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January 30, 2024

MEMORANDUM

TO: Council Members

FROM: Windy Schoby, Fish and Wildlife Policy Analyst- Idaho

SUBJECT: Steelhead response to habitat improvement in the Potlatch watershed of Idaho, Potlatch River Steelhead Monitoring and Evaluation Project

BACKGROUND:

Presenter: Brian Knoth, Fisheries Biologist, Idaho Department of Fish and Game

Summary: Historic and current land use practices have altered habitat conditions and instream flow regimes in the Potlatch River, a tributary to the Clearwater River in Idaho. Partners have collaborated to identify, prioritize, and address limiting factors for ESA listed steelhead throughout the watershed. Over the past decade, flow supplementation, fish passage, and habitat complexity projects have been implemented. Brian Knoth, lead biologist on the Potlatch River Steelhead Monitoring and Evaluation project, will present the positive biological response of steelhead to habitat restoration actions on a watershed scale.

Relevance: The Potlatch Watershed habitat restoration and subsequent monitoring and evaluation are projects supported by the Fish and Wildlife Program. The projects use a comprehensive watershed management approach to address priority limiting factors and to monitor the fish response.

Habitat restoration in the Potlatch River watershed is funded through a combination of individual project grants awarded through Idaho's apportionment of the Pacific Coastal Salmon Recovery Fund awarded to the Idaho Governor's Office of Species Conservation, and the Northwest Power and Conservation Council Fish and Wildlife program funding by Bonneville Power Administration [Project # 2008-604-00](#). Bonneville Power Administration funds are awarded to the Idaho Governor's Office of Species Conservation and are implemented cooperatively between the Idaho Department of Fish and Game and the Latah Soil and Water Conservation District.

Monitoring and Evaluation efforts are funded by a combination of individual project grants awarded through Idaho's apportionment of the Pacific Coastal Salmon Recovery Fund awarded to the Idaho Governor's Office of Species Conservation, a grant from NOAA Fisheries to the Pacific States Marine Fisheries Commission to support Intensively Monitored Watersheds in Idaho, Oregon and Washington, and the Northwest Power and Conservation Council Fish and Wildlife program funding by Bonneville Power Administration [Project # 1990-055-00](#).

Background: The Potlatch River basin can be categorized into two distinct landscapes. The lower watershed is comprised of steep, basaltic canyons surrounded by dryland agriculture. In this portion of the watershed the stream channel is high gradient with large substrate creating riffle/pocket water habitat. The upper Potlatch River watershed is composed of timbered hills and meadows and has lower gradient, forested streams with smaller substrate and cooler water temperatures. Land use practices in the Potlatch River basin, primarily dryland agriculture and timber harvest, have significantly altered stream flows and aquatic habitat. Distinct factors limit the distribution and abundances of fishes in the lower and upper watersheds due to these habitat changes.

Low summer flows and the presence of fish passage barriers are the main factors limiting steelhead population productivity and habitat use in the lower watershed. Forest and meadow habitats have been converted into cropland on the canyon rims and in the headwaters of the tributaries. This land use change has led to higher peak springtime flow and reduced summer base flow that can lead to reach dewatering. Fish passage barriers

are the other major factor limiting habitat in the lower watershed, with road culverts upstream of the canyon reaches being the primary barrier type. A lack of instream complexity is the main factor limiting juvenile steelhead summer and winter rearing habitat in the upper watershed. Streams were often straightened or re-located, and riparian vegetation and instream woody debris were removed during historic timber harvests in this basin. Presently, streams in the upper watershed lack large woody debris (LWD) and other complex habitats. In addition, riparian communities are not yet mature enough to actively recruit materials into streams to create these conditions.

As a result of these differences across the Potlatch River basin, unique restoration strategies have been designed for each area. In the lower Potlatch River watershed efforts are focused on expanding juvenile steelhead rearing habitat by removing migratory barriers and increasing base-flow conditions through summer stream flow supplementation and meadow restoration. In the upper Potlatch River watershed installation of log structures, planting and protecting riparian areas, and restoring floodplain access are tools used to increase habitat complexity and restore riparian function.

The Potlatch River Steelhead Monitoring and Evaluation (PRSME) project evaluates fish and habitat responses to these restoration actions in the Potlatch River basin at multiple scales. First, individual treatment reaches are monitored to determine whether habitat projects produced the intended outcome. Second, fish and habitat responses to restoration projects are monitored at the tributary scale. Finally, responses to restoration by the steelhead population are monitored within the Big Bear Creek and East Fork Potlatch River index watersheds. This hierarchical design allows managers to assess the relationship between a habitat action and fish responses that propagate up to a higher, management-scale level. The PRSME is conducted by Idaho Fish and Game personnel and represents the monitoring and evaluation component of the [Potlatch River Watershed Management Plan 2019 Amendment](#) (Latah SWCD 2019). The monitoring is intended to be long-term and is conducted annually.

More information:

Video series on Potlatch River Steelhead Habitat Restoration produce by Idaho Department of Fish and Game-

[Part 1: Introduction to the Restoration Program](#)

[Part 2: Implementing Stream Restoration Projects](#)

Potlatch River Steelhead Habitat Restoration and Monitoring Program



Northwest Power
and Conservation
Council Meeting

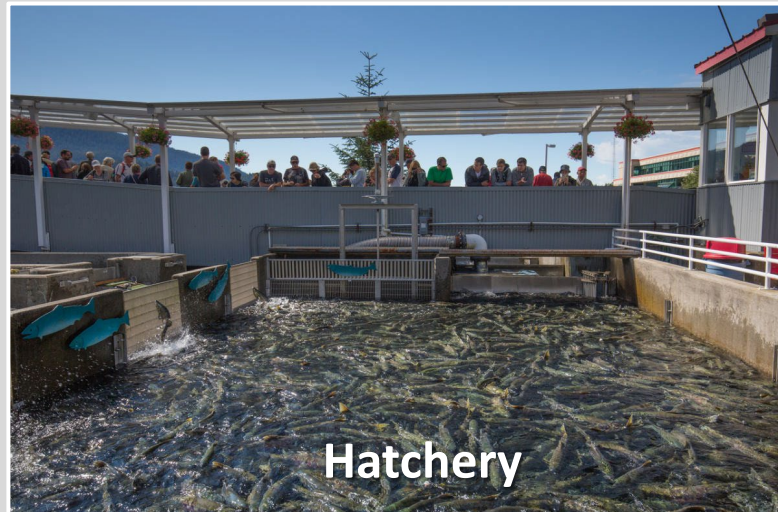
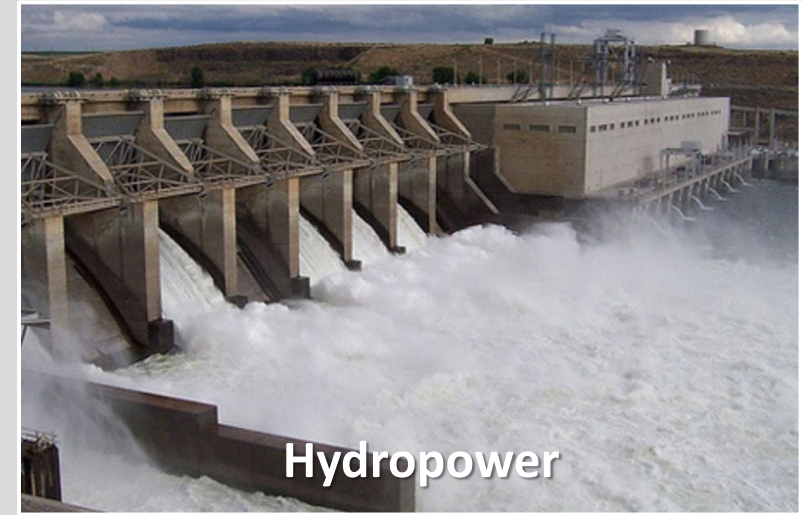
February 7, 2024

Brian Knoth

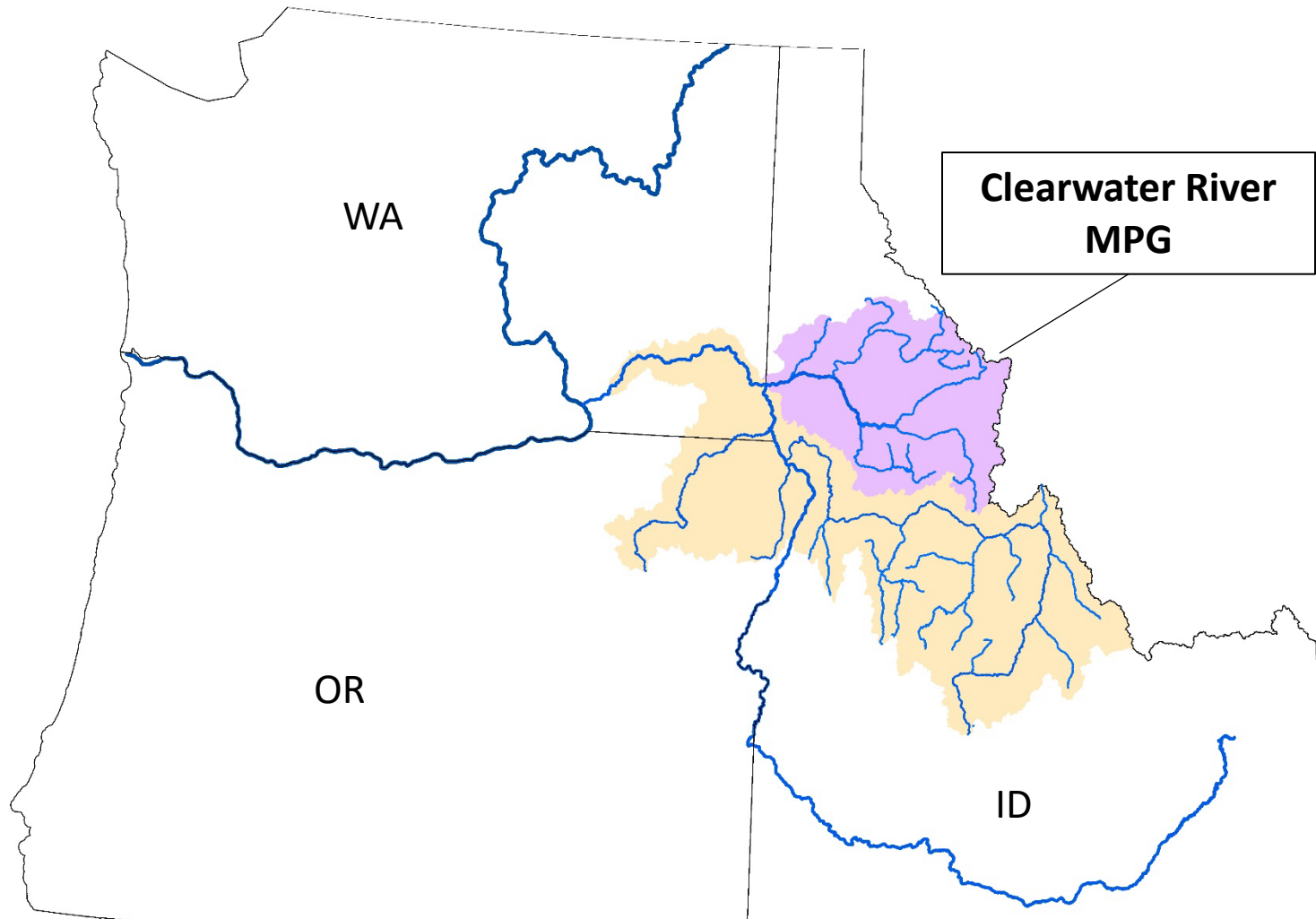


Snake River Steelhead Status and Recovery

- Severe declines in West coast salmon and steelhead stocks
- Contributing factors
- ESA Listing in 1997
- Actions in each forum contribute to recovery efforts



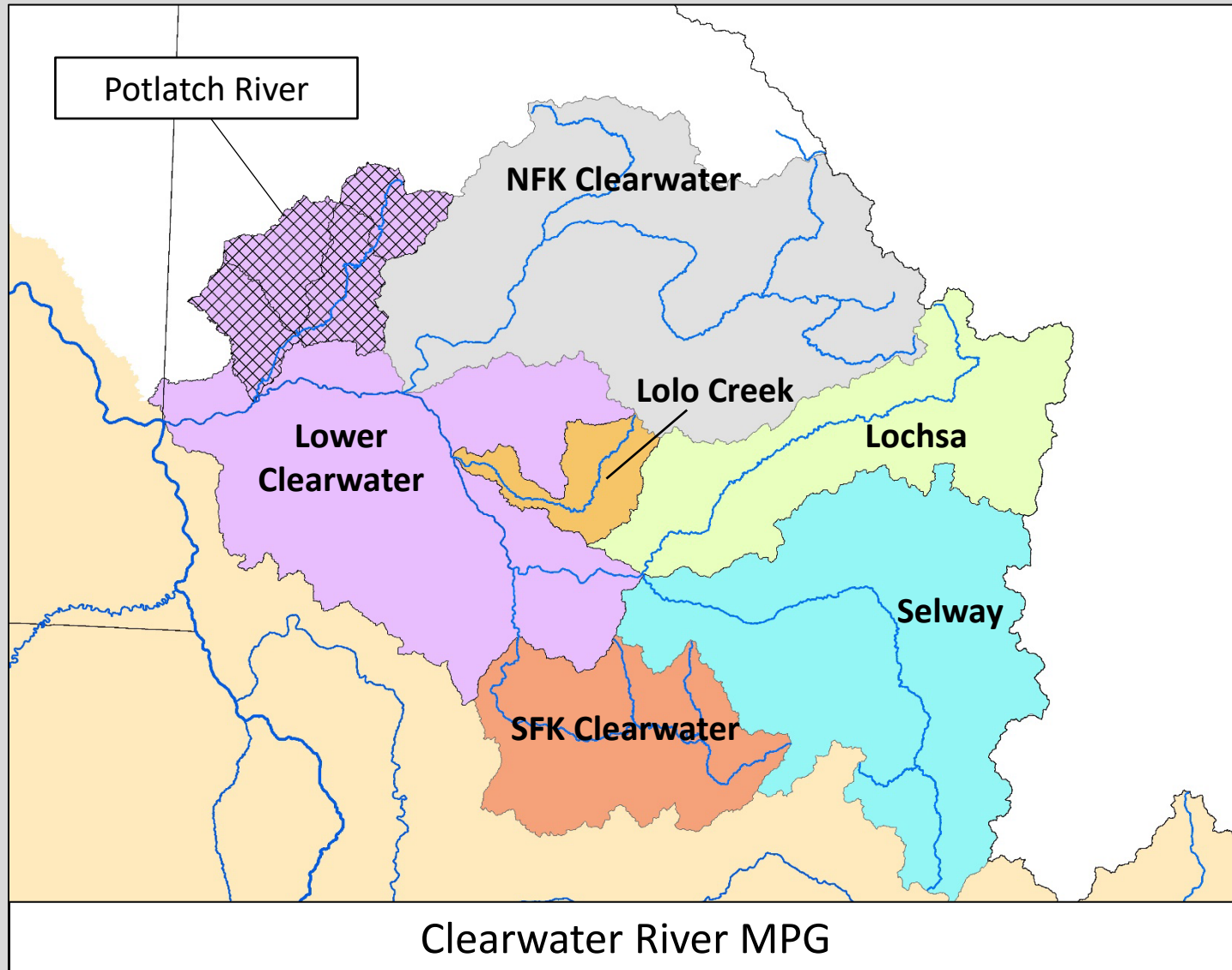
Snake River Steelhead Management



Snake River Steelhead- Distinct Population Segment (DPS)

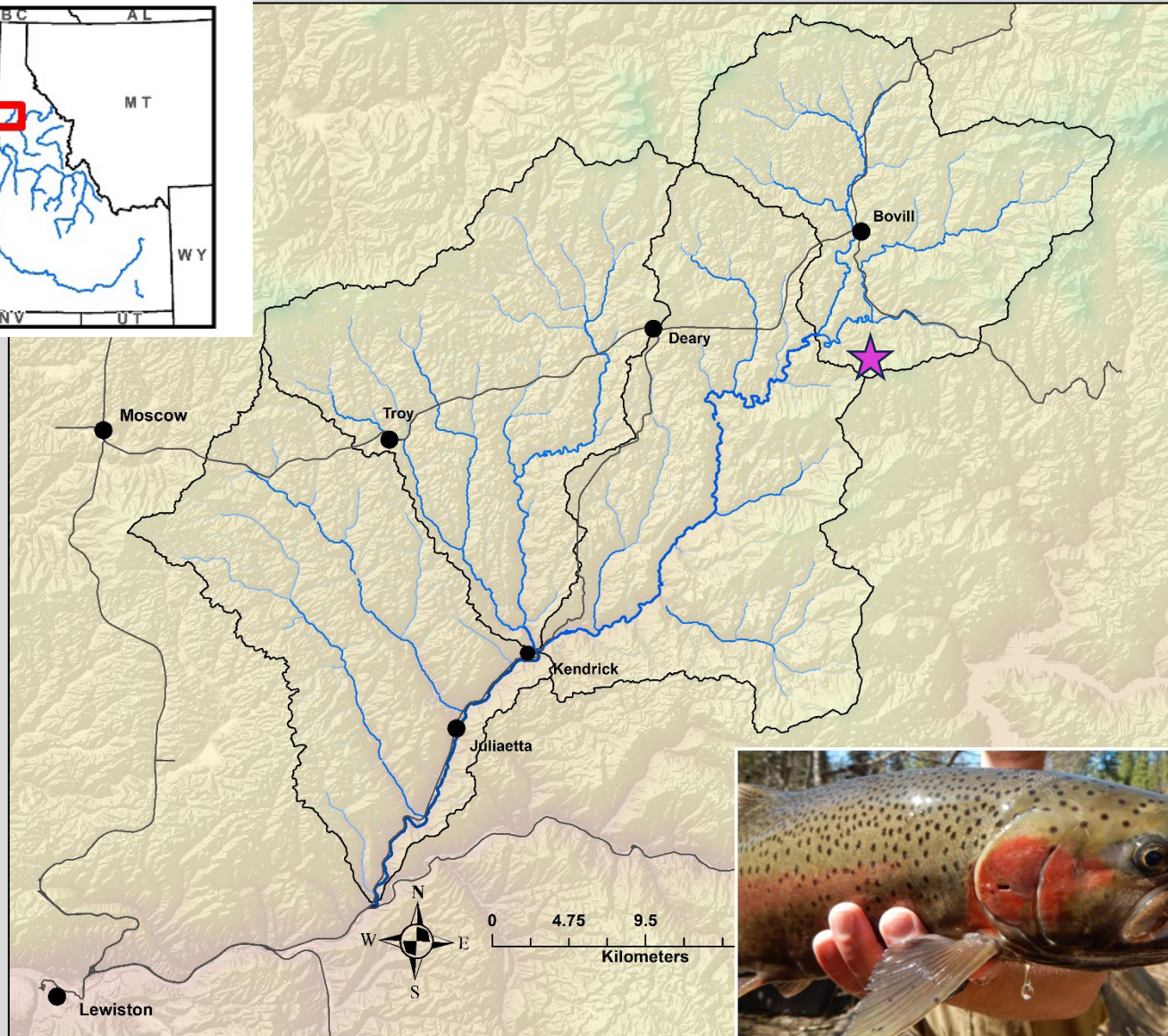
- Snake River DPS comprised of 5 major population groups (MPGs)
 - Clearwater River (ID)
 - Grande Ronde River (WA/OR)
 - Hells Canyon (ID/OR)
 - Imnaha River (OR)
 - Lower Snake (WA)
 - Salmon River (ID)

Snake River Steelhead Management



- Clearwater River MPG comprised of 6 independent populations
 - Lolo Creek
 - Selway River
 - Lochsa River
 - SFK Clearwater River
 - Lower Clearwater River
 - NFK Clearwater River (extirpated)
- Lower Clearwater River population is critical to recovery efforts of Clearwater River MPG

Potlatch River, North-Central Idaho



- Approx. 377,776 acres
- Supports largest spawning area for wild steelhead in the lower Clearwater River
- No hatchery supplementation
- Low rates of hatchery straying

Historical Landscape

- Diverse landscape
- Native grasslands in lower elevations; conifer forests in higher elevations
- Intact riparian zones dominated by cottonwoods and aspen
- Natural flow regime (bulk of precipitation in winter and spring)



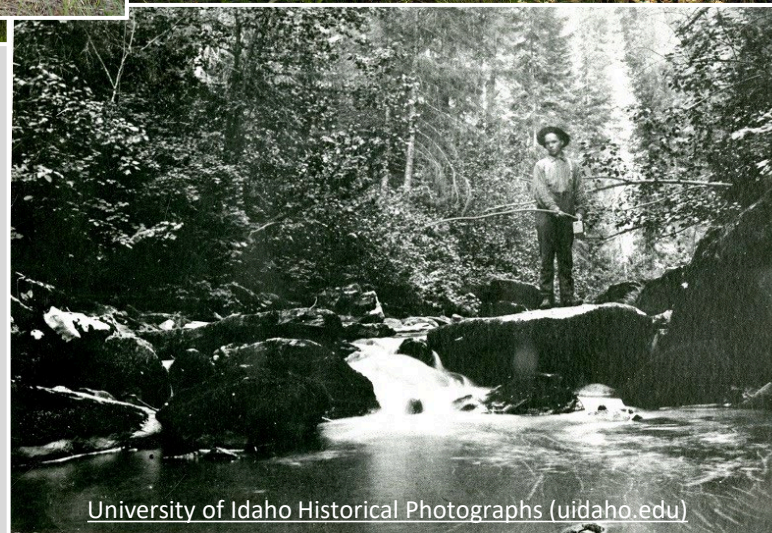
Bluebunch wheatgrass



Idaho fescue



Palouse Land Trust



University of Idaho Historical Photographs (uidaho.edu)



University of Idaho Historical Photographs (uidaho.edu)

Historical Fish Community



- Diverse fish community
- Salmon and steelhead important food source for Nez Perce and Coeur d'Alene tribes
- Highly productive system

Moscow News Review- a local judge complained that although catching large quantities of fish was still commonplace, the fishing in 1910 wasn't as good as when he used to catch 140 fish in a day on Bob's Creek in the 1890's

Historical Land Use Practices

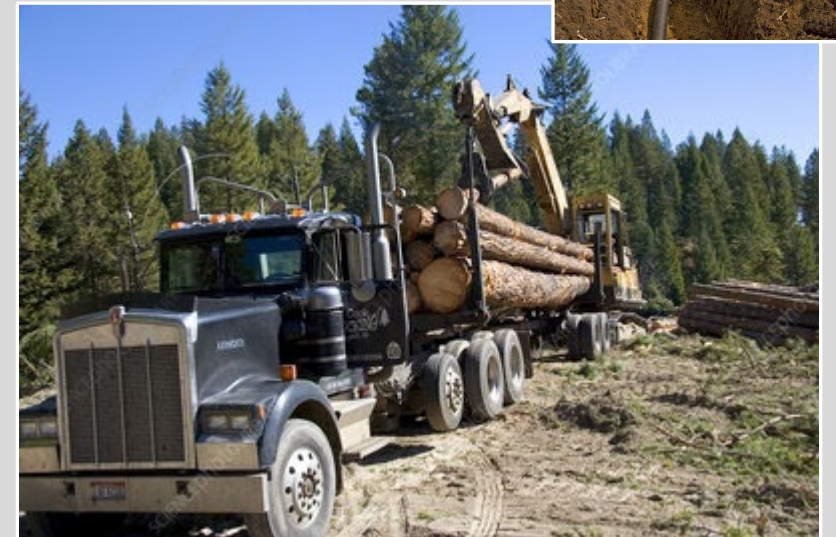
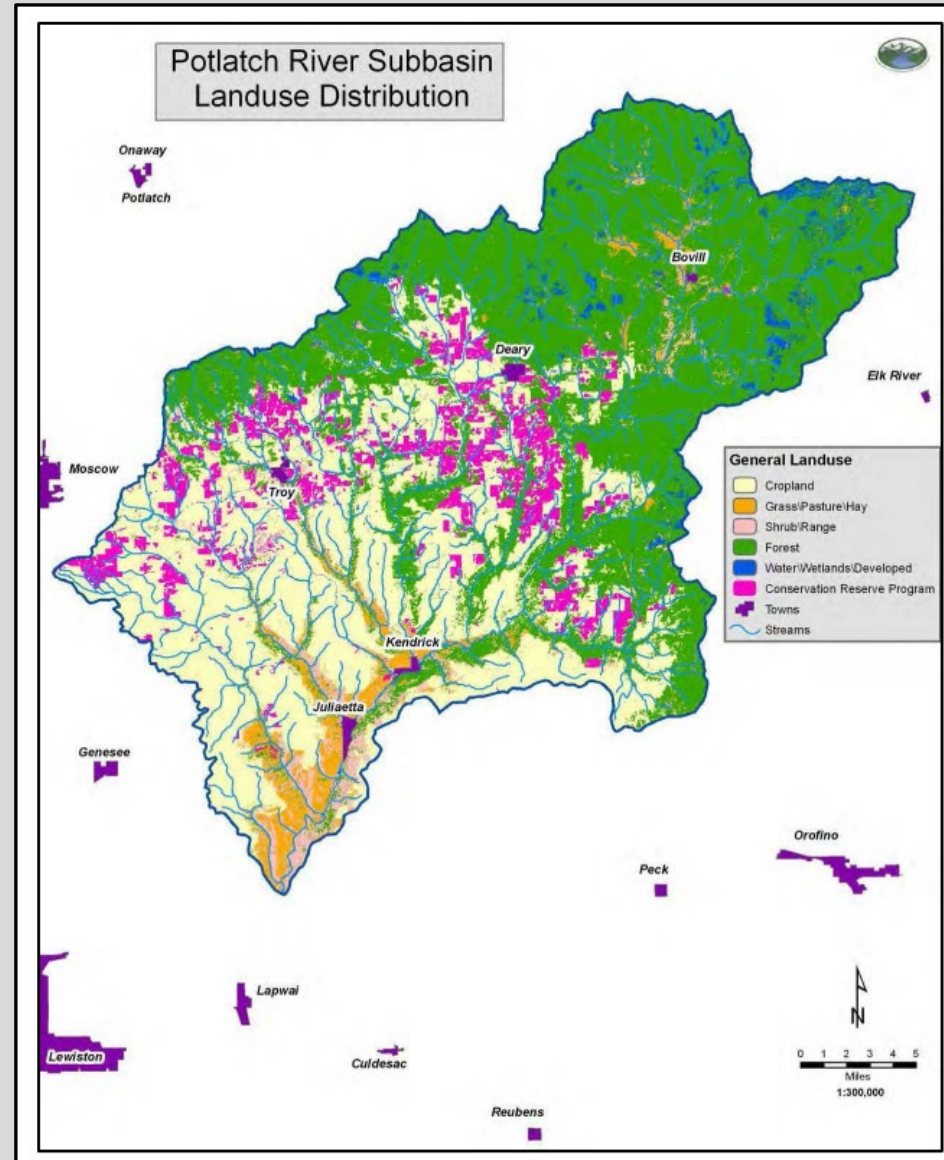


- First settlers arrived in late 1800's
- Agriculture boom in 1880's (dry land wheat farming)
- Logging operations began in early 1900's
- WI&M Railroad built in 1905



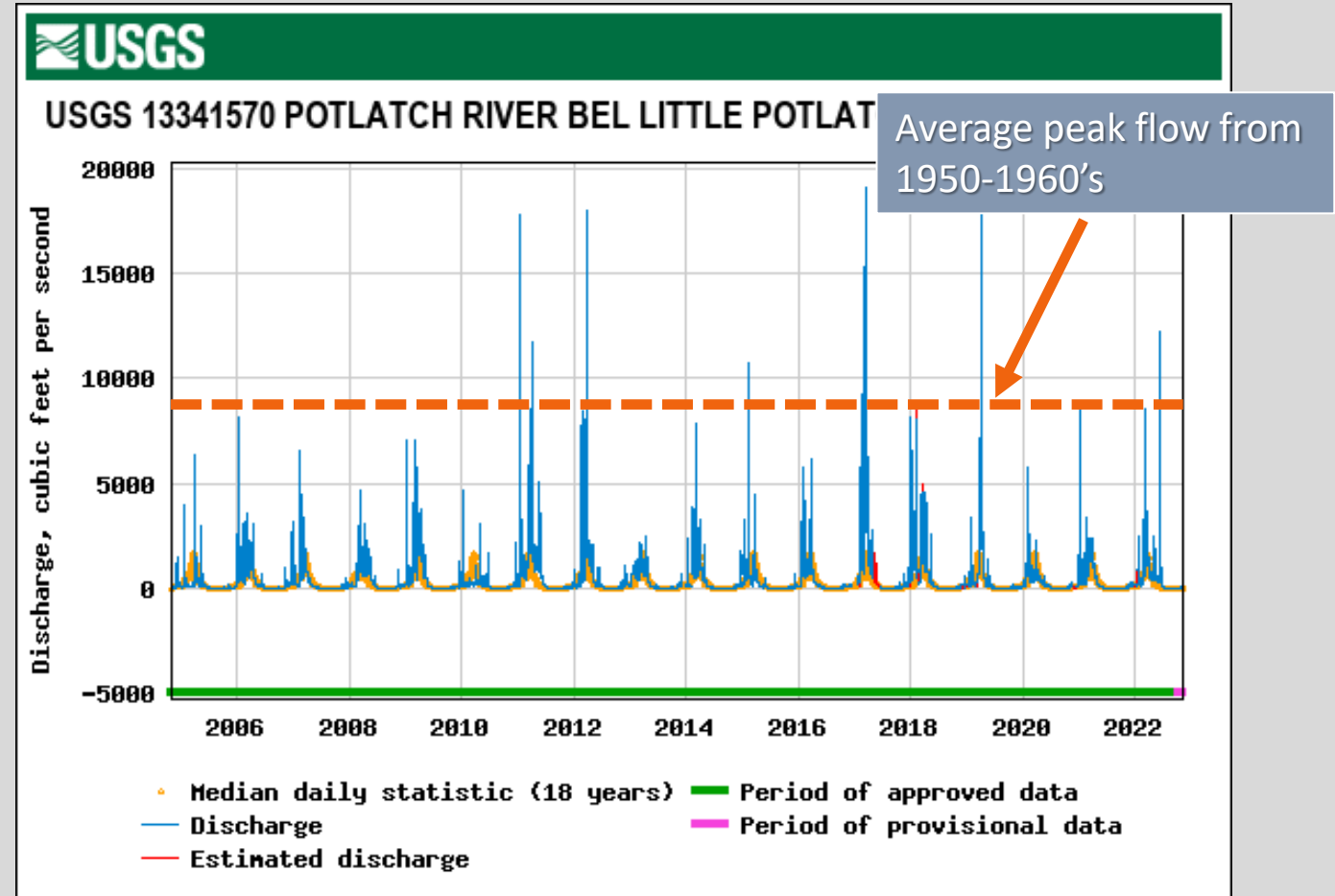
Current Conditions

- Majority of watershed privately owned (78%)
- Commercial timber harvest operations in northwest
- Large-scale commercial agriculture in southeast



Limiting Factors- Altered Flow Regime

- Extremely flashy hydrograph
- Peak spring flows becoming more powerful



Limiting Factors- Altered Flow Regime

- Low summer base flows are a significant problem
- Miles of stream go dry
- Fish stranded in isolated pools; fish kills frequent
- Restricts steelhead rearing habitat



Limiting Factors- Barriers for Passage



- Culverts from road crossings
- High flow velocity
- Dry stream channels/ low flow conditions

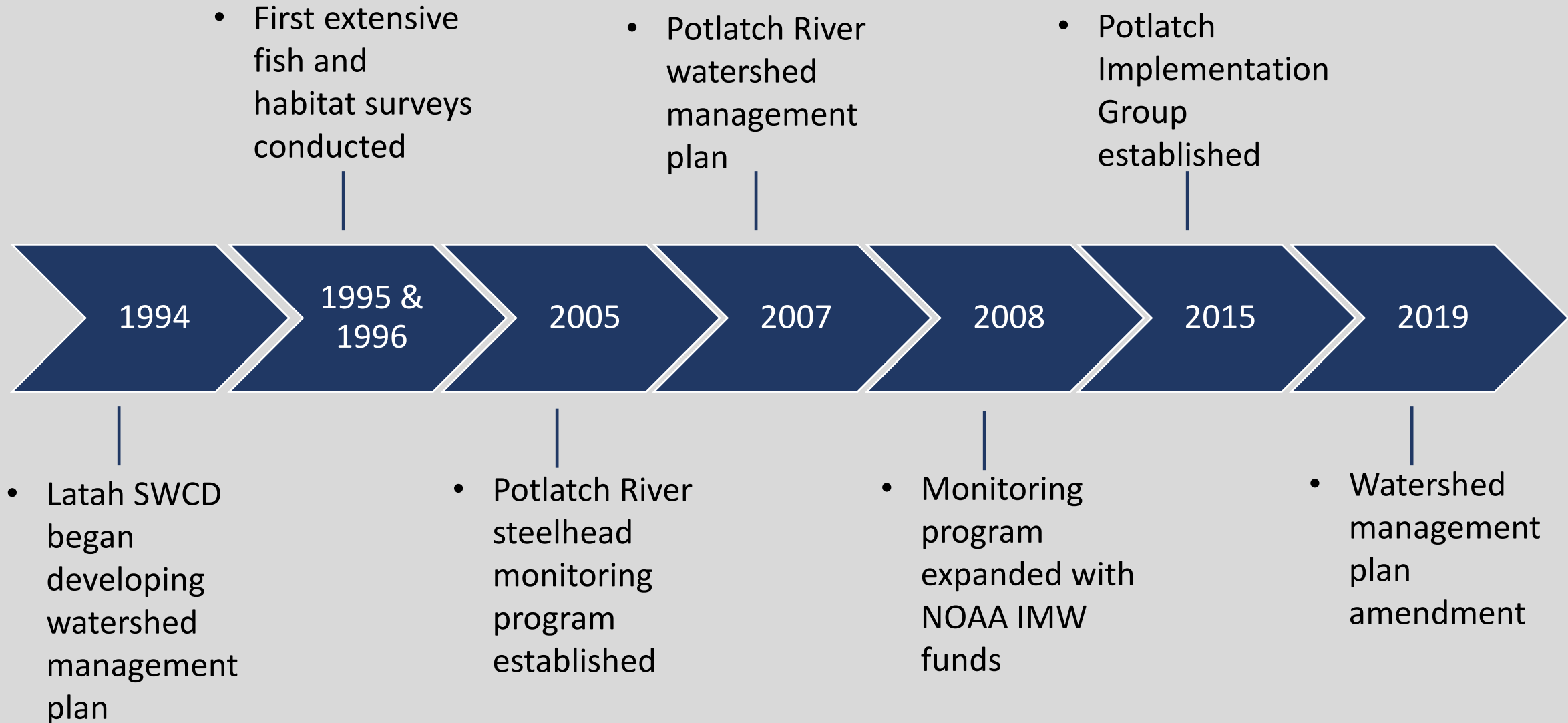


Limiting Factors- Lack of Habitat Complexity

- Streams straightened/channelized
- Riparian vegetation and instream wood removed
- Increased erosion and water temperature
- Fewer pools

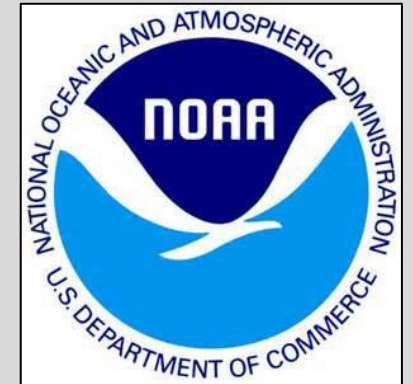


Potlatch River Restoration and Monitoring Programs



Funding Structure

- Habitat Restoration
 - Idaho Governors Office of Species Conservation and Latah Soil and Water Conservation District
 - Fish and Wildlife Program – BPA project # 2008-604-00
 - Individual projects – Pacific Coastal Salmon Recovery Fund
- Monitoring and Evaluations
 - NOAA Fisheries Intensively Monitored Watershed
 - Pacific Coastal Salmon Recovery Fund
 - Fish and Wildlife Program – BPA project #1990-055-00



Potlatch River Steelhead Monitoring

- Goals:

- Determine the effectiveness of habitat restoration work in increasing fish production
- Provide guidance on future habitat work

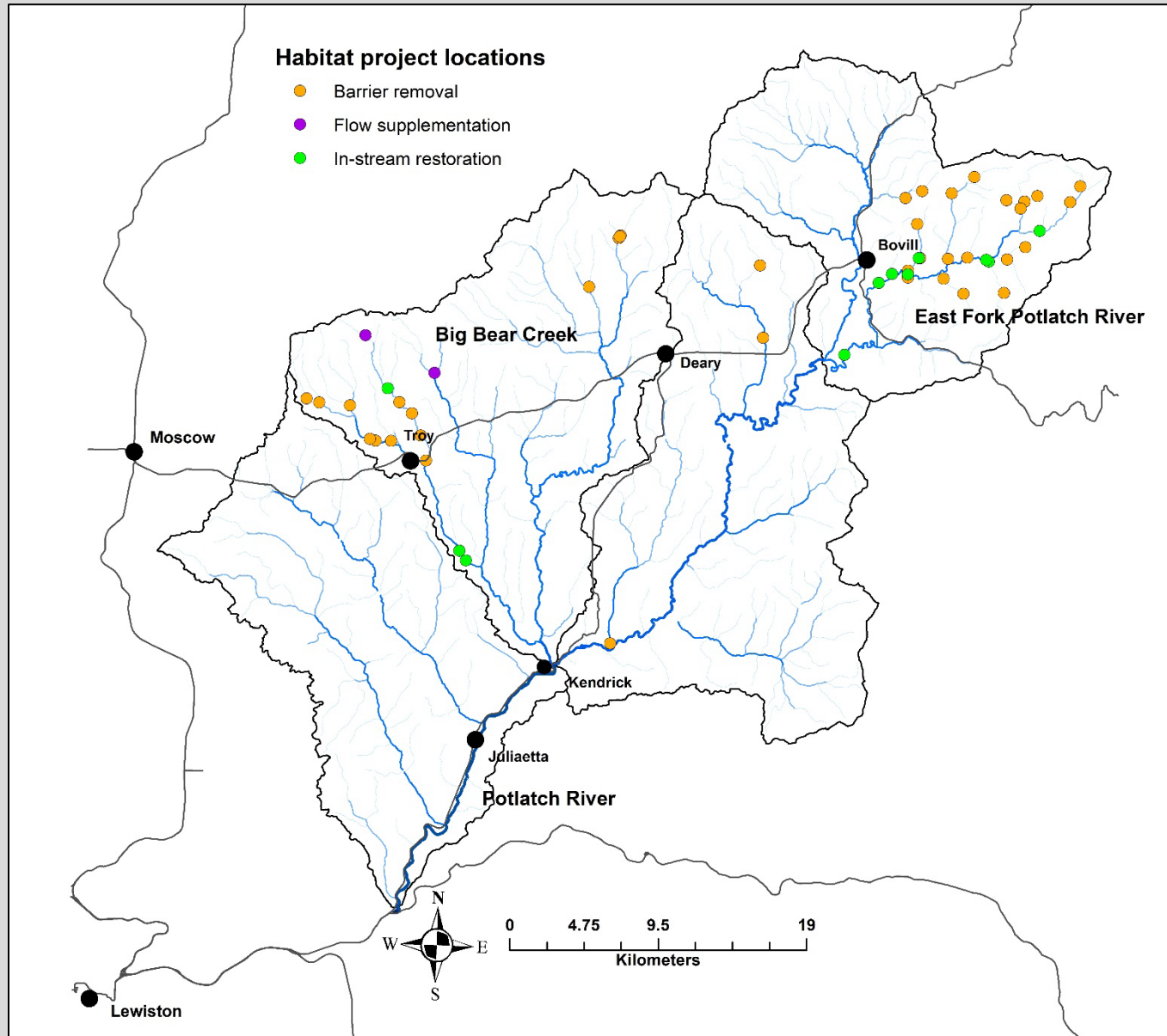


- Metrics:

- Abundance and productivity
- Growth and survival
- Life history
 - Size and age



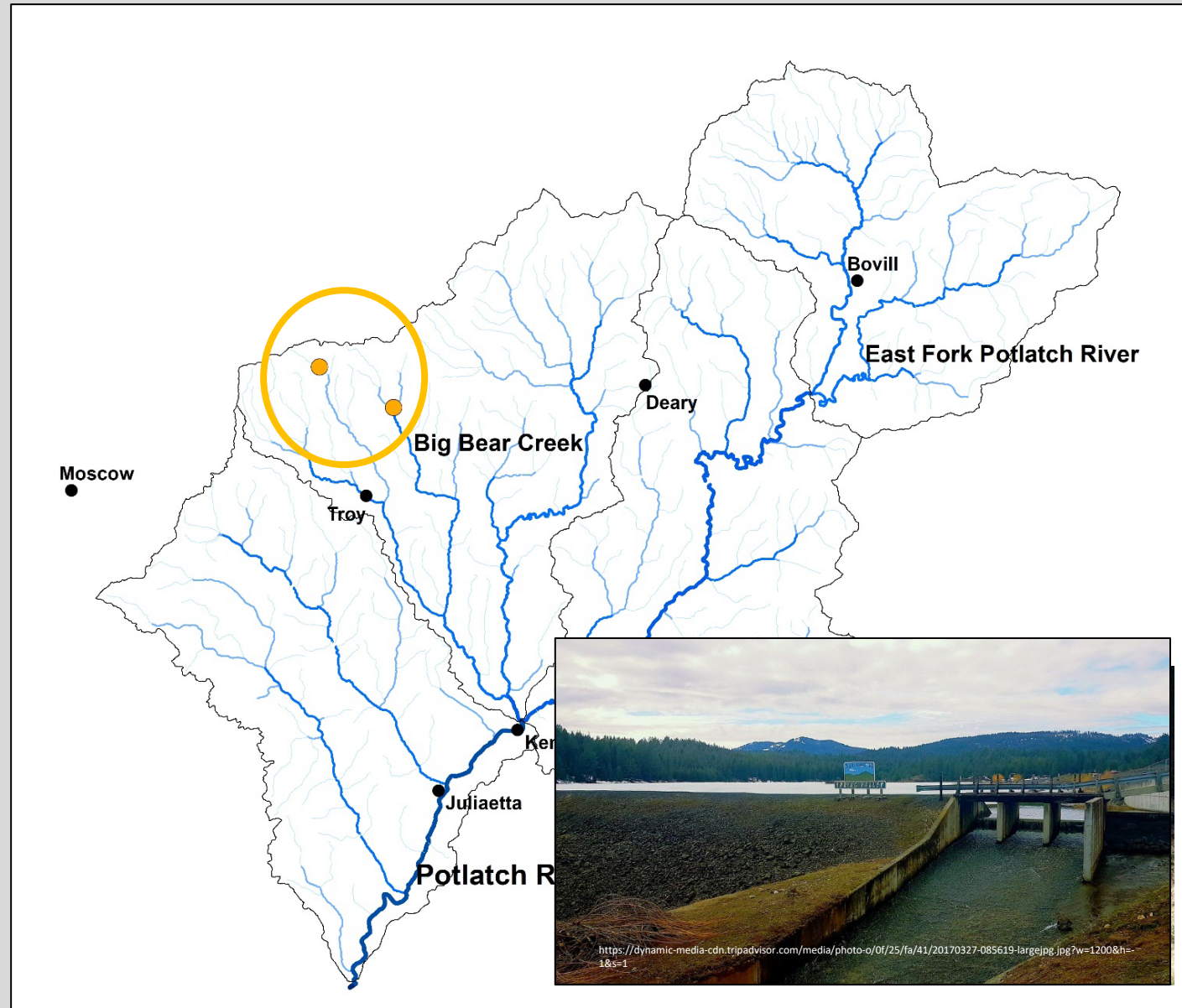
Restoration Strategies and Key Findings



1. Flow supplementation to address low summer base flows
2. Barrier removals to address passage issues
3. In-stream treatments to address lack of habitat complexity

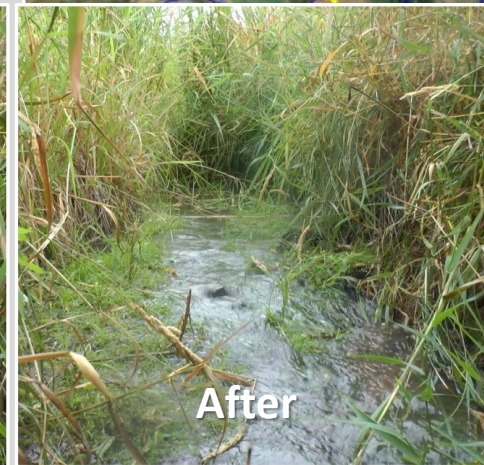
Flow Supplementation

- Restoration Strategy:
 - Supplement summer stream flow through water releases from headwater reservoirs
 - Pilot study (2015 & 2016) confirmed proof of concept (Spring Valley Creek)
- Expected Response:
 - Increase the quantity and improve the quality of juvenile rearing habitat
 - Increase juvenile steelhead growth and survival (initial); improve juvenile steelhead production (long-term)



Fish and Habitat Response

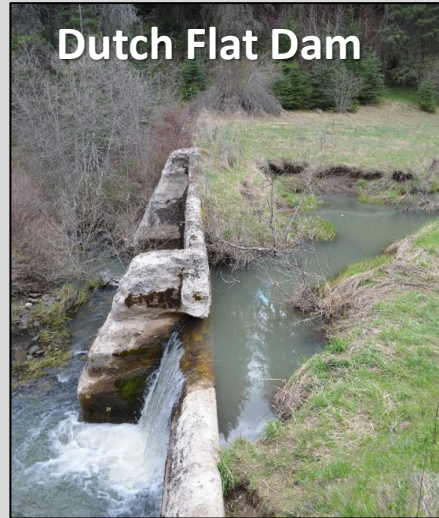
- Maintained perennial flow in > 16 km
 - Re-watered an additional 8-10 km of habitat
- Increased pool density > 100%
- Improved water temperature and dissolved oxygen
- Increased juvenile steelhead growth and survival



Remove or Modify Passage Barriers

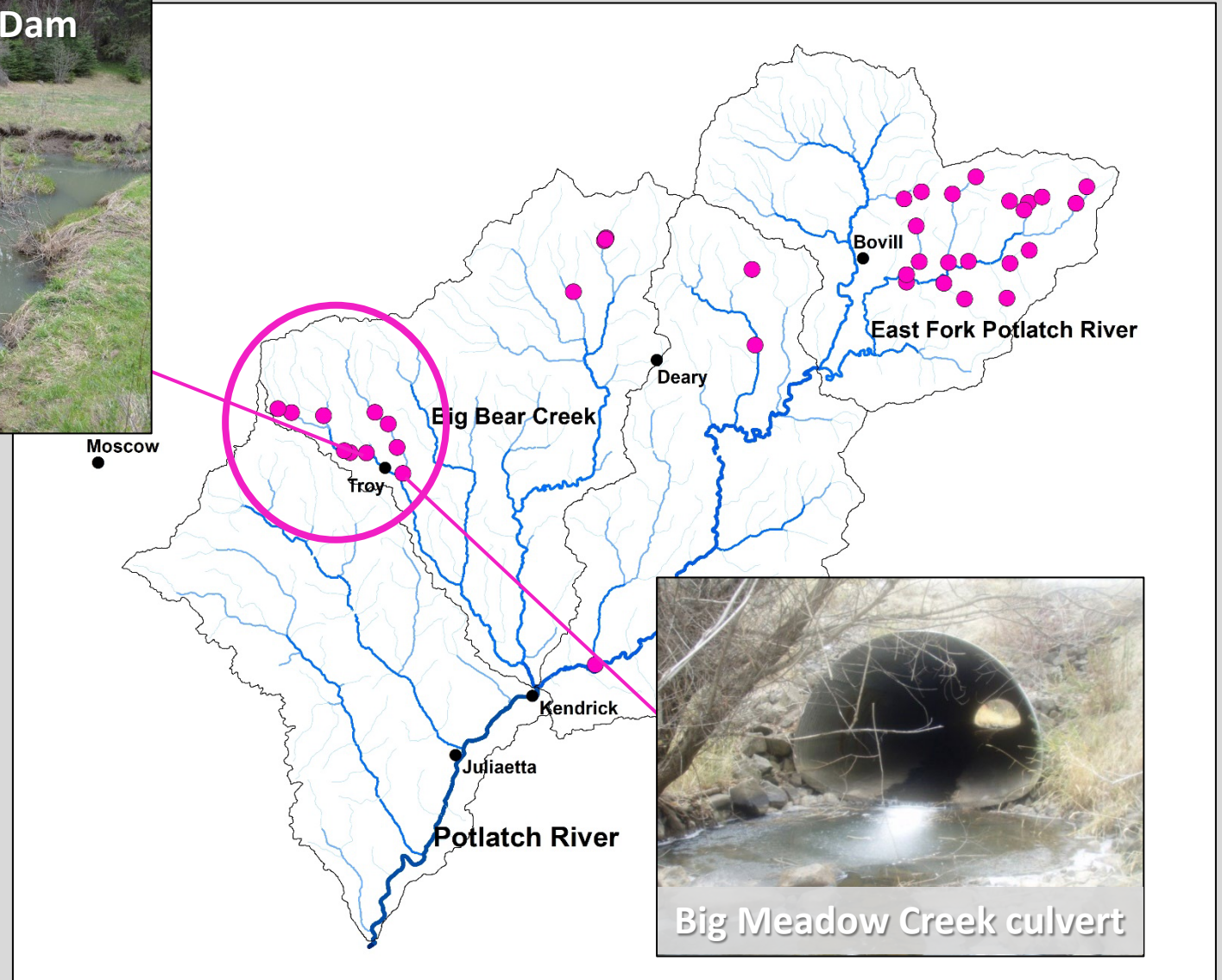
- Restoration Strategy:

- Remove or modify barriers to fish passage
- 14 passage projects completed in Big Bear watershed

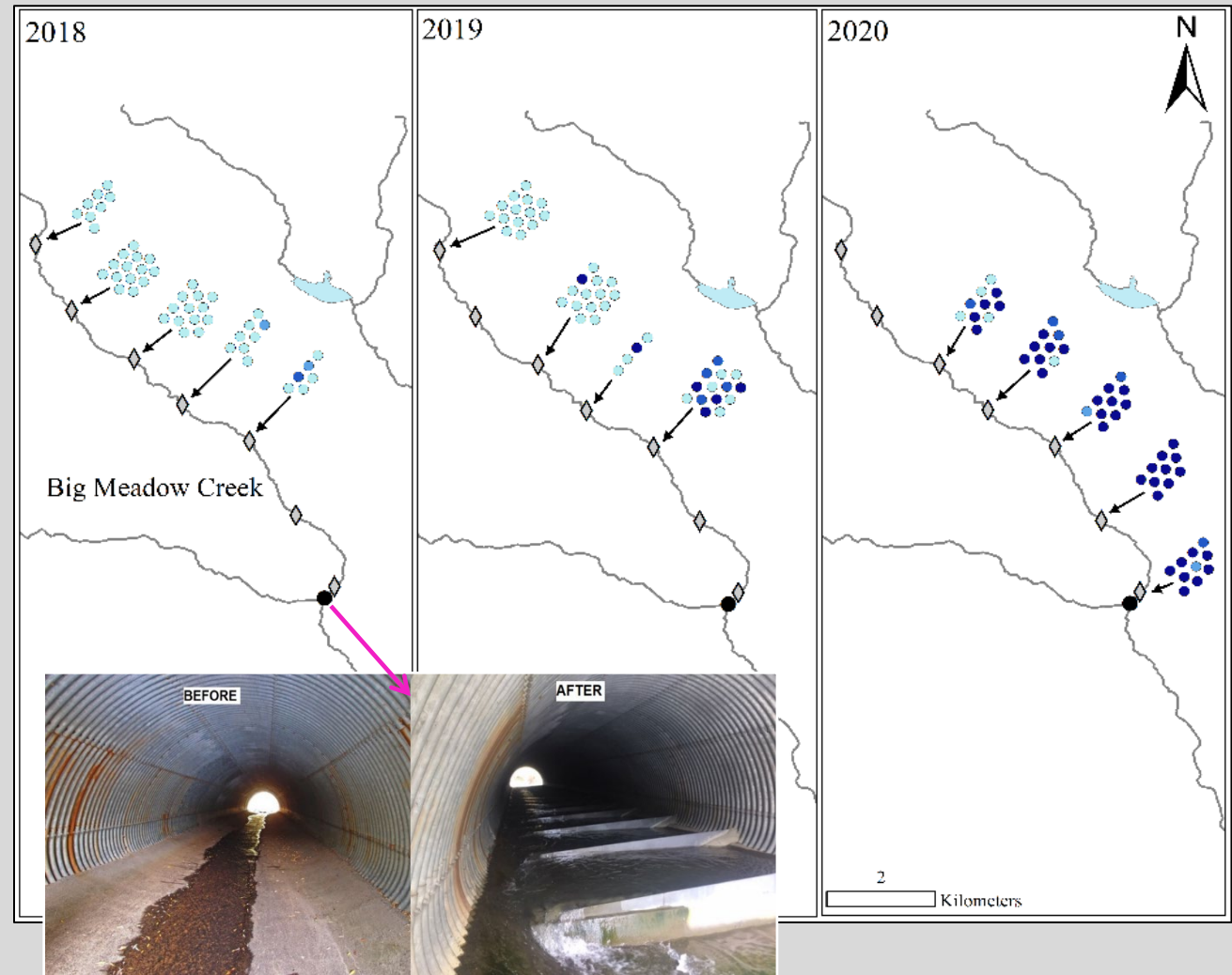
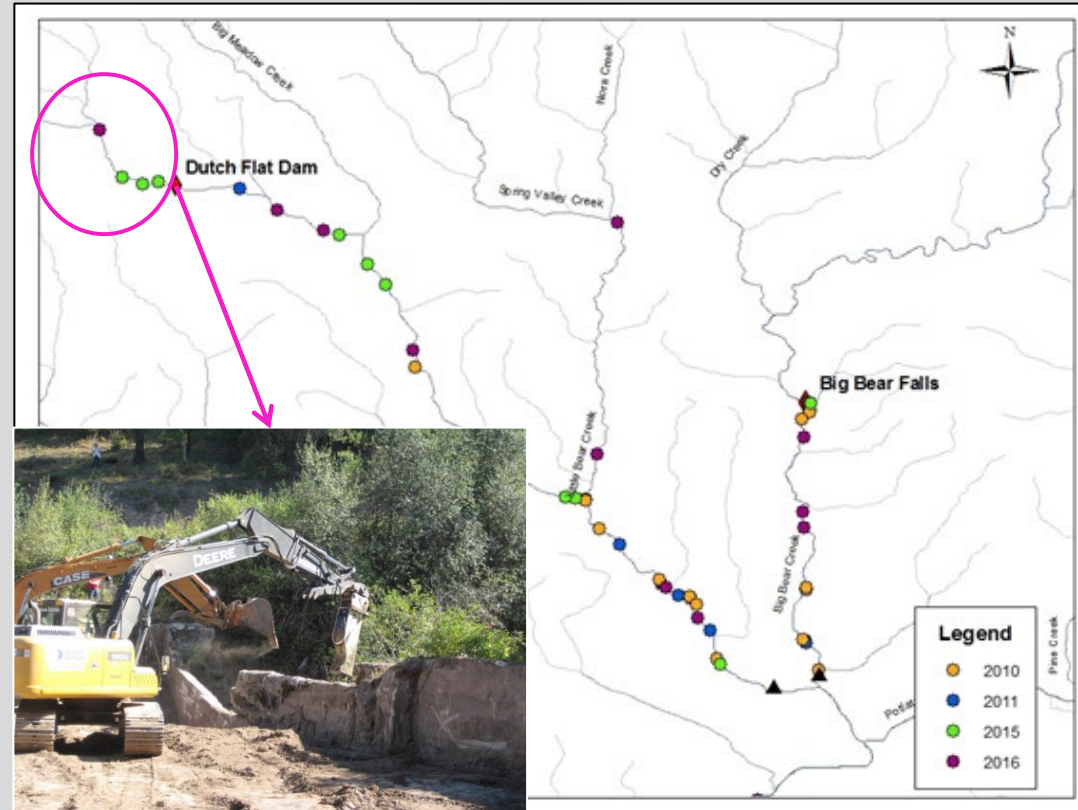


- Expected Response:

- Expansion of adult and juvenile steelhead distribution (initial); increase juvenile steelhead production (long-term)



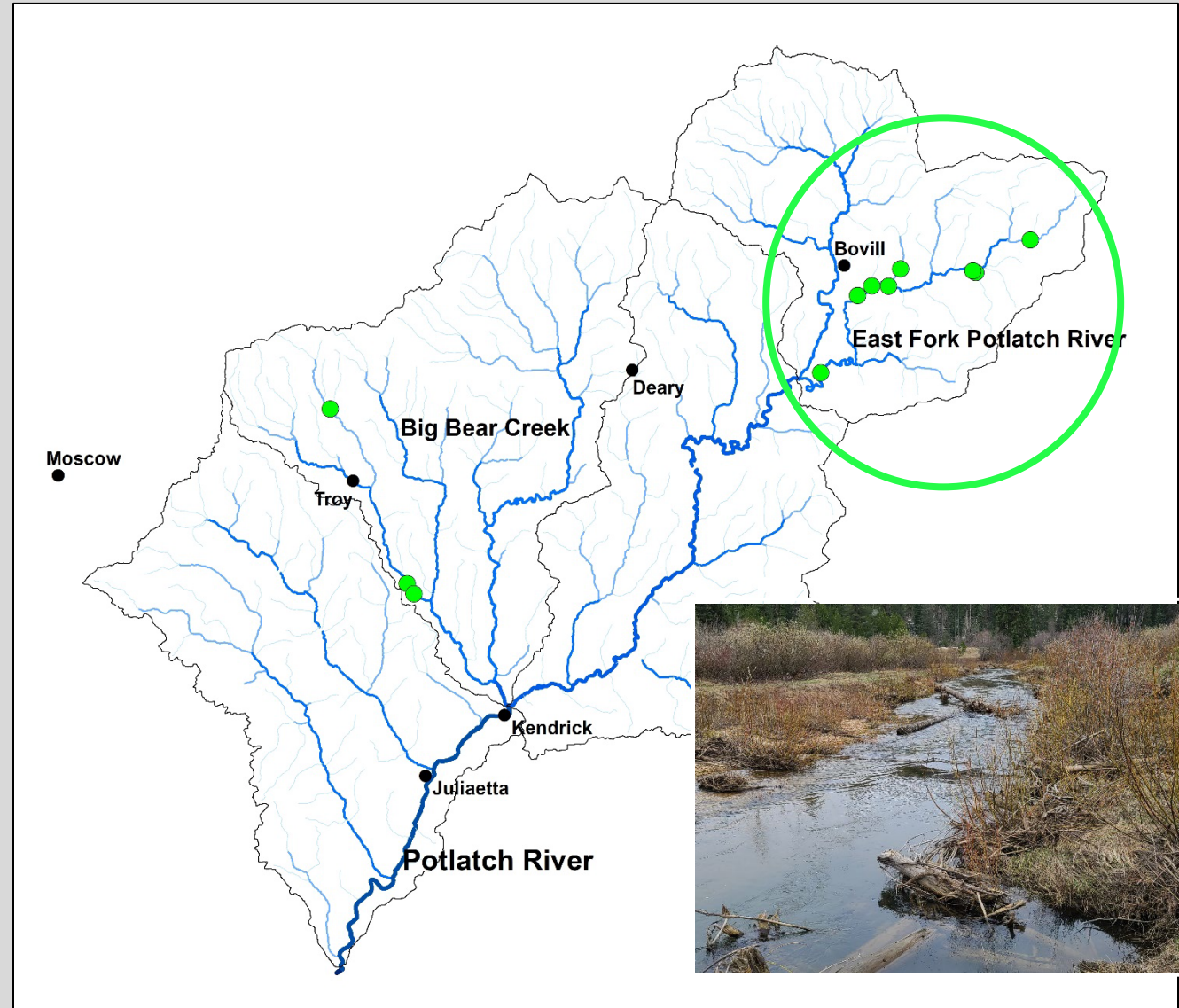
Fish Response



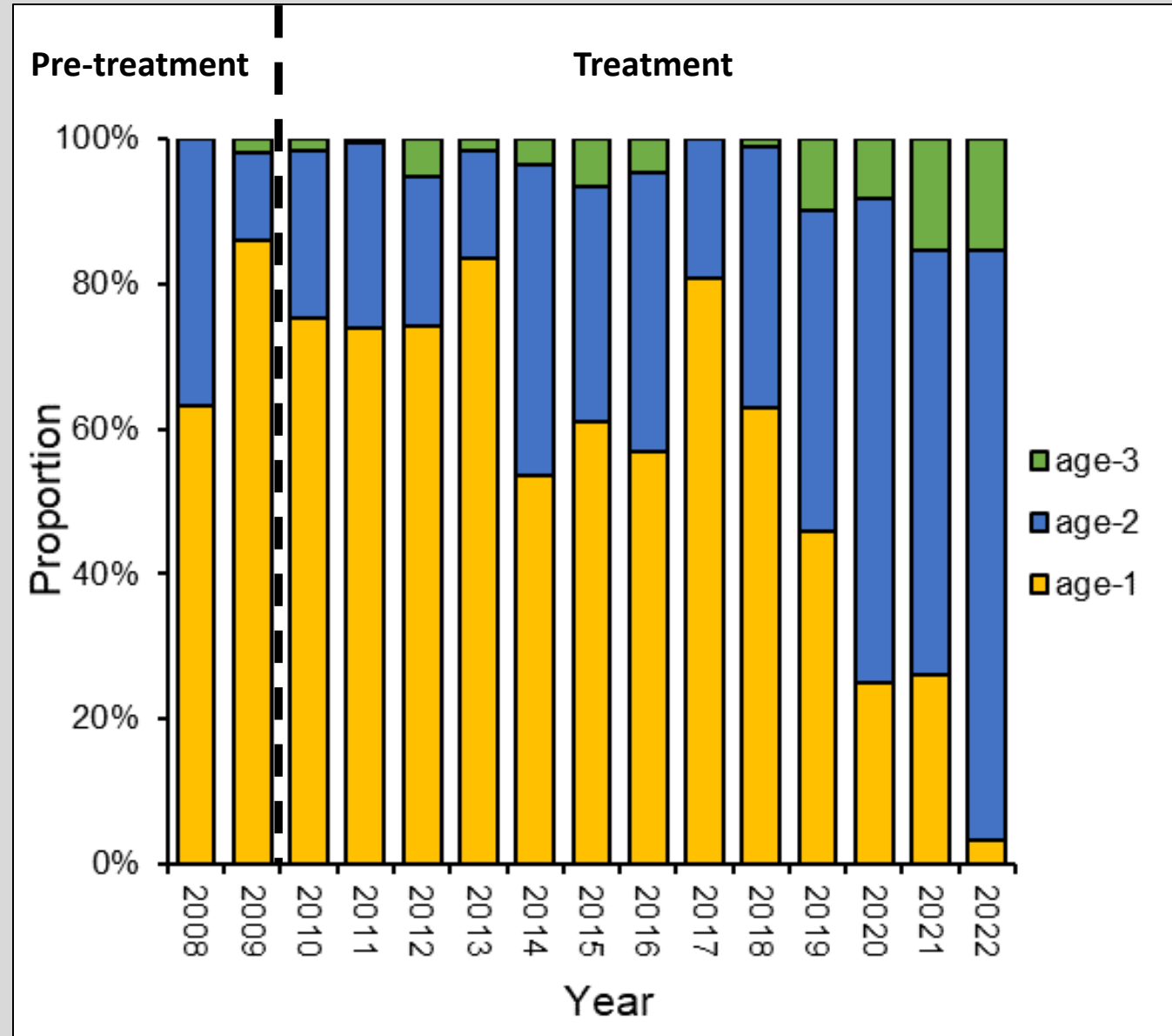
- Documented a rapid recolonization and utilization of reconnected habitat
- Initial response was expansion of steelhead distribution
- Opening access was first step

In-stream Treatments

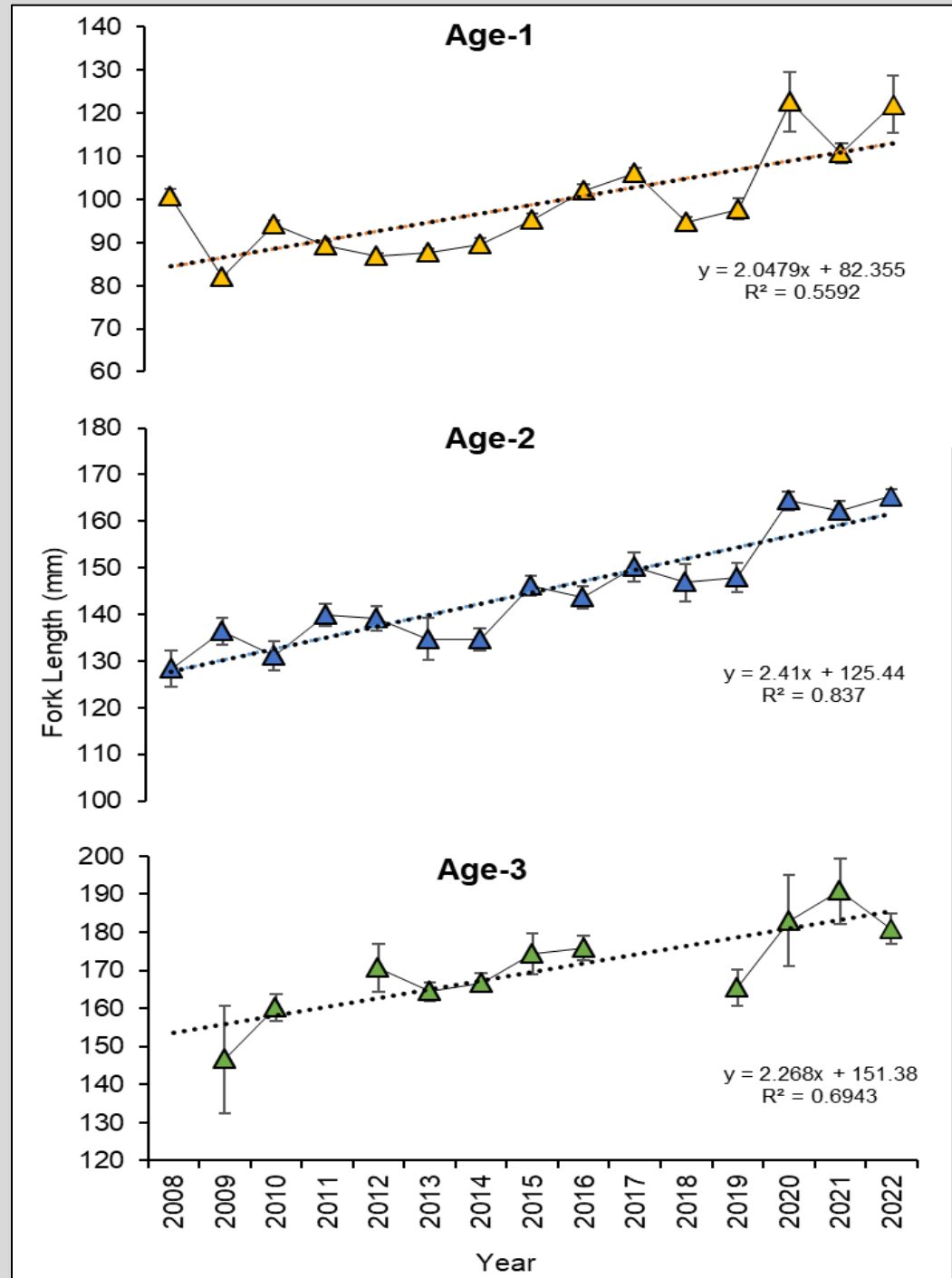
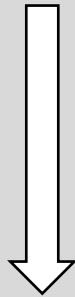
- Restoration Strategy:
 - Install large wood structures, plant and protect riparian areas, and restore floodplain access
 - Large wood treatments completed on > 12 km of EFPR
- Expected Response:
 - Shifts in life history (initial), increase juvenile steelhead production (long-term)



Fish Response- Shift in Age Structure



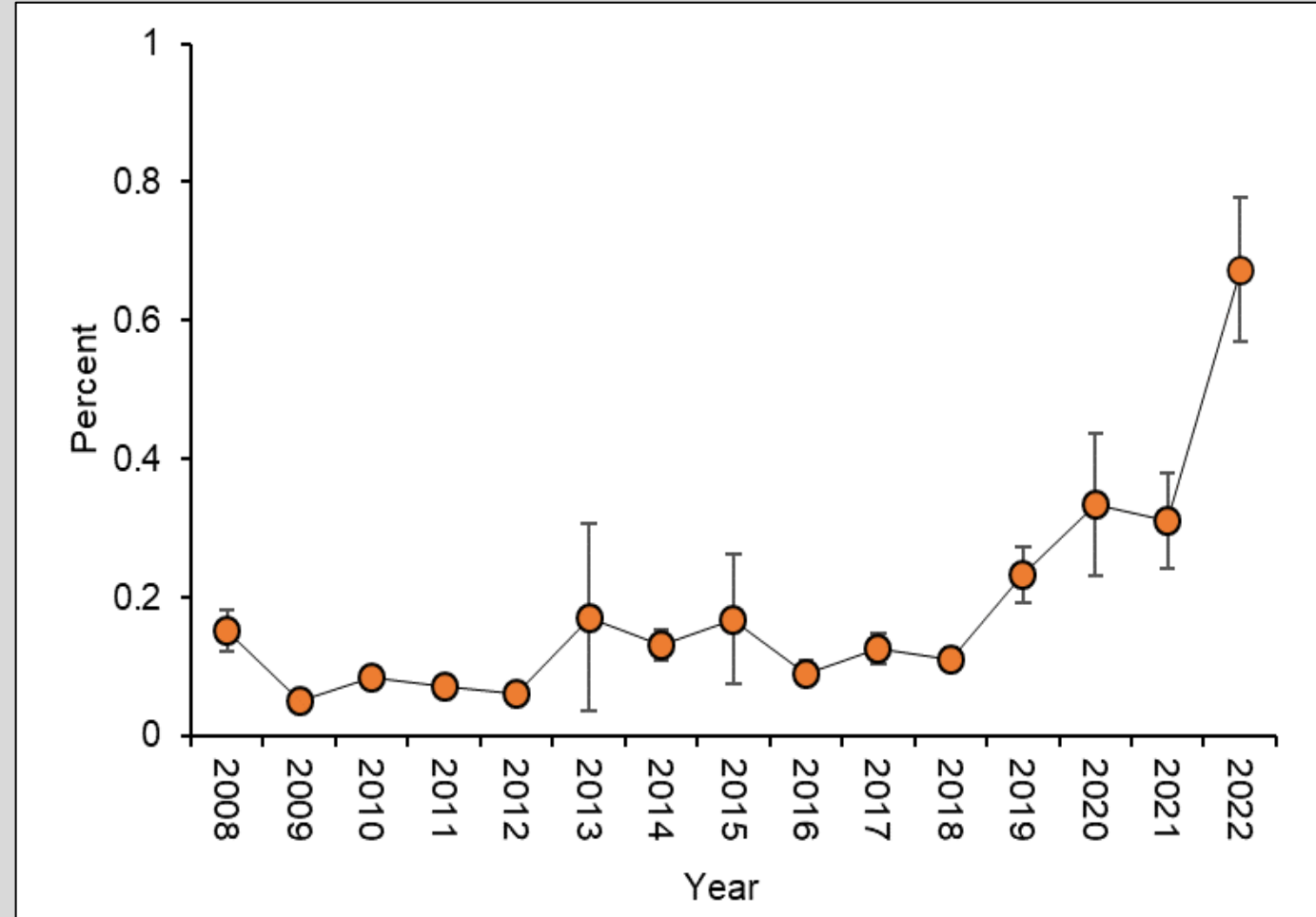
Fish Response- Increased Growth



Fish Response- Improved Survival



Apparent Survival to Lower Granite Dam



Summary

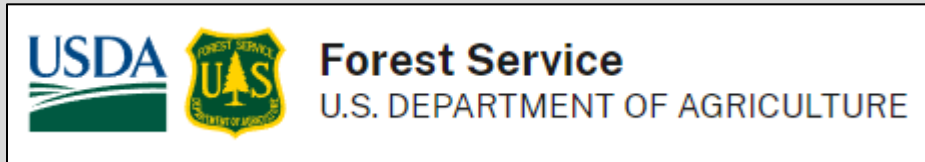
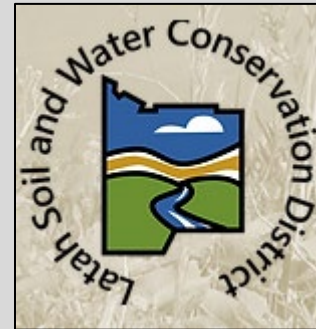
Restoration and monitoring programs are maturing and evolving

- Continue to build relationships and refine programs through adaptive management process
- Most of “low-hanging fruit” projects completed
- More work needed to implement high-impact projects (i.e., Flow supplementation, Big Bear Falls Passage)

Initial response of steelhead to restoration actions are positive

- Next 10-15 years will be critical
- Production/productivity benefits will manifest as habitat conditions & fish numbers improve
- Working towards developing smolt production goals in the basin
 - Provide us a benchmark on “how much restoration is needed?”

Acknowledgements



Private Landowners

