

CONCLUSIONS/RECOMMENDATIONS

1. Sustaining a comprehensive fish monitoring program is vital to effective fish conservation, management, mitigation and restoration throughout the Klamath Basin.

The current monitoring program serves the diverse resource management interests, needs, and obligations of stakeholders and tribal, state, and federal agencies, as defined by the legislative, regulatory, and policy directives governing them. Specific monitoring activities are mandated by legal requirements under the U.S. Endangered Species Act, U.S. Magnuson–Stevens Fishery Conservation and Management Act, and Klamath and Trinity River water projects. Every element of the current monitoring program addresses a priority need, so eliminating any of them would be detrimental.

2. Adopt promising new technologies to make fish monitoring more efficient and informative.

- PIT tagging of juvenile Coho, Chinook and steelhead in tributaries, mainstem traps and hatchery releases and expanded detection in juveniles and adults to assess movement, distribution, habitat use, outmigration timing, freshwater and early ocean survival and adult return rates. (Builds on an extensive existing network and provides individual-based information that cannot be obtained from other methods).
- Acoustic telemetry (1D and 2D) of salmon, steelhead and suckers to assess movement, distribution, habitat use and survival.
- Expanded use of sonar to monitor total returns of salmon and steelhead in the Klamath River mainstem.
- Genetics testing and Parentage Based Tagging (PBT) to help understand how FCH contributes to repopulation in the basin.
- Stable Isotope analysis of otolith microchemistry to identify spatial origin of adult salmon and steelhead returning to the upper Klamath basin.
- Video monitoring at adult weirs including potential use of Artificial Intelligence for video processing.
- Targeted basin-scale eDNA monitoring to complement field surveys with emphasis on difficult-to-access tributaries and multiple focal species. (eDNA as a potentially cost-effective basin-scale distribution tool.)

3. Consider additional monitoring to fill gaps in existing programs.

- Monitoring and research have been unable to identify the causes of, or remedies for, chronic recruitment failure in Lost River and Shortnose Suckers.
- Monitoring is limited for some species including steelhead in the Klamath River, Spring Chinook in the Klamath River, lamprey basin wide and Bull Trout in the Klamath headwaters.
- Monitoring of adult and juvenile anadromous fish passage, mortality and/or delay at Keno and Link River dams has not yet been fully implemented.
- Impacts of water withdrawal entrainment are uncertain on Spring Run Chinook and sucker downstream from Upper Klamath Lake.
- How anadromous (steelhead) and resident (rainbow trout) *O. mykiss* interact remains poorly understood.
- The long-term, cumulative effects of habitat restoration and instream flow on coho in tributary streams are still unknown.

4. Strengthen documentation, archiving, sharing and real-time access to fish monitoring data throughout the basin.

- Advance Klamath Basin Fishery Collaborative initiatives to provide access to standardized PIT tag data submitted by tribal, state, federal and non-governmental organizations.
- Identify needs and opportunities for documenting, archiving and sharing other fish monitoring data and Information.
- Supporting collection and access to fish parasite and disease monitoring information.

5. Support efficient coordination and collaboration among fish monitoring partners throughout the basin.

- Establish annual collaboration process for information sharing and coordination of adaptive management of fish monitoring plans and projects.
- Utilize collaborative process to develop recommendations for fish monitoring priorities and new initiatives where appropriate.

6. Consider dedicated projects to analyze and synthesize monitoring and research information to guide future conservation, management, mitigation and restoration measures.

- Tributary habitat restoration guidelines based on project specific monitoring results throughout the basin.
- Comprehensive review of sucker recruitment failure hypotheses and related evidence to identify a path forward.

7. Any fish monitoring funding shortfalls are best addressed by scaling back select program elements rather than eliminating them.

In the event of funding shortfalls, some projects can operate at reduced effort and still deliver critical information. Even high-priority activities can withstand modest reductions in scale where necessary to maintain core functions. Some projects could also pause for occasional years, especially those that inform long-term rather than annual decisions. However, every project has a threshold beyond which further reductions would critically impair its function and render it ineffective. Any reductions will come at the cost of decreased precision and accuracy in assessments and increased management uncertainty in a changing environment.

8. Effective fish monitoring requires sustaining current programs and partnerships over the long term, including tribal and local initiatives.

Keeping entities and partnerships intact over the long term is essential for long-term success of fish conservation, management, mitigation and restoration throughout the Klamath Basin. Continuing support of tribal and local fish monitoring programs will be necessary to sustain critical functions in the event of funding shortfalls.