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:

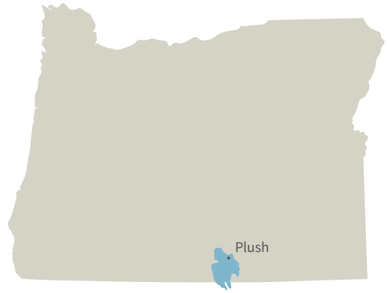
- Honey Creek Irrigators
- Adel Water Improvement District

ECOLOGICAL PRIORITY

Aquatic Habitat for Native Fish Species

FOCAL SPECIES

- Warner sucker
- Warner redband trout



GEOGRAPHIC SCOPE

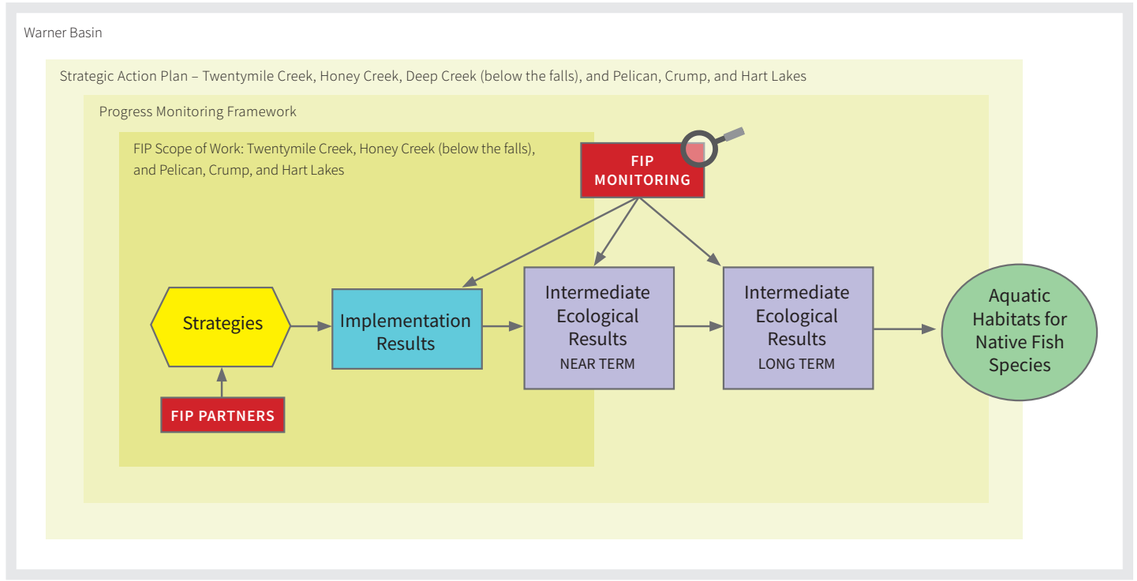
The WBAHP FIP Initiative is focused on the three main tributaries (Twentymile Creek, Deep Creek, and Honey Creek) that support Warner sucker and Warner Lakes redband trout, as well as Pelican, Crump, and Hart Lakes. The three tributaries represent over 45 miles of Warner sucker designated critical habitat 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].

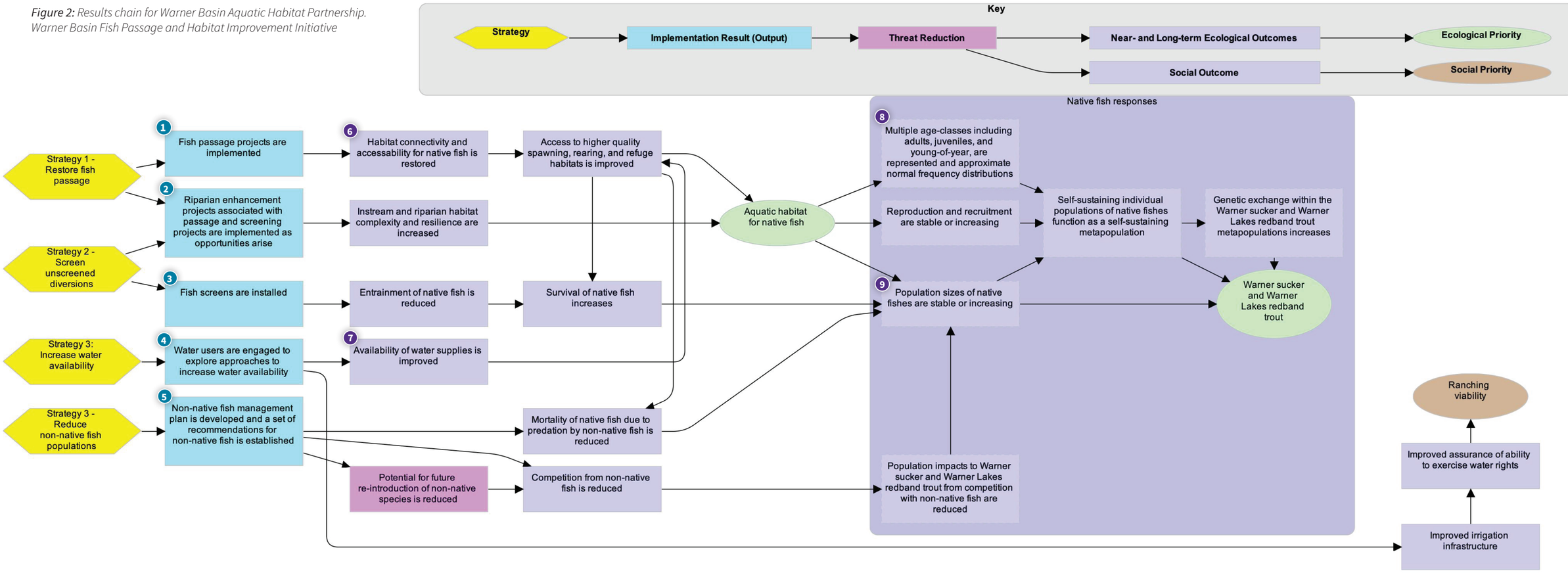
Theory of Change.
Public outreach and education efforts make information explaining the impacts of non-native fish on native fish populations available and therefore increases public understanding and interest in avoiding actions that lead to the introduction or expansion of non-native fish beyond their 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.