Staff briefing on Part Four of the 2014 Fish and Wildlife Program

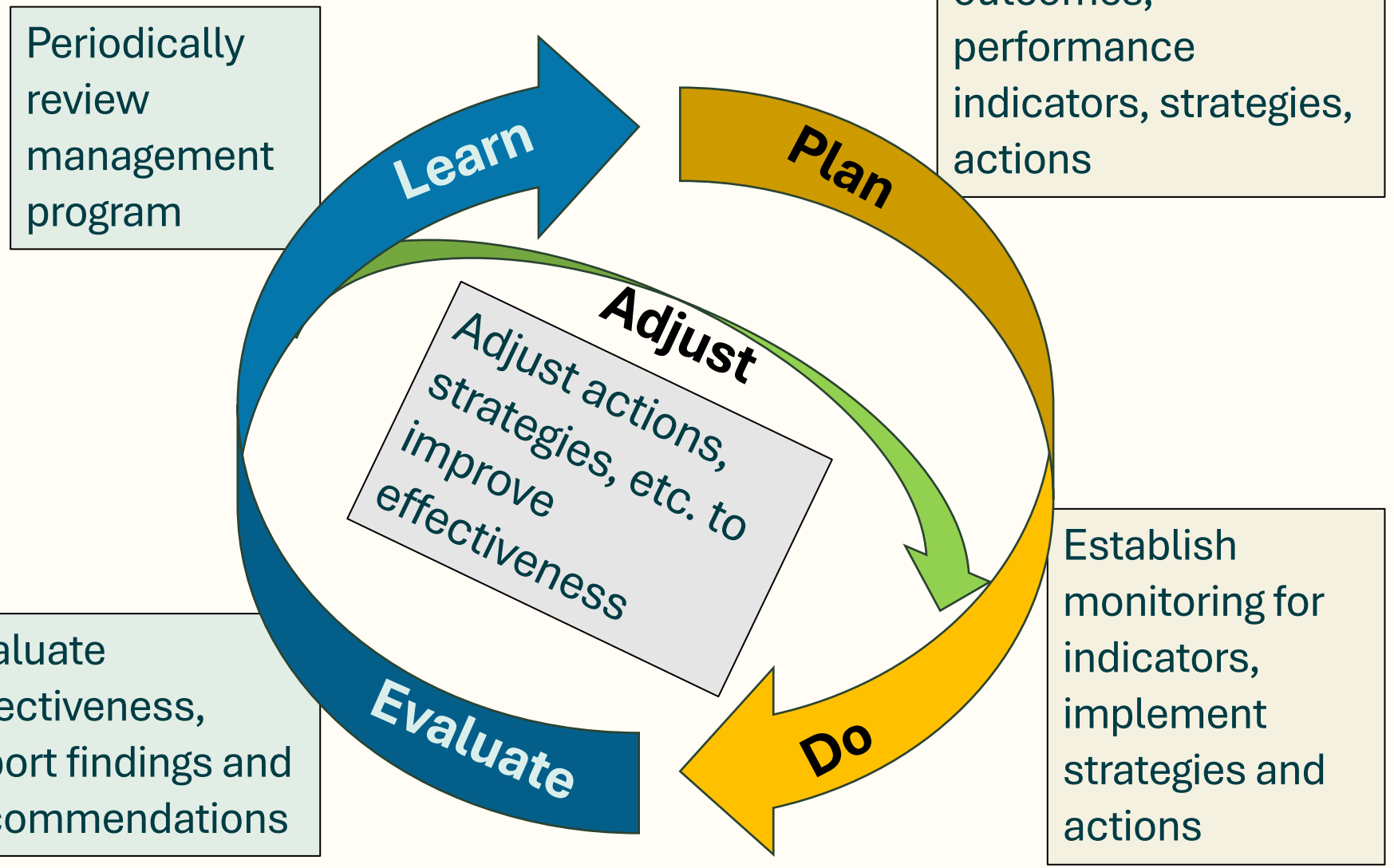
Fish and Wildlife division staff

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

Introduction to Adaptive Management

The adaptive management cycle

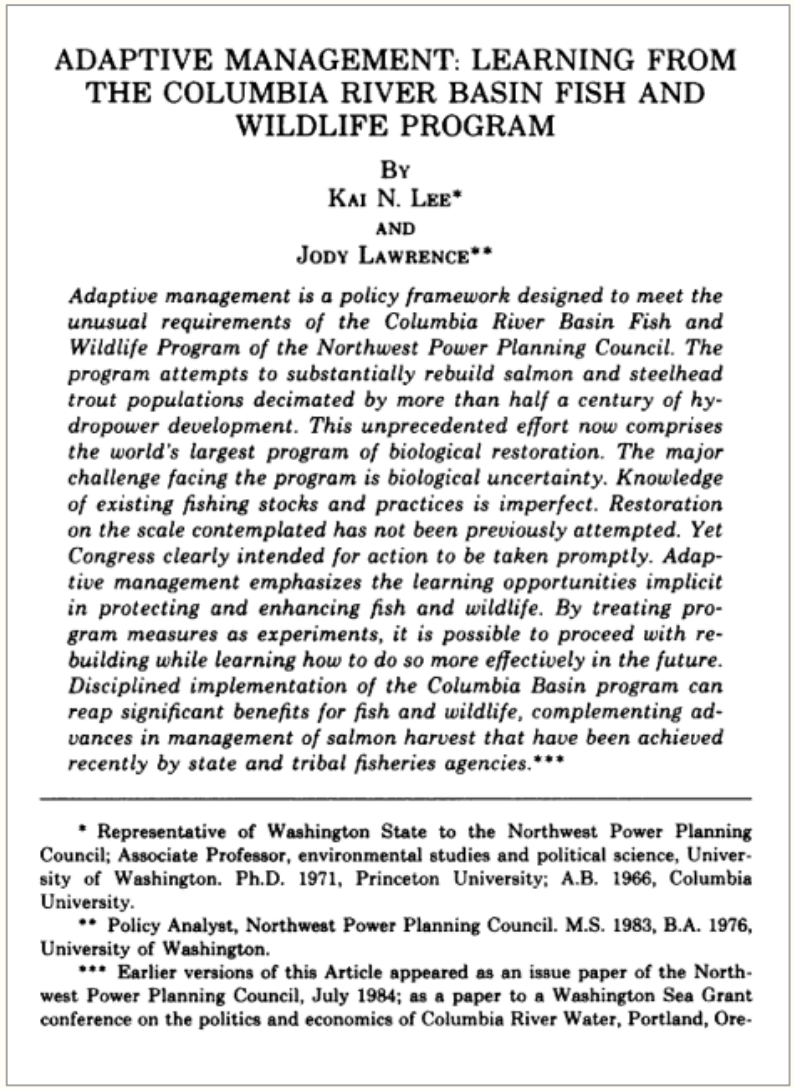
- Managing in the face of uncertainty
- Adaptive management cycle provides a structure to iteratively improve management actions and outcomes
- **Example**: fish reintroduction



History of adaptive management in the Program

- Kai Lee, former Council member and early proponent of adaptive management as policy framework for Fish and Wildlife Program

Examples from the F&W Program	
1987	"Adaptive management should guide action and improve knowledge"
1994	Coordinated implementation, monitoring, and evaluation, Program framework.
2000	"Management actions must be taken in an adaptive, experimental manner because ecosystems are inherently variable and highly complex. This includes using experimental designs and techniques as part of management actions and integrating monitoring and research with those management actions to evaluate their effects on the ecosystem."
2014-now	Adaptive Management Strategy



ADAPTIVE MANAGEMENT: LEARNING FROM THE COLUMBIA RIVER BASIN FISH AND WILDLIFE PROGRAM

By
Kai N. Lee*
and
Jody Lawrence**

*Adaptive management is a policy framework designed to meet the unusual requirements of the Columbia River Basin Fish and Wildlife Program of the Northwest Power Planning Council. The program attempts to substantially rebuild salmon and steelhead trout populations decimated by more than half a century of hydropower development. This unprecedented effort now comprises the world's largest program of biological restoration. The major challenge facing the program is biological uncertainty. Knowledge of existing fishing stocks and practices is imperfect. Restoration on the scale contemplated has not been previously attempted. Yet Congress clearly intended for action to be taken promptly. Adaptive management emphasizes the learning opportunities implicit in protecting and enhancing fish and wildlife. By treating program measures as experiments, it is possible to proceed with rebuilding while learning how to do so more effectively in the future. Disciplined implementation of the Columbia Basin program can reap significant benefits for fish and wildlife, complementing advances in management of salmon harvest that have been achieved recently by state and tribal fisheries agencies.****

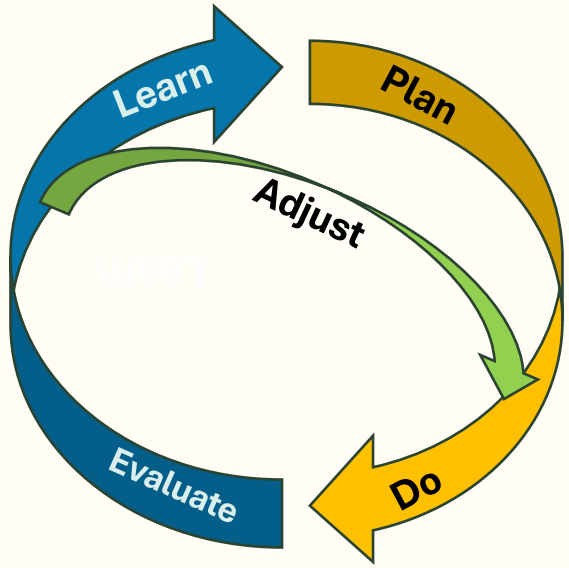
* Representative of Washington State to the Northwest Power Planning Council; Associate Professor, environmental studies and political science, University of Washington. Ph.D. 1971, Princeton University; A.B. 1966, Columbia University.

** Policy Analyst, Northwest Power Planning Council. M.S. 1983, B.A. 1976, University of Washington.

*** Earlier versions of this Article appeared as an issue paper of the Northwest Power Planning Council, July 1984; as a paper to a Washington Sea Grant conference on the politics and economics of Columbia River Water, Portland, Ore-

Why do we have an adaptive management strategy?

- Large and complex basin with unique mitigation needs
- After decades of research, it is easy to assume we know what needs to be done throughout basin and for different species, including effects of different actions



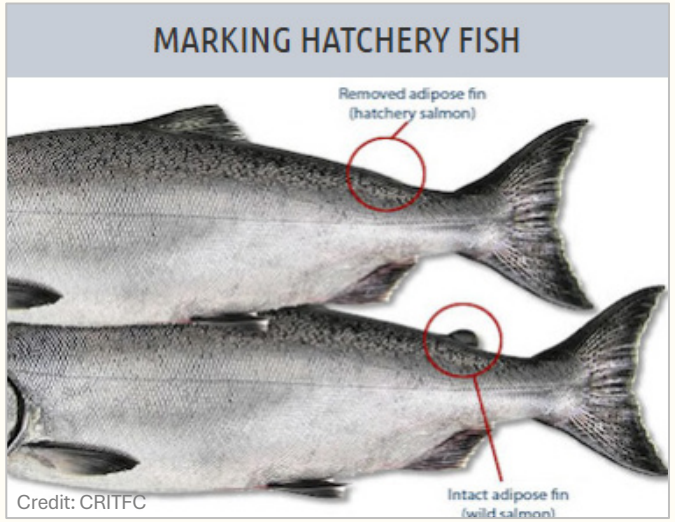
But…

- The basin continues to change, always influencing mitigation
- Ongoing critical uncertainties regarding where to work, what to do, management and decision-making, and continuing to gather foundational information about species and the ecosystem

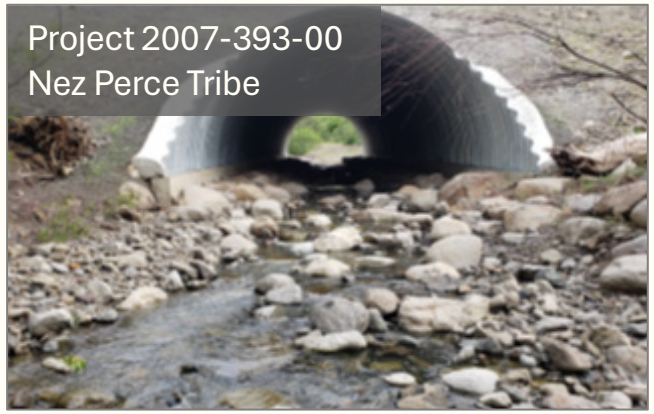
And…

- Power Act requires Program measures to be based on and supported by **best-available** scientific knowledge [4(h)(6)(B)]

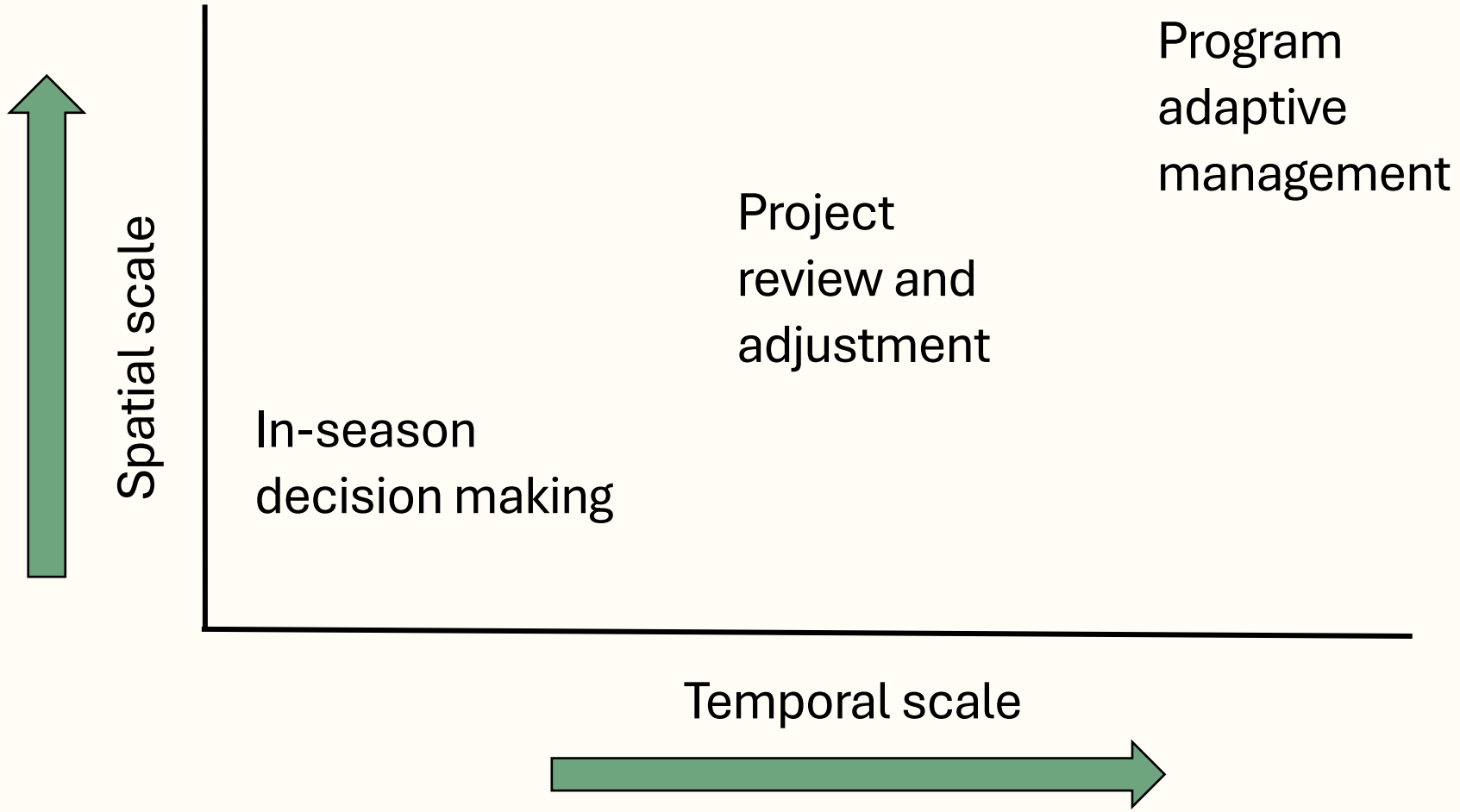
Examples of adaptive management leading to improved management and implementation



- Fish tagging technology
- Hydrosystem passage
- Hatchery reviews and reform
- Habitat



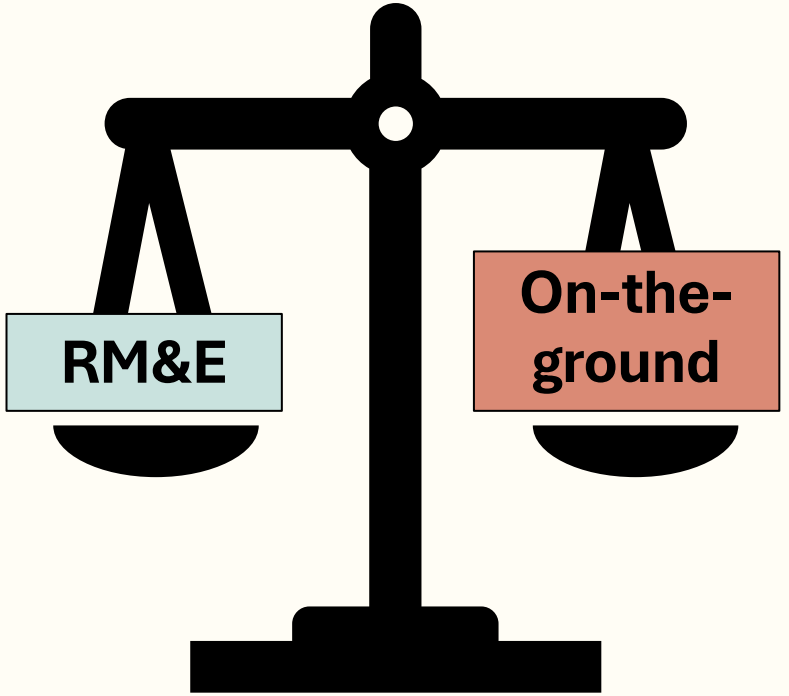
Adaptive management exists at multiple scales



Considerations

- RM&E to know what actions to do, where, for what benefit, and to determine whether goals and objectives are being met
  - Is level of effort appropriate?
  - Are actions effective?
- On-the-ground work being done to mitigate for the effects of the hydrosystem on fish, wildlife, and habitat

- **Requires balance**



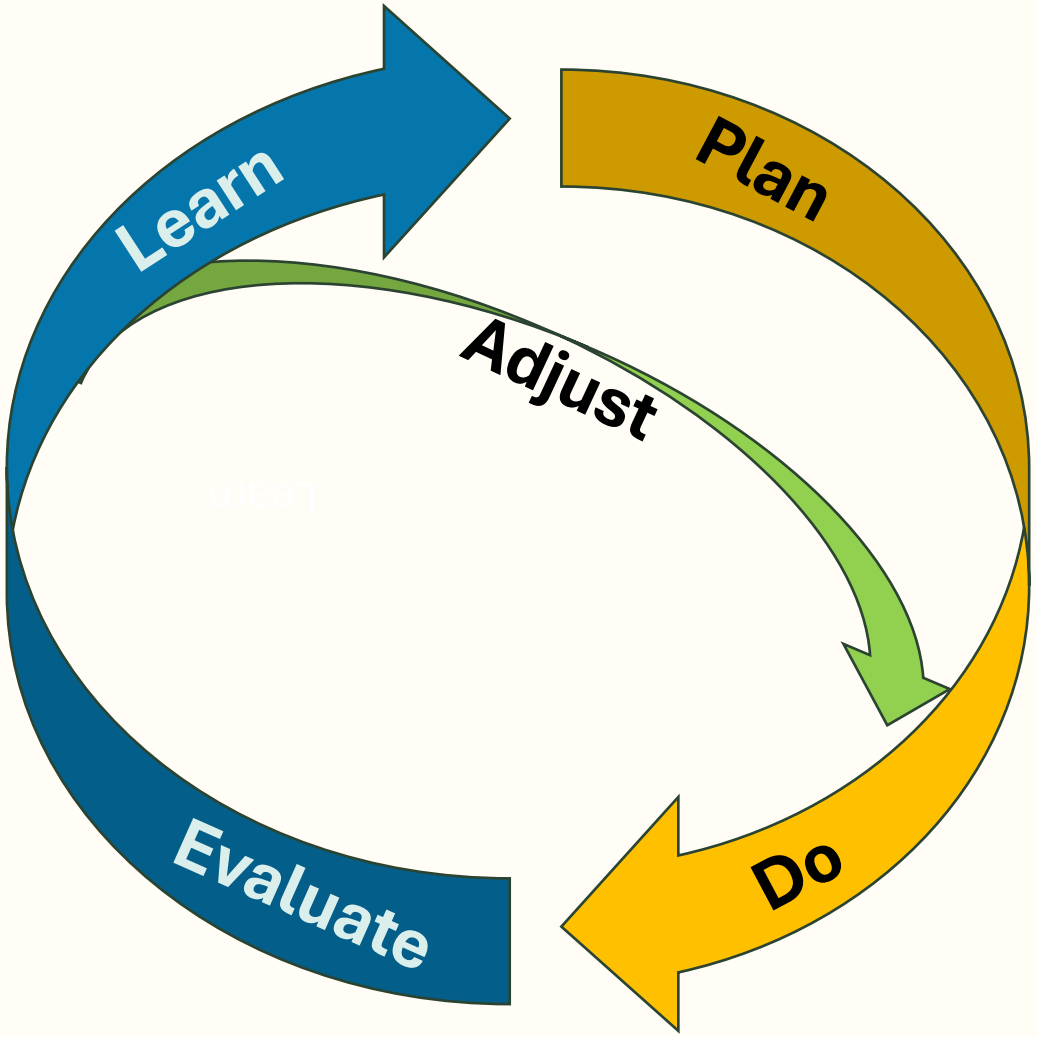
Overview of Part Four: Adaptive Management

Topics covered in Adaptive Management Strategy

2014: Adaptive management

- Monitoring
- Effectiveness
- Research
- Data management
- Reporting
- Evaluation
- Risk uncertainty matrix

2020: Assessing, monitoring and reporting



Adaptive Management Strategy (page 101)

Text of strategy:

- The Council is committed to an adaptive management approach that uses research and monitoring data to understand, at multiple scales, how projects and measures are performing, and to assess the status of focal species and their habitat.
- Are projects and measures are having the intended measurable benefits?
- Is progress being made toward program goals and objectives?

Monitoring (page 101)

Principles:

- Monitoring ensures projects are:
  - implemented properly
  - comply with established standards
  - perform for the intended duration
  - are completed as planned
- Status and trend monitoring informs baseline information needed to track progress
- Accuracy and precision of data matters
- Call for coordinated monitoring efforts (geographically and topically)
- Monitoring data collected with goal to inform decision-making

Monitoring (page 102)

General measures:

- **Annual reporting by Bonneville**.
- Required reporting on the **accuracy and precision of data collected**.
- **Support Monitoring Resources** sponsored by PNAMP.
- Ensure that all managers can collect this data and to make it publicly accessible.
- Ensure data are secured in **appropriate regional databases**.
- **Align implementation metrics to share info about what, and where, actions are funded in the basin**.
- Provide **information on intensively monitored watersheds at least every three years.**
- Continue to explore whether a programmatic approach for monitoring would be more cost-effective and efficient.

Effectiveness (page 103)

Principles:

- Effectiveness projects will address hypotheses relevant to management decisions.
- For action effectiveness, assess whether types of actions implemented by projects are resulting in the intended biological benefit.
- Determined through both monitoring and research to reach a scientifically defensible conclusion about the success of an action.

Wallowa River mainstem restoration 2020, 2022

Effectiveness (page 103)

General Measure:

- Bonneville and its partners should continue to transform the effort to evaluate action effectiveness from monitoring individual projects into a cost-effective, independent third-party, standardized, and statistically valid method for habitat projects and water transactions projects.

Project 1996-083-00 Confederated Tribes of the Umatilla Indian Reservation

Research (page 103)

Principles:

- All research projects must be **consistent with the scientific method** and appear likely to produce an outcome within a designated time frame. The research plan should **prioritize critical uncertainties** for the program and guide funding recommendations.
- Research should **consider potential impacts on and effects from other activities occurring in the same geographical area** as the proposed research activity.
- Research projects will address **hypotheses relevant to management** decisions, with the results **published in peer-reviewed scientific journals**.

Research (page 104)

General Measures:

- The Council will, with federal and state fish and wildlife agencies and tribes **review and update its research plan every 3 years beginning in 2014**.
- To assist in this, the **Council will co-sponsor Columbia River science/policy conferences** to discuss scientific and technical developments in key policy areas.
    - The Council will work with the Independent Scientific Advisory Board and others to develop the agendas.
- Bonneville should **ensure all contracts for research projects identify an end date.**
- Bonneville will **report annually to the Council on publications** resulting from program research.
- The Council will **review the accomplishments of intensively monitored watersheds and the Integrated Status and Effectiveness Monitoring Project** to ensure that it is cost-effective and produces useful results.

Data Management (page 104)

Principles:

- Monitoring and research data collected under the program must be **readily accessible, usable, searchable** …, and … preserved beyond the longevity of a project.
- Program **reporting relies on coordinated data sharing** that is facilitated using regional data systems
- **Refinement of coordinated data management systems** should be guided by program evaluation and reporting needs.
- Collaboration among …monitoring entities in Basin to **prioritize regional data coordination [and] support program indicators and objectives**
- Continue to **refine metrics, methods, and indicators** … to evaluate and report on program progress, focal species, and habitats

Data Management (page 105)

General Measures:

- Bonneville should:
  - ensure that **data** associated with broad categories of information (fish abundance, productivity, genetic diversity, geographic distribution, habitat conditions) **are identified and accessible from a single, centralized website**.
  - ensure all **information about anadromous fish is summarized by specific life-cycle stages** and made accessible from a single location.
  - **contract for complete data products** (e.g., annual population estimates) along with collaborative processes and preliminary data collection (e.g., redd counts).

Reporting (page 105)

Principles:

- Information acquired under the program will be organized, summarized, and reported to the public.
- Subbasin dashboards report on species-specific trends in the subbasin, which are a good sub-metric for much broader HLI.

Reporting (page 105)

General Measures:

- Bonneville should require **all RM&E projects to report annually** results and interim findings, as well as the benefits to fish and wildlife.
  - High priority = separate research reports from monitoring reports
  - **Research reports** address hypotheses and critical uncertainties
  - **Monitoring reports** provide data about implementation, status, and trends
  - **Action effectiveness** reported as part of research and monitoring reports
- Council will continue to work with Bonneville and the ISRP to identify and assemble the information needed to produce an **annual summary of results** for Council review.
- Council will periodically review and update the **high-level indicators** report
- Council will **maintain the program's dashboard and the HLI website report**

Evaluation (page 106)

Principle:

- Adapting to new information is an intrinsic part of the program. The research, monitoring, and evaluation process will ensure that this happens.

Spawning channel at Cle Elum

Evaluation (page 106)

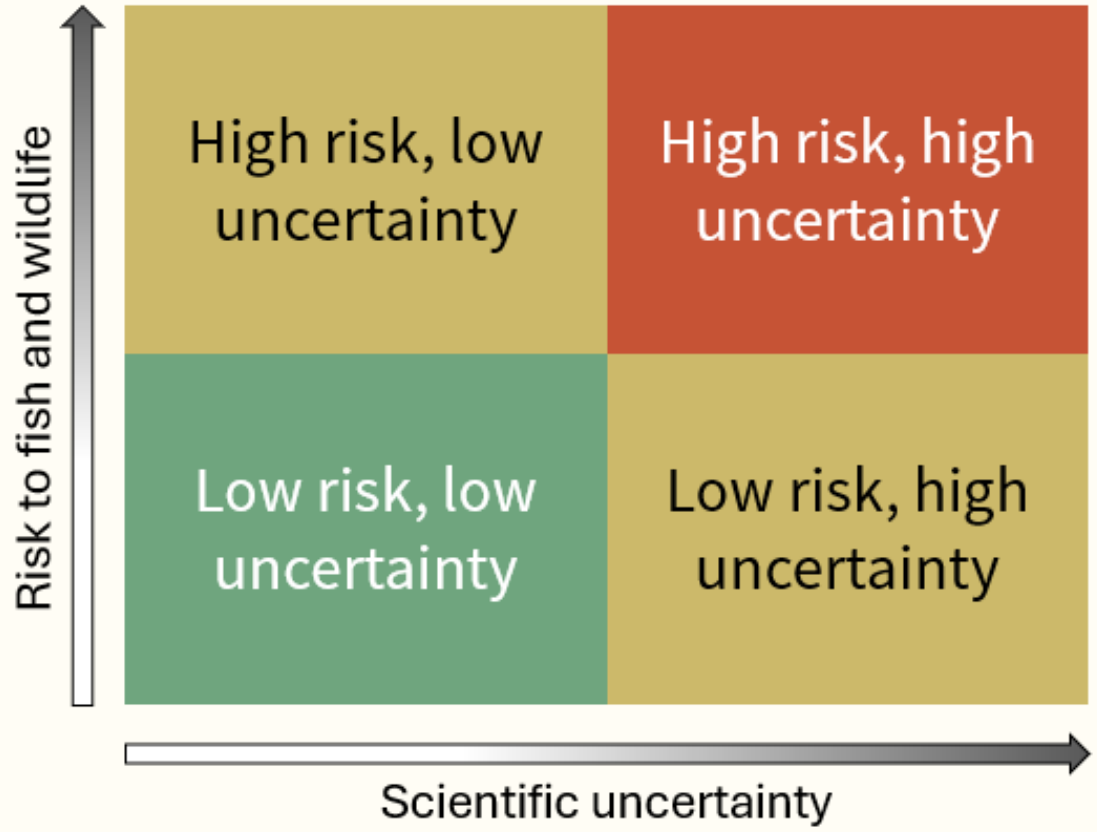
General Measures:

- Develop an **evaluation process** to ensure Program accountability.
- **Request evaluation of data** gathered over several years.
- Support of **continued research and life cycle modeling**.
- Bonneville, agencies, tribes, and other entities receiving Bonneville funding will assist the Council in **compiling data in the appropriate format to inform outputs described in reporting section**.

Risk Uncertainty Matrix (pg. 102/ 107)

Principle:

- The **risk uncertainty matrix** is a tool to consider the risk and uncertainty associated with a measure.



Discussion and Key Issues

Status of Adaptive Management in Program

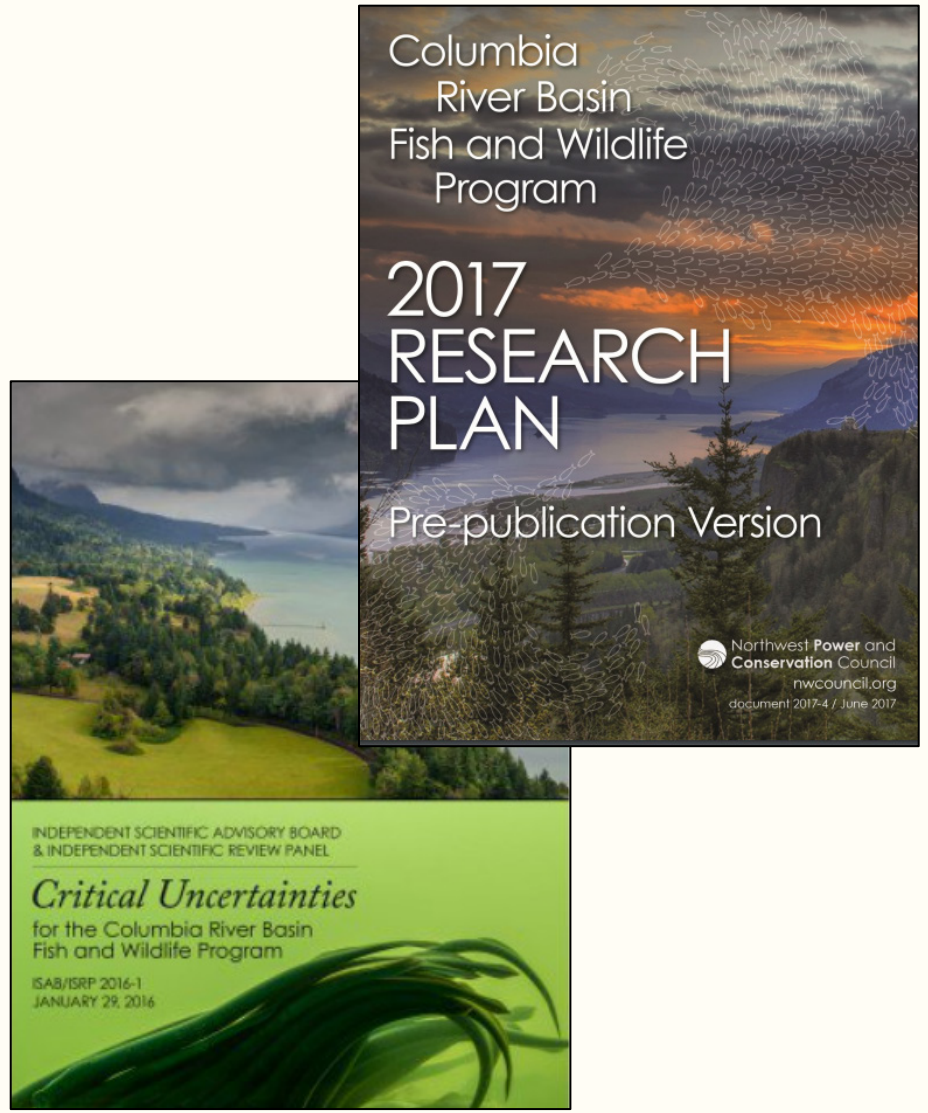
- Adaptive management has been a key part of the Program since 1982
  - Numerous examples of critical uncertainties that have been resolved
  - Improved planning and development of targets- including 2020 addendum
  - Improved management
  - Improved data management and reporting
  - Improved outcomes
- Continues to provide framework to iteratively improve management and decision-making at all scales of Program, across all strategies

Contemporary Critical Uncertainties: 2014/2020

1. Tributary habitat
   - Do investments in tributary habitat restoration mitigate for degraded mainstem habitat and passage conditions? …
   - What additional … projects should be implemented …?
2. Mainstem habitat
3. Fish propagation
4. Hydrosystem flow and passage operations
5. Estuary, plume and ocean
6. Population structure and diversity
7. Predation
8. Non-native species
9. Contaminants
10. Climate change
11. Human development
12. Harvest
13. Monitoring and evaluation methods
14. Public engagement

Tools available to guide implementation of adaptive management strategy

- **Research Plan (2017)** lays out in great detail the critical uncertainties that affect ability to do the most-effective on-the-ground work, and the plan to address them
  - **Critical uncertainties database** is searchable list
- **Critical Uncertainties Report (2016)** revisits existing uncertainties and identifies extent to which current projects do or could address uncertainties
- **Risk-uncertainty matrix** is heuristic model of when monitoring is needed and should be prioritized
- **Tributary habitat RM&E strategy** describes kinds of projects that should be monitored and what data should be collected, and where we already know enough to proceed without monitoring

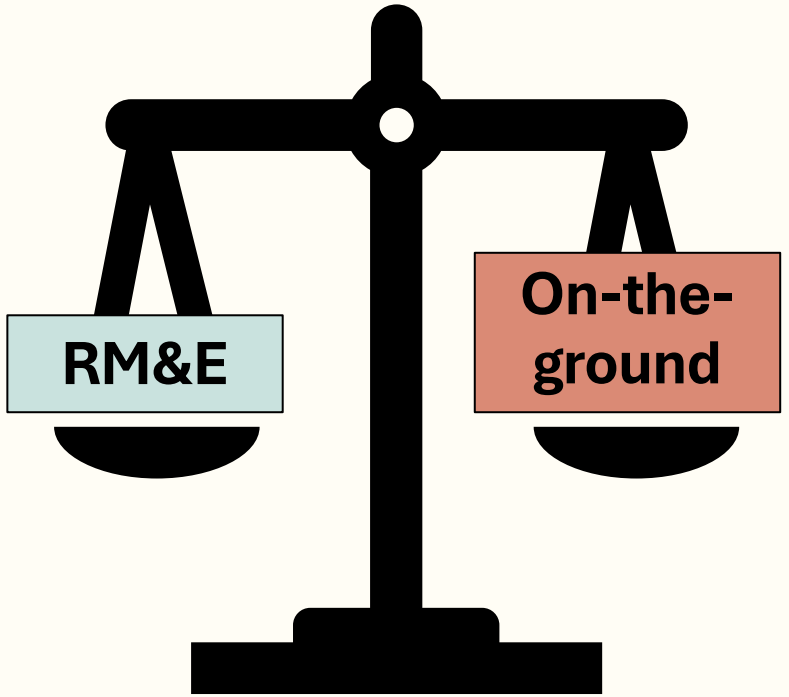


Issues: Uncertainty will always exist

- Uncertainty exists in power planning and fish and wildlife mitigation planning
- This is a normal part of management and of the scientific method
- Adaptive management strategy organizes our approach to addressing these uncertainties in a thoughtful manner such that better on-the-ground management can occur in the future
- Addressed through models, research, adaptive management to answer questions like what will an action achieve? When? For the benefit of which species? Etc.

Issues: Balanced approach to RM&E and on-the-ground work

- On-the-ground work mitigates for the effects of the hydrosystem on fish, wildlife, and habitat
- RM&E informs what actions to do, where, for what benefit, and to determine whether goals and objectives are being met
- Goal is that RM&E informs management and on-the-ground work, not purely academic
- **Requires balance**



Issues: Research vs research (which is actually M&E)

- Adaptive management strategy draws distinction between Research and research (monitoring and evaluation)
- Program suggests **Research** projects have specific hypotheses, timeframes, other requirements
  - Three-five years start to finish
- Program suggests M&E cover all other baseline status and trends monitoring/evaluation.
- **However**, scope and duration of Research should be defined by question, not using arbitrary time frame applied to all research
  - Life cycle duration of target species?
  - Time frames for physical processes/ecological functions to play out?
  - Range of environmental conditions evaluated?


Questions?

Issues from 2017 Implementation Assessment

Monitoring	Accessibility of monitoring data and reporting of derived information such as abundance must be secured for program accountability and to inform the program and project implementation. This access will become more challenging with continued level funding and increasing costs associated with the program's data management efforts.
Effectiveness	Following the development of a Program-focused habitat monitoring and evaluation approach adequate support will be needed for its proper implementation.
Research	Research projects funded through the Program must improve on how they clearly communicate their hypotheses, how they connect to a critical uncertainty, and must specify an end date by which findings will be available.

Issues from 2017 Implementation Assessment

Data Management	Improvements are needed to adequately manage and make information accessible in an informative manner for Program publications, aquatic habitat data, and fish focal species data. The progress achieved for salmon and steelhead through StreamNet and the Coordinated Assessment effort will require adequate funding to be maintained. The level of funding for the StreamNet data management project, lack of dedicated funding for the Coordinated Assessment effort, and future funding for the Regional StreamNet Library post-accord are concerns.
Reporting	Further improvements in annual project reports to Bonneville, such as separating research reports from monitoring reports, remains an ongoing need.
Evaluation	An area that would benefit from renewed attention is the regional approach for evaluating hatcheries and their effectiveness. Ongoing support continues to be needed in all Program areas to ensure continued and improved synthesis and reporting of information to guide project implementation and to inform the Program, e.g. species conditions and action performance.