is vital during and after the project to enable appropriate maintenance and management.
Adaptations	The flexibility of FIP budgets was helpful when it became necessary to adjust timelines because of poor weather conditions.	Additional staff were hired to increase capacity to implement and monitor projects.	A streamlined process was established to solicit qualified contractors, run a bid tour, evaluate and award contracts, and follow through to final inspection and certification.	Cross-jurisdictional relationships supported fluidity of funds across county lines for project implementation and design.	Clear and frequent communications helped staff align project objectives and landowner needs. Where possible, one staff person was assigned to a landowner from project inception to completion.



Removing encroaching junipers increases the amount of quality sagebrush habitat available. Harney Soil and Water Conservation District works with private landowners to voluntarily conserve Sage-Grouse habitat on their property. At this site, western juniper was cut from over 500 acres to improve conditions.

For More Information

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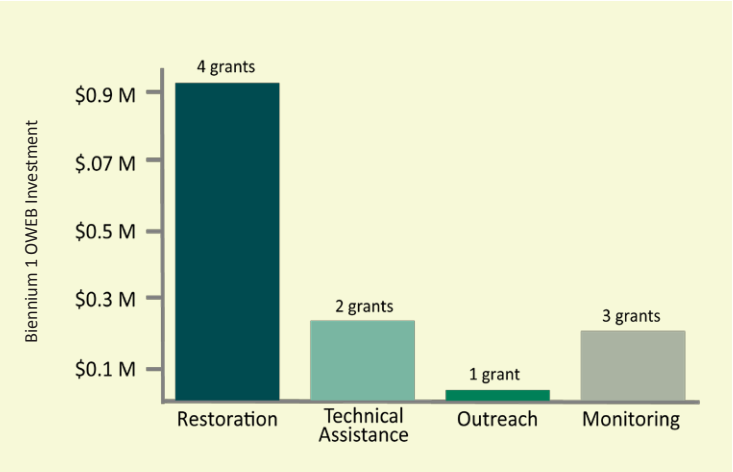
Focused Investment Partnership Progress Report: 2015-2017 Biennium 1
Aquatic Habitat for Native Fish Species

UPPER GRANDE RONDE INITIATIVE

The Upper Grande Ronde Partnership is focusing restoration on 11 prioritized reaches of the upper Grande Ronde sub-basin, which includes sections of the Grande Ronde River, Catherine Creek, and several tributaries upstream of the confluence with the Wallowa River. Since the late 1800s, poorly-managed logging and grazing, road and railroad construction, urbanization, and irrigation withdrawals degraded streams and reduced fish habitat. There are lower late-season flows and stream temperatures are warmer. These conditions threaten native fish species, including steelhead and salmon.

Funding



OWEB awarded $1,431,723 in funding that leveraged $2,753,272 in matching funds.

Benefits

- Improved understanding of how restoration actions impact steelhead and salmon in northeastern Oregon
- Organized approach among diverse partners to develop complex engineering designs
- Enhanced fish habitat through instream and floodplain projects
- Improved passage at diversion dams and culvert replacement that expands or improves access to habitats
- Coordinated monitoring approach to measure progress and quantify outcomes
- Engaged landowners, students and civic groups on the actions needed to restore habitat for native fish

About This Report

The Focused Investment Partnership (FIP) grant program is a bold, new conservation approach that supports high-performing partnerships to strategize restoration actions and measure ecological outcomes through coordinated monitoring. In January 2016, the Oregon Watershed Enhancement Board awarded an Implementation Focused Investment Partnership (FIP) grant to the Upper Grande Ronde Partnership. This report documents progress made from 2016 to 2017 to meet their strategic action plan goals. Work completed under the FIP grant program is part of a much larger, on-going collaborative effort of Bonneville Power Administration, federal, state and local agencies, private landowners, and non-governmental organizations.

Goal

Increased habitat quantity, quality, and diversity for all life stages of spring Chinook, summer steelhead, and other native species in Catherine Creek and the Upper Grande Ronde River

Strategies

- Remove barriers and create additional aquatic habitat
- Restore flow during critical periods
- Restore natural habitat complexity and processes
- Conduct monitoring studies to fill knowledge gaps on juvenile salmon mortality and riparian restoration effectiveness
- Inform, educate, and engage relevant landowners and residents

Implementation Actions (2016-17)

Restoration

174 POOLS
placed over 6.25 miles

30 MILES of FENCE
repaired

3 CULVERTS
replaced

3.5 MILES of NEW CHANNEL

5 MILES of NEW FENCE
installed

450 LARGE WOODY DEBRIS STRUCTURES
placed over 6.25 miles

123 ACRES
new or activated floodplain

Scientific Investigation

11 RIVER MILES
monitored over 2 years for habitat quantity & quality, stream temperature, and flow

3 SCIENTIFIC PAPERS
evaluating deterrent options to protect plantings from elk and deer browse

1 INVESTIGATION
into effect of fish carcass additions to steelhead growth during summer rearing

2 PIT* TAG ARRAYS
installed to track fish movements and survival
*passive integrated transponder

Outreach & Engagement

14 LANDOWNERS
engaged resulting in 4 projects and 2 easements

22 PRESENTATIONS
to provide technical assistance and training to increase awareness

Near-Term Outcomes (0-10+ Years)

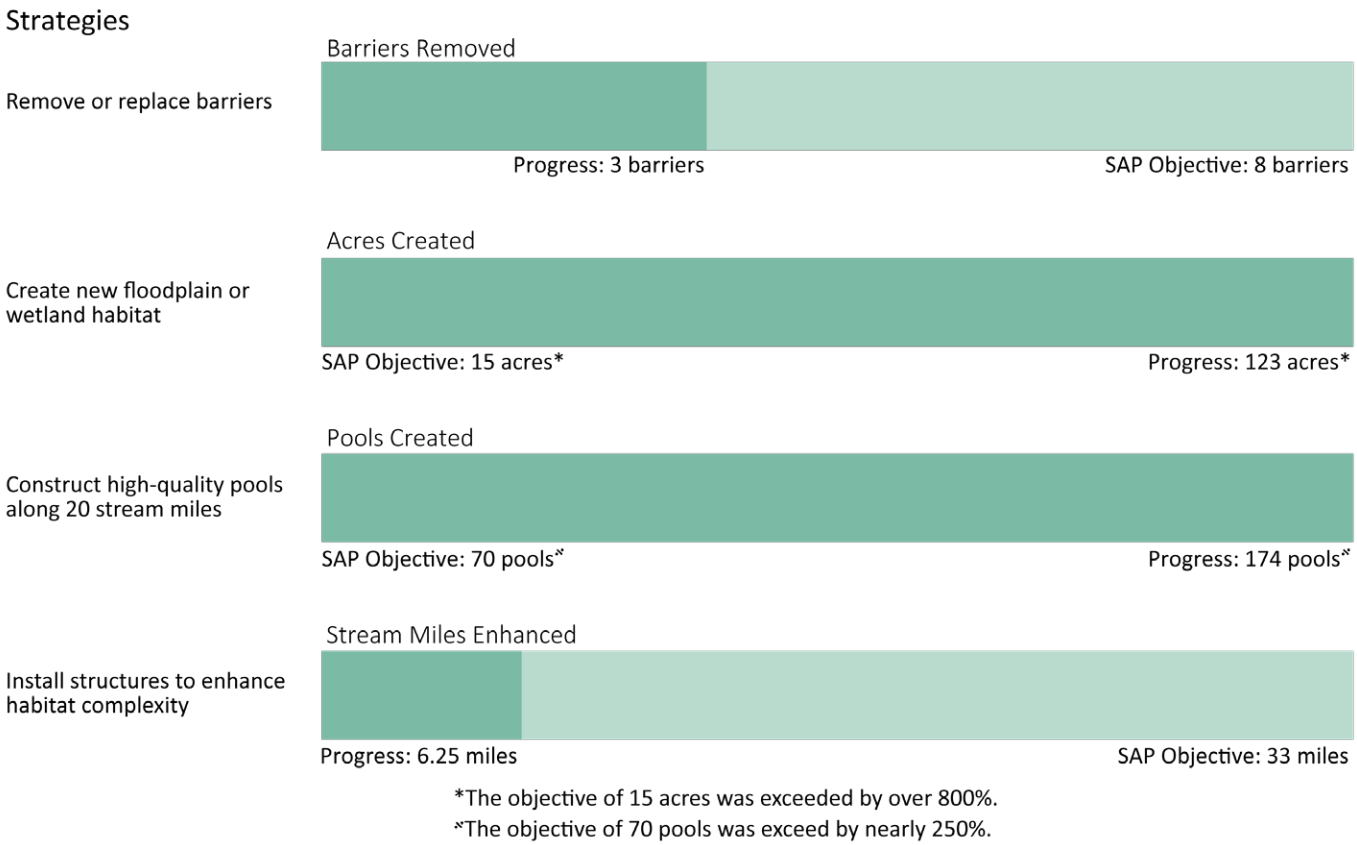
- Access to aquatic habitats is increased
- Floodplain is reconnected to stream system
- Increased instream complexity
- Late season flow is increased

Long-Term Outcomes (20+ Years)

- Distribution of salmon increases in watershed
- Improved channel structure and processes to maintain habitat
- Spawning habitat and streamside plantings improve
- Summer stream temperatures decrease
- Productivity of salmonid species improves

The upper Grande Ronde River supports populations of Endangered Species Act-listed fish species. Photos by ODFW and USFWS.

Strategic Action Plan (SAP) Progress, Biennium 1



*The objective of 15 acres was exceeded by over 800%.

^The objective of 70 pools was exceed by nearly 250%.

Progress on metrics reflects implementation supported by OWEB funding, and does not represent all progress achieved via other funding sources.

Monitoring Approach

- Evaluates restoration techniques to make future projects more effective through adaptive management
- Improves knowledge of factors affecting salmon survival rates to prioritize projects
- Collects data on a consistent set of ecological metrics paired with snorkel surveys to measure restoration outcomes

Grande Ronde Model Watershed staff measure streamflow on Limber Jim Creek. Monitoring investigates how streamflow timing and quantity may change as a result of large wood additions aimed at reconnecting the floodplain.

Adaptive Management in the FIP

	Restoration		Monitoring		Engagement
Challenges	Meeting National Historic Preservation Act Section 106 requirements may require an additional 1-2 years of planning.	There was an initial lack of capacity to fund technical engineering designs, which caused delays.	Finding capacity to analyze monitoring data and ensure information is properly shared and incorporated into future planning is a challenge.	There is uncertainty around securing funding to do repeat habitat and snorkel surveys.	Partners within a FIP are dynamic. Changes have occurred in core partners as well as the larger implementation partnership.
Lessons Learned	Cultural resource surveys require frequent or consistent coordination to proceed in a timely manner.	The flexibility of the FIP program enabled the partnership to direct funds where they are most needed.	There is a need to better coordinate monitoring efforts among partners.	Life Cycle Models could be useful for planning restoration with maximum impact for salmon.	When planning projects, budget time to discuss them and align focus among new funders and partners.
Adaptations	Partners were supported with training and funding for cultural resource surveys to keep projects moving forward.	Partners worked together to leverage Technical Assistance (TA) matching grants in Biennium 1. A plan is in place for additional TA in the next biennium.	The timeline and budget were increased for the Catherine Creek Hall Ranch Project to expand project scope and fish benefit.	A monitoring coordinator was hired to assist the partnership in working as a team and minimize redundancies in monitoring efforts.	Developing clear project goals and objectives through communication and trusting relationships supported project prioritization.

Before restoration at Dry Creek, the stream banks were incised and the floodplain was less than one acre. The Union Soil and Water Conservation District worked with a private landowner to restore the creek's sinuosity and floodplain, doubling it in size. The stream habitat was further enhanced by placing 280 large trees and 600 pieces of wood and planting more than 5,000 native plants.

For More Information

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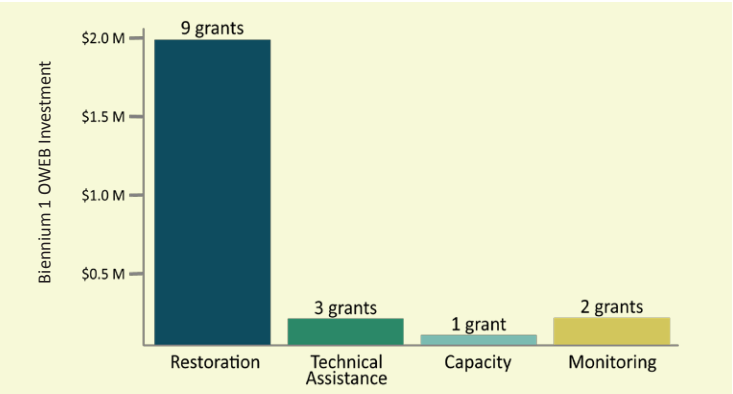
Focused Investment Partnership Progress Report: 2015-2017 Biennium 1
Aquatic Habitat for Native Fish Species

UPPER and MIDDLE WILLAMETTE MAINSTEM ANCHOR HABITATS

Willamette River Anchor Habitats range from the Middle Fork and Coast Fork confluence to habitats above Willamette Falls. Scientists have identified them as the locations with the highest value fish and wildlife habitat and offer the greatest return on restoration investments. Anchor Habitats represent a stepping stone approach to providing essential habitat for species with wide ranges such as salmon, songbirds, and butterflies. Since the late 1800s, land use has dramatically altered the river. Development has resulted in over half of the river's 180-mile length being armored. Channels are straightened and dams block upstream fish passage. Runoff from adjacent farms and urban centers has degraded water quality and elevated stream temperatures, nutrients, and bacteria. Rare floodplain forests, which provide critical seasonal habitat for fish, have declined by more than 70%.

Funding



OWEB awarded $2,539,664 in funding that leveraged $2,640,910 in matching funds.

Benefits

- Expanded floodplain habitat from removing levees and enhancing former gravel pits
- Increased number of side channels that support cooler water temperatures
- Enhanced riparian vegetation along sloughs and channels providing shade and habitat
- Reduced coverage of aquatic invasive species
- Improved fish passage by modifying artificial barriers
- Coordinated monitoring approach to measure progress and quantify outcomes

About This Report

The Focused Investment Partnership (FIP) grant program is a bold, new conservation approach that supports high-performing partnerships to strategize restoration actions and measure ecological outcomes through coordinated monitoring. In January 2016, the Oregon Watershed Enhancement Board awarded an Implementation Focused Investment Partnership grant to the Willamette Mainstem Anchor Habitat Working Group. This report documents progress made from 2016 to 2017 to meet their strategic action plan goals. Work completed under the FIP grant program is part of a much larger, on-going collaborative effort of federal, state and local agencies, private landowners and non-governmental organizations implementing restoration work guided by the Willamette Basin Planning Atlas. The restoration is backed by the funding partnership between Bonneville Power Administration, Meyer Memorial Trust and OWEB that supports large-scale and complex projects on the mainstem Willamette River.

Goal

Sustain and enhance seasonally important resources for native fish through increasing habitat complexity and quantity, improving floodplain connectivity, and restoring floodplain forests in the Upper and Middle Willamette Mainstem Anchor Habitats

Strategies

- Remove revetments and levees in reaches likely to experience channel changes
- Construct lateral channels in areas with high likelihood of hyporheic flow
- Plant riparian vegetation along sloughs and side channels
- Control aquatic invasive weeds
- Increase and enhance floodplain plant communities
- Modify floodplain topography to increase the extent and duration of floodplain inundation
- Modify artificial barriers to aid fish passage and increase extent and duration of floodplain inundation
- Enhance former gravel pits by re-connecting pits, re-grading boundaries and filling ponds

Biennium 1 Implementation Results (2016-17)

Restoration

- **804** ACRES floodplain forest restored
- **4** MILES off-channel fish habitat
- **3** BARRIERS MODIFIED for floodplain connectivity
- **96** ACRES aquatic invasive species treated

Scientific Investigation

- **1** BASELINE ASSESSMENT of instream components
- **1** STUDY of cold water refugia for fish in the mainstem

Outreach & Engagement

- **1** OUTREACH PLAN
- **1** WORKSHOP on outreach to Latino communities
- **23** TOURS
- **550** VOLUNTEER HOURS

Near-Term Outcomes (0-10+ Years)

- River channel is re-connected to its historical floodplain
- Length of secondary channels is increased
- Native fish accessibility to the floodplain is increased
- Native riparian forest is enhanced
- Extent of invasive plant species is reduced

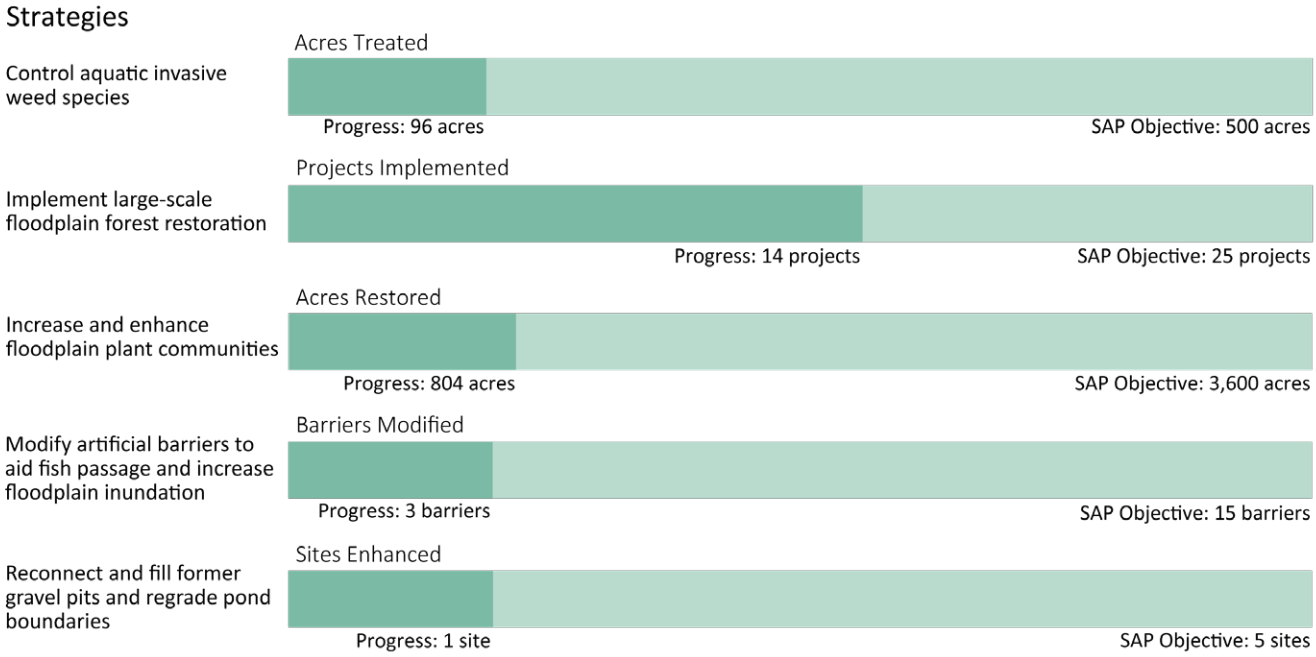
Pacific Lamprey
(Entosphenus tridentatus)

Winter steelhead
(Oncorhynchus mykiss)

Long-Term Outcomes (20+ Years)

- Channel migration and sinuosity increases
- Canopy cover and near-bank shading increases
- Temperature and dissolved oxygen conditions improve
- Habitat connectivity and complexity increases
- Seasonally-important habitat resources for native fish increase

Strategic Action Plan (SAP) Progress, Biennium 1



Progress on metrics reflects implementation supported by OWEB funding, and does not represent all progress achieved via other funding sources.

Monitoring Approach

- Builds a framework to assess implementation and effectiveness of restoration projects
- Collects data to monitor changing water levels and river features that native fish need at different times of year
- Evaluates the impact of aquatic invasive species on water quality
- Tracks changes in vegetation and ecological responses to reforestation
- Conducts fish sampling to assess native fish habitat use

Oregon Chub
(Oregonichthys crameri)

Spring Chinook salmon
(Oncorhynchus tshawytscha)

Willamette Riverkeeper and Benton SWCD partnered with Portland State University and U.S.Geological Service to assess the invasive plant *Ludwigia hexapetala* infestation and water quality at Mission Lake/ Windsor Island Slough prior to restoration. *Ludwigia* traps sediment and reduces open-water habitats. It also negatively affects water quality by reducing dissolved oxygen from rapid seasonal growth and decay. These data provides a baseline for comparison for effectiveness monitoring to occur after future removal.

Adaptive Management in the FIP

	Restoration	Monitoring	Engagement		
Challenges	Permitting to do earthwork for floodplain reconnection and side channel projects is a major hurdle, resulting in construction delays.	A long timescale is required for floodplain forests to be established and for the ecological benefits of re-vegetation to be realized.	Cultivating relationships with landowners for private lands restoration along the mainstem is a long-term process that requires an investment of time and energy.	The large scale of the geographic scope, number of stakeholders, and diversity of issues in the FIP has resulted in overlapping goals and geography with other initiatives.	Transitions in leadership mean that new staff need time to get up-to-speed on complex partnerships and projects.
Lessons Learned	High-level permitting agreements among key federal agencies, state agencies, and counties could accelerate earthwork projects.	Most projects are taking place on public or otherwise protected lands. The uncertainty surrounding future funding affects landowner participation.	The results chain model has supported creative thinking on how to use indicators to efficiently assess effectiveness of actions.	Linkages between limiting factors in the results chain and anticipated impacts have been helpful to scale expectations among stakeholder groups and to plan monitoring efforts.	The partnership has exceeded anticipated progress toward outreach targets, is on track for volunteer targets, and will revisit outreach targets for salience to key audiences.
Adaptations	Opportunities to coordinate permitting among agencies are being explored.	The partnership is developing new approaches to assess changes in vegetation and ecological responses to meet shorter-term monitoring needs.	The partnership is exploring ways to engage with private landowners that continue to build trust and illuminate the value of restoration now and into the future.	The partnership has honed its focus to maintain an emphasis on mainstem-specific issues, science, and projects.	The partnership is working to become more resilient to change by building leadership capacity across organizations.

Through the Willamette Confluence Middle Fork Restoration Project, The Nature Conservancy restored 330 acres of natural floodplain and in-channel habitat. This included removing levees separating old gravel extraction ponds. The pits are now seasonally connected to the river and offer new backwater fish habitat.

For More Information

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