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

August 23, 2022

MEMORANDUM

TO: **Fish and Wildlife Committee**

FROM: **Kris Homel, Leslie Bach, and Patty O'Toole**

SUBJECT: **Assessing performance of the Council's Fish and Wildlife Program- Part 1: a 40-year retrospective of program development**

BACKGROUND:

Presenters: Kris Homel, Leslie Bach, and Patty O'Toole

Summary: Council staff will present a status update on assessing the performance of the Council's Fish and Wildlife Program. The update will focus on describing the development of the various programs over time, and what is meant by "program performance." This description is facilitated by using a common set of terms to categorize each program, which can be cross walked to the current 2014 program strategies and associated strategy performance indicators. We will discuss the approach to assessing performance and provide a preview of the kinds of information that are instrumental to upcoming assessment topics. The presentation will be structured as a workshop, with many breaks for discussion, feedback, and input from Committee members. Examples provided in the presentation are drawn from a companion report, in development.

Relevance: Beginning with the first program in 1982, every fish and wildlife program has included references to aspects of program performance. The 2009 and 2014 programs expanded on performance with an emphasis on understanding the outcomes from the investment in fish and wildlife mitigation. The focus on program performance was again reinforced in 2018 by specific direction from Council members to the staff. The 2020 program addendum addresses program performance through (1)

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reorganizing and compiling the goals and objectives of the program, which serve as benchmarks for performance, and (2) developing strategy performance indicators.

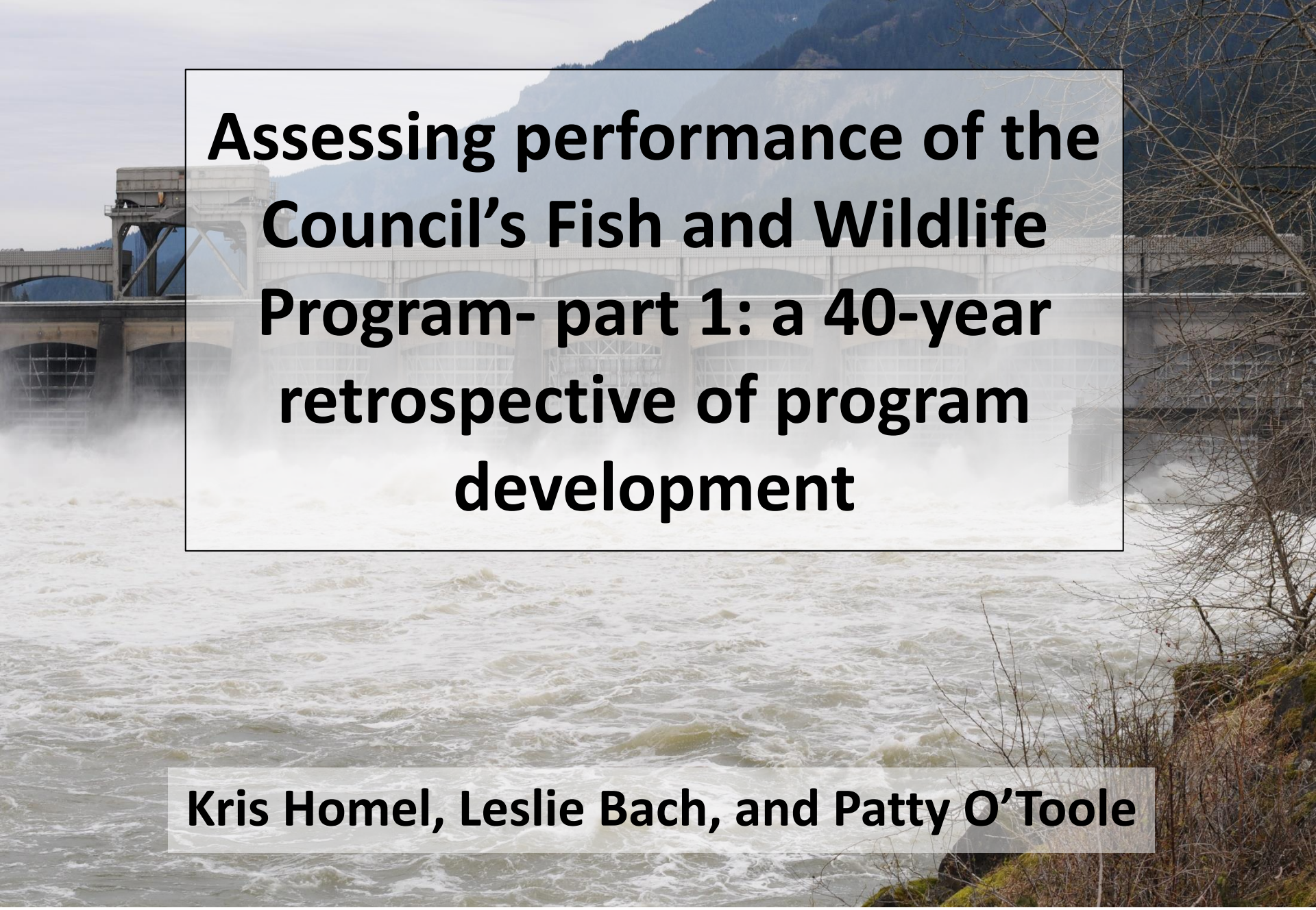
Background: The Northwest Power and Conservation Council's Fish and Wildlife Program represents a 40-year effort to mitigate for the effects of the hydropower system on fish and wildlife in the Columbia Basin. The scope and investment in this Program make it one of the largest fish and wildlife mitigation efforts in the world and a significant part of the tapestry of mitigation efforts in the Columbia Basin. The Program is developed by drawing on regional expertise on how best to mitigate for the construction and operation of the hydrosystem. Consequently, there is an expectation that complete implementation of prescribed actions through investment in mitigation will contribute to and achieve established objectives and goals.

It is important to note that implementation of the Fish and Wildlife program occurs against a changing backdrop. Even as substantial effort is applied to mitigate for the impacts of the hydrosystem, other human impacts and natural disturbances in the basin produce environmental degradation that can negatively affect ecosystem function or fish and wildlife populations. Accomplishments of the program must be understood and interpreted in the context of these changing environmental conditions.

To understand what kind of progress has been made, we begin by describing the history of the program (1980-2020) as a way to develop a common understanding that will facilitate a more detailed assessment of program performance. This summary represents part 1 of a five-part assessment. In part 1, we describe the background of the program, including the legal framework and co-occurring events that precipitated the formation of the Council and the Council's Fish and Wildlife programs. Then we describe how programs were developed over time using a common set of terms to categorize the measures or strategies described in each program. The terms used to categorize programs can all be connected to 2014 strategies and strategy performance indicators (SPIs), such that datasets on outcomes can be linked to the work that was called for in each program over time.

An understanding of history and context are key to future assessments of performance because they set the boundaries on the kinds of work that have been called for, where that work occurred, and when the work was implemented. This translates into a more refined understanding of when outcomes from that work might be observable. In this presentation we will describe the planned approach to parts 2 – 5 of the assessment, which cover the following categories: hydrosystem; habitat; natural production and artificial propagation; and program adaptive management. In each of these parts, we will describe the types of actions and projects that have been implemented over time at the scale of the Columbia River Basin/ Fish and Wildlife Program and at the geographic scale of ecological

provinces. We will draw on datasets assembled for the strategy performance indicators as well as other information to characterize relationships between what was called for, what was implemented, and what kinds of changes have occurred.



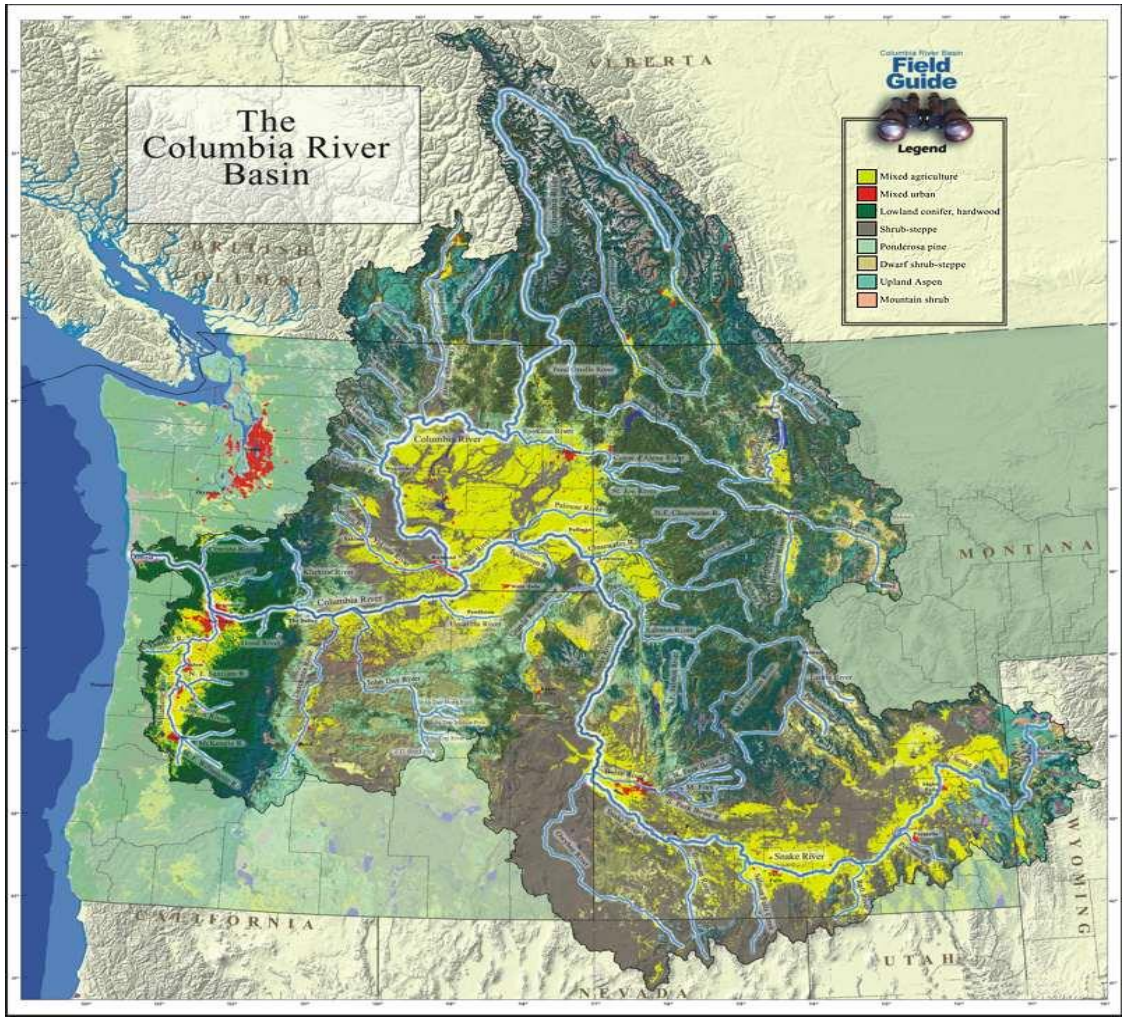
Assessing performance of the Council's Fish and Wildlife Program- part 1: a 40-year retrospective of program development

Kris Homel, Leslie Bach, and Patty O'Toole

Take home points

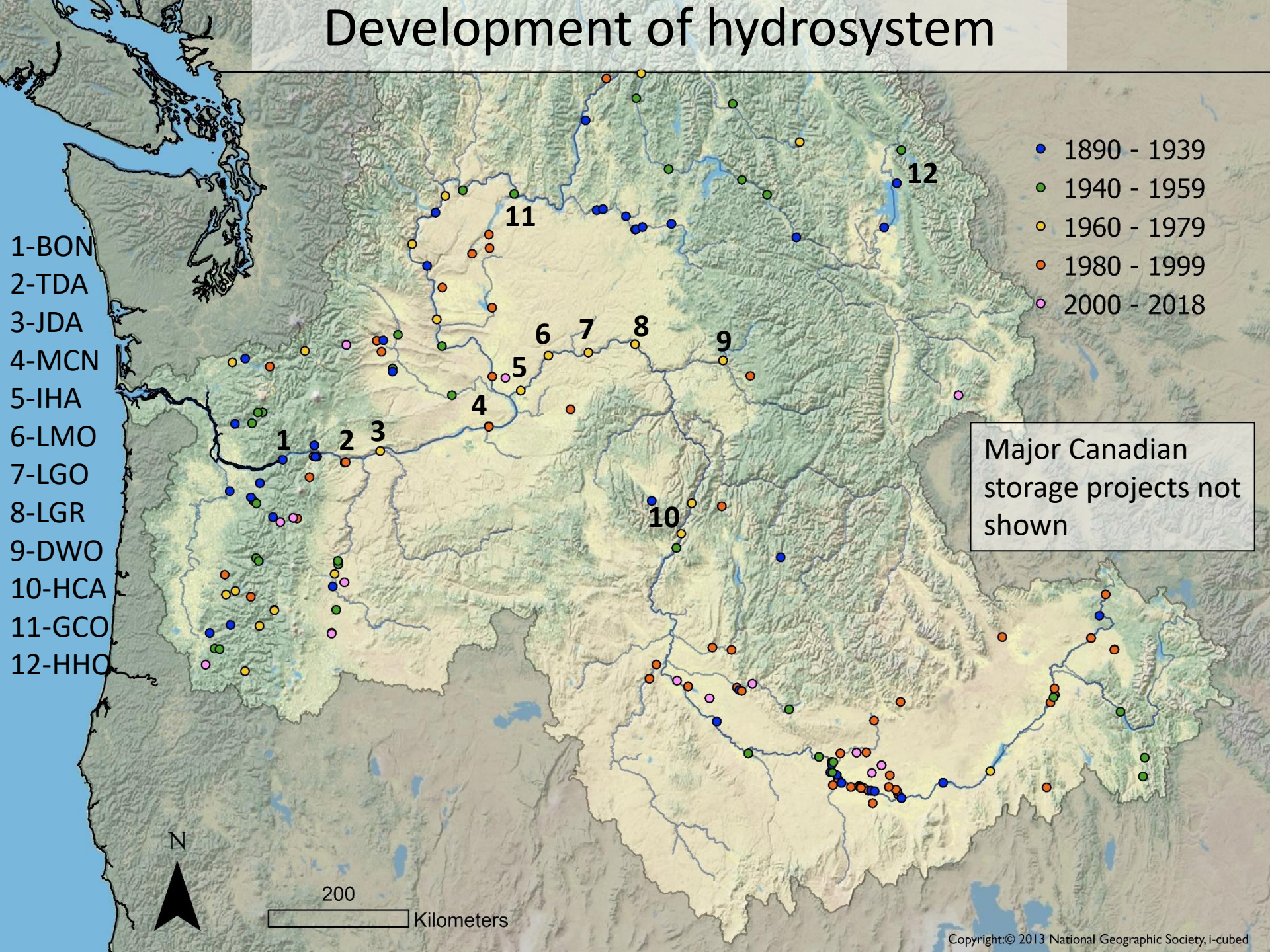
1. Hydrosystem is not one system or one operation in place for a set time period
2. Program not just one document implemented for 40 years
3. Basin is diverse and constantly changing
4. Evaluating performance will require specifically addressing complexity
5. The approach described today sets the stage for our performance work going forward

Columbia Basin: geologically, geographically and hydrologically diverse

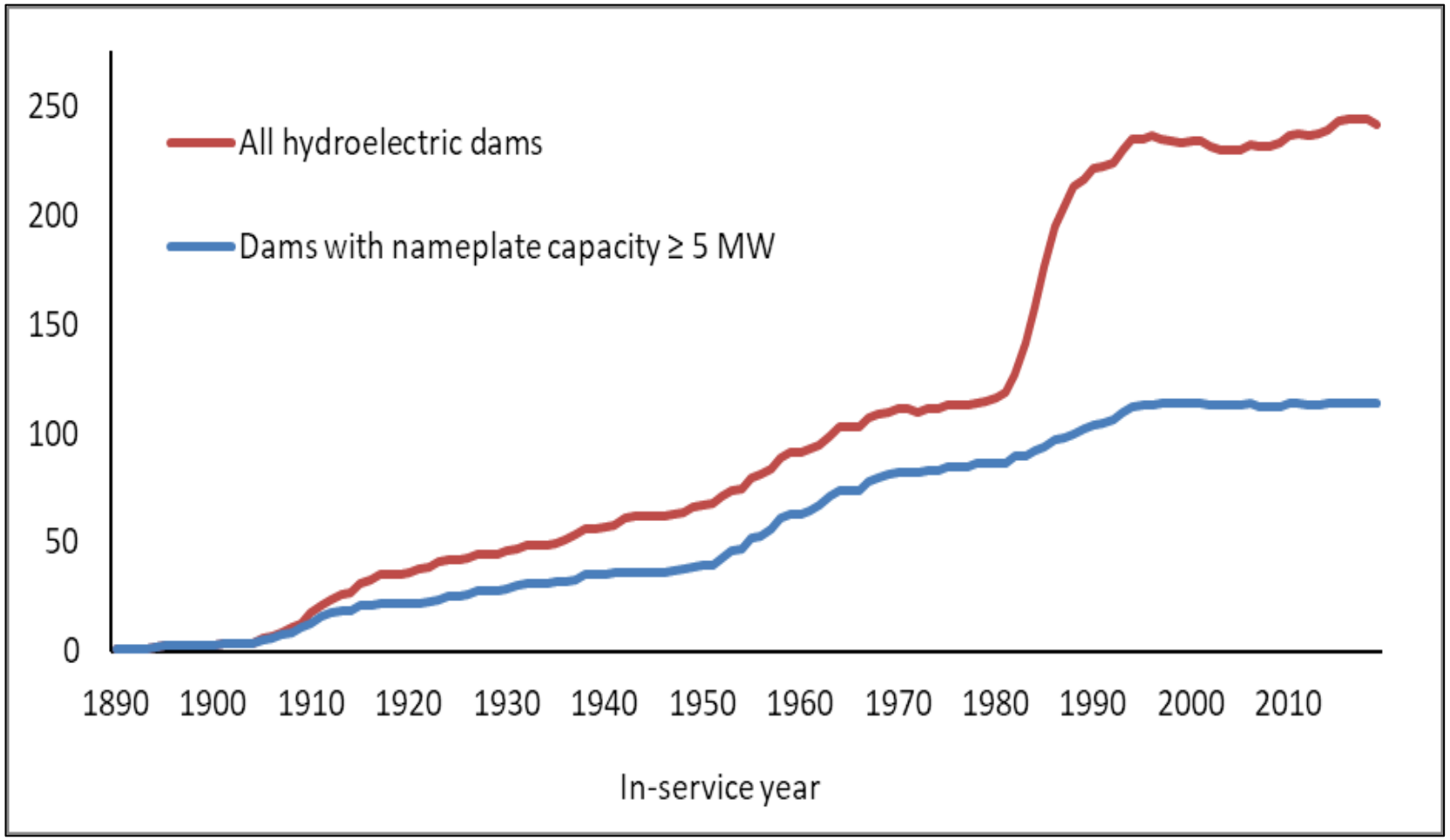


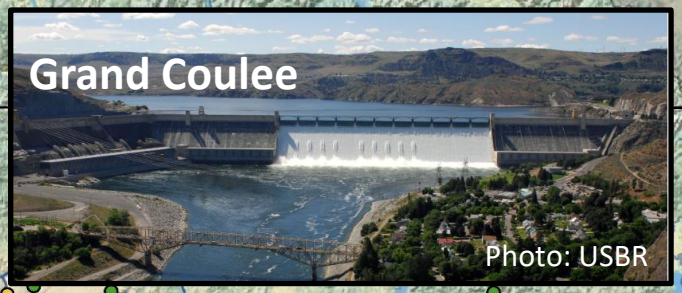
- Geological upheaval
  - Earthquakes, volcanoes, Ice Age, epic floods
- Geographically and hydrologically diverse
  - Unique habitats throughout basin
- Multiple species of salmon evolved- each associated with different habitat types
- Diversity of other resident and migratory fish and wildlife
- Collectively form rich ecosystem

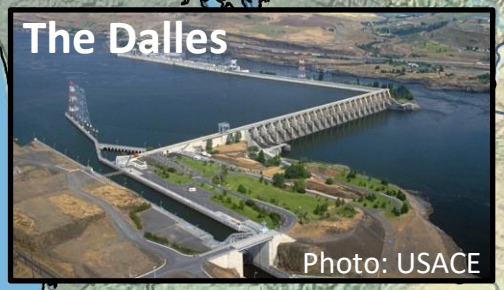
Development of hydrosystem



Development of hydrosystem







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Kilometers

Hydrosystem effects on fish and wildlife

- Individual effects:
  - Construction (fragmentation, blocked areas)
  - Inundation (habitat loss)
  - Operation
- System wide effects
- Losses:
  - Salmon, Steelhead
  - Other anadromous fish
  - Resident fish
  - Wildlife

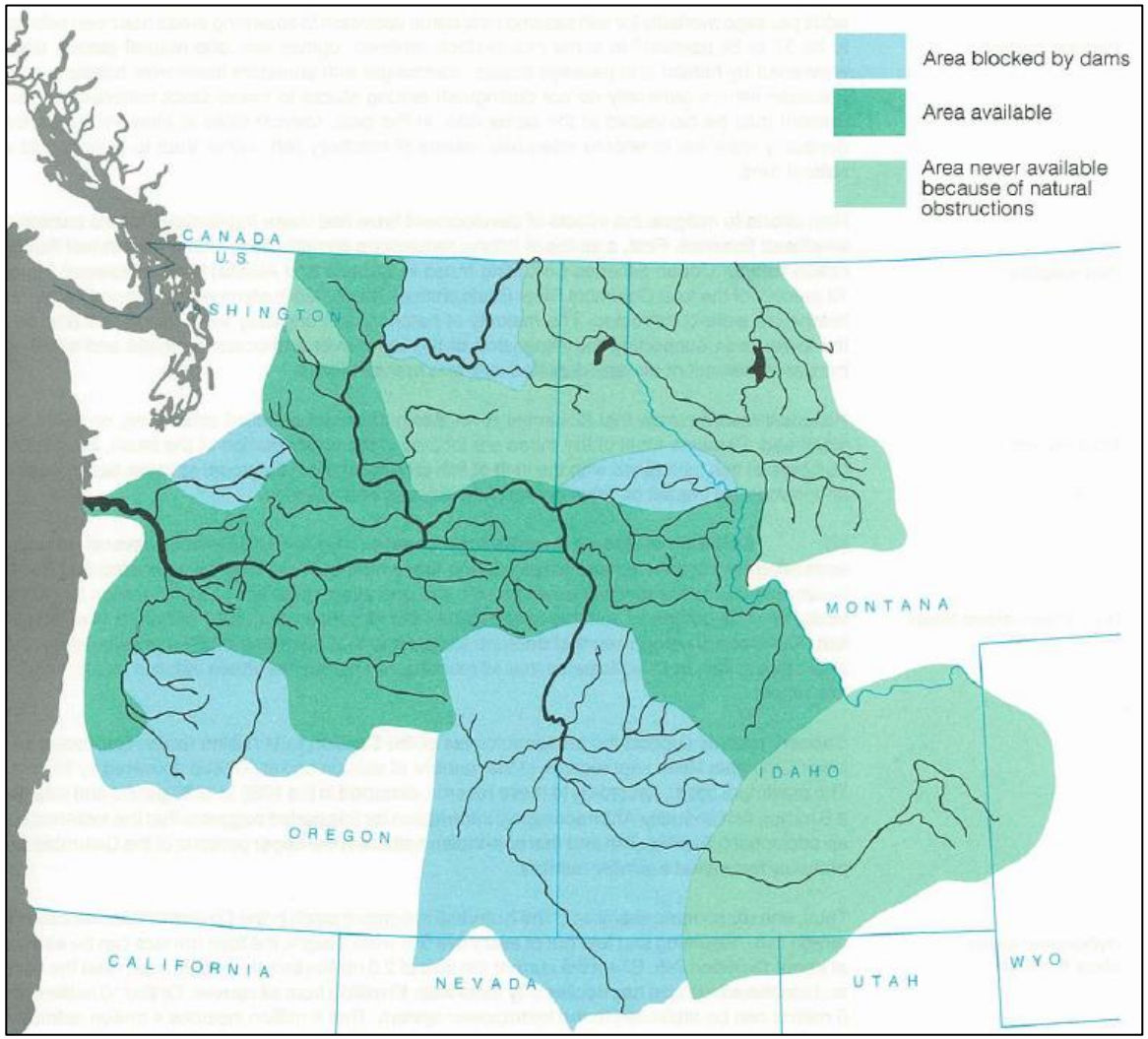


Figure source NPPC 1987

Multiple land use and resource use effects on fish and wildlife


Photo: USFS


Photo: Jeroen Komen

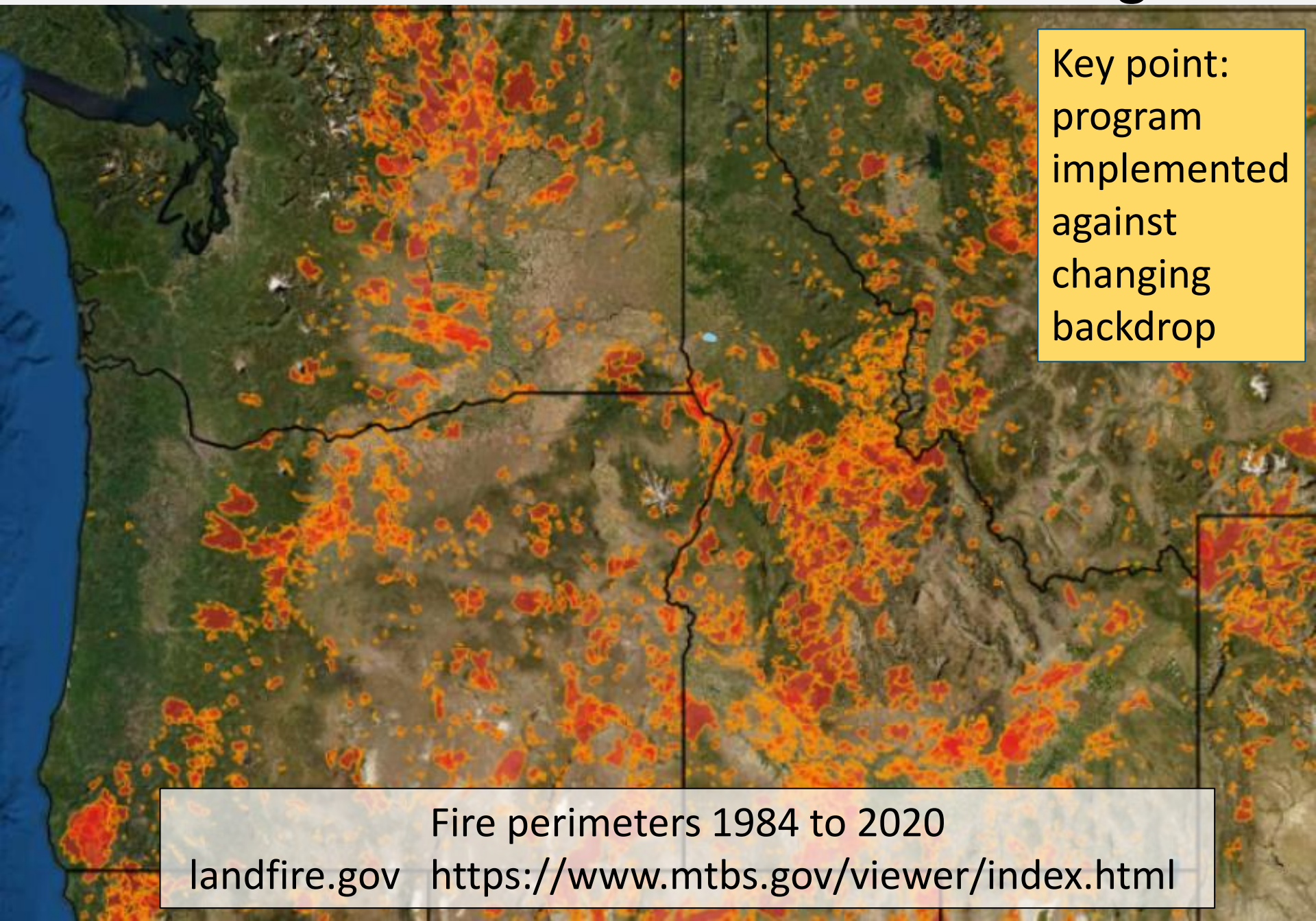

Photo: EPA


Photo: Kris Homel


Photo: Brent Wojahn; The Oregonian


Photo: Bruck and Sohn Kunstverlag

Effects are not static- continued changes



Power Act definition of mitigation responsibility

1. Mitigation responsibility includes all hydroelectric facilities in the U.S. portion of the Columbia Basin regardless of ownership (federal, non-federal [e.g., PUDs or other local entities and regulated by FERC]), location, size, or minimum power generation **[4(h)(1)(A); 4(h)(2)(A)]**
2. Second, mitigation is achieved through a combination of onsite actions and offsite mitigation **[4(h)(1)(A); 4(h)(6)(E); 4(h)(8)(A)]**
3. The Fish and Wildlife Program must treat the "river and its tributaries as a system" **[4(h)(1)(A)]**
4. BPA to use its fund and authorities to protect, mitigate, and enhance fish and wildlife in a manner consistent with the Council's program **[4(h)(1)(A)]**
5. BPA and federal action agencies must take into account Council's program in decision making "to the fullest extent practicable" while treating fish and wildlife equitably with other authorized purposes of the dams **[4(h)(11)(A)]**

Components of mitigation

Goal
(e.g., 5 million salmon and steelhead)

In-kind, in-place (e.g., hydrosystem modifications)

Replacement
(e.g., artificial propagation)

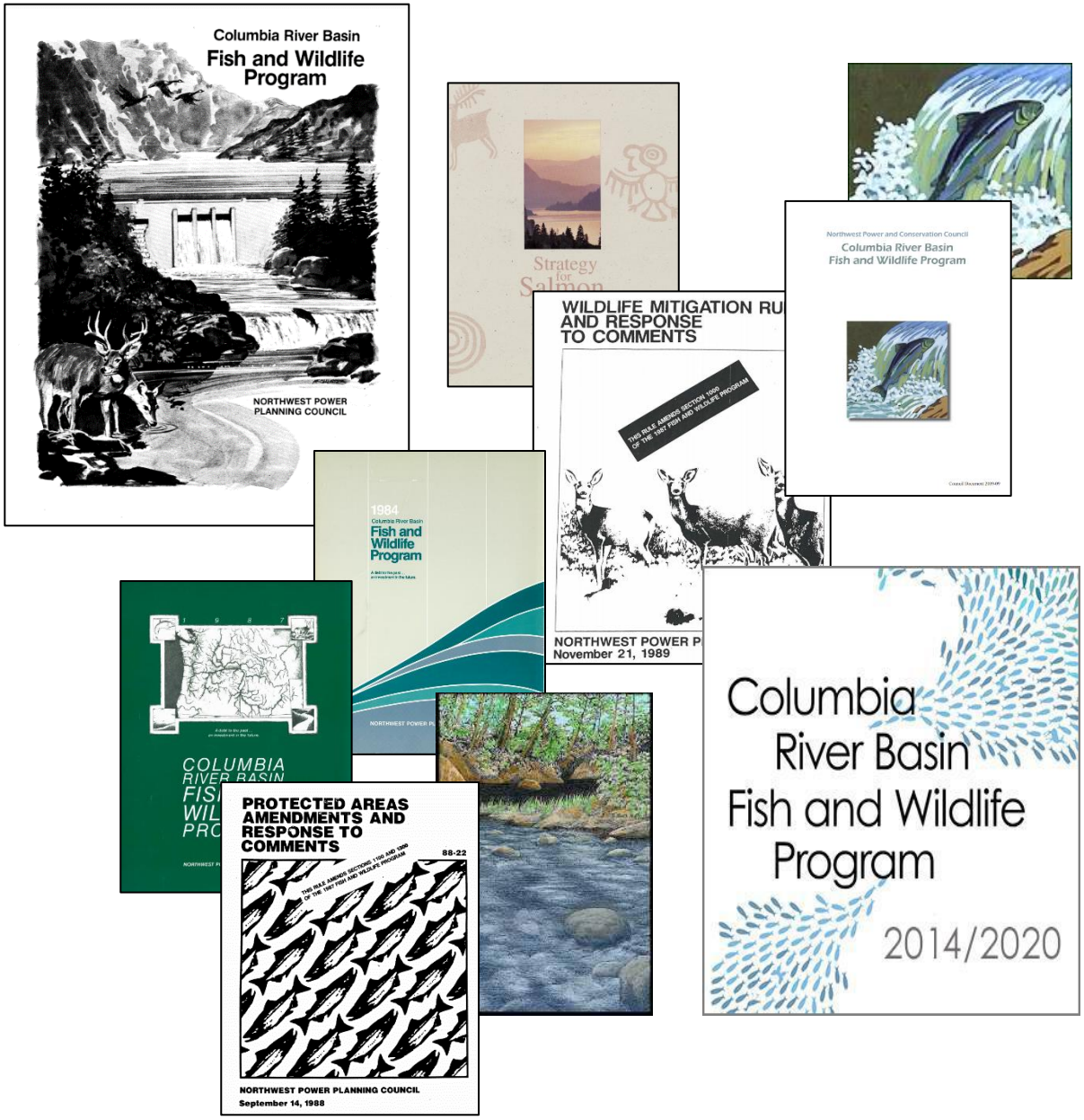
Offsite
(e.g., tributary habitat restoration)

Key point: program is responsible for protection and mitigation for all species affected by hydrosystem, regardless of whether they are ESA-listed

Stool image from clipart-library.com

Fish and Wildlife Program: background

Described in 20 comprehensive or minor program amendments and addendums



Key points:

- program not static over time
- substantial advances and development of comprehensive strategies

Program development and implementation

Key development roles:

- Recommendations for measures and objectives provided to Council, especially from federal and state fish and wildlife agencies and Columbia Basin tribes
- Council organizes into principles and strategies that treat basin as a system
- Public review
- Council adoption

Key implementation roles:

- Requirements (of action agencies- BPA, COE, BOR, FERC)
- Projects (funded by BPA)
- Other actions (by Council)

Program funding

BPAs Reimbursable Program

Congressionally appropriated capital investment repayment

Reimbursable Operations and Maintenance Expenditures

Army Corps of Engineers

Columbia River Fish Mitigation Program (CRFM):

Capital construction and research projects for mainstem dam fish passage improvements

Operations and maintenance:

- Dam Facility O&M

- Wildlife Mitigation

- Hatcheries:
Dworshak
John Day Mitigation
Willamette Mitigation

Anadromous Fish Evaluation Program (AFEP)

Fish and Wildlife Service

Lower Snake River Compensation Plan Hatcheries

Bureau of Reclamation

Leavenworth Hatchery Complex

BPAs Direct Program

Columbia River Fish and Wildlife Program

Program includes: NMFS and USFWS Biological Opinions for Salmon, Steelhead, Kootenai River White Sturgeon, Bull Trout

CRSO and EIS costs

BPAs overhead costs 50% of NPCC budget

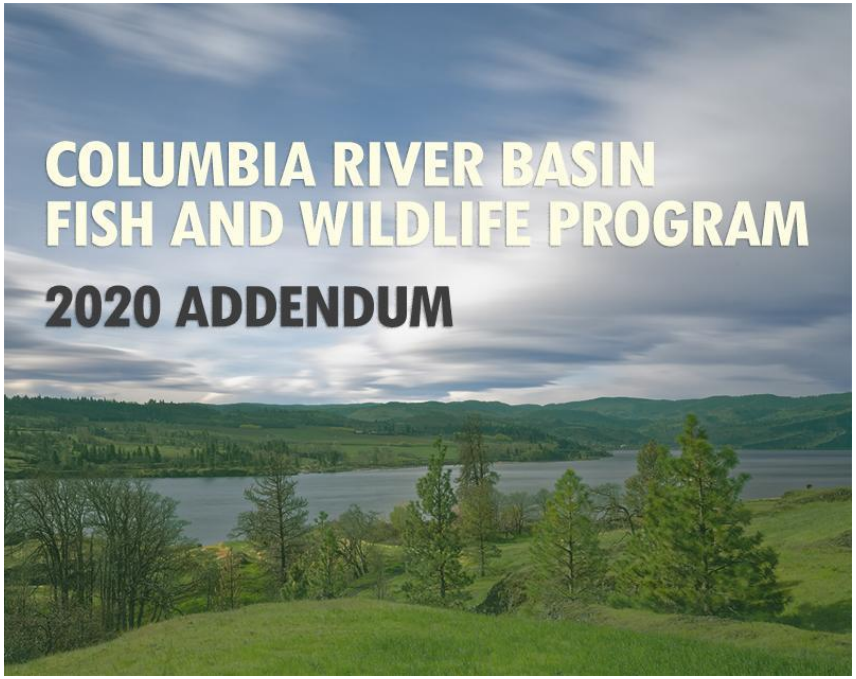
Council program also includes required actions (e.g., hydrosystem operations [COE and BOR] and relicensing considerations and protections [FERC]) and other work not funded by BPA

Questions on background?

Focus on performance

- Aspects of performance in every program
- In 2014/2020 Program increased focus toward understanding outcomes from 40 years of investment

- Forms the basis for current efforts on "program performance"



Performance: results (or progress) relative to expectations (or benchmarks)

1. Describe what has been called for in each program (inputs)
2. Summarize the work that has been done to implement programs (outputs)
3. Assess ecological changes resulting from/ occurring in parallel with implementation (outcomes)
4. Do so in relation to established benchmarks (goals and objectives or other program priorities)

Key point:

- Assessment focused on ecological changes associated with F&W program

Performance assessment completed in parts

Part 1: Program history, context, and approach to summarizing efforts and accomplishments

Parts 2 – 5: Category assessment [inputs, outputs, and outcomes]

- Hydrosystem
- Habitat
- Natural production and artificial propagation
- Program adaptive management

Addressing complexity in performance assessment

Sources of complexity:

- Basin large and geographically and hydrologically complex
- Impacts (hydrosystem and land use) are different across the landscape and among species
  - Complete loss in blocked areas
- Landscape continues to change
- Program varied over time
- Implementation of program has varied geographically and over time

Program development over time in relation to regional events

- Describe by ~ decade
- Timeline of regional events
- Description of program using a common set of categories and themes to characterize programs in consistent way over time
  - Although not the same as 2014 strategies, they do crosswalk to the strategies
- Showing full detail for 1980s and examples from other decades.
  - Complete details in retrospective document (*in prep*)

Hydrosystem

- Flow/ storage reservoir operations
- Passage
- Water quality
- RM&E

Habitat

- Restoration
- Protection
- Wildlife
- RM&E
- Non-native and invasive species
- Predator management
- O&M for lands

Natural production and artificial propagation

- Facility construction
- Artificial propagation
- Harvest recommendations
- RM&E

Program adaptive management

- Regional planning
- Data management
- Science review
- Regional coordination
- Public engagement
- RM&E and reporting

1970 - 1989

	1971	National Environmental Policy Act
	1972	Clean Water Act Marine Mammal Protection Act
	1973	Endangered Species Act
	1976	*U.S. v. Oregon* Magnuson-Stevens Fishery Conservation and Management Act Lower Snake River Fish and Wildlife Compensation Plan Columbia River Salmon and Steelhead Summit
	1978	Public utilities Regulatory Policies Act
Northwest Power Act	1980	Mid-Columbia FERC settlement
Council formed	1981	
1st program	1982	Salmon and Steelhead Conservation and Enhancement Act
Fish and Wildlife Committee formed		
Amend 1982 program	1984	
	1985	Pacific Salmon Treaty ratified
2nd program	1987	
Amend 1987 program	1988	Vernita Bar Agreement Snake River Coho Salmon considered extirpated, but never officially listed under ESA
Amend 1987 program	1989	Fish Spill MOA Formation of the Columbia Basin Fish and Wildlife Authority

Program development- 1980s

Year	Description
1982	1st Program
1984	*Minor amendment*
1987	2nd Program
1988	*Protected Area Rules*
1989	*Wildlife Rules*

Program development- 1980s

Hydrosystem examples

- Flow: Water budget, flows for resident and anadromous fish; drawdown limitations at Libby and Hungry Horse
- Passage: Interim transportation; work on bypass; interim spill until bypass complete
- Water quality: Use storage to maintain temperatures
- RM&E: Numerous studies related to passage, survival, monitoring, and more

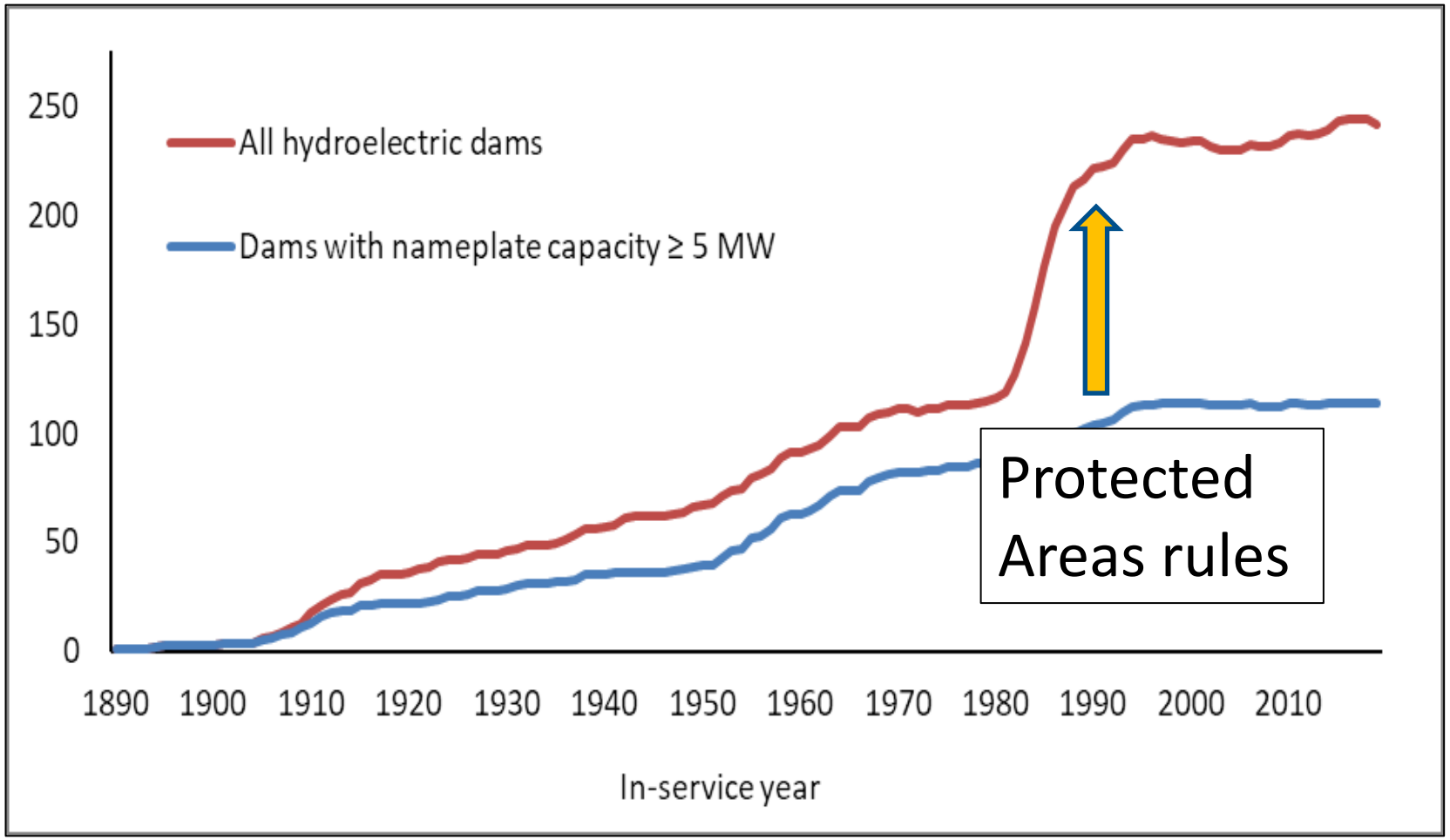
Program development- 1980s

Habitat examples

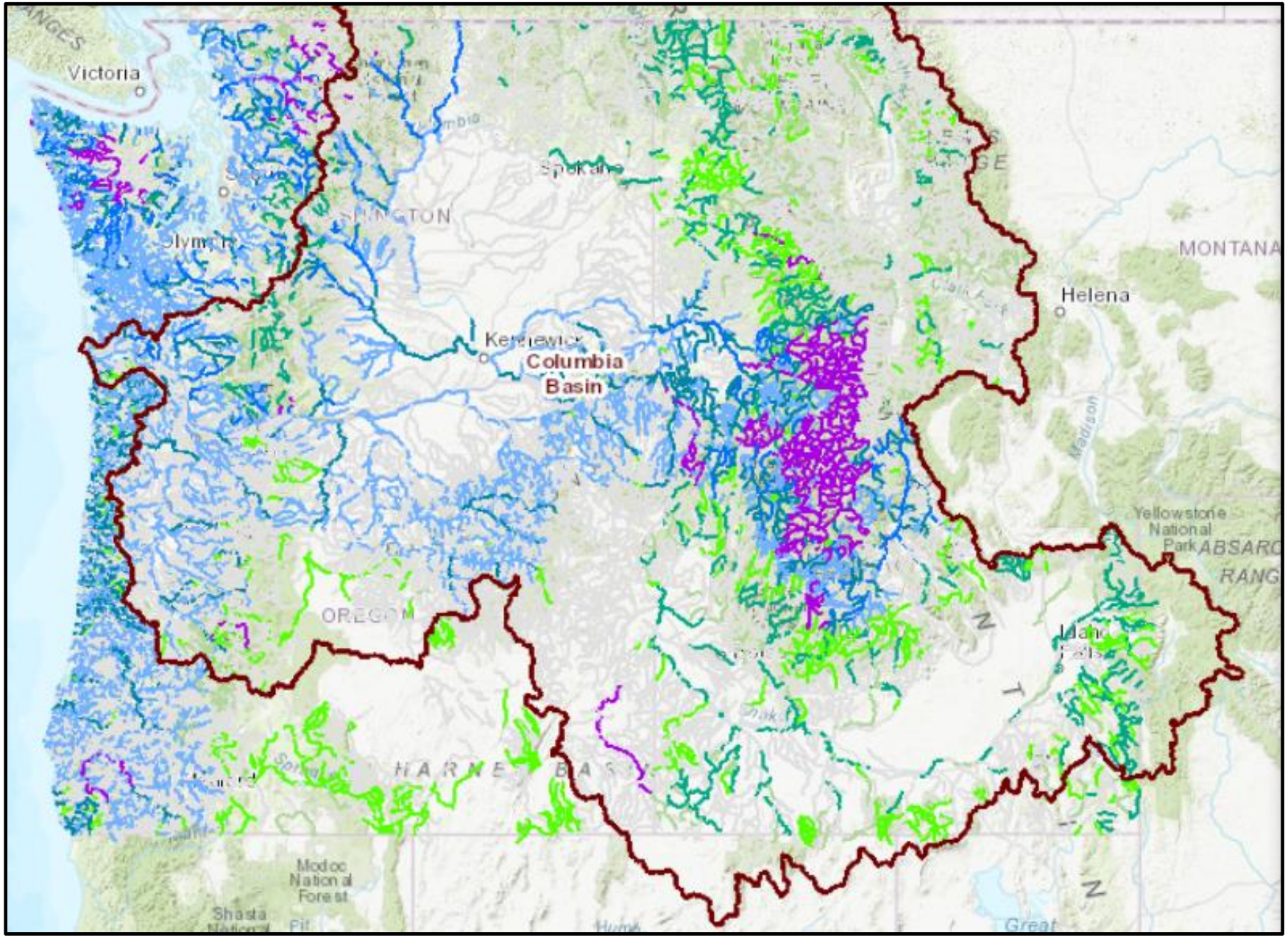
- Restoration: specific projects in tributaries and blocked areas
- Protection: water conservation in Yakima Basin; screens; Protected Areas designated, and rules adopted in 1988
- Wildlife: establish criteria for mitigation and review first set of projects; 1989- Wildlife Rules; interim goal for wildlife mitigation (35% of lost HUs in next 10 years)
- Predator management: study methods to control native Northern Pikeminnow

Photo from pikeminnow.org

Development of hydrosystem



Protected Areas



Program development- 1980s

Natural production and artificial propagation examples

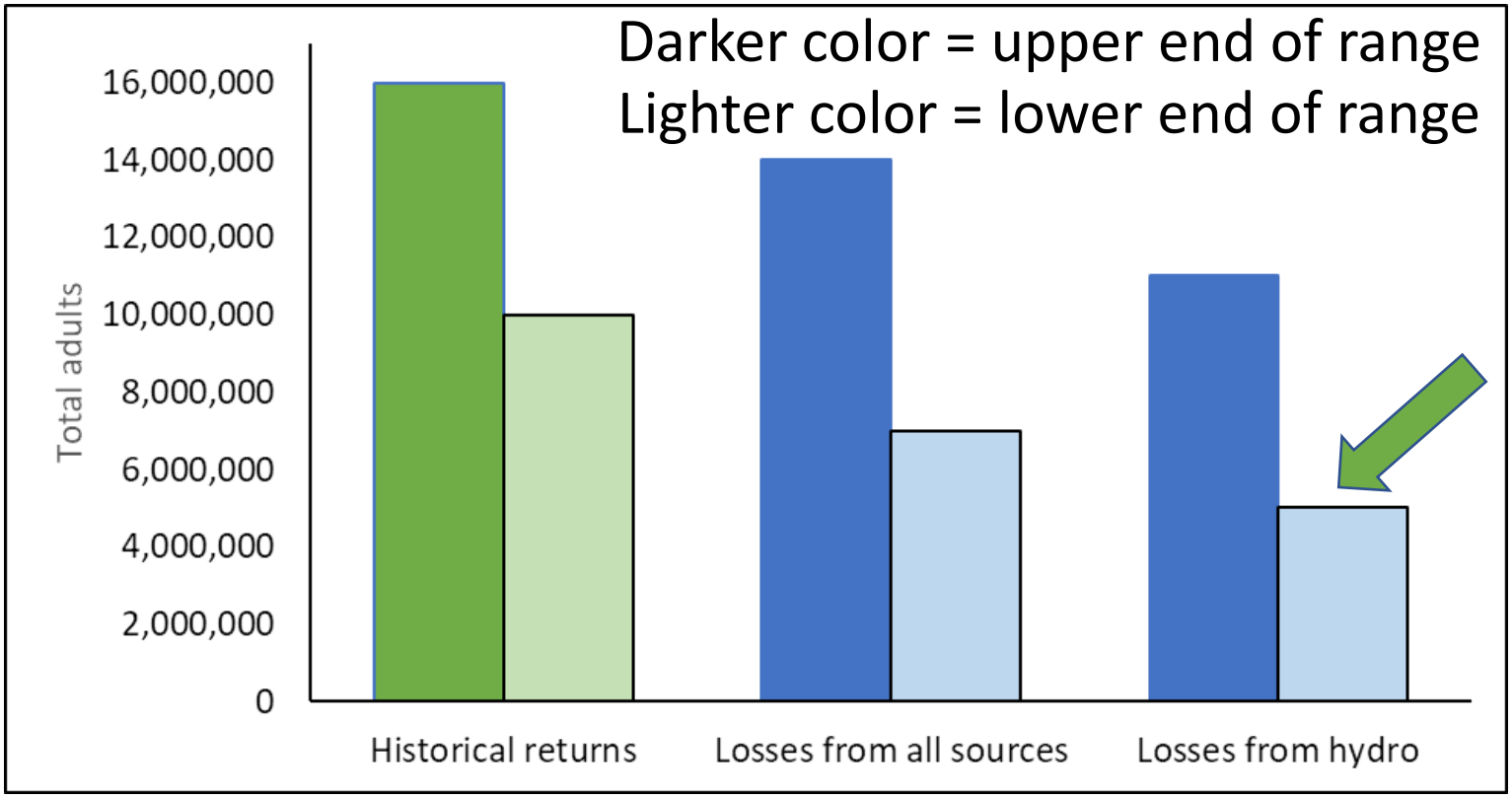
- Artificial propagation: supplement naturally spawning stocks with hatchery stocks; production of resident species; resident fish substitution; production in upper portion of basin
- Facility construction: design and construction of new facilities for anadromous and resident species
- Harvest recommendations: harvest must be adequately controlled and consistent with program objectives; known-stock fishery demonstration programs
- RM&E: improve natural production through flows and restoration; artificial propagation methods for various species; supplementation techniques, disease issues

Program development- 1980s

Program adaptive management examples

- Regional planning: loss assessments; interim double-the-run goal established; calls for system and subbasin planning and 5-year action plan
- Data management: Establish Coordinated Information System; establish Fish Passage Center; other databases
- Science review: creation of Scientific Review Group
- RM&E and reporting: effects of oceanographic factors in plume on juvenile salmonids

Salmon and steelhead losses and goal



Goal: 5 million salmon and steelhead

Estimates of the range of historical returns and losses from NPPC 1986

* Other estimates of historical returns range from ~6 million (ISAB 2015) to 35 million (BPA 1984)

Program development- 1980s

Other key topics and accomplishments

- Program's flow, reservoir and passage measures are to be considered hard constraint on hydrosystem operations and on power planning
- Emphasis on boosting weak stocks to prevent ESA-listing
- First programs set road map for next 40 years
- Broad regional collaboration (created a table that engaged all fish and wildlife managers)
- First programs also ambitious and pioneered new approaches and technology
- Tremendous regional investment of time and expertise into programs and associated analyses

Questions on 1980s?

1990 - 1999

1991

3rd Program: part 1

3rd Program: part 2

ESA listing: Snake River Sockeye

Salmon Summit

1992

3rd Program: part 3

Parts 2 and 3 = Strategy for Salmon

ESA listings:

- Snake River Fall Chinook
- Snake River Spring/ Summer Chinook

BiOp on ocean and river fisheries

1993

3rd Program: part 4

FCRPS BiOp (revised 1992 FCRPS BiOp)

ESA listing: Oregon Chub

1994

Lawsuit on Strategy for Salmon (NRIC decision)

Idaho v NMFS (invalidated FCRPS 'no jeopardy' decision)

ESA listing: Kootenai River White Sturgeon

4th Program

Northwest Forest Plan

1995

Amend 1994 program

FCRPS BiOp (supersedes 1994 BiOp)

Columbia System Operations Review (NEPA)

National Academy of Sciences releases "Upstream: Salmon and society in the Pacific Northwest"

1996

Power Act Amendment

Formation of ISRP/ project review

ISG review of 1994 program "Return to the River"

1997

ESA listings:

- Upper Columbia Steelhead
- Snake River Steelhead

1998

Supplemental FCRPS BiOp

ESA listings: Lower Columbia Steelhead

1999

ESA listings:

- Lower Columbia Chinook
- Lower Columbia Chum
- Mid-Columbia Steelhead
- Upper Columbia Spring Chinook
- Upper Willamette Steelhead
- Bull Trout

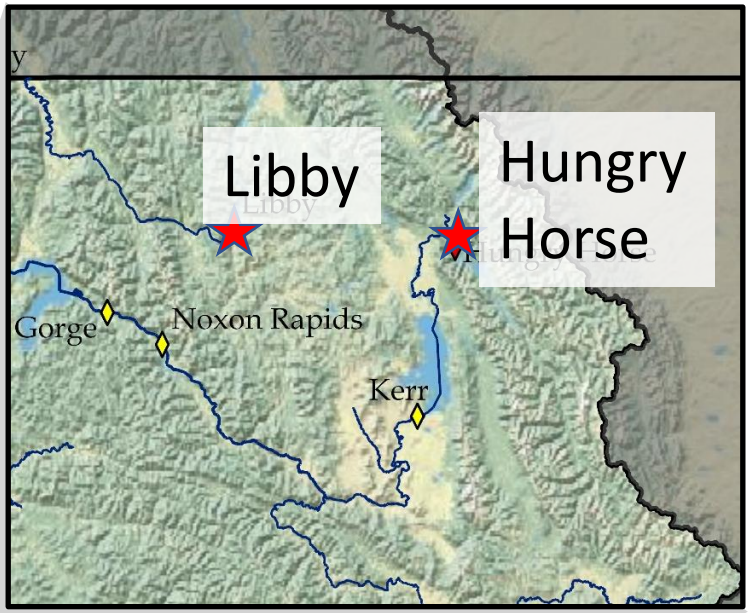
Program development- 1990s

Year	Description
1991-1993	3rd Program
	Part 1: Highest priority production and habitat actions
	Part 2: Mainstem survival and harvest
	Part 3: System integration
	Part 4: Resident fish and wildlife
1994	4th Program
1995	*Resident fish and wildlife*

Resident fish losses and goal

Libby Dam inundated 239.8 km

Hungry Horse Dam inundated 115.3 km and blocked access to 526.9 km



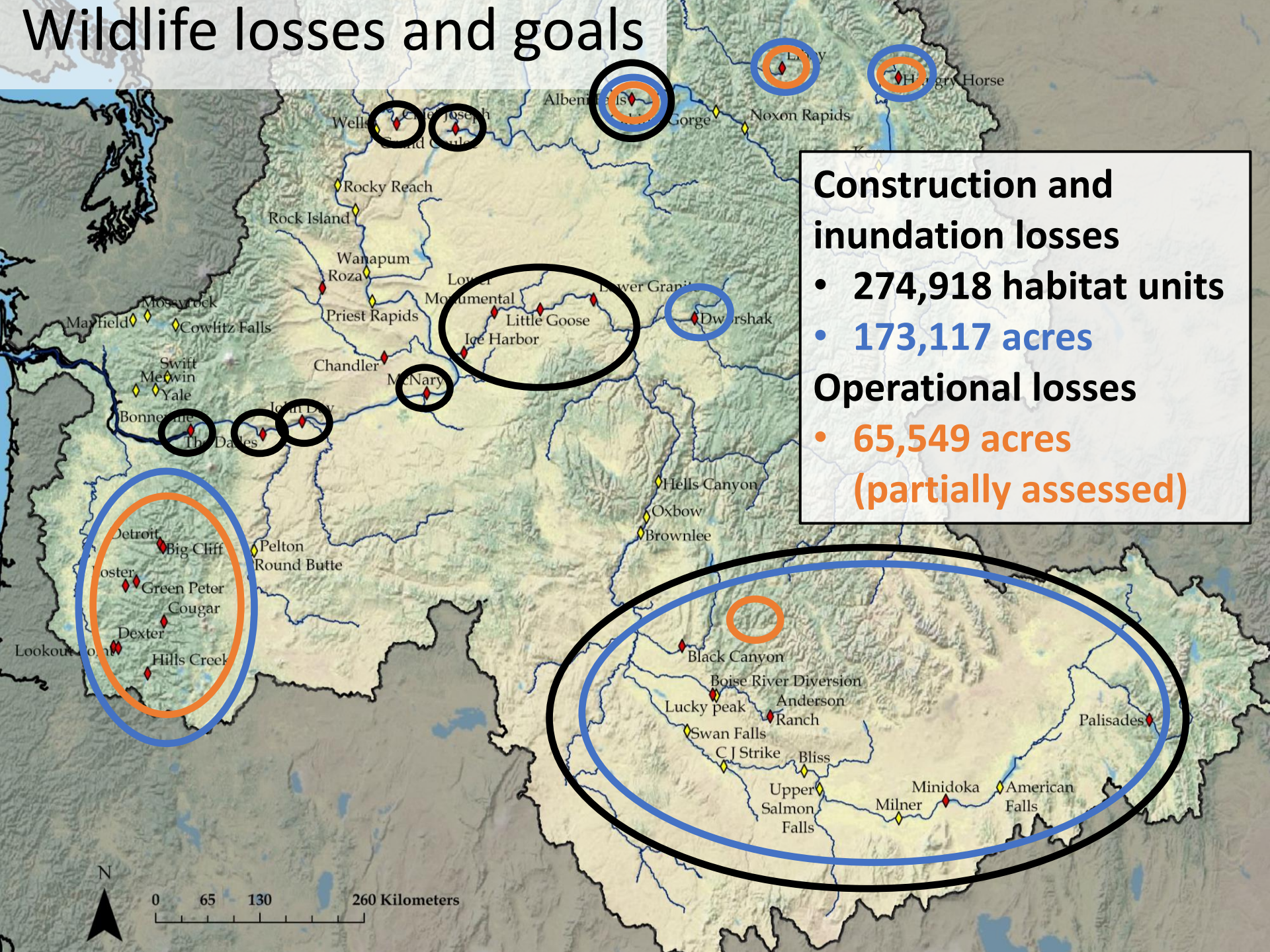
Losses included:
Westslope Cutthroat Trout, Rainbow Trout, Bull Trout, Mountain Whitefish, Kokanee Salmon, Sturgeon

Goals:

Libby- by 2028 protect or restore 175.4 km of Kootenai River and 64.4 km of tributaries, make accessible 96.6 km of previously blocked streams

Hungry Horse- by 2024, restore and protect 721 km of habitat in flathead river watershed equivalent to habitat blocked and inundated

Wildlife losses and goals



Construction and inundation losses

- **274,918 habitat units**
- **173,117 acres**

Operational losses

- **65,549 acres (partially assessed)**

Questions on 1990s?