Northwest **Power** and **Conservation** Council

July 8, 2025

MEMORANDUM

TO: **Council Members**

FROM: **Erik Merrill, Independent Science Manager**

SUBJECT: **ISRP Habitat Retrospective Report**

BACKGROUND:

Presenters: Kurt Fresh, Kurt Fausch, and Rich Carmichael (Chair), Independent Scientific Review Panel (ISRP); and Stan Gregory, ISRP Peer Review Group

Summary: The ISRP's Habitat Retrospective Report provides a review and synthesis of progress and challenges in Columbia River Basin Fish and Wildlife Program habitat protection and restoration projects. The review looks at several major project components, including planning and prioritization, implementation methods, and research, monitoring, and evaluation. Overall, the ISRP found significant improvements in all the major components and commended the Program's restoration efforts for evolving and expanding over time in a manner consistent with the science. However, challenges remain, particularly for understanding watershed scale restoration responses and research, monitoring, and evaluation. Specifically, the ISRP continues to recommend improvements to the research, monitoring, and evaluation component in order to better understand how much restoration is needed to produce biologically meaningful results and under what conditions effects achieve the greatest benefits.

Relevance: A retrospective review of habitat protection and restoration in the Program is consistent with directions provided in the 1996 Amendment to the Power Act for the ISRP to review "*the results of prior-year expenditures*" (i.e., retrospective

reviews). The Council's 2014 Fish and Wildlife Program provides further guidance for the ISRP to conduct retrospective reviews stating that, among other items, the ISRP's report should summarize "*major basinwide programmatic issues identified during project reviews*." The ISRP accomplishes this by looking at themes that emerged in previous retrospectives and major category reviews, drawing on scientific publications and reports, and examining a subset of projects and investigating how they applied their results to proposed future actions.

Workplan: Scientific reviews are an integral part of the Council's workplan for the Fish and Wildlife Program.

Background: For 28 years, the ISRP has reviewed projects that implement the Columbia River Basin Fish and Wildlife Program. The completion of the Anadromous Fish Habitat and Hatchery Review in 2022 marked the end of the sixth major iteration of project reviews. To take advantage of lessons learned and restoration advancements over these three decades of review, the ISRP, in consultation with the Northwest Power and Conservation Council, determined that habitat restoration would benefit from a retrospective report that evaluates progress in habitat protection and restoration projects in the Program, evidence for their success, and ongoing and future challenges. The ISRP's presentation will highlight the report's major findings and selected recommendations to improve Program planning, implementation, and evaluation.

More info: See the full report (ISRP 2025-2).

Habitat Retrospective Report:

Review and Synthesis of Progress and Challenges in Columbia River Basin Fish and Wildlife Program Habitat Protection and Restoration Projects

Presentation to the Northwest Power and Conservation Council

July 16, 2025

ISRP INDEPENDENT SCIENTIFIC REVIEW PANEL

ISRP 2025-2 | June 30, 2025

ISRP Members

✓ **Richard Carmichael, M.S.,** (ISRP Chair) Retired, Oregon Department of Fish and Wildlife

✓ **Kurt Fresh, M.S.,** (ISRP Vice-Chair) Retired, Northwest Fisheries Science Center, NOAA Fisheries

✓ **Kurt Fausch, Ph.D.,** Emeritus, Colorado State University

- **Patrick Connolly, Ph.D.,** Emeritus, United States Geological Survey
- **Dana Infante, Ph.D.,** Michigan State University
- **Josh Korman, Ph.D.,** Ecometric Research and Adjunct Professor, University of British Columbia
- **Yolanda Morbey, Ph.D.,** Professor, Department of Biology, Western University, Ontario, Canada
- **Thomas P. Quinn, Ph.D.,** Emeritus, University of Washington
- **Kenneth Rose, Ph.D.,** University of Maryland
- **Thomas Turner, Ph.D.,** University of New Mexico
- **Ellen Wohl, Ph.D.,** Colorado State University

Peer Review Group member

✓ **Stan Gregory, Ph.D.,** Emeritus, Oregon State University

Staff

✓ **Erik Merrill, J.D.,** Independent Science Manager, Northwest Power and Conservation Council

ISRP Review Responsibilities

1. Projects proposed for Bonneville funding to implement the Council's F&W Program

2. Projects funded through Bonneville's reimbursable program

3. Retrospective review of project results

Kootenai River, Idaho

Retrospective Review

Review the results of prior year expenditures (projects):

- Focus on benefits to fish and wildlife
- Provide biological information
- Summarize major basinwide programmatic issues identified during project reviews

In consultation with the Council, the ISRP concluded it would be beneficial to conduct a retrospective review of habitat restoration and protection in the Program.

Habitat Retrospective Report – Why Now?

- 40+ years of F&W Program habitat protection and restoration work
- In the 28 years of ISRP reviews, habitat restoration approaches and RM&E are highlighted in programmatic issues and project conditions
    - 2022 marked the end of the 6th major review of all Program projects
- A similar review of habitat restoration has not been completed for many years and is considered a high priority
- Important to highlight major advancements and accomplishments to inform future efforts, including Program and project development
- Columbia Basin Tributary Habitat RM&E Strategy developed to guide future efforts

Racetrack Creek, Clark Fork River subbasin, Montana

Major Objectives

Identify:

- Advancements and achievements in habitat protection and restoration
- Evidence for success, including exemplary projects
- Current and emerging challenges
- Recommendations for improvements in Program actions

Approach

- We reviewed and synthesized:
  - program summaries and project proposals
  - reports and publications (in-basin and out-of-basin, over 360 references)
  - the Habitat RM&E Strategy
  - ISRP and ISAB reports
- Focus on salmon, steelhead, and trout
- Focus on restoration project types that largely targeted habitat processes
- Considered wildlife projects

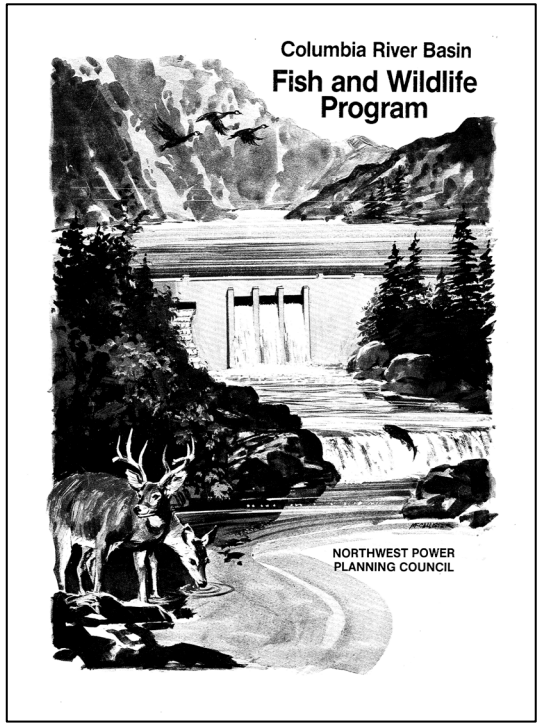
Duck Valley, Southern Idaho

Report Organization

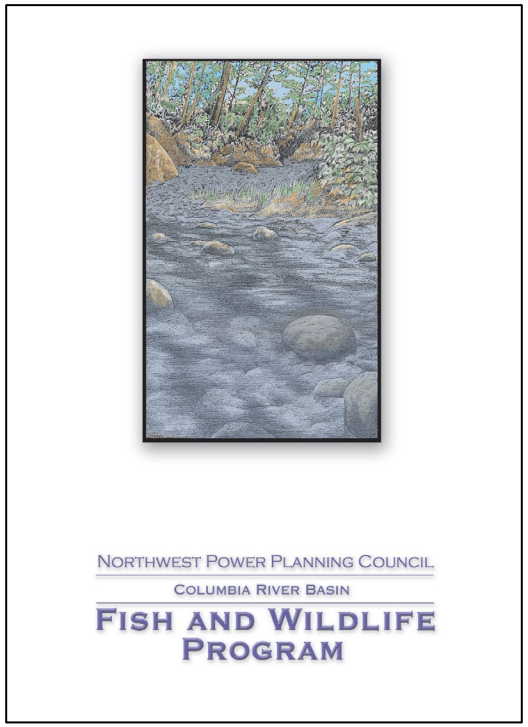
- Summary, plus the main body of the report, which is the technical material
- Chapters
  - Introduction
  - Planning and prioritization
  - Methods
  - RM&E
  - Intensively Monitored Watersheds (IMWs)
  - Confounding factors
  - Exemplary projects
  - Concluding remarks

Planning and Prioritization

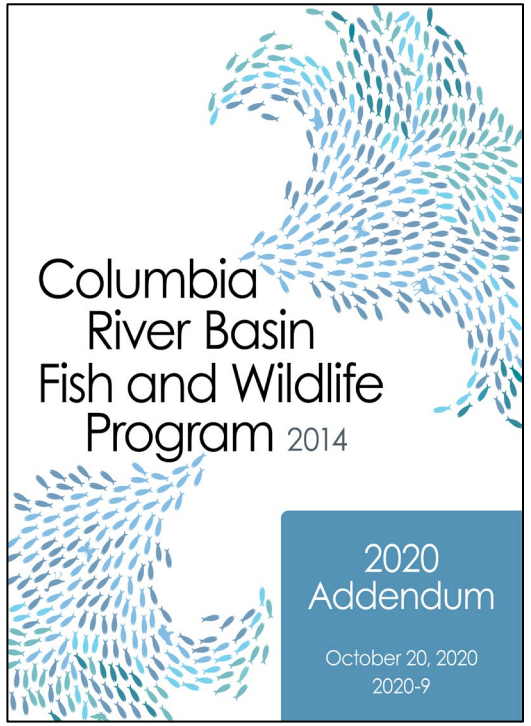
- Significant improvement in habitat protection and restoration efforts over the 40+ year lifespan of the Program.



1982



2000



2020

Planning and Prioritization

- The Program's restoration efforts have evolved and expanded.
  - Greater complexity and integration of restoration actions
  - Include multiple coordinated projects across large spatial scales as well as individual projects.

Clearwater subbasin, Idaho

Restoration of Ecological Processes

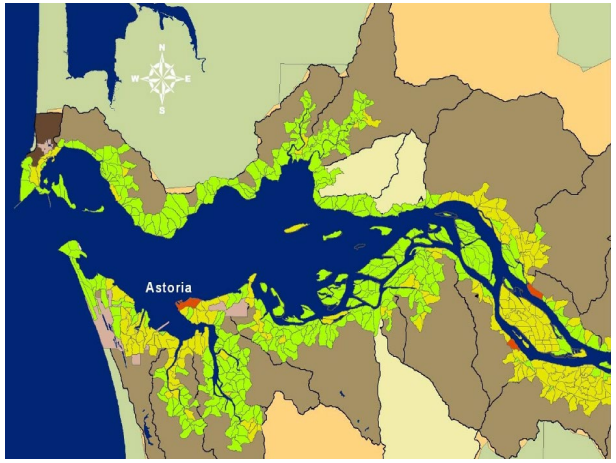
- The paradigm guiding restoration has shifted from restoring structure to restoring processes as well as structure.
- Few of the Program's habitat restoration projects meet the full description of process-based restoration.
- The proportion designed to restore impaired processes has increased since 2000 to emphasize ecosystem function.

Wallooskee-Youngs Bay, Columbia Estuary, Oregon

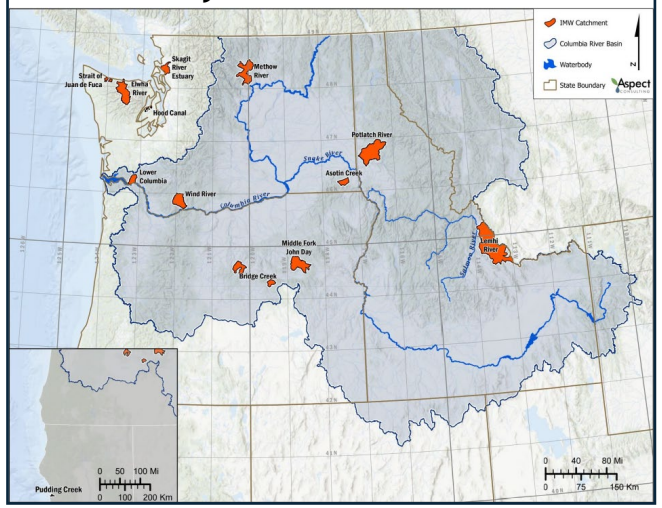
Improvements in Planning and Prioritization

- Increasing and effective use of models such as habitat and life cycle models
- More rigorous analysis of limiting factors and density dependence
- Use of landscape frameworks and strategic planning
- Use of Indigenous Knowledge, such as First Foods Planning Framework

Lower Columbia River Estuary Partnership



Intensively Monitored Watersheds



Atlas Implementation Guidelines – Catherine Creek and Upper Grande Ronde River

Recommendations

- Continue to support analyses of limiting factors and density dependence as critical components of habitat restoration planning and prioritization, including life-cycle modeling.

- Explore the potential use of habitat and life-cycle models for strategic analyses and general restoration planning for projects that lack necessary information or support for detailed project-scale modeling.

Entiat River, Washington

Recommendations

- Incorporate process-based restoration and the assessments necessary to support it in planning and prioritization.

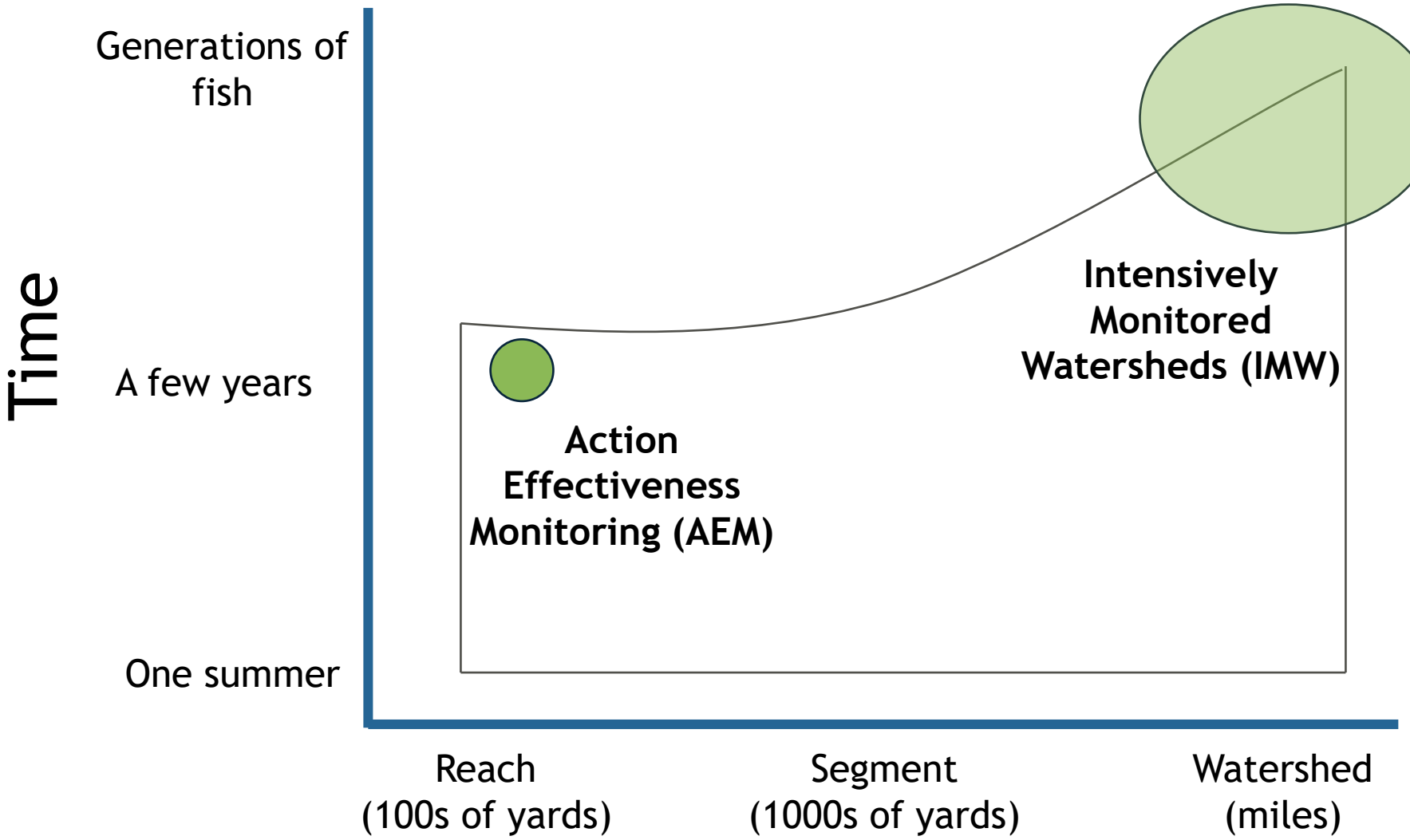
- Determine where watershed-level assessment and coordination approaches are effectively guiding restoration and develop additional subbasin assessments to fill gaps and better represent the diversity of landscape types and ecoregions in the Basin.

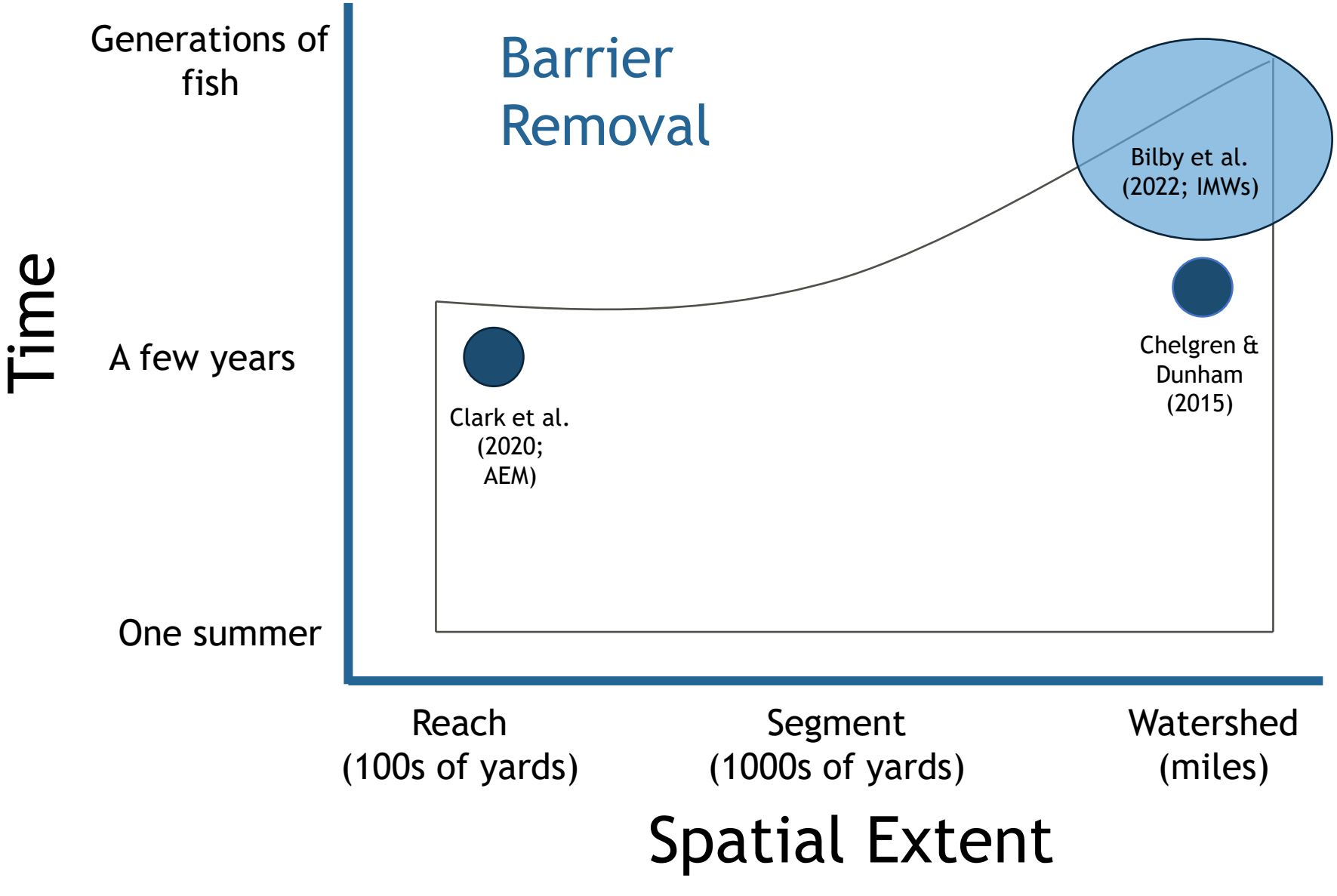
Meacham Creek, Umatilla River subbasin, Oregon

Methods of habitat restoration and protection

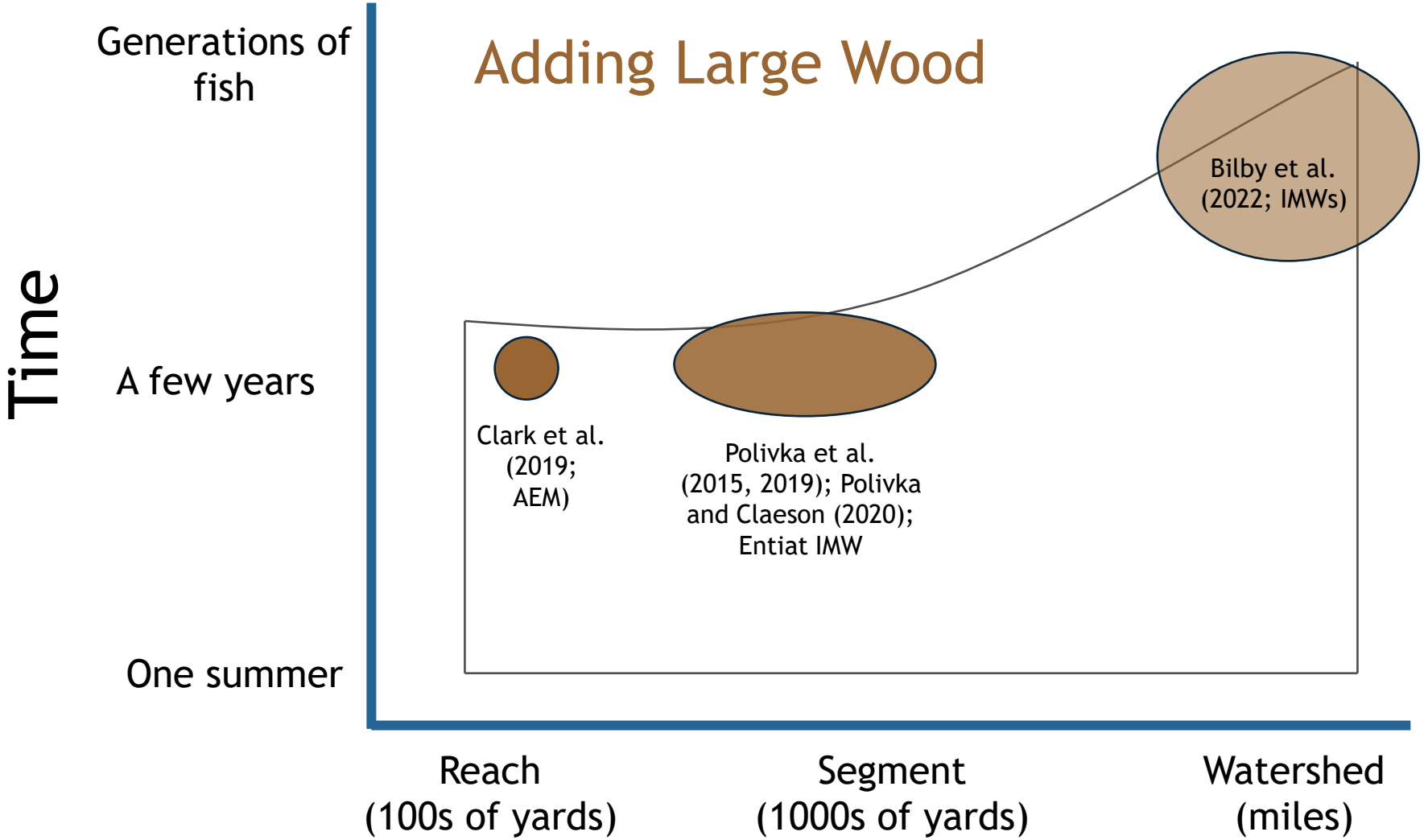
- Reviewed 8 common methods
- Reach vs. Watershed scales
- Resident fishes

Photo: Fifteenmile Creek, Oregon


Generations of fish
A few years
One summer
Time
Intensively Monitored Watersheds (IMW)
Action Effectiveness Monitoring (AEM)
Reach (100s of yards)
Segment (1000s of yards)
Watershed (miles)
Spatial Extent


Barrier Removal
Generations of fish
A few years
One summer
Time
Bilby et al. (2022; IMWs)
Chelgren & Dunham (2015)
Clark et al. (2020; AEM)
Reach (100s of yards)
Segment (1000s of yards)
Watershed (miles)
Spatial Extent

Adding Large Wood



Summary of Methods

Method	Effect	Response time (yrs)	Key limitations
Barriers	+	2-5	Lack of upstream habitat
Large wood	+	10 or more	Too little added
Reconnect floodplains	+	ca. 10	Lack suitable controls
Riparian restoration	(+)	30 to 50	Studies too short
Dikes/Tidegates	+	5 to 10	Few projects evaluated
Envt'l Flows	+	20 or more	Many complex effects
Coldwater refuges	(+)	10 or more	Small areas restored
Wildlife	(+)	Variable	Restoration not "in-kind"

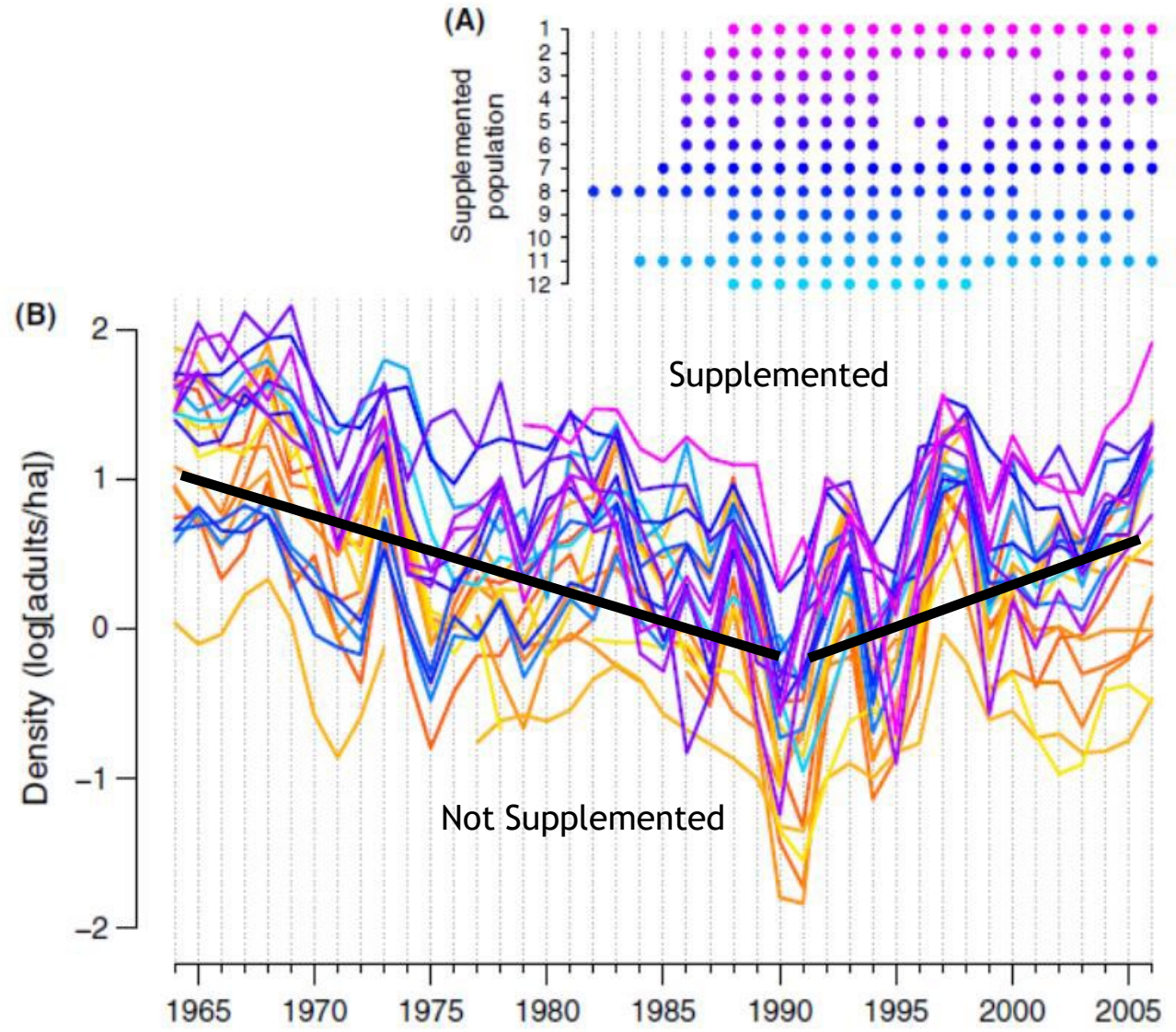
Research, Monitoring, and Evaluation (RM&E)

- Columbia Basin Tributary Habitat RM&E Strategy
  - Consistent and logical approach
  - Key Management Questions on implementation, effectiveness
  - Limited guidance on implementation, scaling up, data analysis, and evaluation of plan effectiveness
- Tradeoffs in study design
  - Confidence vs relevance
  - Testing designs in advance
- Pre-existing vs. new studies
  - BACI designs
  - Staircase – staggered start to account for unplanned events (fires, floods, etc.)

Bridge Creek, John Day River subbasin, Oregon

Synthesizing information across multiple studies

- New statistical methods
  - Different years and duration
  - High year-to-year variation
- Example: Supplementation of Chinook
  - Long-term decline, then increase
  - 3% increase with supplementation
  - Environmental variation twice that of supplementation



Scheuerell et al. 2015

Confounding Factors

- Climate change
- Landscape change
- Ocean conditions
- Non-native species
- Predation
- Hatchery fish and supplementation
- Dams
- Water quality
- Density Dependence
- Logistical factors
- Interactions among factors

Recommendation: Looking ahead, develop tools to try to forecast future conditions.

Bonneville Dam fish ladder

Example: Variable Ocean Conditions

- El Nino, Pacific Decadal Oscillation (PDO), upwelling, climate change uncertainty (the “blob”)
- Significant salmon mortality occurs in ocean
- Producing more smolts in good condition is key:
  - Results in more salmon surviving to adulthood
  - Freshwater habitat directly affects fish condition and thus survival at sea
  - Habitat restoration is critical when ocean conditions are poor

Illustration: Sebastian Munster, circa 1570

Exemplary Projects: Elements and Characteristics

The report:

- identifies several exemplary projects for anadromous fish, resident fish, and wildlife
- recommends specific elements and characteristics applicable at a local scale and at broader subbasin or watershed scales.

Example of a key element showing progress:

- Guided by clear goals, SMART objectives, and quantitative desired outcomes

Wind River, Photo: Wind River Watershed Project

Exemplary Projects – Anadromous Fish

- Columbia Land Trust Estuarine Restoration Project - Columbia Land Trust
- Wind River Watershed Project – U.S. Forest Service, Underwood Conservation District, WDFW, U.S. Geological Survey
- John Day Watershed Restoration Project - Confederated Tribes of the Warm Springs Reservation of Oregon
- Umatilla Anadromous Fish Habitat Project - Confederated Tribes of the Umatilla Indian Reservation

Middle Fork John Day River, Photo: CTWS

Exemplary Projects – Resident Fish

- Evaluate the Life History of Native Salmonids in the Malheur River Basin – Burns Paiute Tribe
- Coeur d'Alene Reservations Fisheries Habitat Project – Coeur d'Alene Tribe

Bull trout

Exemplary Projects – Wildlife

- Scotch Creek Wildlife Area Project – Washington Department of Fish and Wildlife
- Kootenai River Operational Loss Assessment – Kootenai Tribe and Montana Fish, Wildlife and Parks
- Upper Columbia United Tribe's Wildlife Monitoring and Evaluation Project
- Shoshone-Bannock Wildlife Mitigation Project – Southern Idaho Wildlife Mitigation Program

Camas Creek, Photo: IDFG

Conclusions

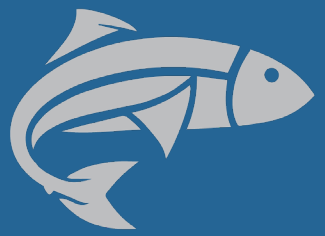
- Significant improvement over 40+ years of F&W Program habitat protection and restoration work
- Planning and prioritization of projects and actions have especially improved
- Restoration methods have improved due to monitoring and process-based approaches
- RM&E challenges remain despite significant Program efforts
  - Columbia Basin Tributary Habitat RM&E Strategy is promising
  - But RM&E needed at large physical and biological scales
  - Scaling up the outcomes of habitat restoration to the Columbia River Basin and synthesis of information across studies, especially for IMWs, are needed.
- Prioritization of actions and evaluation of success must account for an array of challenges such as climate and landscape change

Johnson Creek, Salmon River subbasin, Idaho

Acknowledgements

- **Northwest Power and Conservation Council staff:** Patty O'Toole, Kris Homel, Mark Fritsch, Rudy Salakory, Eric Schrepel, Kendra Coles, Kym Buzdygon, and intern Jasmine McIntosh
- **Bonneville Power Administration:** Jody Lando, Sean Welch, and Russell Scranton
- **Others provided information or photos:** Leslie Bach, Greg Sieglitz, Mike Young, Dan Isaak, Dan Bottom, Mark Scheuerell, Jude Love, Christian Gonzales-Pereda, Mike Lambert, and Jerimiah Bonifer

Questions?



ISRP

INDEPENDENT
SCIENTIFIC
REVIEW PANEL

Northwest **Power** and
Conservation Council