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

October 1, 2024

MEMORANDUM

TO: **Council Members**

FROM: **Maureen Hess, Kate Self, and Patty O'Toole**

SUBJECT: **Fish and Wildlife Program performance: Artificial Production categorical assessment**

BACKGROUND:

Presenters: Maureen Hess, Kate Self, and Patty O'Toole

Summary: Staff will present excerpts from the second categorical assessment focused on implementation of the Columbia River Basin Fish and Wildlife Program's (Program) Artificial Production (AP) measures. This assessment covers major AP actions called for in the Program over the last 40 years and implementation of those actions. This overview of the Program's AP facilities and production programs will highlight how the Program fits within the broader landscape of the Basin's hatchery mitigation for dams and development impacts to fish, and how managers adaptively use best management practices to improve artificial production while working toward meeting mitigation and conservation objectives. We highlight examples from the Program that demonstrate how AP is critical to maintaining harvest opportunities, and preventing and/or restoring extirpation of fish populations. We include Program-scale observations and topics for the region to consider ahead of the next Program amendment process. This assessment, along with other categorical assessments, will provide critical information to the Council and region on the implementation and performance of the Program in anticipation of the upcoming Program amendment.

Relevance: Beginning with the first Program in 1982, every fish and wildlife Program has included references to aspects of Program performance. The 2020 Program addendum addresses Program performance through (1) reorganizing and compiling Program goals and objectives and (2) developing strategy performance indicators. Council staff are assessing Program performance through three complementary efforts: the first is the Program Retrospective (presentations in 2022 and 2023), the second is assessments of implementation by major category of work (Categorical Assessments), and the third is an evaluation of progress toward reaching Program Goals and Objectives.

Workplan: Item 4.3 Program Performance- Artificial Production Categorical Assessment

Background: The Northwest Power and Conservation Council's Columbia River Basin Fish and Wildlife Program represents a 40-year effort to mitigate the effects of the hydropower system on fish and wildlife in the Columbia Basin. The scope of 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. There is limited precedent for assessing the performance of a program of this size. Given this scale, we developed an overall approach to manage the volume and complexity of information.

The performance assessment includes three complementary efforts- the Program Retrospective, assessments of Program implementation by major category of work (Categorical Assessments), and an evaluation of progress toward Program Goals and Objectives.

In 2024, staff released a retrospective of the Northwest Power and Conservation Council's Fish and Wildlife Program that included a review of the Program's history and key events. This historical context provided information on why different elements have been included in the Program over time, what kind of changes were expected to occur, where those changes could occur, and when they could occur. In preparing this retrospective, we went through a detailed process to assemble the full set of measures called for across 40 years of Programs. These were organized by topic so that we could determine how the Program has changed over time and when different topics came to prominence, along with identifying major topics in each Program. Staff presented on the Retrospective in 2022 and 2023 and it was a one-time review of past Programs.

The categorical assessments provide more detailed information on implementation of the major topics identified in the retrospective. These are organized according to four main *categories* in the Program:

Hydrosystem, Habitat, Artificial production, and Program Adaptive Management. For 2024, we will present a summary of the first three categories. In each assessment, we describe (1) what was called for in the Program, (2) what was implemented, and (3) how implementation compares to available benchmarks. These assessments incorporate content from existing summaries (e.g., the Program Tracker with Strategy Performance Indicators, published research or reports, and dashboards on particular topics) and also include new summaries from a variety of information sources. Strategy Performance Indicators are updated annually on Program Tracker, and categorical assessments will be updated prior to Program amendments, approximately every five years.

The third piece of program performance is evaluating progress toward the goals and objectives described in the 2020 addendum. The status and trends of these goals and objectives will be presented in December 2024 and will be available on the Council's expanded Program Tracker web tool at that time. Evaluating progress relies on multiple sources of data, including the SPIs. Goals and objectives will be updated annually on Program Tracker.

In this inaugural Artificial Production categorical assessment, over 90 Program actions were reviewed following the approach described above. For this presentation, we selected a subset of actions that include emphasis on hatchery production for upriver interior-basin Salmon and Steelhead, producing fish to support harvest and conservation, resident fish substitution programs in blocked areas, and native fish conservation efforts. This overview of the Program's AP facilities and production programs will highlight how the Program fits within the broader landscape of the Basin's hatchery mitigation for dams and development impacts to fish, and how managers adaptively use best management practices to improve artificial production while working toward meeting mitigation and conservation objectives. We highlight examples from the Program that demonstrate how AP is critical to maintaining harvest opportunities, and preventing and/or restoring extirpation of fish populations. We include Program-scale observations and issues or challenges for the region to consider ahead of the next Program amendment process.

Staff will release supplementary documentation on the Artificial Production assessment prior to the call for recommendations to amend the Fish and Wildlife Program. The staff considers this work to be iterative and welcomes feedback even as this particular category of work wraps up for 2024 in order to assess implementation of other categories before the start of the amendment process. In future years, assessments will build off the framework developed this year and will include additional measures, expanded documentation, and further opportunities for feedback.

Collectively, the retrospective, categorical assessments, and status and trends assessment will provide critical information to the Council and

region on the Fish and Wildlife Program and serve as an educational resource leading up to the next Program amendment.

More Info: https://www.nwcouncil.org/fish-and-wildlife/hatcheries/

Highlights from the first categorical assessment focused on the Hydrosystem were presented to the Council in October 2023 and September 2024. The slides and presentations are available here:

https://www.nwcouncil.org/fs/18487/2023_10_f4.pdf
https://vimeo.com/874878458#t=143m59s
Link to September 2024

The full presentations on the Program Retrospective were delivered to the Fish and Wildlife Committee in 2022 and the full Council in 2023. Those presentations are available here:

August 2022: https://www.nwcouncil.org/fs/17876/2022_08_f1.pdf
September 2022: https://www.nwcouncil.org/fs/18031/2022_09_f2.pdf
May 2023: https://www.nwcouncil.org/fs/18305/2023_05_1.pdf

The retrospective is available on the Council's website here:
https://www.nwcouncil.org/fs/18802/retrospective.pdf

Artificial production categorical assessment: Implementation overview

Maureen Hess, Kate Self, Patty O'Toole

Council Meeting
October 8, 2024

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

Outline

I. Approach to Program Performance

II. Components of artificial production (AP) Categorical Assessment

III. Implementation of artificial production measures in the Program

IV. Resources and considerations ahead of the next Program Amendment

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

Part I.

- Retrospective of Program history
- Categorical Assessments of implementation
- Tracking of Goals and Objectives

Part II.

- Overview – Columbia River Basin (CRB) artificial production
- Summary of artificial production-related strategies and measures in the Program

Part III.

- Overview – F&W Program artificial production: facilities and programs
- AP program highlights

Part IV.

- Considerations
- Resources: Hatchery website and Program Tracker tool

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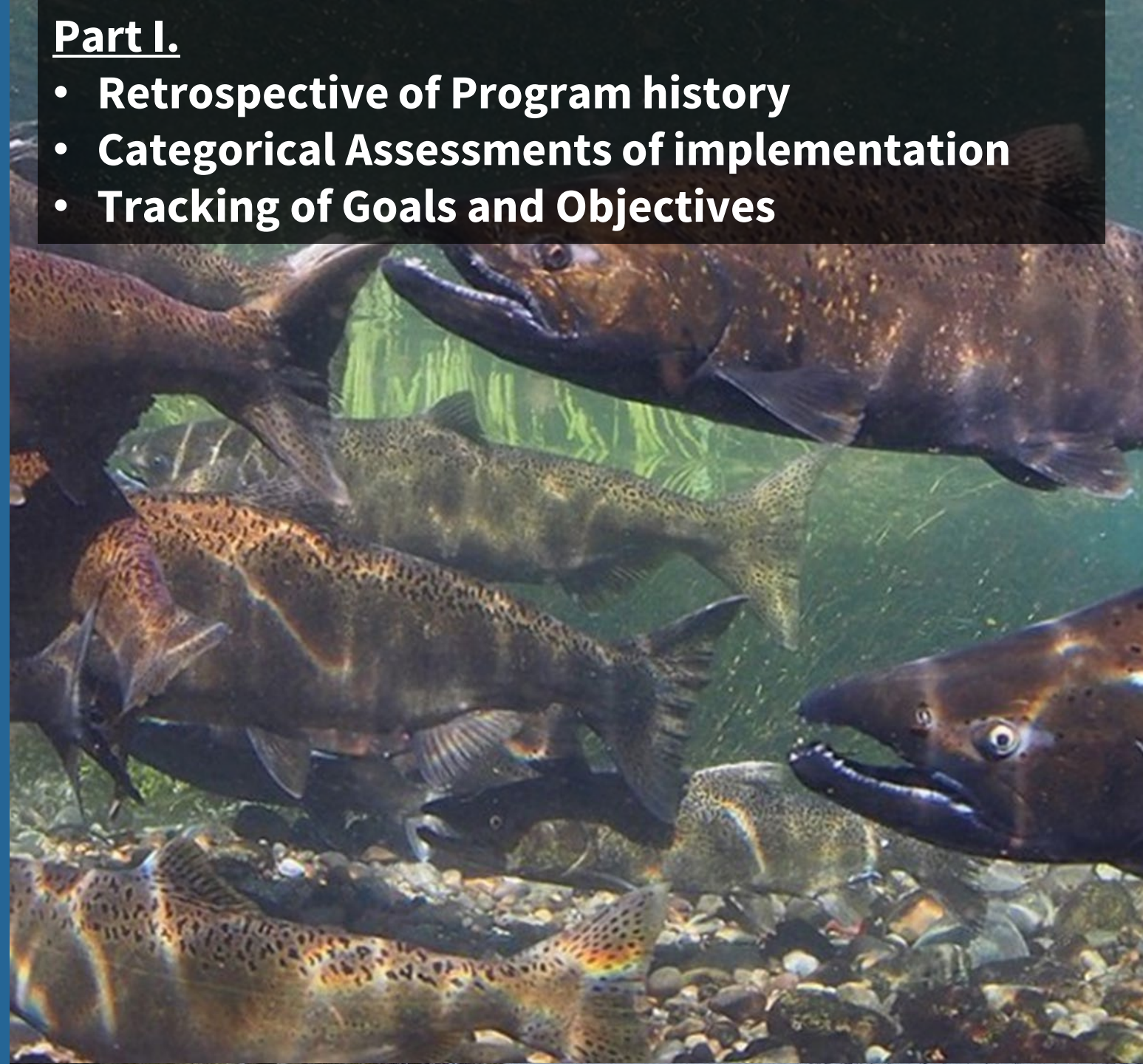
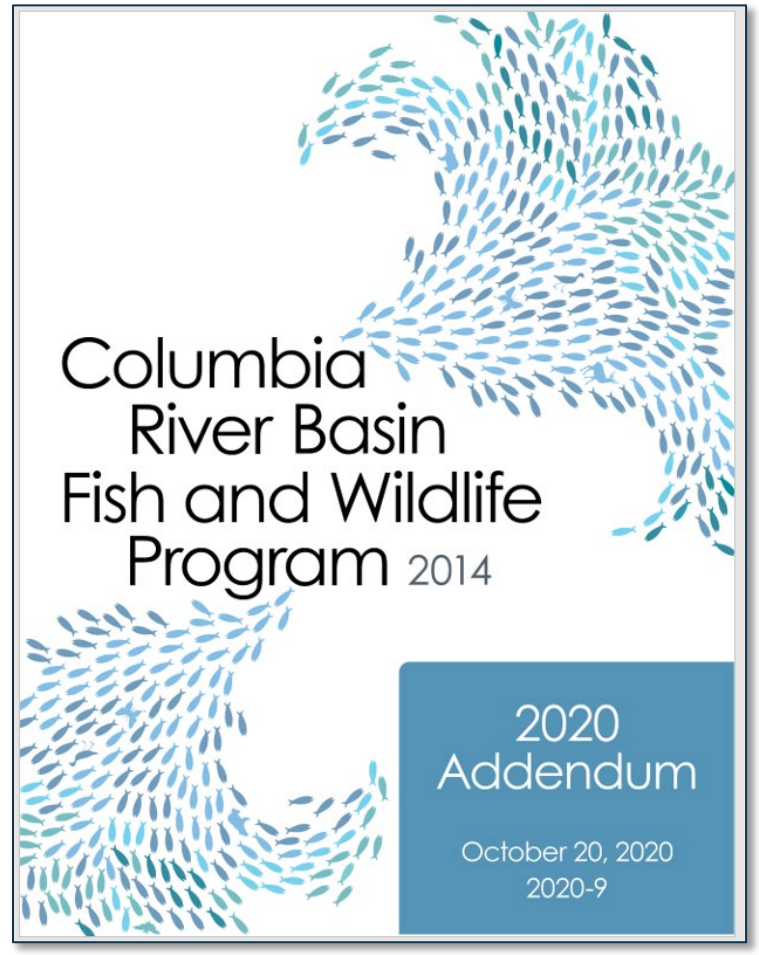
Part I.

- **Retrospective of Program history**
- **Categorical Assessments of implementation**
- **Tracking of Goals and Objectives**



Evaluating Performance of the Fish and Wildlife Program

- Called for in the Northwest Power Act
- Aspects of performance in every program
- Recent increased focus on understanding progress from 40 years of investment across the Columbia Basin
- Program performance evaluation is an educational resource: Identify key questions for region to consider in anticipation of next Program amendment

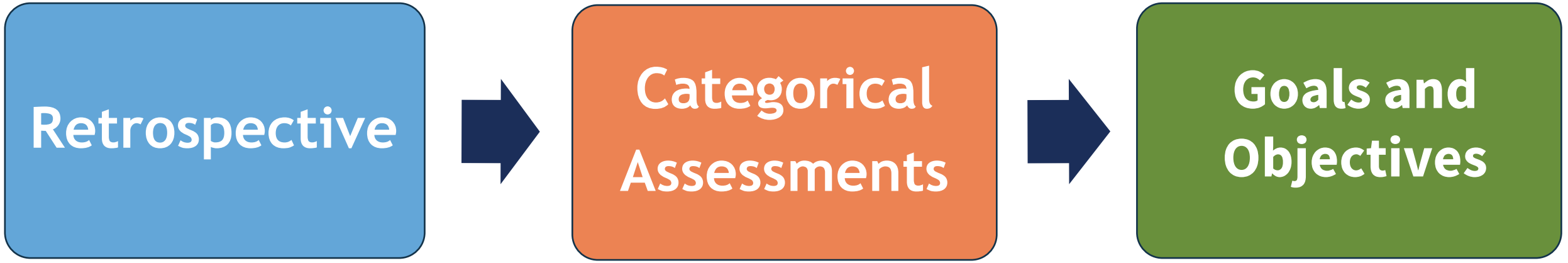


Our approach…

One-time document

Updated every five years

Tracker updated annually



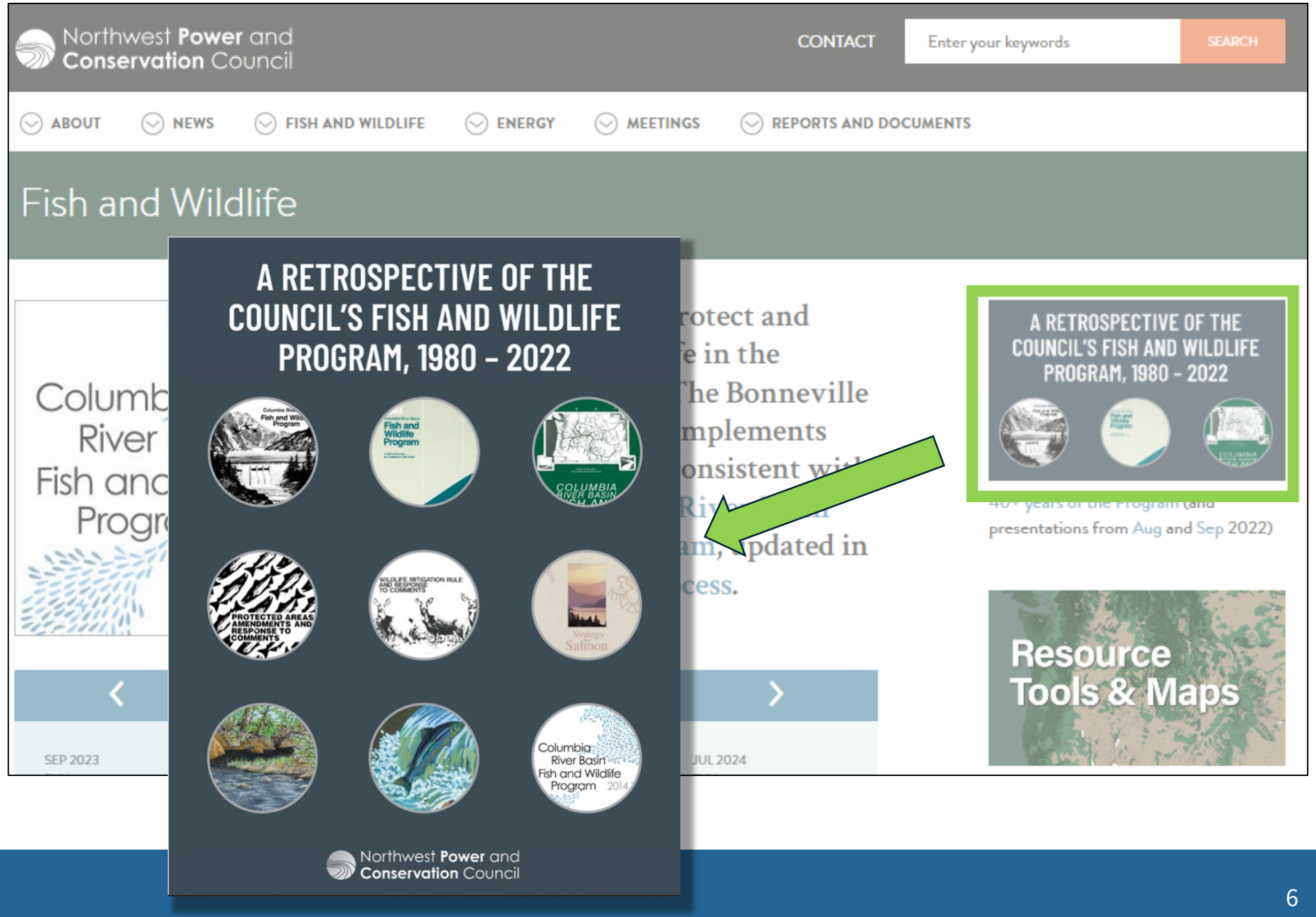
Program history and context

Describe Program implementation; uses SPIs (updated annually)

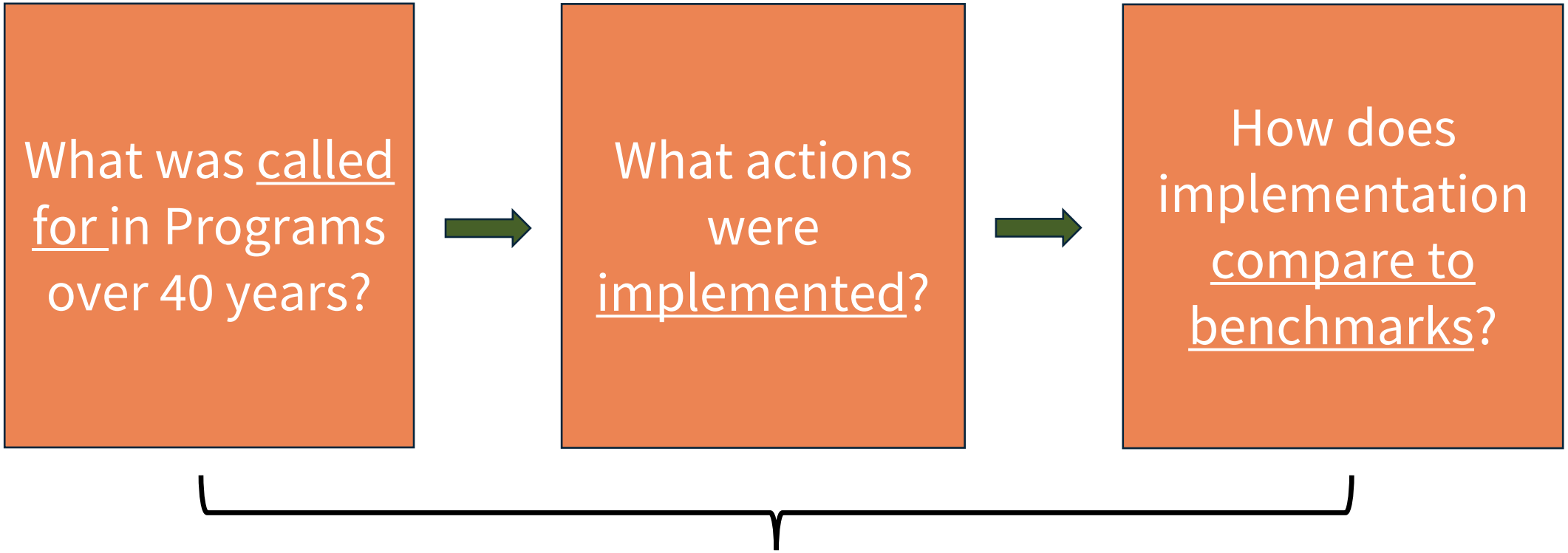
Status and trends

Retrospective

- **Identify major actions**
  - Development of Basin and Hydropower
  - Northwest Power Act
  - Program history and context by decade



Categorical assessment steps



- Report on implementation, progress, challenges
- Identify key questions for region to consider

Goals and objectives

Track progress toward Program goals and objectives from 2020 addendum

- 5 Goals
- 37 Objectives
- Associated SPIs

- Revising Program Tracker to include goals and objectives
- Each goal and objective has high level visual summary and is connected to associated SPIs
- All methods to summarize data documented on Tracker
- December presentation on progress toward goals and objectives

Outline

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

Part II.

- Overview – Columbia River Basin (CRB) artificial production
- Summary of artificial production-related strategies and measures in the Program

Key messages

- The Basin's system of hatcheries serves the primary purpose to mitigate impacts to fish from dams and development.
- Hatcheries balance and manage risk while working toward meeting mitigation and conservation objectives.

Council's Program emphasizes:

- Restoring habitat is not enough: Develop hatchery programs to complement habitat restoration.
- Locate hatchery production to interior regions above Bonneville.
- Conservation programs and harvest opportunities.
- Use RM&E and best available science to manage programs adaptively.

THE COLUMBIA RIVER BASIN

Then

10-16

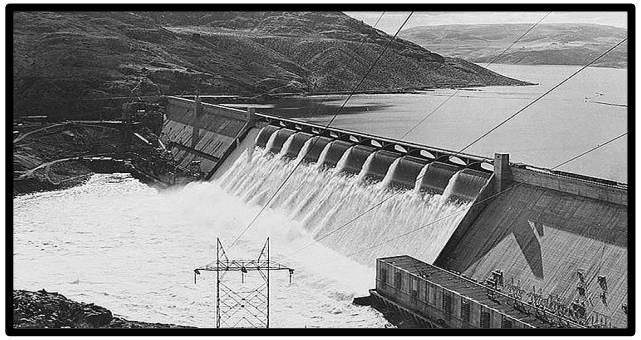
Prior to 1850

Salmon and Steelhead Annual Returns (Million)

Now

1.8

2014-2018 Average at the Columbia River Mouth



Columbia River Salmon and Steelhead abundance over time: late 1800s

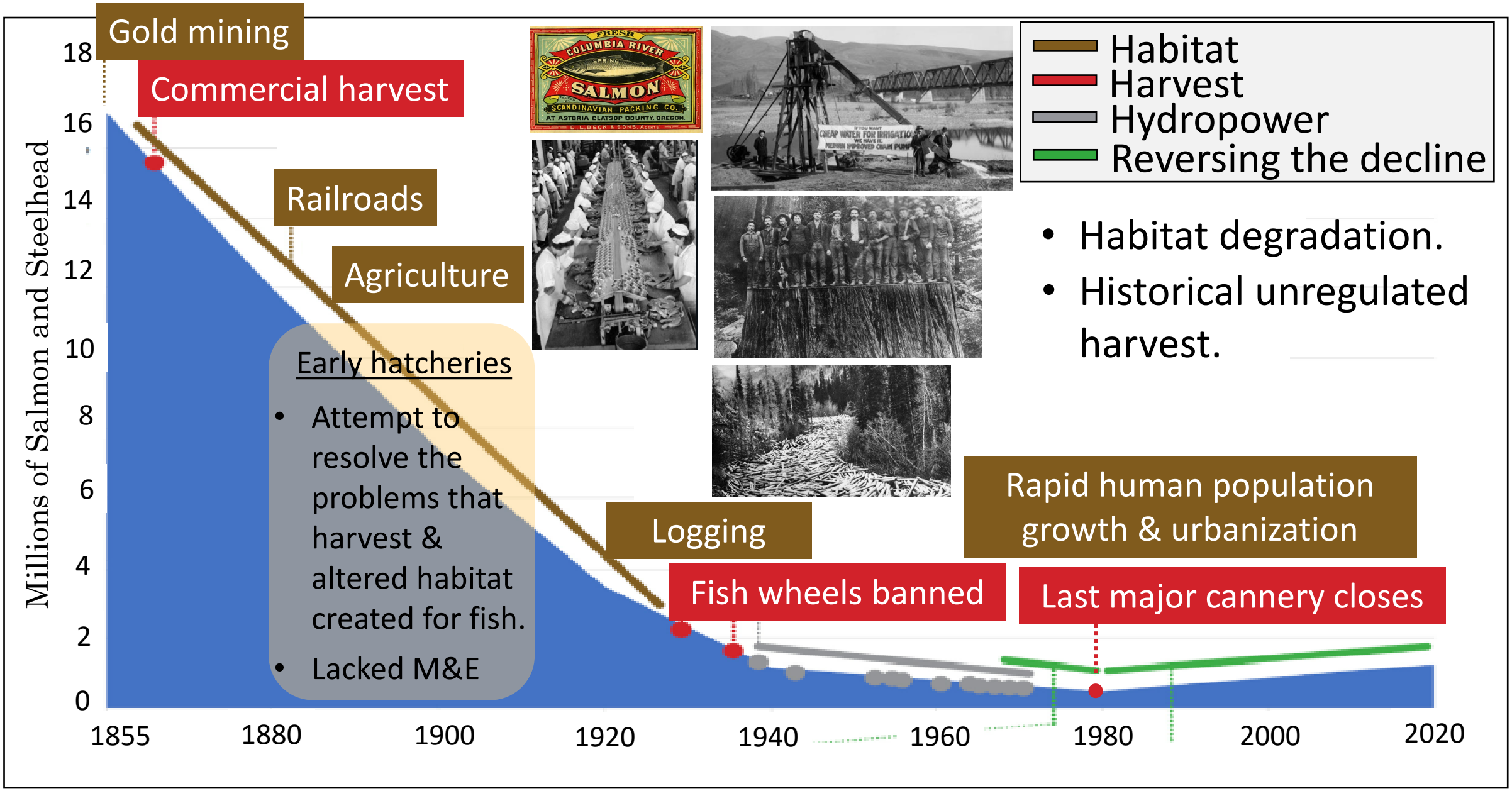
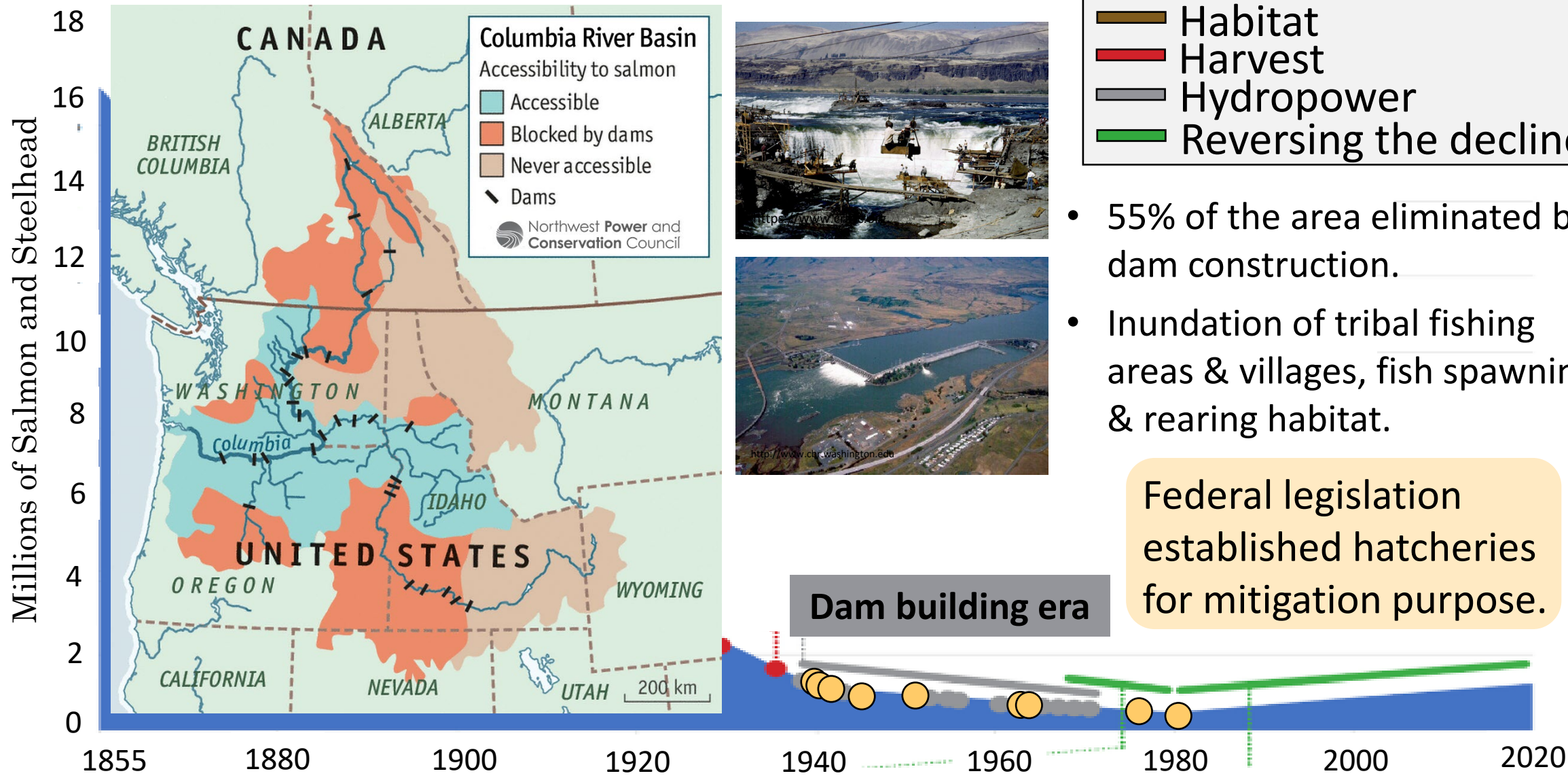


Figure adapted from Fivecrows et. al. 2023

Columbia River Salmon and Steelhead abundance over time: 1930s – 1970s

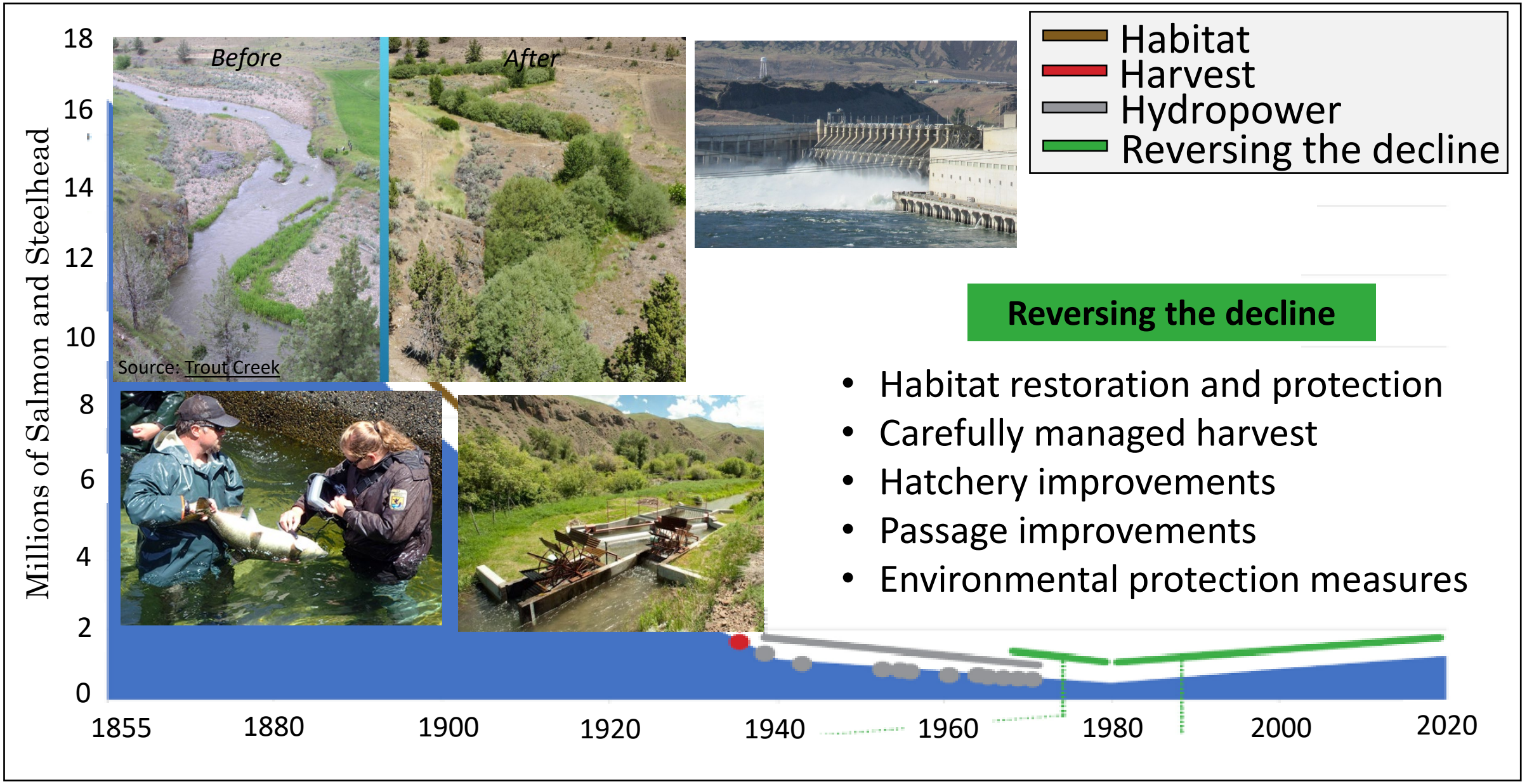


- 55% of the area eliminated by dam construction.
- Inundation of tribal fishing areas & villages, fish spawning & rearing habitat.

Federal legislation established hatcheries for mitigation purpose.

Figure adapted from Fivecrows et. al. 2023

Columbia River Salmon and Steelhead abundance over time: 1970s - today



Reversing the decline

- Habitat restoration and protection
- Carefully managed harvest
- Hatchery improvements
- Passage improvements
- Environmental protection measures

Figure adapted from Fivecrows et. al. 2023

Columbia River Salmon and Steelhead abundance over time

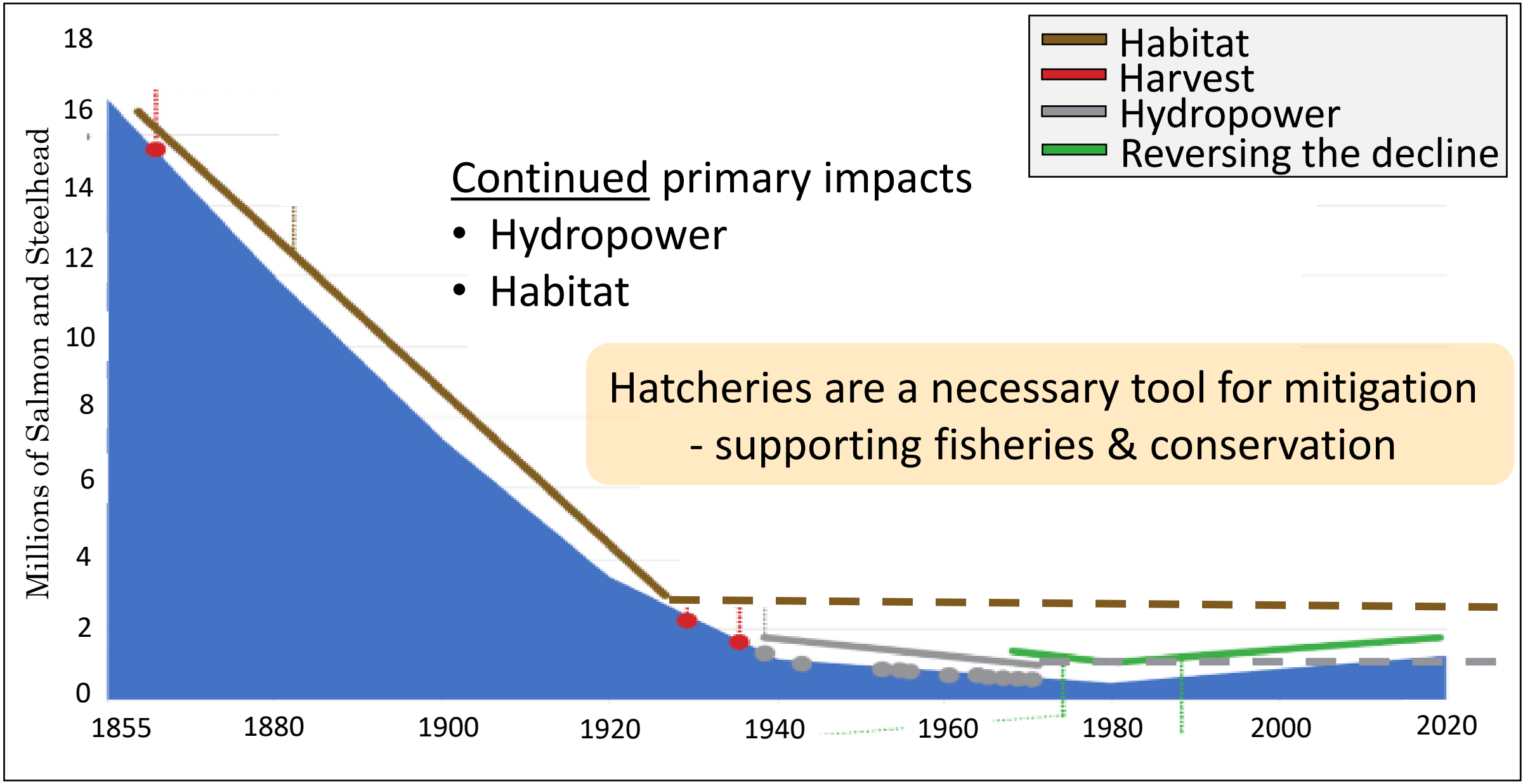


Figure adapted from Fivecrows et. al. 2023

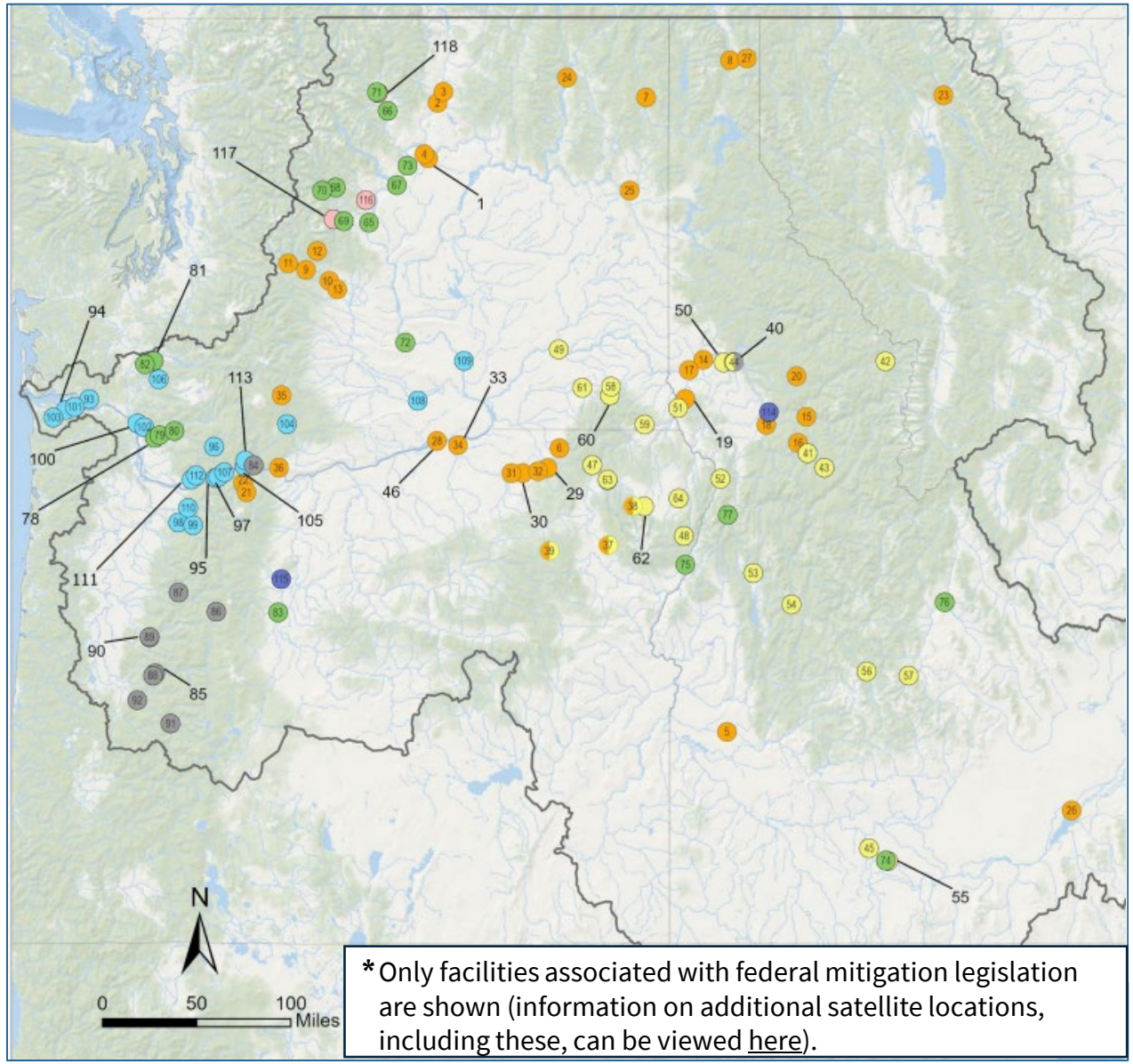
Columbia River Basin artificial production

- *Key points for next set of slides:*

	Historic	Contemporary
Purpose of hatcheries	Resolve problems that altered habitat and commercial harvest created for fish	Mitigation for hydropower dams and development impacts
Location in the basin	Primarily located in the lower river, below Bonneville Dam	Distributed more comprehensively throughout the basin, including resident fish
Operational requirements	None	Endangered Species Act consultation: HGMPs, risk analysis/evaluation of hatchery effects on listed species, permitting
Monitoring & Evaluation (M&E)	Programs lacked M&E	Decades of hatchery reform, review, adaptive management through established M&E programs
Management objectives	Harvest (support canneries, lower river, ocean)	Harvest (Treaty, non-Treaty) & Conservation (i.e., supplementation, reintroduction)

Columbia River Basin artificial production – purpose & location

*Hatchery facilities built/established as mitigation for dams and development**



* Only facilities associated with federal mitigation legislation are shown (information on additional satellite locations, including these, can be viewed here).

- 118 hatchery facilities
- 11 hatchery mitigation funding programs
- 5 anadromous Salmon & Steelhead species
  - Chinook Salmon
  - Coho Salmon
  - Chum Salmon
  - Sockeye Salmon
  - Steelhead
- Additional species (NPCC F&W Program)
  - Burbot
  - Pacific Lamprey
  - Trout (Rainbow, Brook, Lahontan Cutthroat, Westslope Cutthroat)
  - White Sturgeon

Columbia River Basin artificial production – mitigation for dams and development

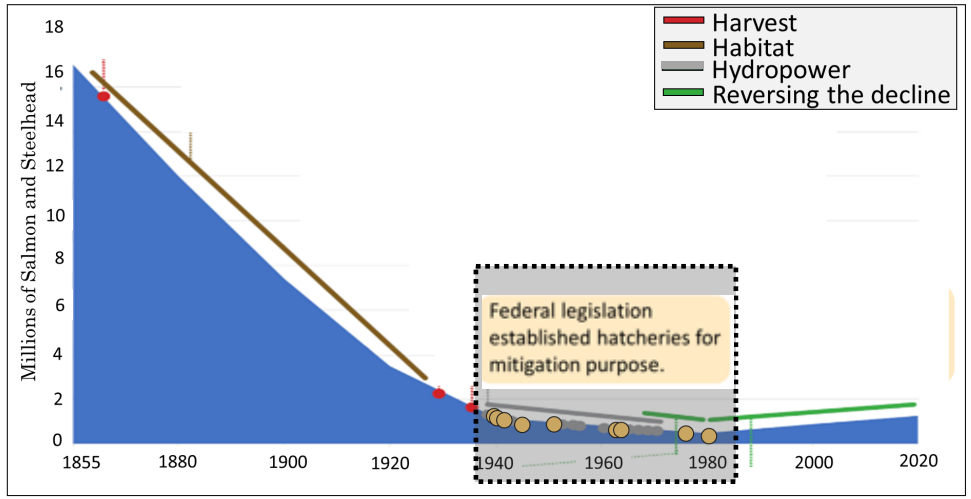


Figure adapted from Fluecrows et. al. 2023

Map will show the system of hatcheries built/established as mitigation

- Follows order of federal legislation through time

Warner W. Gardner, Assistant Secretary of the Interior – **1947** on building the Lower Snake River dams:

"The salmon run must, if necessary, be sacrified," adding: "The government's efforts should be directed toward ameliorating the impact of this development upon the injured interests and not toward a vain attempt to hold still the hands of the clock."

Canada
United States

*Main hatchery facilities represented, not including satellites.

200
Kilometers

N

Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – mitigation for dams and development

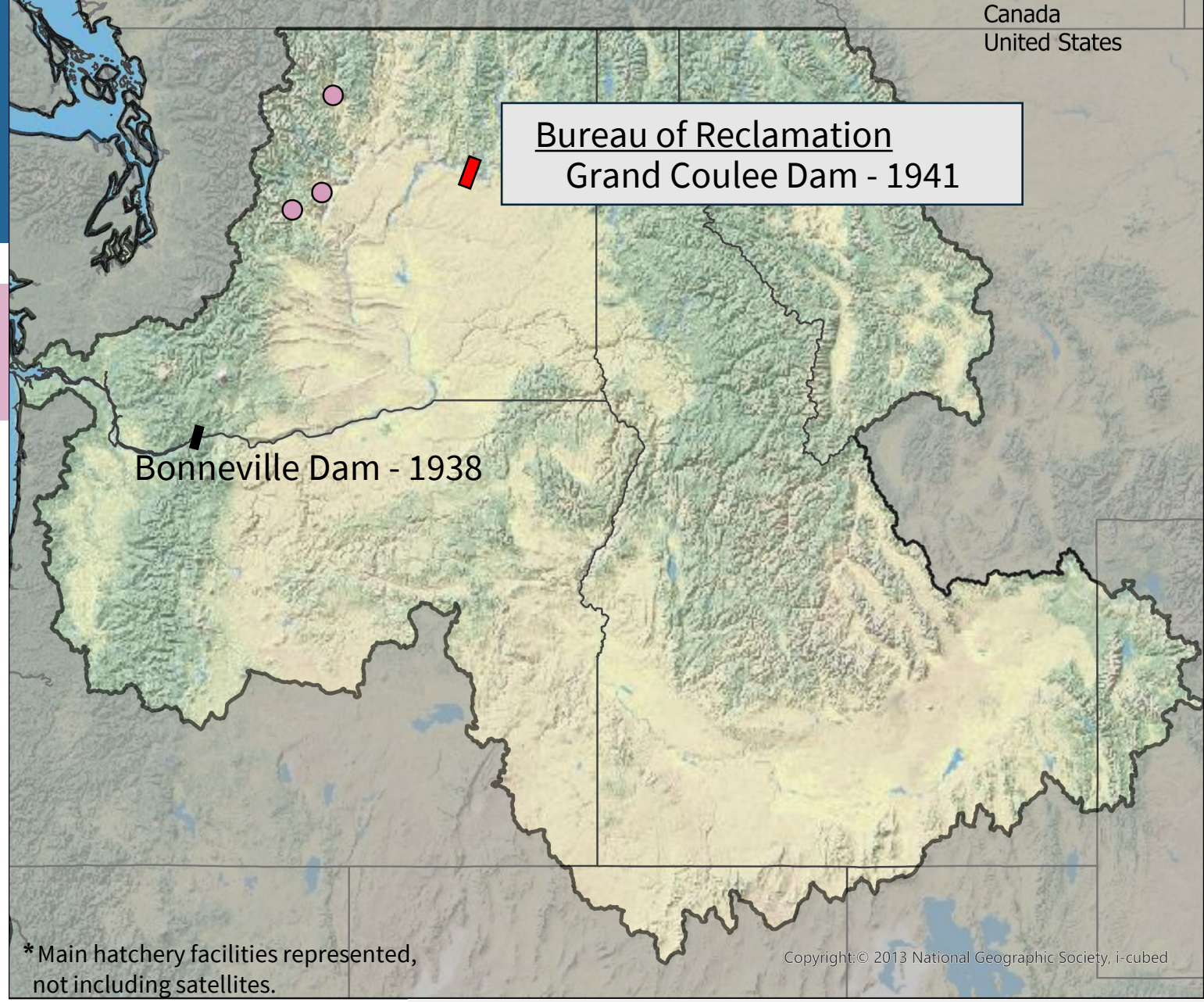
➢Bureau of Reclamation – Mitigation for Grand Coulee Dam

<u>Hatchery facilities</u>

- Entiat NFH - 1941
- Leavenworth NFH - 1942
- Winthrop NFH - 1942

<u>Federal Authorization</u>

- Grande Coulee Dam Project, 49 Statute 1028 – **1935**
- Reauthorized, Columbia Basin Project Act, 57 Statute 14 – 1943
- Reauthorized, Fish & Wildlife Coordination Act, 60 Statute 1080 - 1946



Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – mitigation for dams and development

- Mitchell Act - Mitigation for Columbia River development

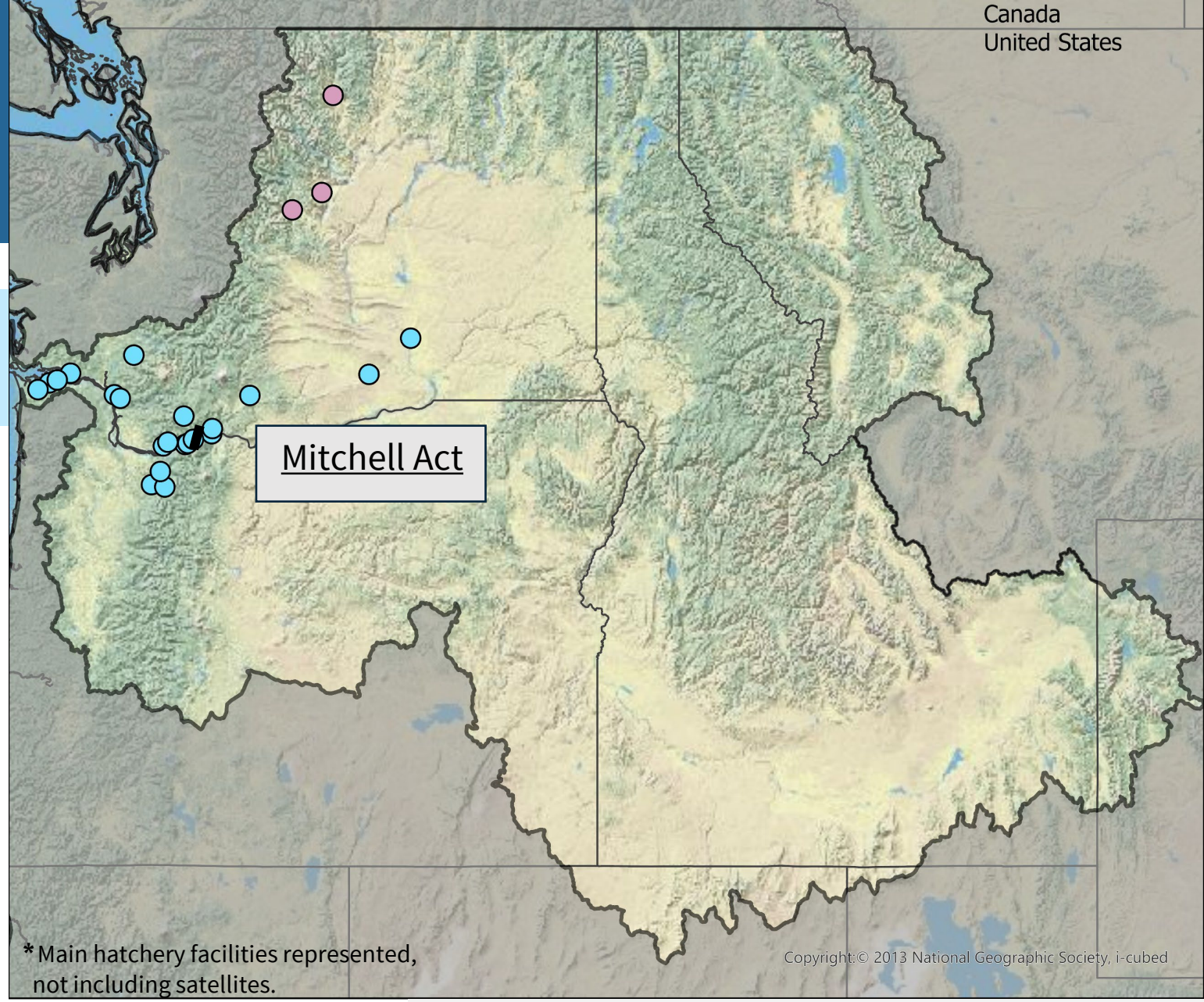
Hatchery facilities

21 facilities – most built 1950-60s

- 13 below Bonneville Dam
- 6 Bonneville pool
- 2 Columbia River above McNary Dam-

Federal Authorization

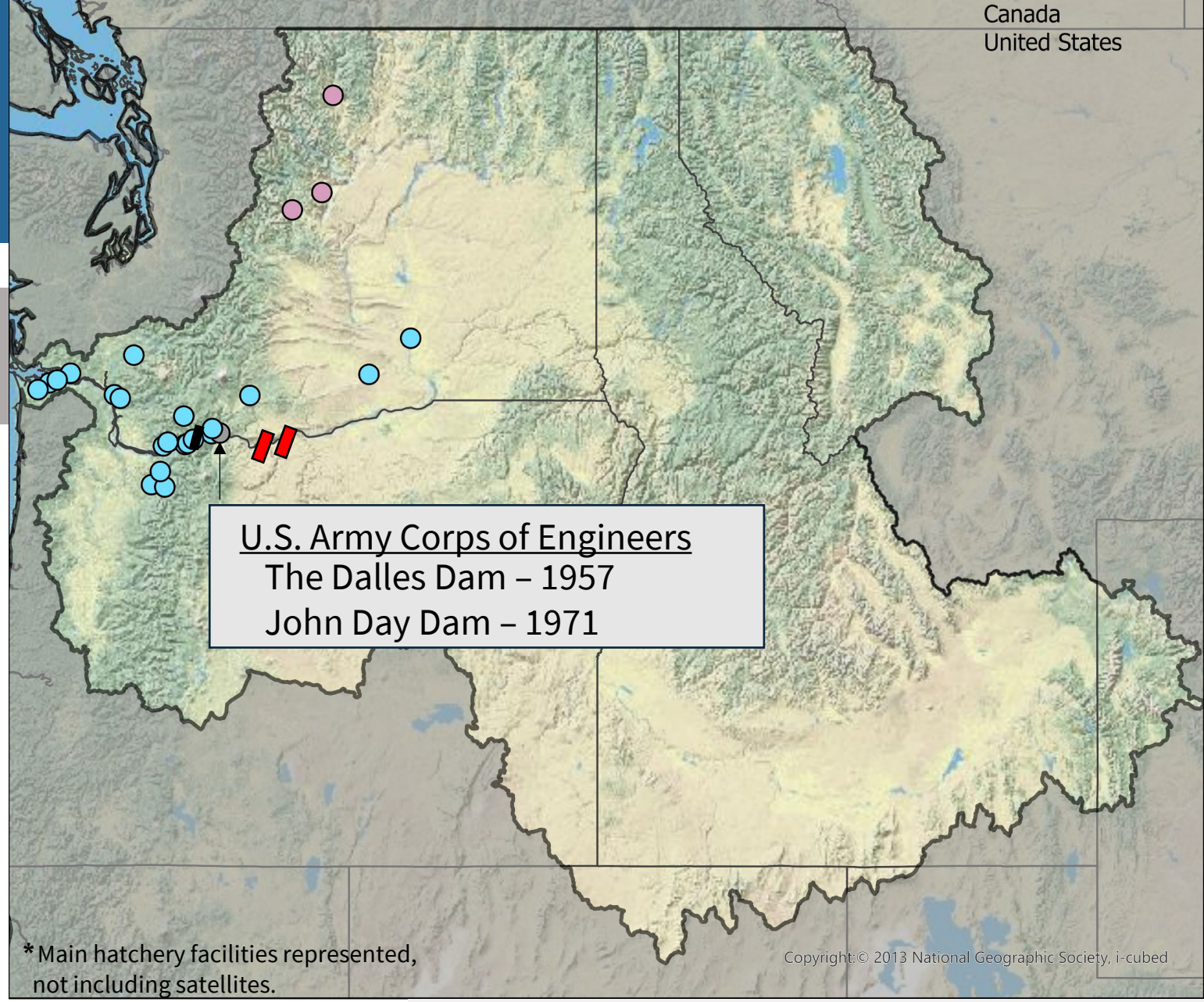
- Mitchell Act (Public Law 75-502) - **1938**



Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – mitigation for dams and development

- U.S. Army Corps of Engineers - Mitigation for John Day Dam



Hatchery facilities built/established as mitigation for dams and development

Hatchery facilities

- Spring Creek NFH - 1972

Federal Authorization

- Rivers and Harbors and Flood Control Act – **1950**
- P.L. 81-516, 64 Stat. 163, 179. 81st Congress, 2nd Session - 1950

Columbia River Basin artificial production – mitigation for dams and development

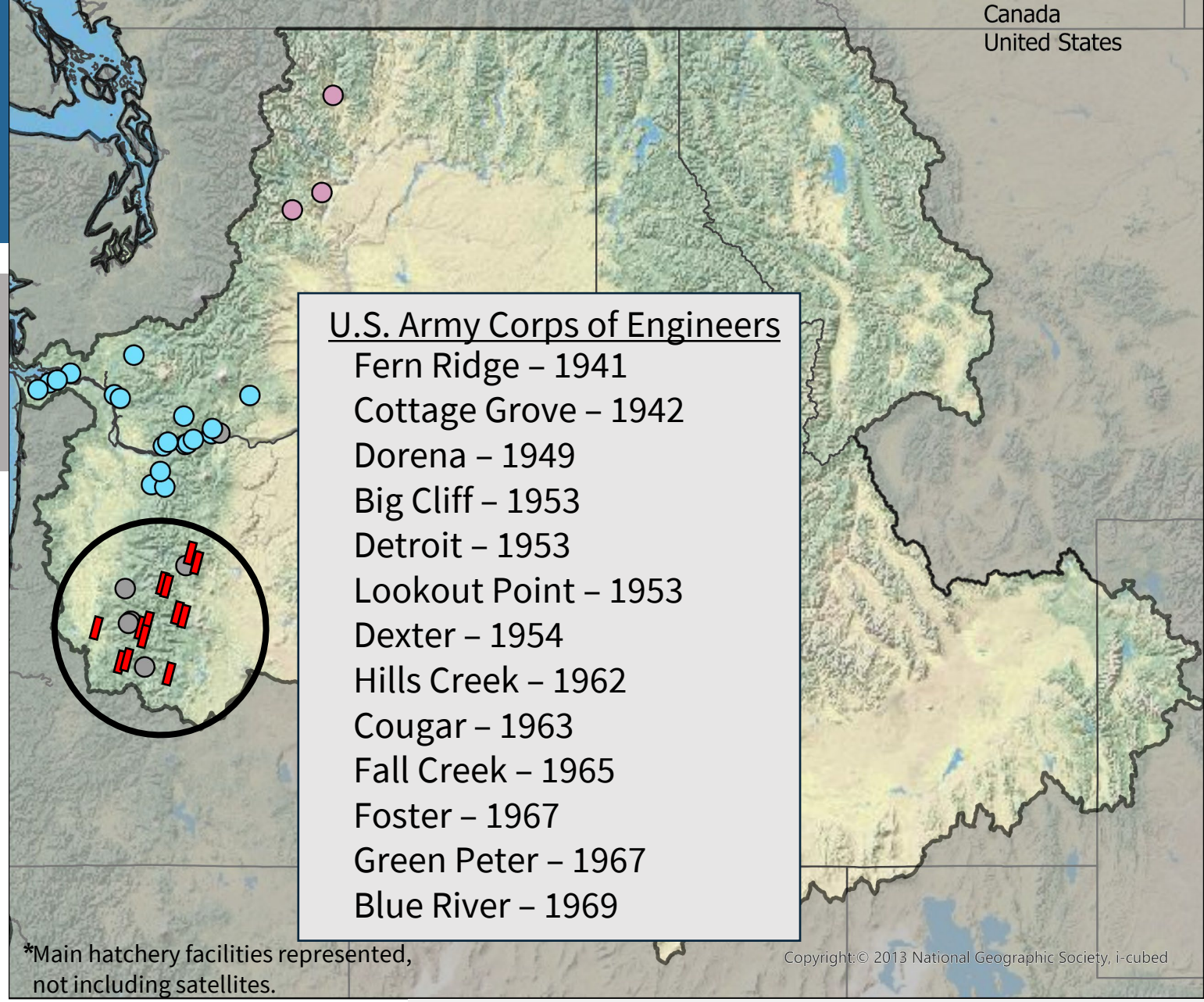
- U.S. Army Corps of Engineers - Mitigation for 13 Willamette Basin Dams

<u>Hatchery facilities</u>

- Marion Forks and satellite - 1951
- Leaburg - 1953
- Willamette and satellite – 1950s
- South Santiam and satellite - 1968
- McKenzie - 1975

<u>Federal Authorization</u>

- Act Authorizing the Construction of Public Works on Rivers and Harbors for Flood Control, and for Other Purposes - **1938**
- (52 Stat. 1215) and Flood Control Act of 1950 (P.L. No. 516-81) - 1950



Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – mitigation for dams and development

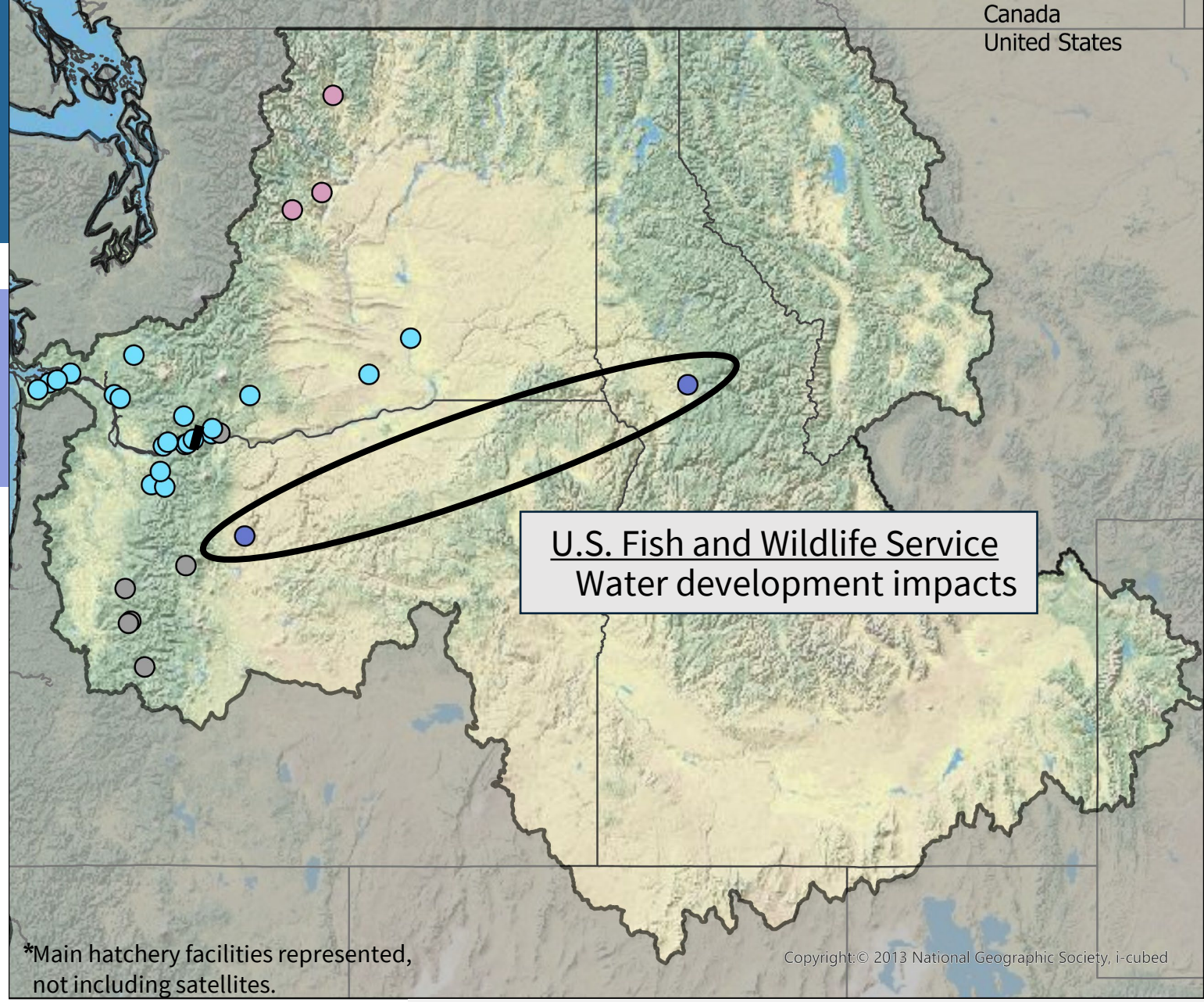
- U.S. Fish & Wildlife Service - Mitigation for Columbia River development

Hatchery facilities

- Kooskia NFH - 1969
- Warm Springs NFH - 1979

Federal Authorization

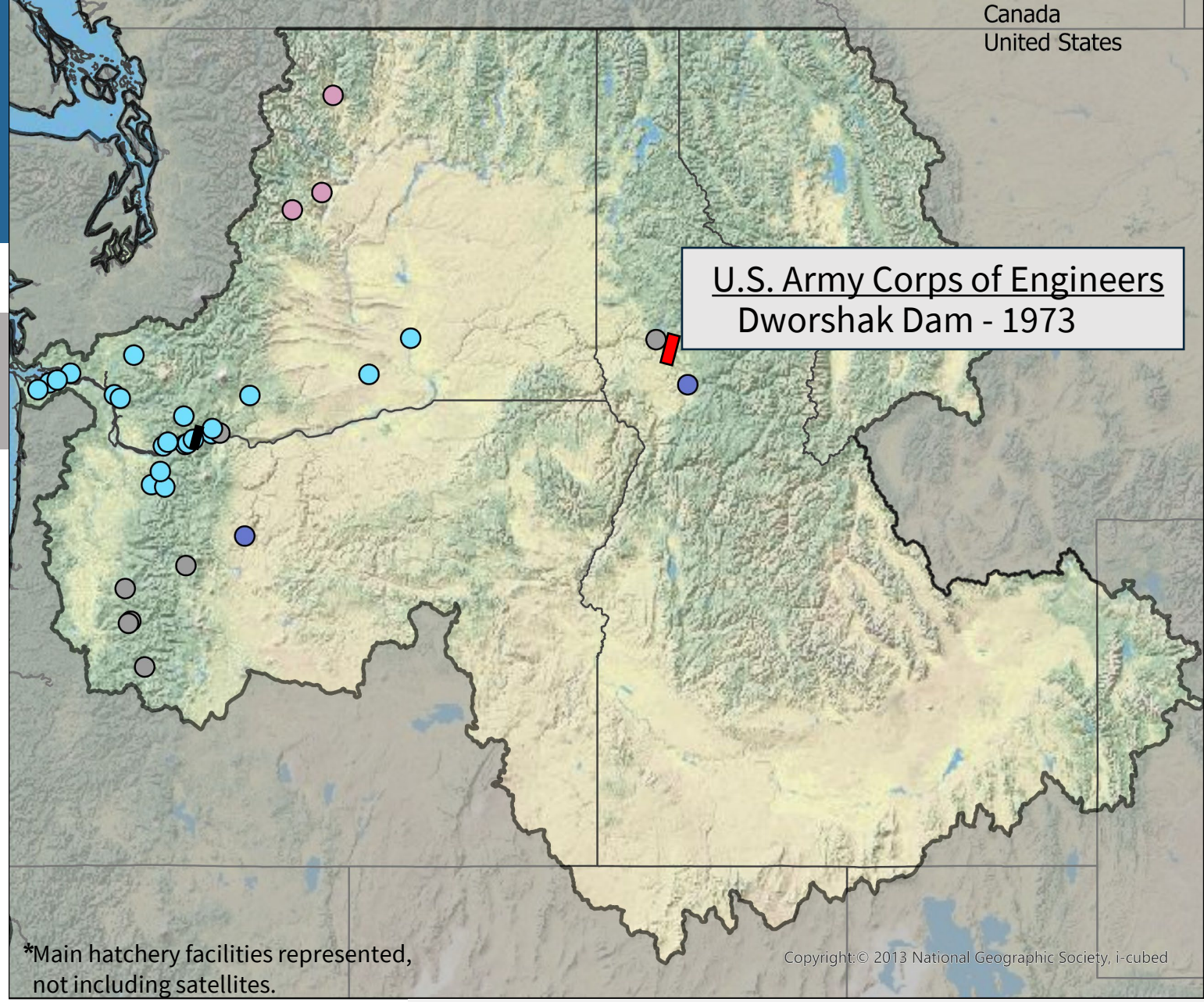
- Congressional Appropriation 1961 - 75 Statute 255 - **1961**



Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – mitigation for dams and development

➢ U.S. Army Corps of Engineers - Mitigation for Dworshak Dam



Hatchery facilities built/established as mitigation for dams and development

Hatchery facilities

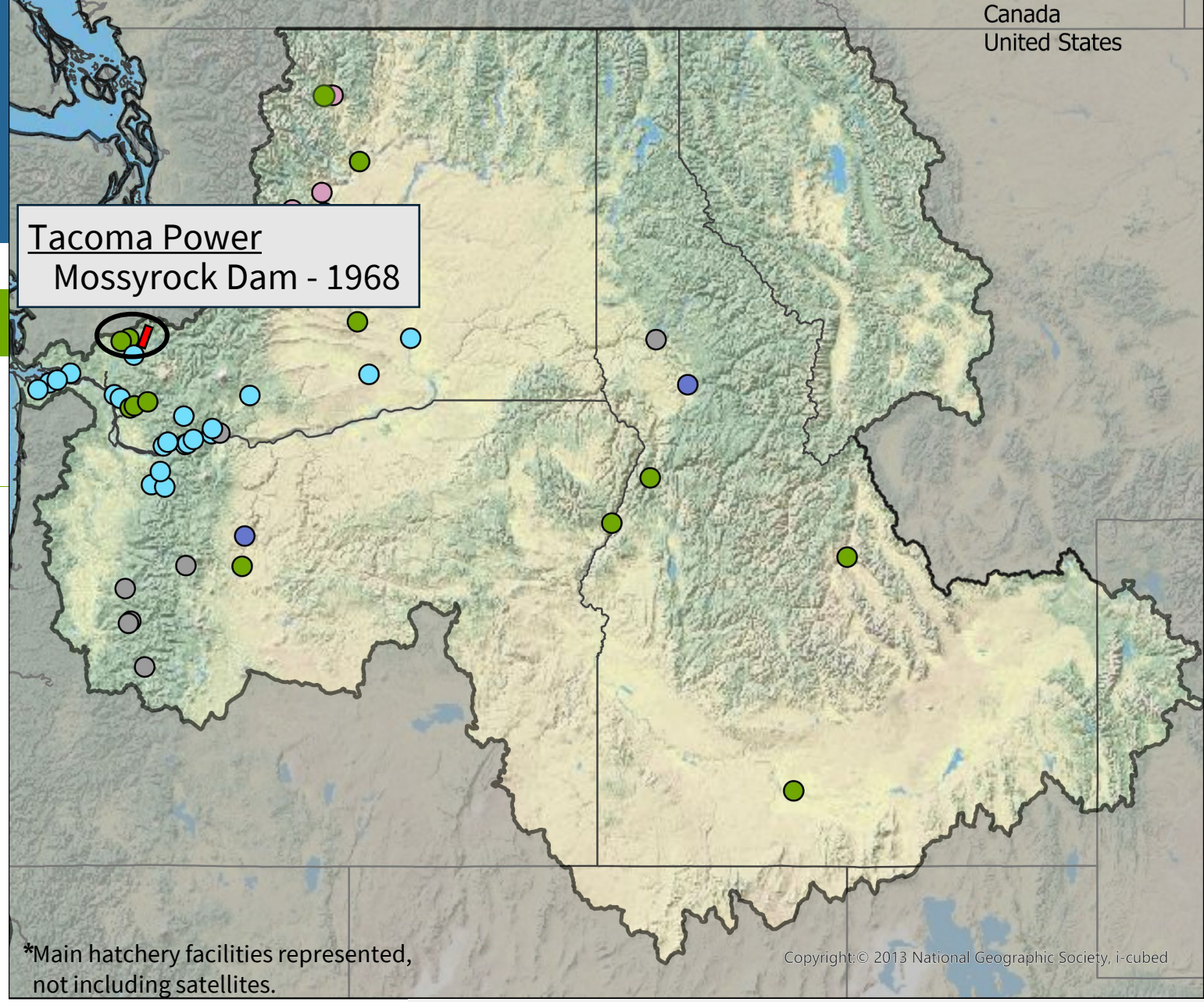
- Dworshak - 1969

Federal Authorization

- Flood Control Act of 1962, P.L. No. 87-874, 76 Sat. 1180 - **1962**

Columbia River Basin artificial production – mitigation for dams and development

➢ Private & Public Utilities



Hatchery facilities built/established as mitigation for dams and development

Hatchery facilities

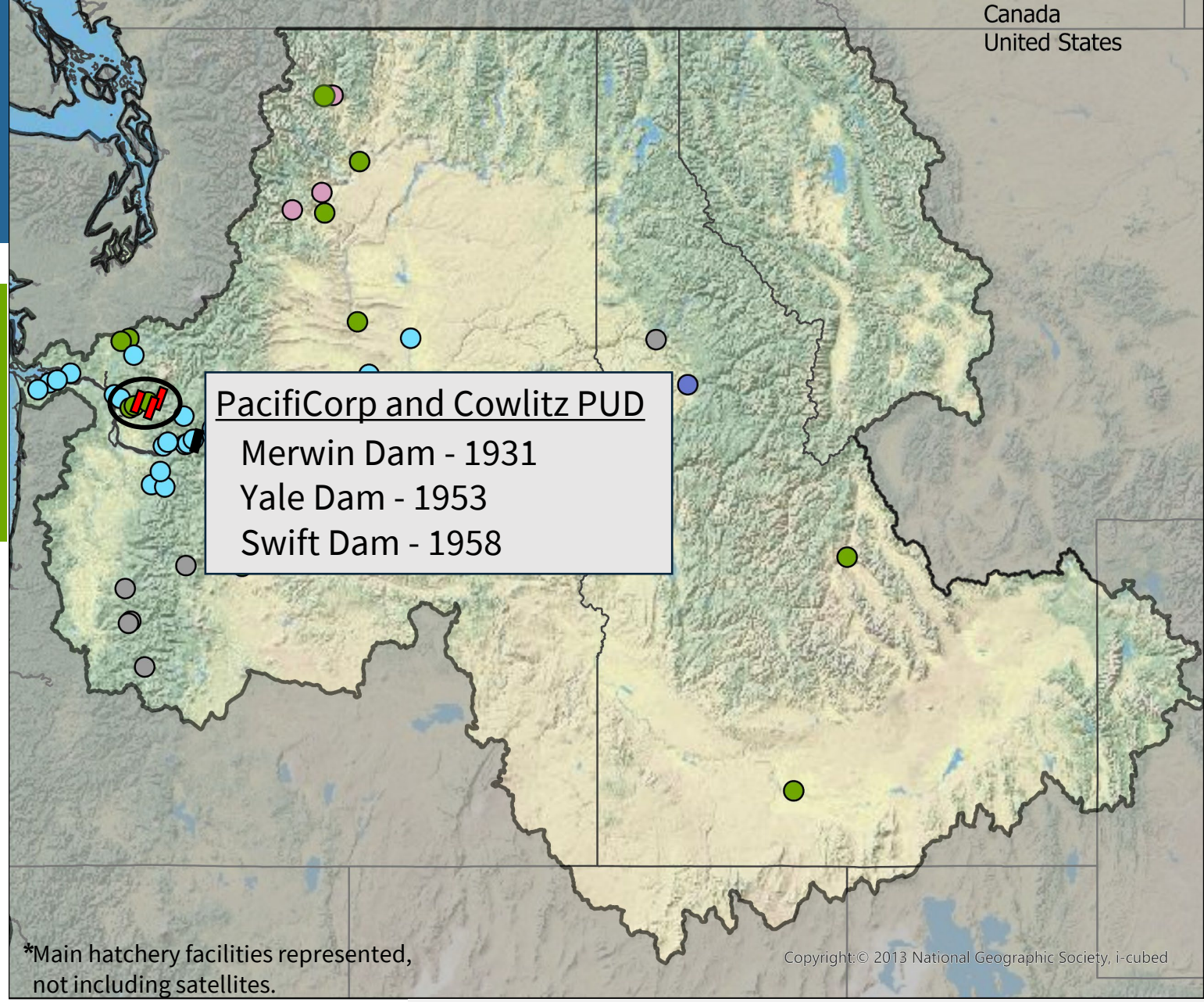
- Cowlitz Salmon – 1967
- Cowlitz Trout - 1967

Federal Authorization

- FERC license

Columbia River Basin artificial production – mitigation for dams and development

- Private & Public Utilities
  - PacifiCorps & Cowlitz PUD – mitigation for Lewis River dams



Hatchery facilities built/established as mitigation for dams and development

Hatchery facilities

- Lewis River – 1923
- Speelyai – 1958
- Merwin - 1993

Federal Authorization

- FERC license

Columbia River Basin artificial production – mitigation for dams and development

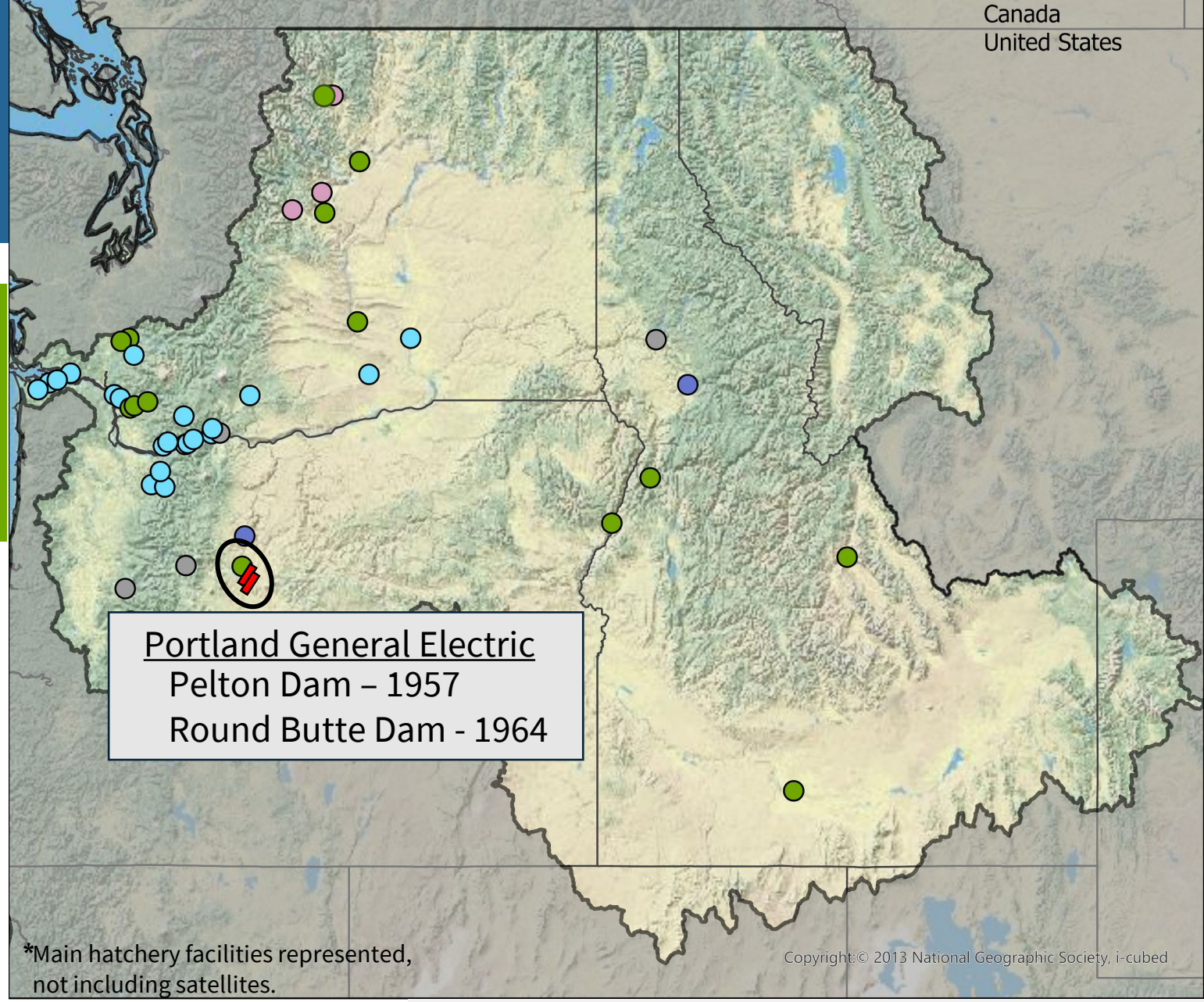
- Private & Public Utilities
  - Portland General Electric – mitigation for Pelton & Round Butte dam complex

Hatchery facilities

- Round Butte - 1972

Federal Authorization

- FERC license



Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – mitigation for dams and development

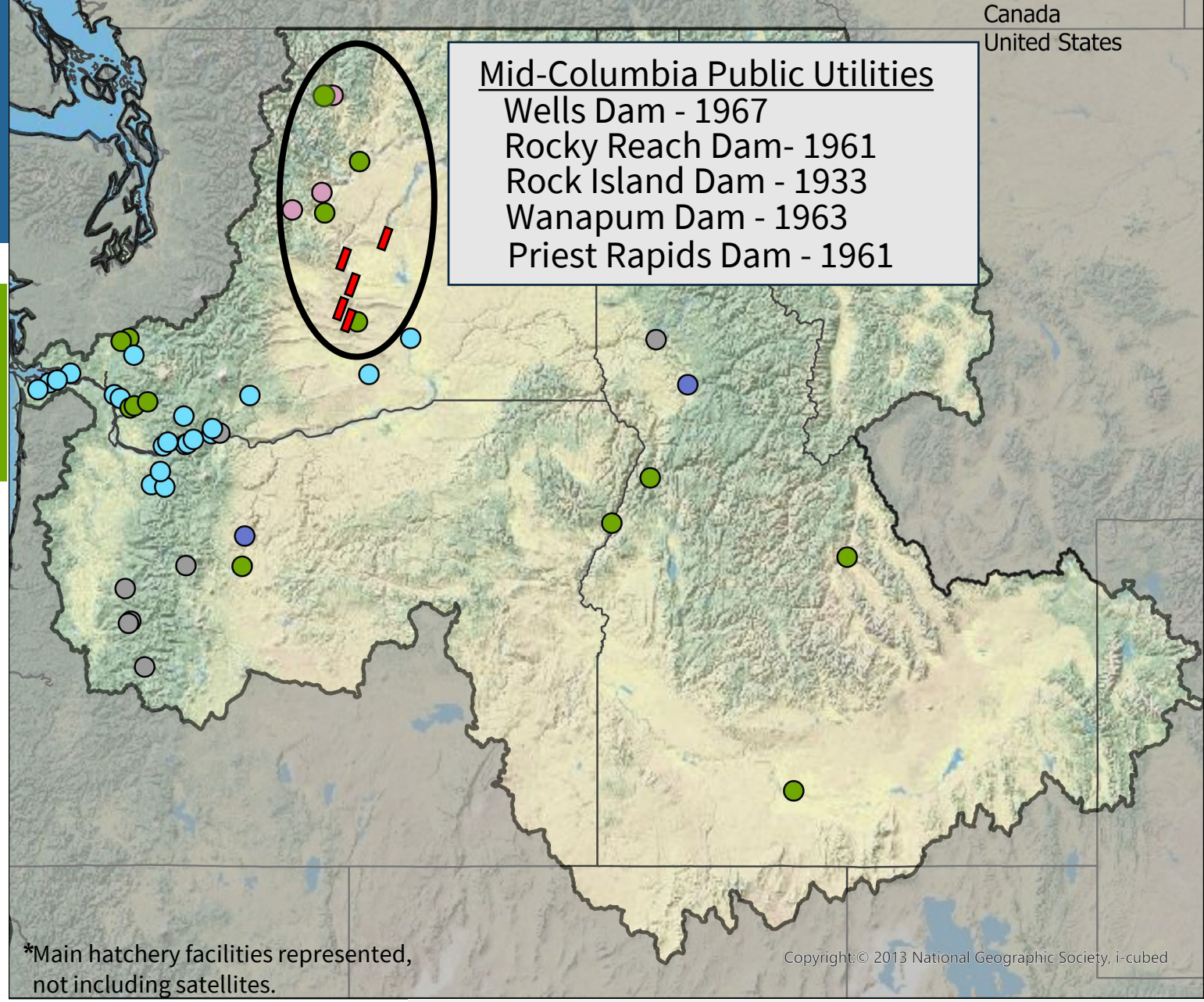
- Mid-Columbia public utility districts (Grant, Chelan, Douglas – mitigation for 5 dams

Hatchery facilities

- Priest Rapids – 1963
- Wells – 1967
- Eastbank and satellites – 1989
- Methow - 1992

Federal Authorization

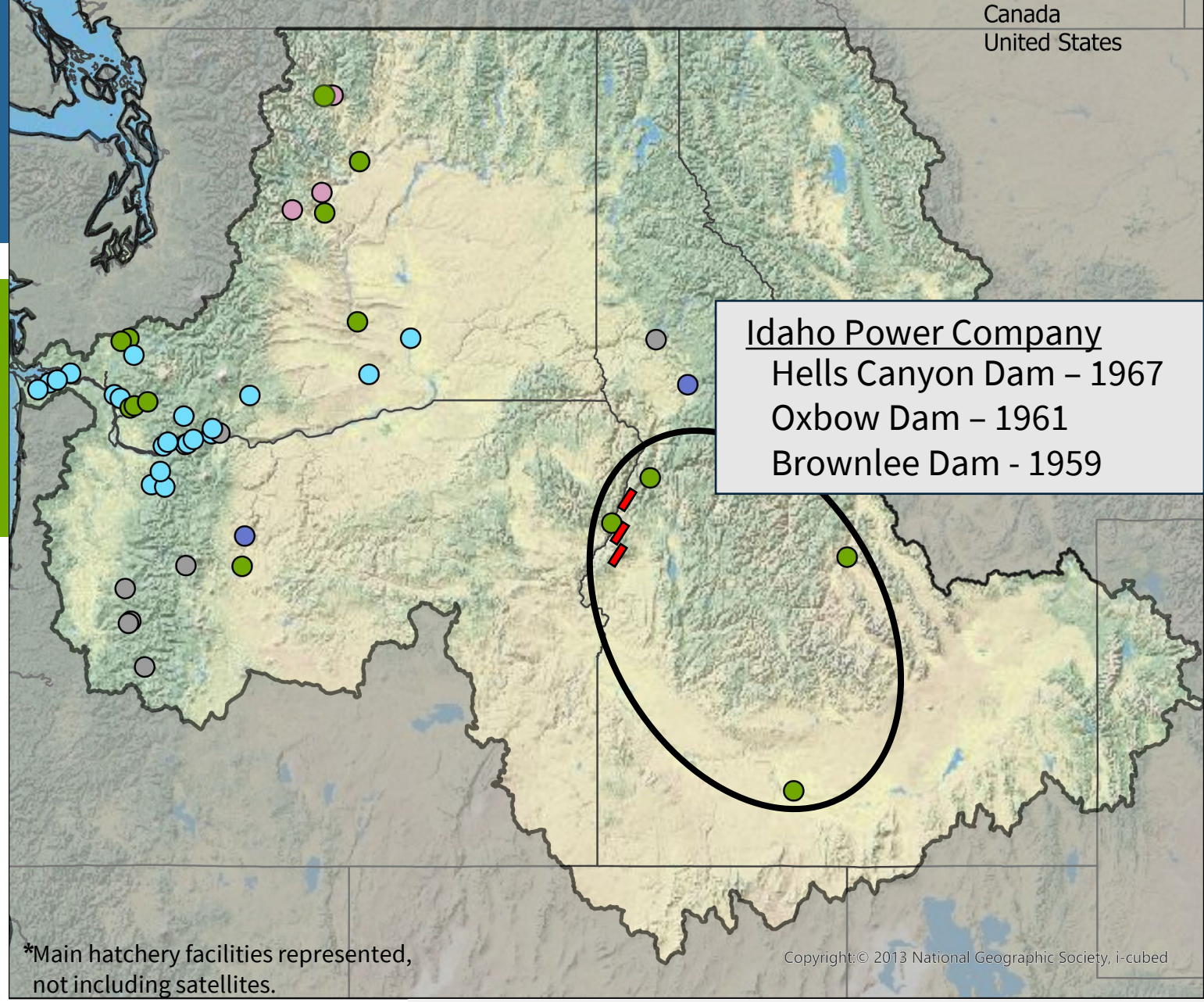
- FERC license



Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – mitigation for dams and development

- Private & Public Utilities
  - Idaho Power Company – mitigation for the Hells Canyon dam complex



Hatchery facilities built/established as mitigation for dams and development

Hatchery facilities

- Oxbow – 1962
- Rapid River – 1964
- Niagara Springs – 1966
- Pahsimeroi - 1969

Federal Authorization

- FERC license

Columbia River Basin artificial production – mitigation for dams and development

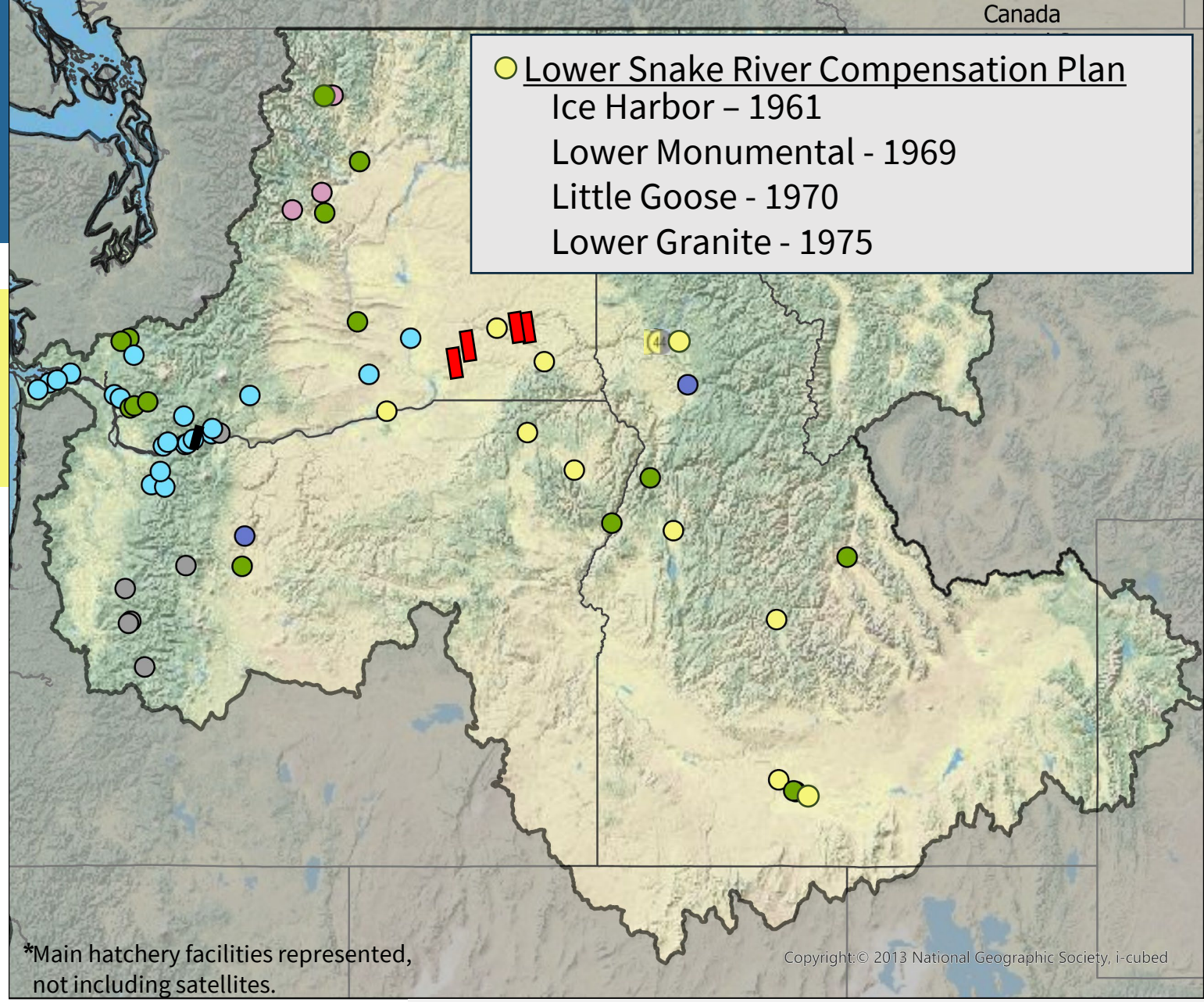
- Lower Snake River Compensation Plan – mitigation for 4 lower Snake River dams

Hatchery facilities

11 main facilities (not including satellites) – most built 1980s

Federal Authorization

- Water Resource Development Act (90 Stat. 2917) - **1976**



Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – mitigation for dams and development

- NW Power & Conservation Council's Columbia River Basin Fish & Wildlife Program – mitigation for the Federal Columbia River Power System

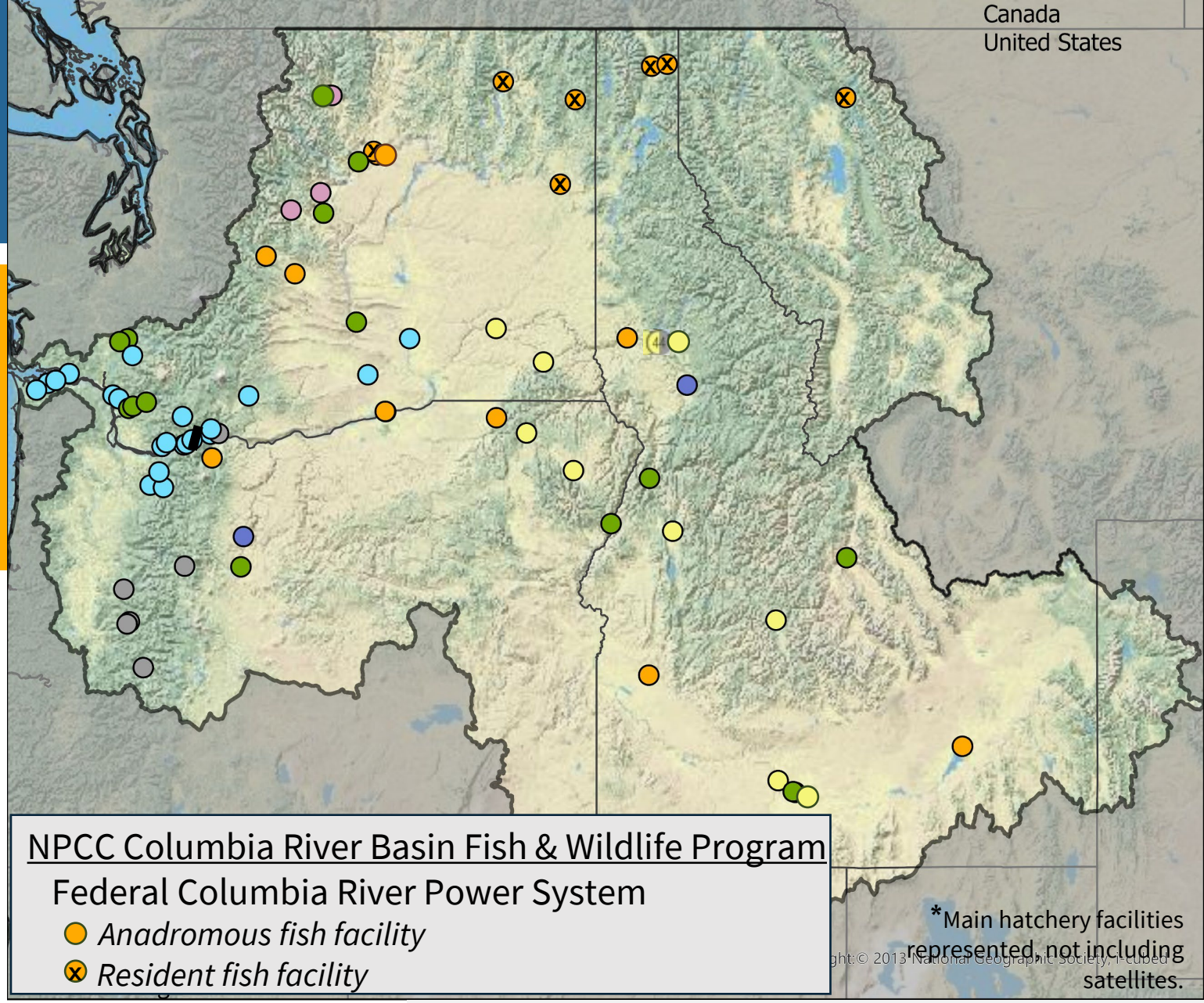
Hatchery facilities

16 main facilities (not including satellites) – most built 1990s, 2010s

- 9 anadromous
- 7 resident

Federal Authorization

- Northwest Power Act (Public Law 96-501) - **1980**



Hatchery facilities built/established as mitigation for dams and development

Columbia River Basin artificial production – purpose & location

Anadromous Salmon & Steelhead production programs

* Estimated from 2015 Fish Passage Center data

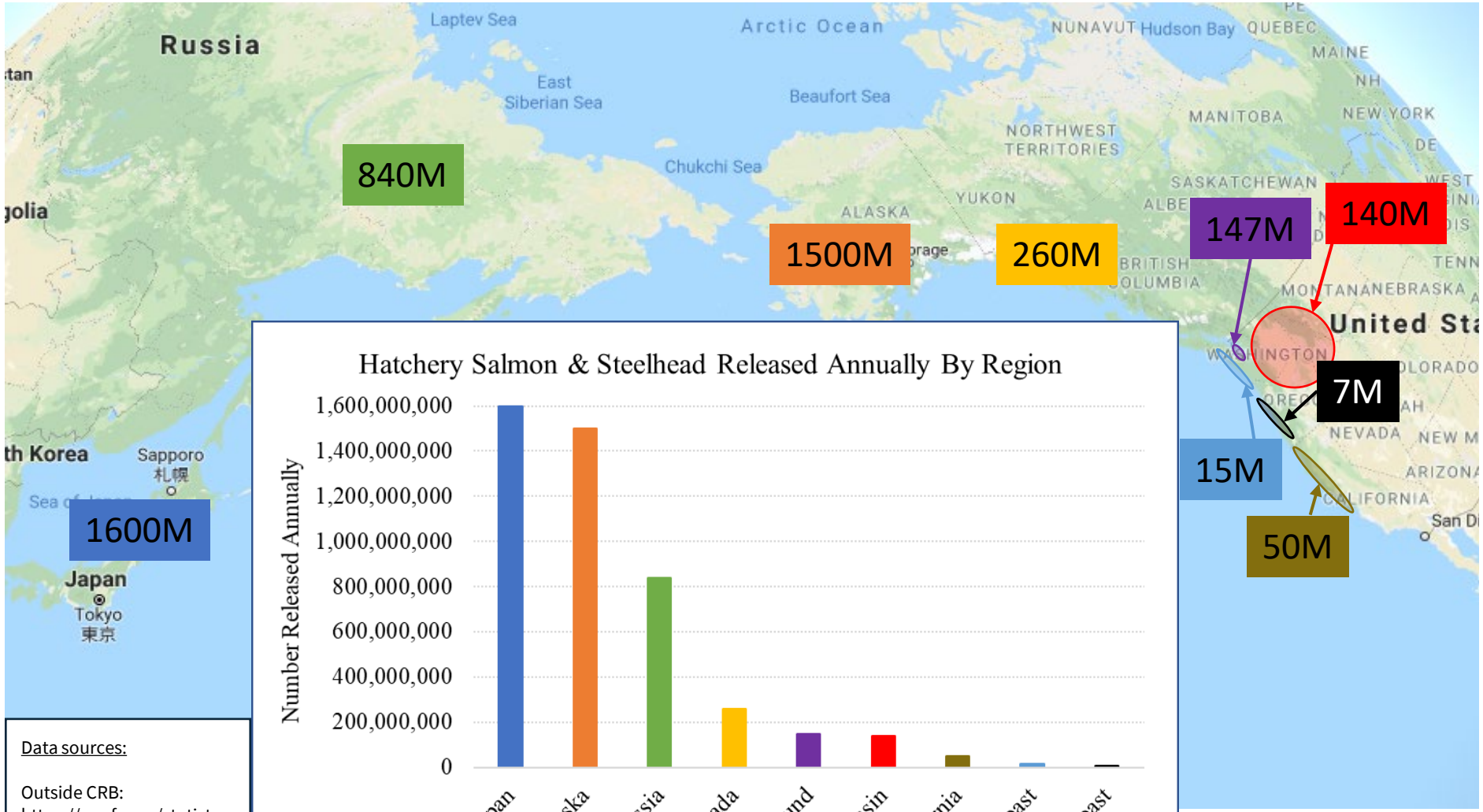
~ <u>140 million</u> juvenile salmon and steelhead released annually

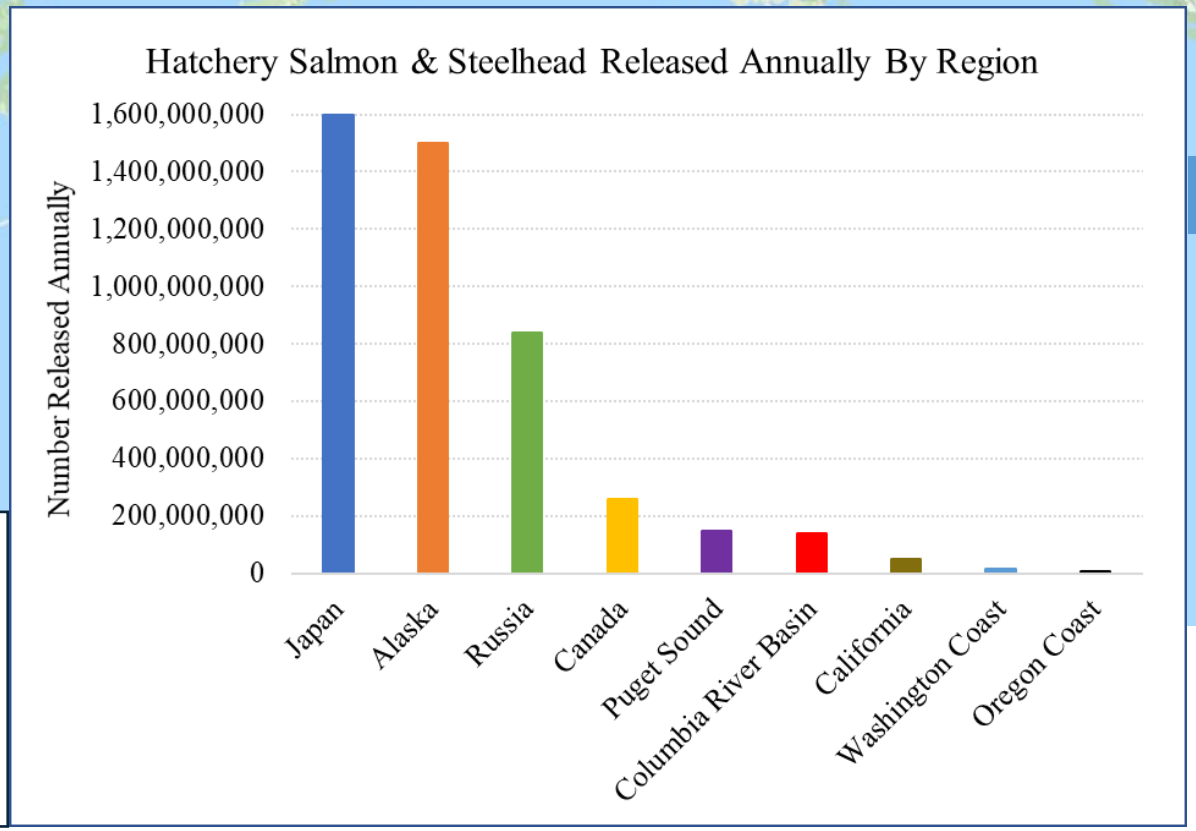
- 4 regions:
  - Columbia River – Below Bonneville
  - Columbia River – Bonneville to McNary
  - Columbia River – Above McNary
  - Snake River

~64% above Bonneville Dam

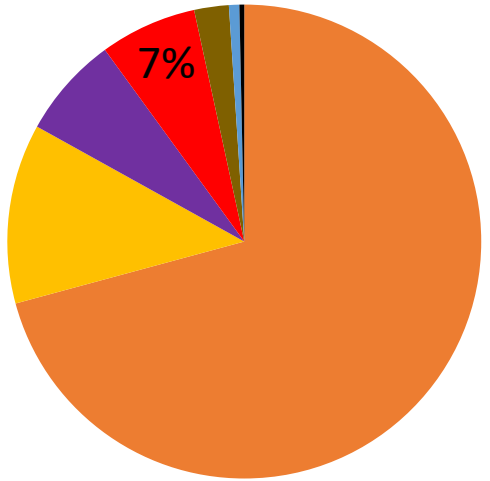
Columbia River Basin artificial production – purpose & location

Context for scale *of current hatchery salmon & steelhead release numbers*





NE Pacific region



Data sources:

Outside CRB: https://npafc.org/statistics

CRB: Fish Passage Center, 2015 migration year.

Columbia River Basin artificial production

- *Key messages for next set of slides:*

	Historic	Contemporary
Purpose of hatcheries	Resolve problems that altered habitat and commercial harvest created for fish	Mitigation for hydropower dams and development impacts
Location in the basin	Primarily located in the lower river, below Bonneville Dam	Distributed more comprehensively throughout the basin, including resident fish
Operational requirements	None	Endangered Species Act consultation: HGMPs, risk analysis/evaluation of hatchery effects on listed species, permitting
Monitoring & Evaluation (M&E)	Programs lacked M&E	Decades of hatchery reform, review, adaptive management through established M&E programs
Management objectives	Harvest (support canneries, lower river, ocean)	Harvest (Treaty, non-Treaty) & Conservation (i.e., supplementation, reintroduction)

Columbia River Basin artificial production – operations, M&E, management

1970s - early 2000s: Court decisions, legislation, ESA listings lead to hatchery improvements & reform

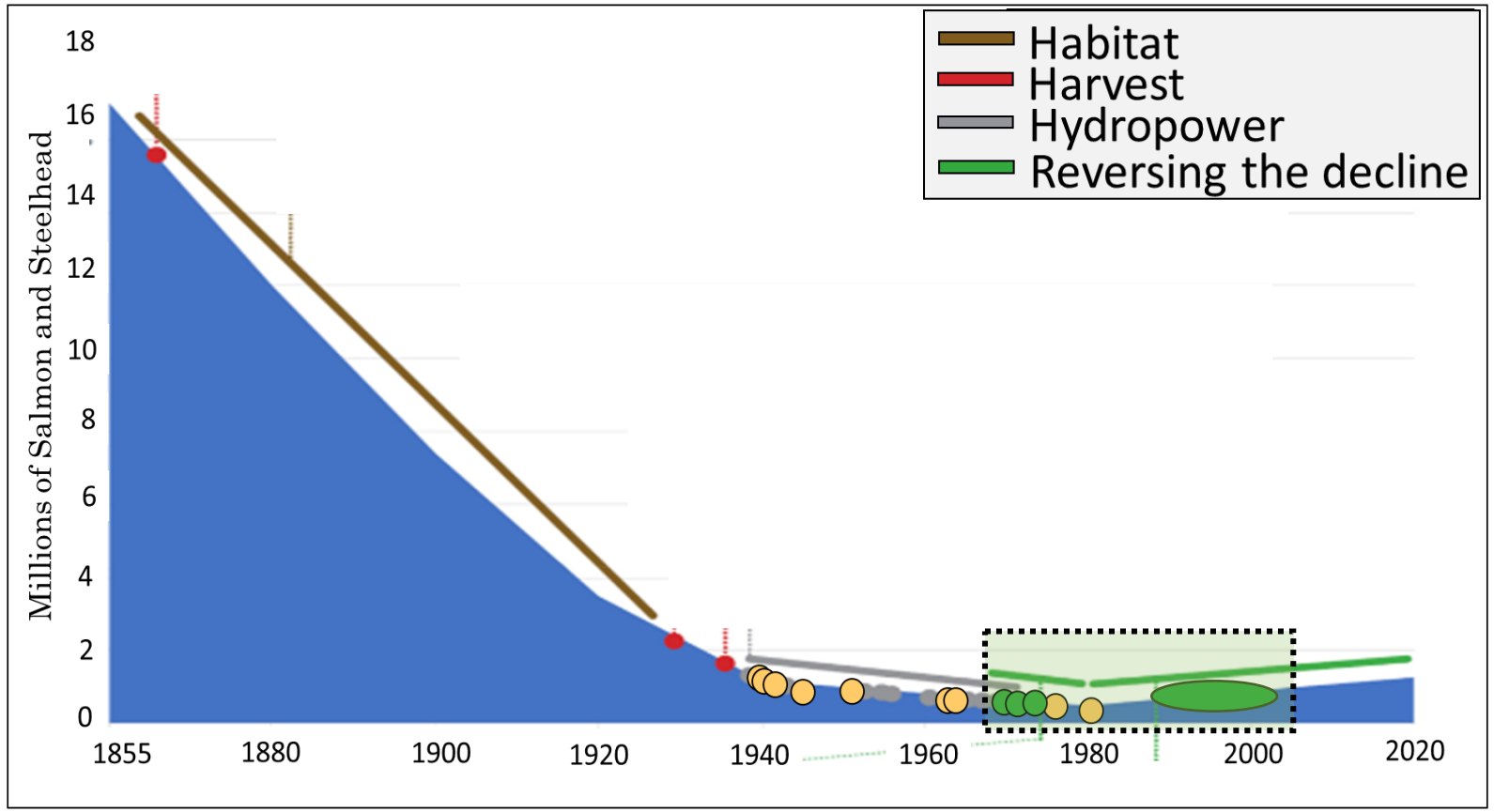


Figure adapted from Fivecrows et. al. 2023

- Federal legislation established hatcheries for mitigation purpose.
- **Facilitating efforts to reverse the decline and improve and guide hatchery operations:**
  - *U.S. v Oregon* court decision
  - Clean Water Act
  - Endangered Species Act (ESA)
  - ESA species listings

Columbia River Basin artificial production – operations, M&E, management

Three decades of significant efforts to review and improve hatcheries

Examples:

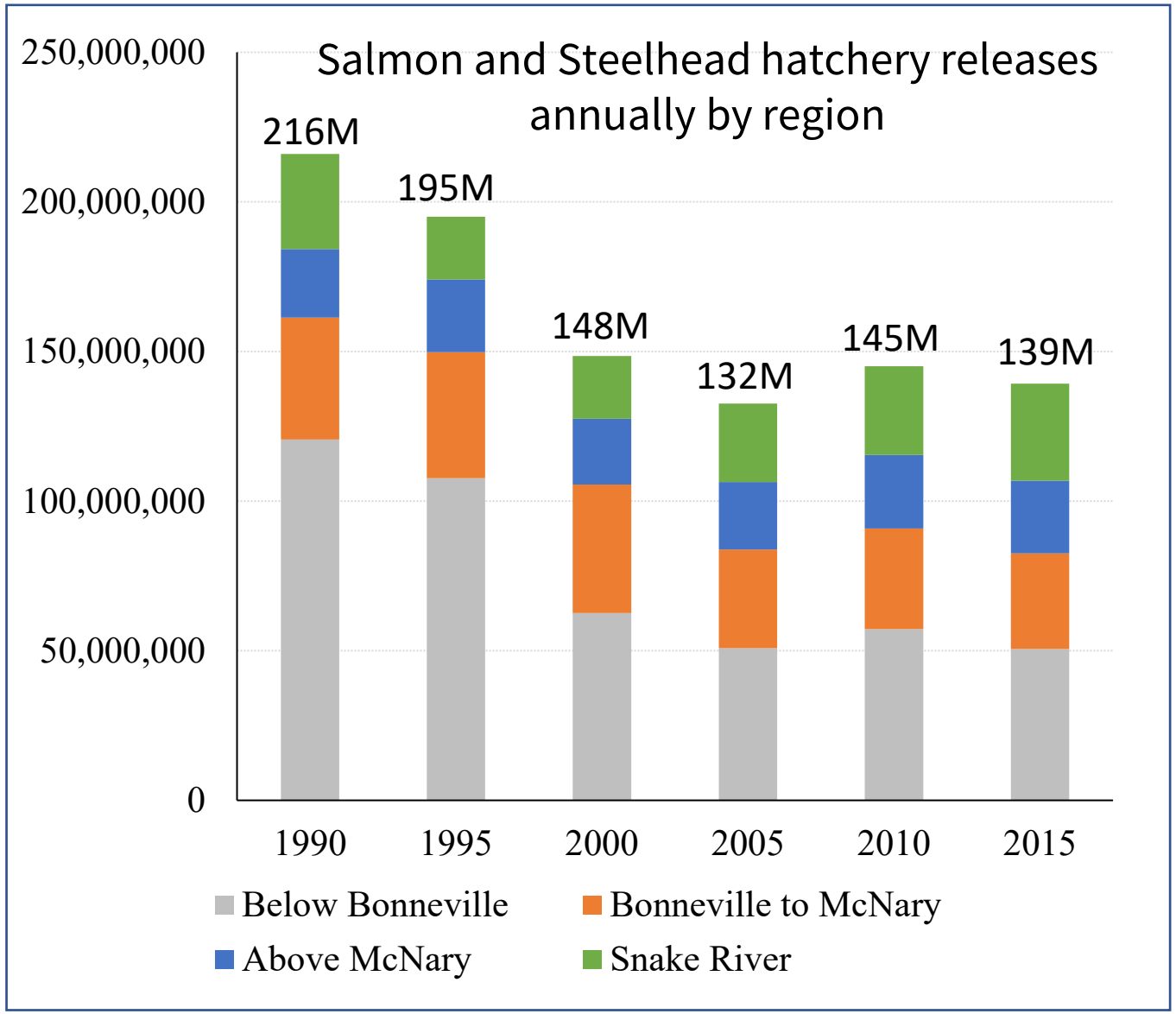
- 1990-1992: Regional Assessment of Supplementation Projects
- 1992-1995: Integrated Hatchery Operations Team
- 1994: Master Planning requirements
- 1997: 3-Step Review Process
- 1997-1999: Artificial Production Review
- 2001: Performance Standards and Indicators
- 2002-2005: Artificial Production Review and Evaluation and Hatchery and Genetics Management Plan
- 2003-2005: Independent Scientific Advisory Board Review of Salmon and Steelhead Supplementation
- 2006-2007: Ad Hoc Supplementation Monitoring and Evaluation Workshops
- 2005-2015: Hatchery Scientific Review Group

In addition to:

- ESA and Biological Opinion compliance
- Ongoing monitoring & evaluation
- Legal agreements

Columbia River Basin artificial production – operations, M&E, management

Influenced hatchery operations and production numbers

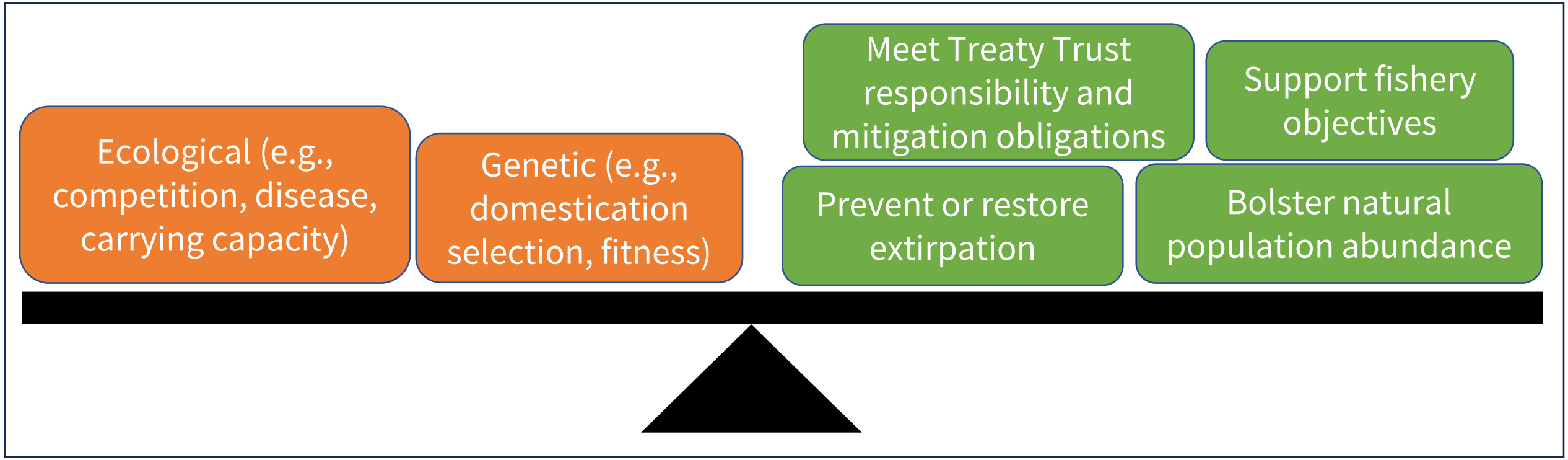


1990 vs. 2015

- Total releases reduced by ~77,000,000
- Majority reduction occurred Below Bonneville
- Minor increase Above McNary and Snake River

Columbia River Basin artificial production – operations, M&E, management

Balancing and managing risk while meeting mitigation and conservation objectives



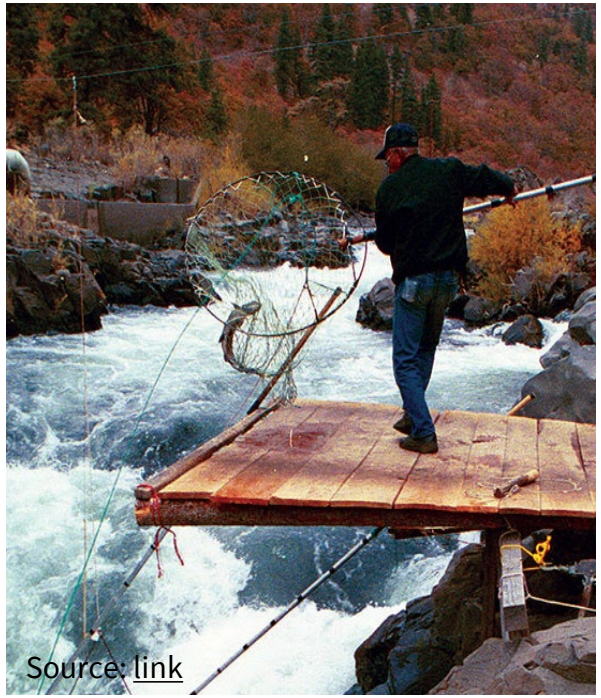
<u>Hatchery operations are managed to minimize risks & operate consistent with ESA</u>

- Broodstock management (e.g., local, factorial mating, integrated, segregated)
- Adult returns (e.g., pHOS, PNI, fisheries)
- Rearing strategies (e.g., densities, feeding, disease management)
- Release strategies (e.g., timing, location, acclimation, life stage, marking)
- Monitoring, assessment, reporting, and adaptive management

Columbia River Basin artificial production – operations, M&E, management

Hatcheries are managed to achieve multiple objectives – fish for harvest and/or conservation

Fishery objective



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Conservation & Fishery objective

- **Supplementation** – Prevent extirpation, rebuild natural production
- **Reintroduction** – Restore extirpated populations

Columbia River Basin artificial production – operations, M&E, management

Two different management approaches

Fishery only

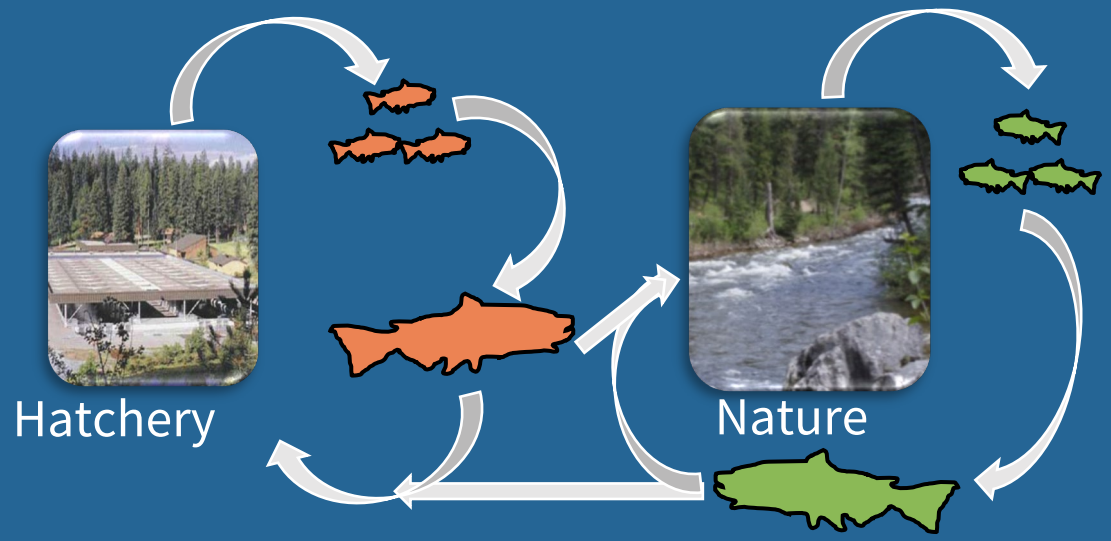
[Segregated management]

- Two environments, Two populations
- Promotes harvest of hatchery fish
- Managed to not impede recovery of natural populations

Conservation & Fishery

Supplementation & Reintroduction

[Integrated management]

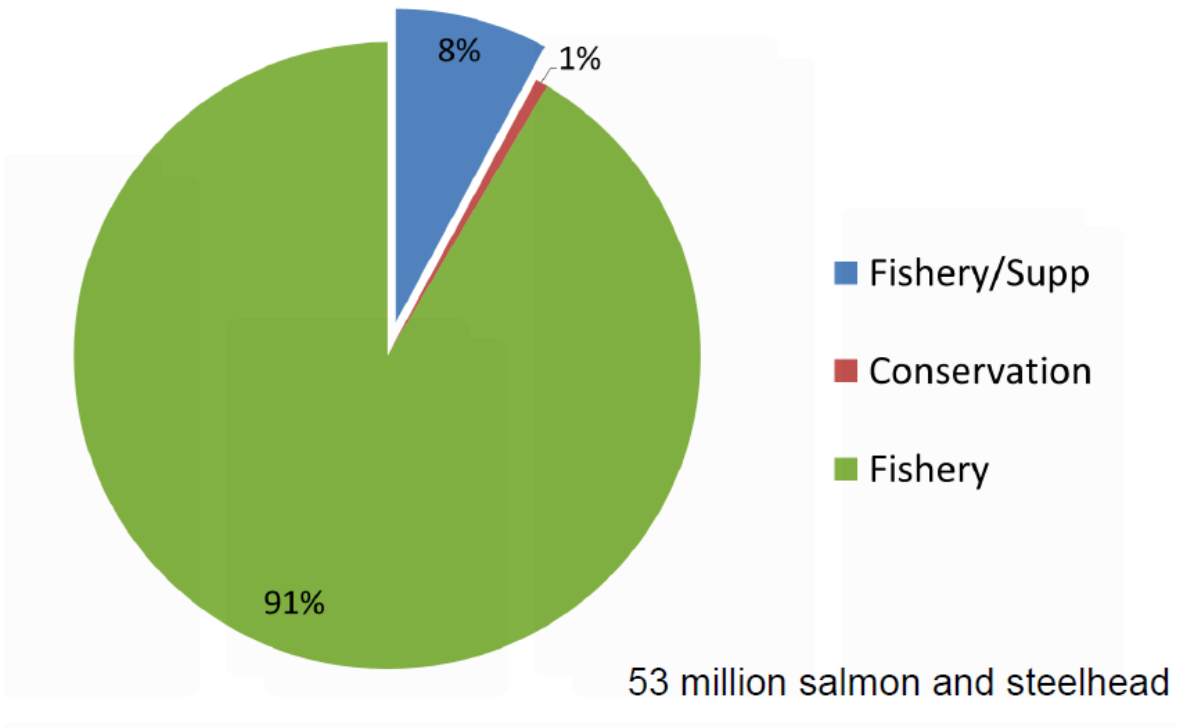


- Two environments, One population
- Support rebuilding natural production
- Prevent or restore extirpated populations

Columbia River Basin artificial production – operations, M&E, management

Anadromous Salmon & Steelhead hatchery production by management objectives

Below Bonneville Dam



Interior – Above Bonneville Dam
(including Bonneville pool)

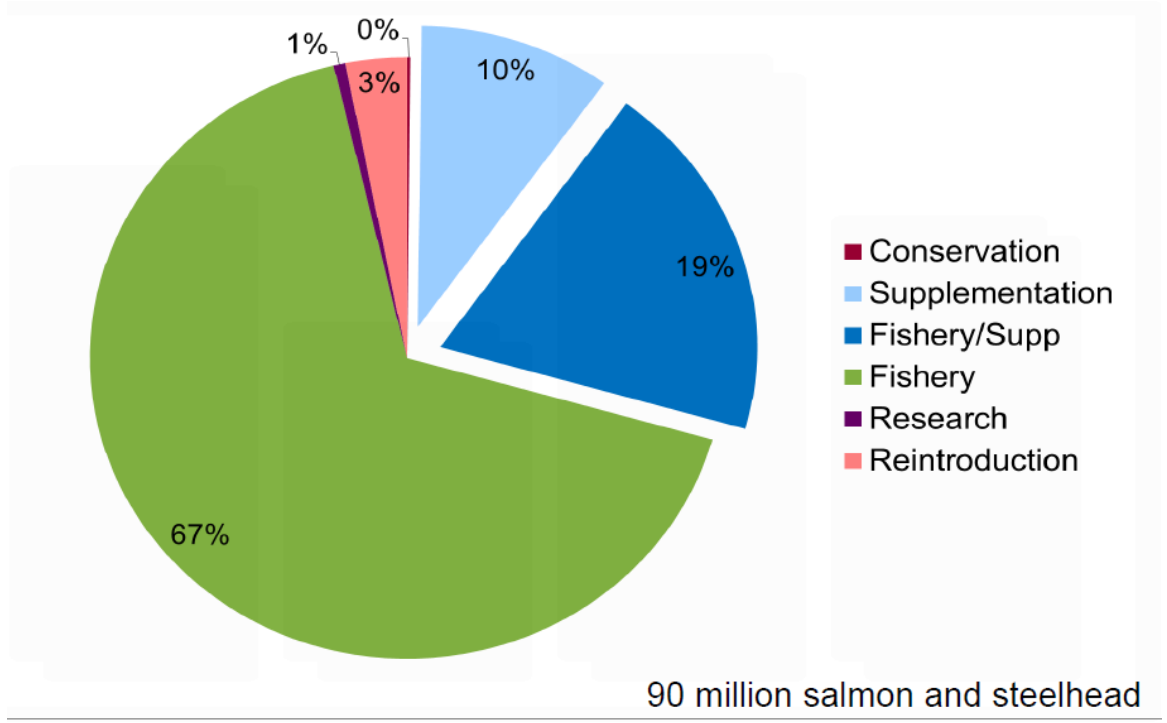


Figure: Becky Johnson, Nez Perce Tribe; Columbia Basin Partnership workshop, 2016

Outline

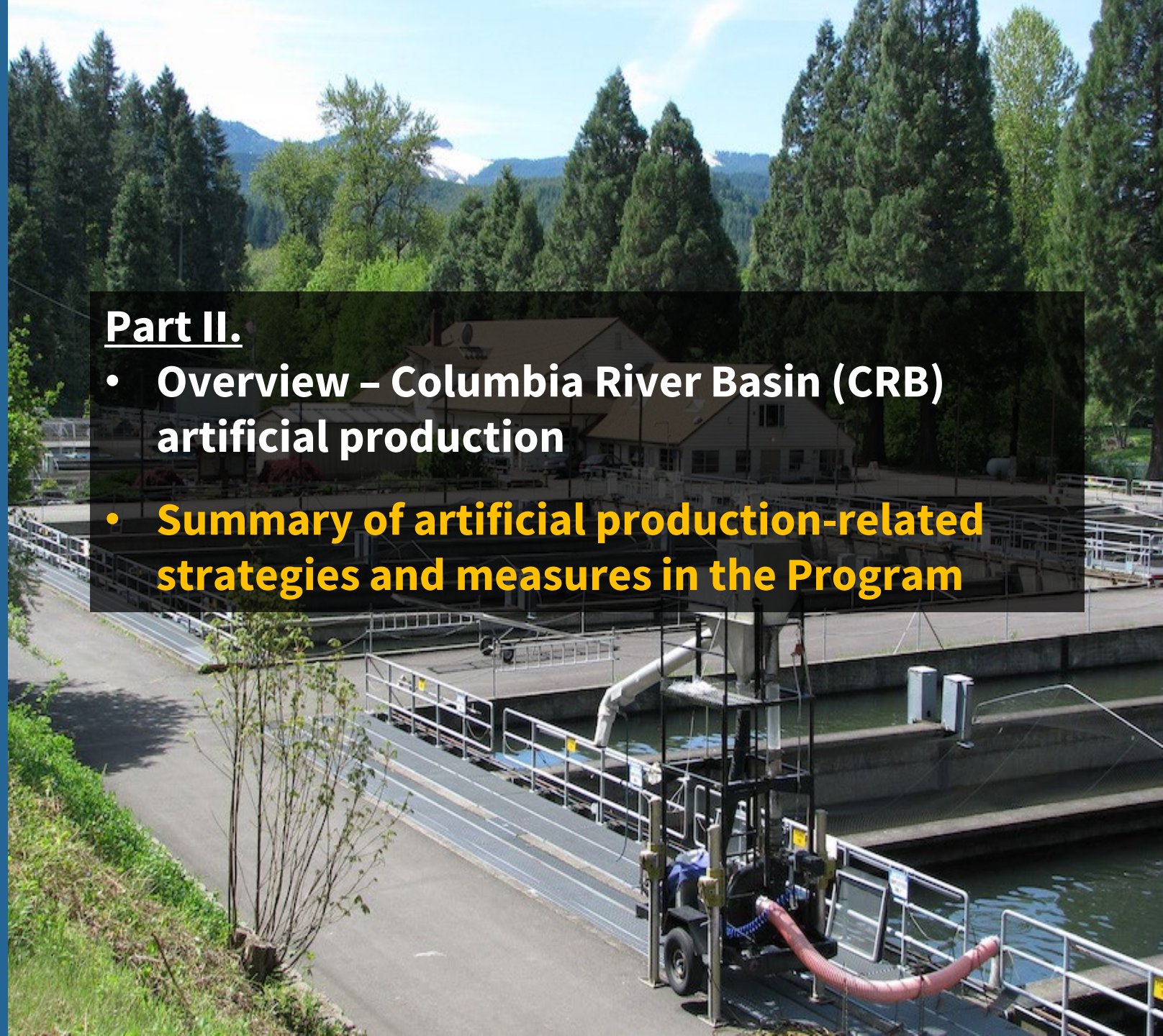
I. Approach to Program Performance

II. Components of artificial production (AP) Categorical Assessment

III. Implementation of artificial production measures in the Program

IV. Resources and considerations ahead of the next Program Amendment

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



Part II.

- Overview – Columbia River Basin (CRB) artificial production
- Summary of artificial production-related strategies and measures in the Program

Program strategy:
fish propagation including hatchery programs

Use hatchery programs as tools to help meet the mitigation requirements of the Northwest Power Act.

Example measures:

- All propagation actions should complement the management activities of the region's agencies and tribes, including habitat improvements.
- Tagging (PIT, coded wire, acoustic, radio, genetic)
- Test and monitor alternative hatchery strategies, approaches, and practices.
- Support standardized performance measures and reporting.
- Report on trends in supplemented populations to compare to non-supplemented populations in "reference streams".

Program strategy:
the use of hatcheries for reintroduction

Return lost salmon and steelhead into blocked areas, or re-establish populations in watersheds accessible for anadromy but where the native population had been extirpated or the risk of extirpation is very high.

Example measures:

- Re-establish salmon and steelhead where they have been extirpated, also in blocked areas.
- Develop goals, objectives, timelines, benchmarks and experimental framework for reintroduced populations developed by agencies and tribes.

Program strategy:
Anadromous fish mitigation in blocked areas

Implement actions that may include passage investigation, reintroduction of anadromous fish, habitat improvements, and harvest opportunities for the loss of salmon and in blocked areas of the Columbia Basin that historically had runs of anadromous fish.

Example measures:

- Increase opportunities for consumptive and non-consumptive resident fisheries for native, introduced, wild, and hatchery-reared stocks compatible with native resident fish species and their restoration.
- Reintroduce anadromous fish above Chief Joseph and Grand Coulee dams (phased approach) and above projects in the Willamette River Basin.

Program strategy:
Resident fish mitigation

For resident fish and other aquatic species impacted by the hydrosystem, protect and mitigate freshwater and associated terrestrial habitat, and native fish populations.

Measures:

- Interim fisheries where native fisheries have been lost, or where native populations and habitats are actively being recovered and need protection.
- Apply a diversified approach for mitigating losses, including **hatcheries**, harvest augmentation, modifying hydrosystem operations, and habitat mitigation.

Program strategies: Sturgeon and Lamprey

Implement actions that result in increased abundance and survival for Columbia River Basin green and white sturgeon, including habitat actions, dam operations and passage, hatchery considerations (sturgeon), monitoring populations, and research to improve understanding of how the development and operation the FCRPS has on survival and growth of sturgeon and lamprey.

Sturgeon measures	Lamprey measures
• Hatcheries for supplementation. • Baseline population assessments on hatchery and natural-origin populations. • Continue interim hatchery production. → 100% PIT-tagging of hatchery fish	• Evaluate the potential role of lamprey propagation and translocation when passage and habitat improvements alone are insufficient.

Themes of artificial production measures across Programs:

Facility Construction

- Comprehensive plans for new facility construction in interior basin.
- Develop infrastructure (e.g. acclimation) to supplement natural production in subbasins with low abundance.

Artificial Production Programs

- Prioritize interior regions of the basin.
- Emphasize conservation programs, in addition to supporting fisheries.
- Prevent and restore extirpated populations.
- Blocked area mitigation.

Regional data sharing, coordination across parties, support emerging science, etc.

Outline

I. Approach to Program Performance

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

Part III.

- Overview – F&W Program artificial production: facilities and programs
- AP program highlights

Council's Columbia River Basin Fish & Wildlife Program

➢ *Key messages for next set of slides:*

Component of F&WP AP	**Key messages**
Hatchery operations	• **Operates as a system** - 39 facilities are assets of the Program, but many other facilities are used to support AP of the Program. • **Co-managed** by multiple state, tribal, and federal partners.
Anadromous fish programs	Occurs throughout the basin, majority in the **interior**.
	Managed to provide fish for **harvest and conservation** objectives: • Contributing to both Treaty and non-Treaty harvest. • Preventing extirpation of populations, contributing to natural abundance. • Re-establishing extirpated populations.
Resident fish programs	• Primarily located in **blocked areas** of the basin. • Native fish **conservation** objectives. • Primarily supports and enhances tribal subsistence & non-tribal sport **fisheries**.
Other native fish programs	• Preventing extirpation of **White Sturgeon** through conservation aquaculture • Research & development of methods for **Pacific Lamprey** aquaculture for restoration

Council's Columbia River Basin Fish & Wildlife Program

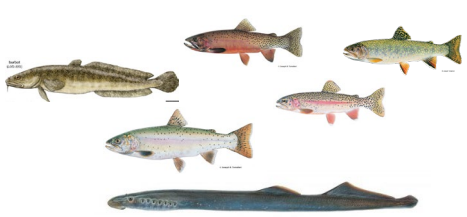
Artificial production

39

Hatchery mitigation facilities authorized under the NW Power Act

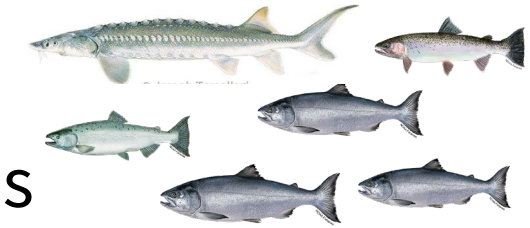
47

Production programs supporting fisheries & conservation



12

Species



4 States

11 Tribes

2 Federal

Implementing AP programs

Kootenai Tribe of Idaho

Spokane Tribe of Indians

Confederated Tribes of the Warm Springs Indian Reservation of Oregon

Council's Columbia River Basin Fish & Wildlife Program
Artificial production

Year	Measure/Process	Facilities
1987 Program	Implement artificial production facilities to raise Chinook salmon and steelhead	Hood River, Umatilla, Walla Walla, Grande Ronde
1991 Program	Protect and rebuild Snake River sockeye	Springfield and Eagle hatcheries etc.
1994/1995 Programs	Hungry Horse Dam resident fish mitigation	Sekokini Springs Isolation Facility
2001	Columbia Cascade Provincial Review	Chief Joseph Hatchery
2014/2020 Programs	Lamprey propagation and translocation	Step 1 Master Plan approved in 2018

Examples in this table represent master planning and STEP review processes

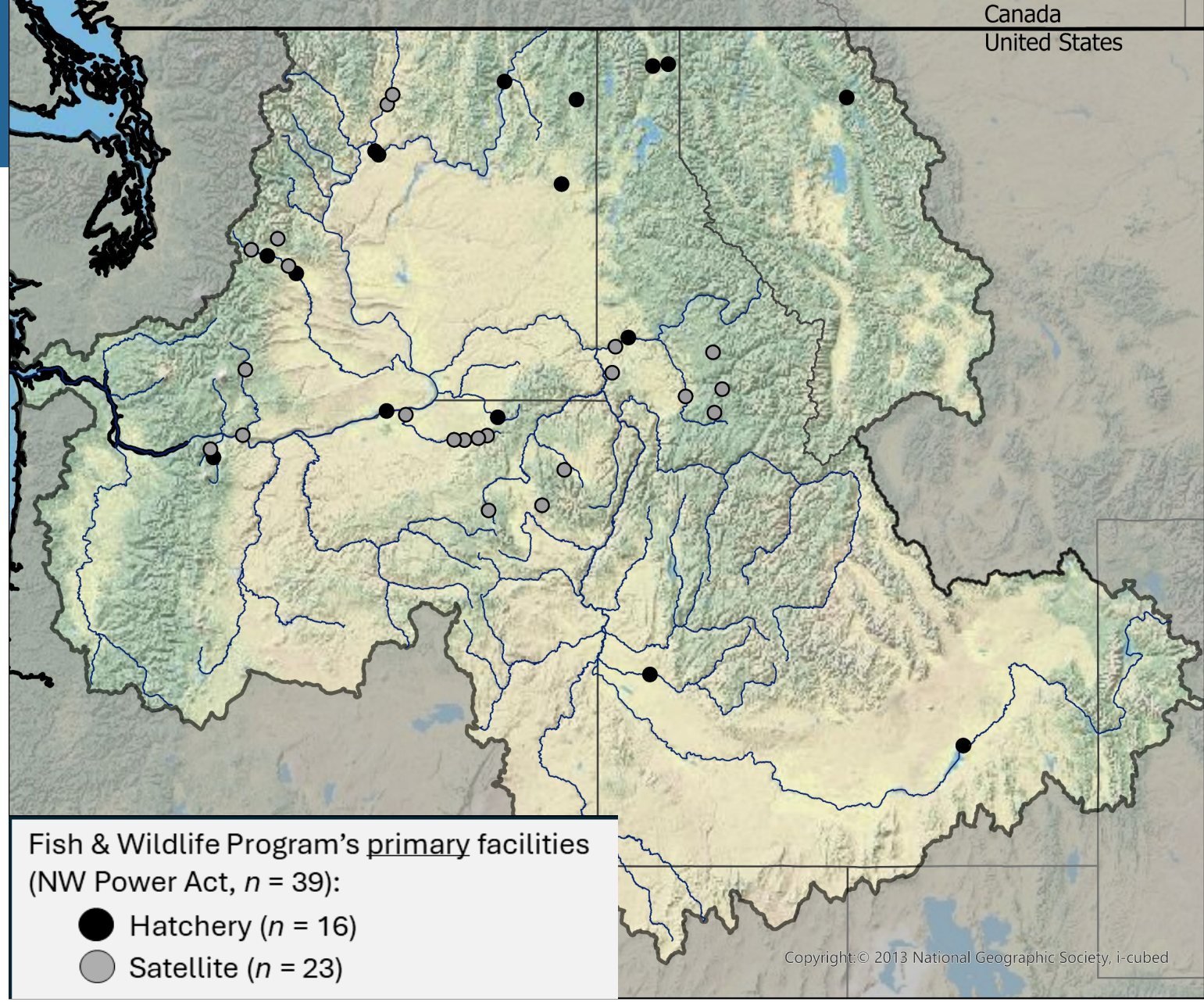
Artificial production review has been consistently called for over the history of the Program

- **This includes Master Planning (1994) and the Three-Step Review Process (1997)**
- **Reviewed by the Independent Scientific Review Panel (ISRP)**
- **Includes resident and anadromous facilities**

Council's CRB F&W Program artificial production facilities

Facilities built/established as mitigation through the NW Power Act:

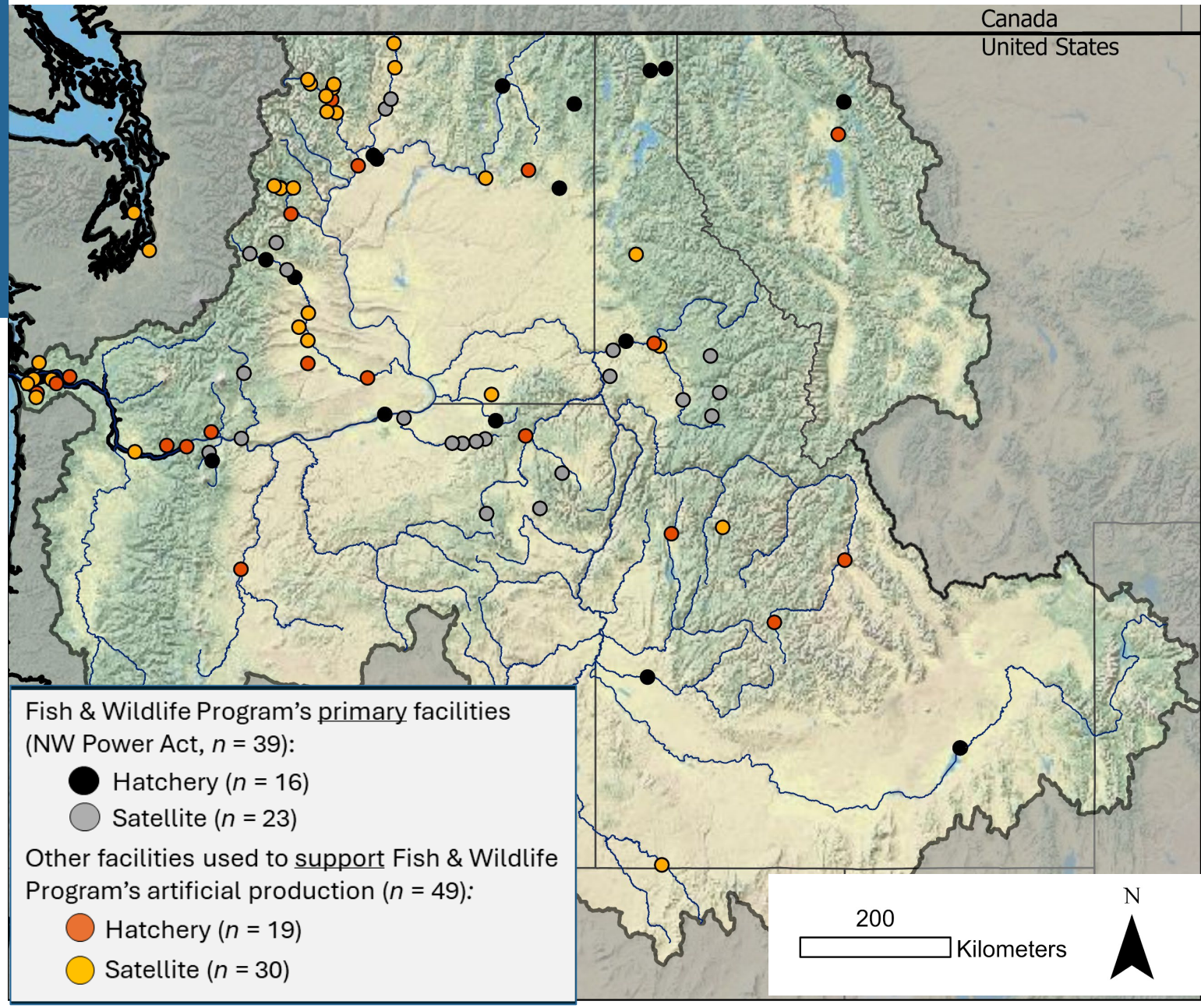
- 16 hatcheries
  - 9 anadromous
  - 7 resident
- 23 satellites



Facilities established as mitigation through the NW Power Act

Council's CRB F&W Program AP facilities supporting hatchery production through the NW Power Act

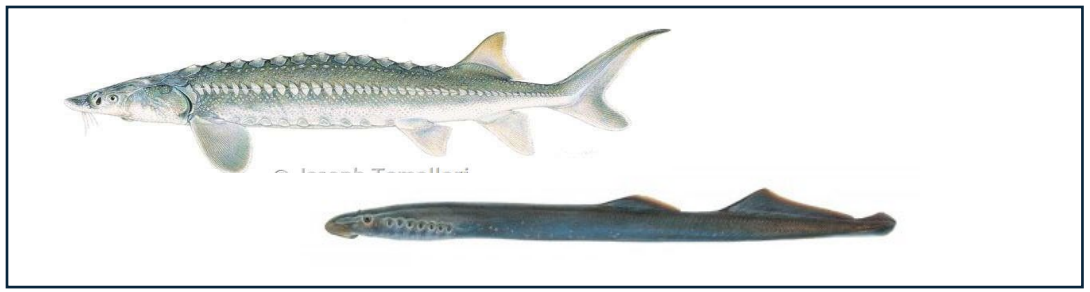
- While separate hatchery mitigation programs exist, the AP in the CRB operates as a **system**
  - Other facilities support production programs authorized through the NW Power Act
    - *Example: Prosser Hatchery (Mitchell Act facility) supports multiple production components of F&WP (lamprey, Chinook, Coho, steelhead kelts)*



Council's Columbia River Basin Fish & Wildlife Program

Artificial production of 12 species

Species category	Species
Anadromous Salmon & Steelhead	Chinook Salmon
	Chum Salmon
	Coho Salmon
	Sockeye Salmon
	Steelhead
Resident	Brook Trout
	Burbot
	Lahontan Cutthroat Trout
	Rainbow Trout
	Westslope Cutthroat Trout
Sturgeon	Sturgeon
Pacific Lamprey	Pacific Lamprey



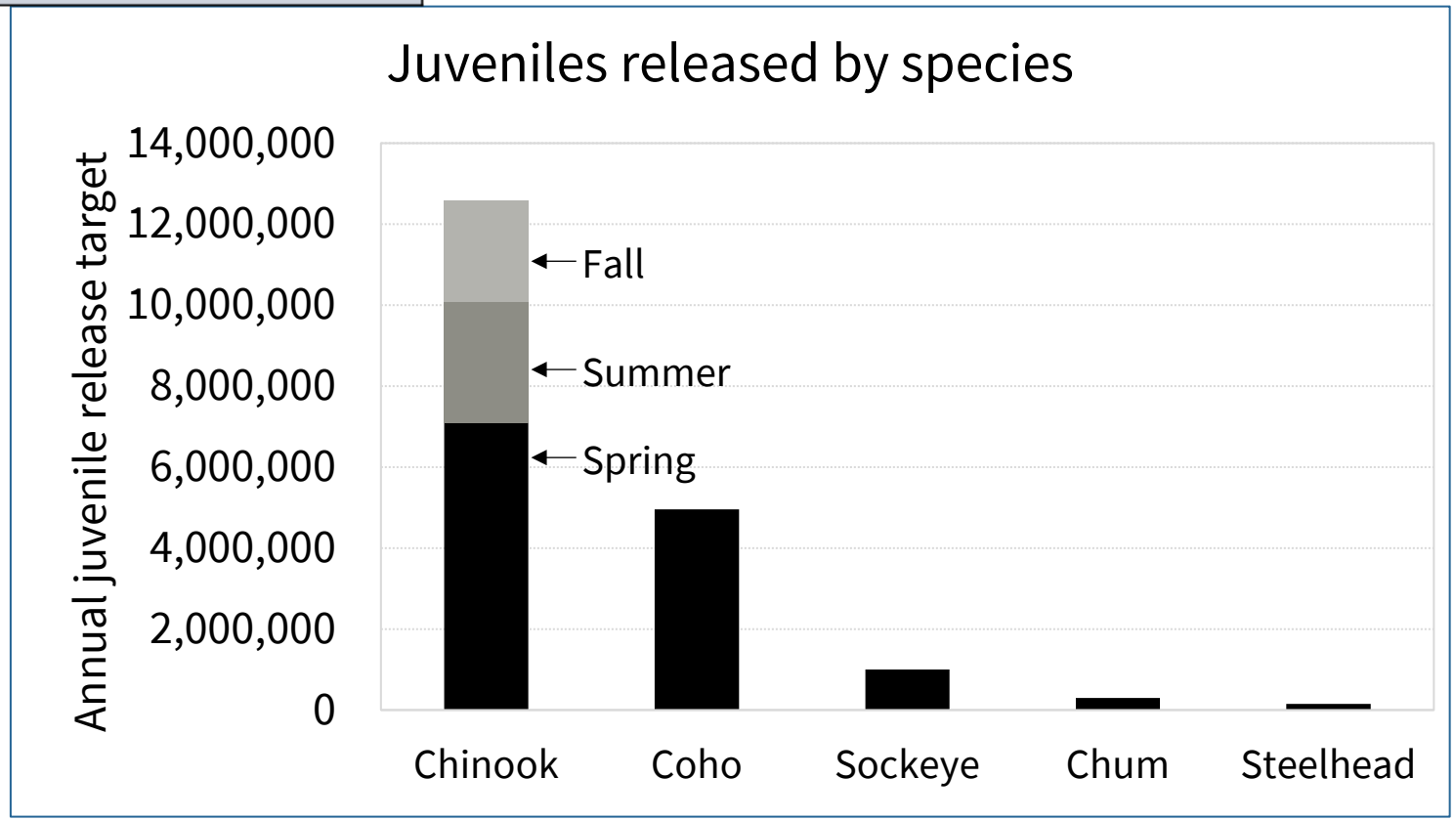
Council's Columbia River Basin Fish & Wildlife Program

Anadromous Salmon & Steelhead artificial production – species & numbers

Species category	Species
Anadromous Salmon & Steelhead	Chinook Salmon
	Chum Salmon
	Coho Salmon
	Sockeye Salmon
	Steelhead

- 31 programs
  - 27 juvenile release
  - 4 adult release

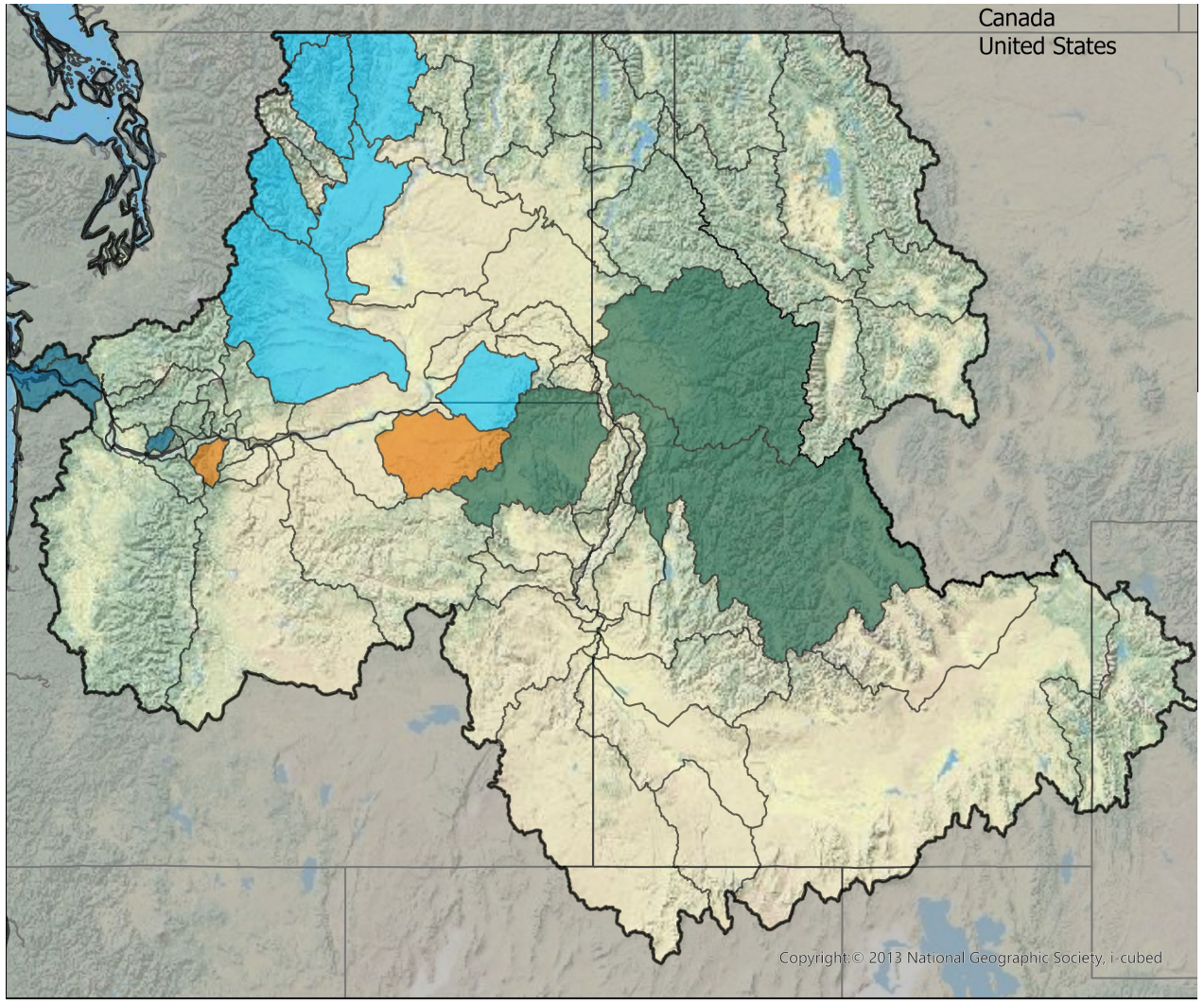
  (steelhead kelt, sockeye)



* BPA funded portion estimated for some production programs.

Council's Columbia River Basin Fish & Wildlife Program

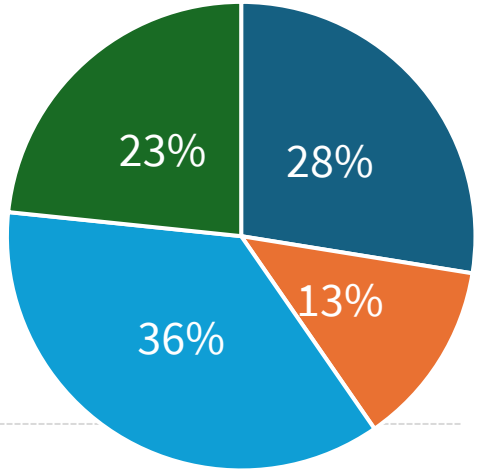
Anadromous Salmon & Steelhead artificial production – numbers & locations

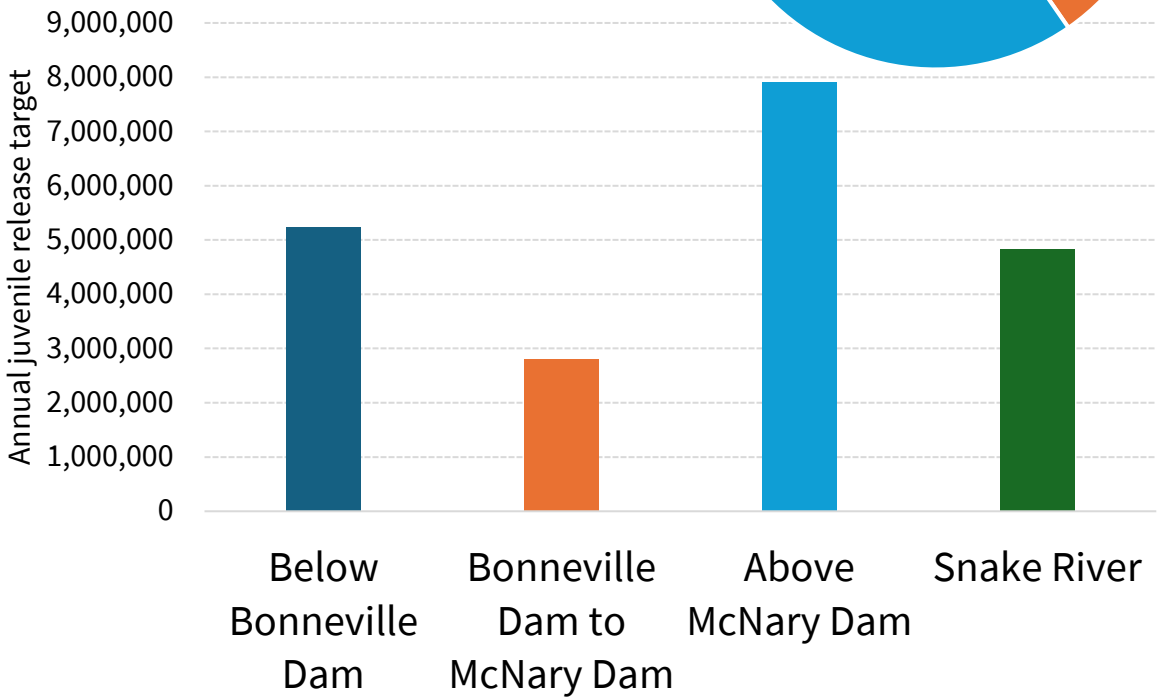


Subbasins where hatchery releases of anadromous fish occur

~ 19 million annual juvenile target release*

- 72% interior basin



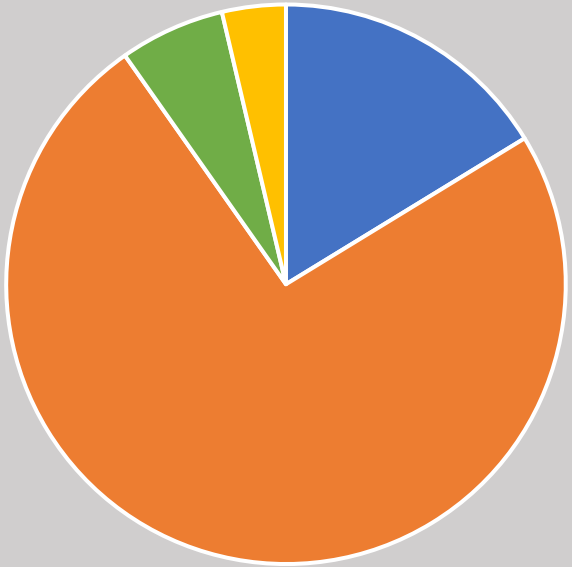


* BPA funded portion estimated for some production programs.

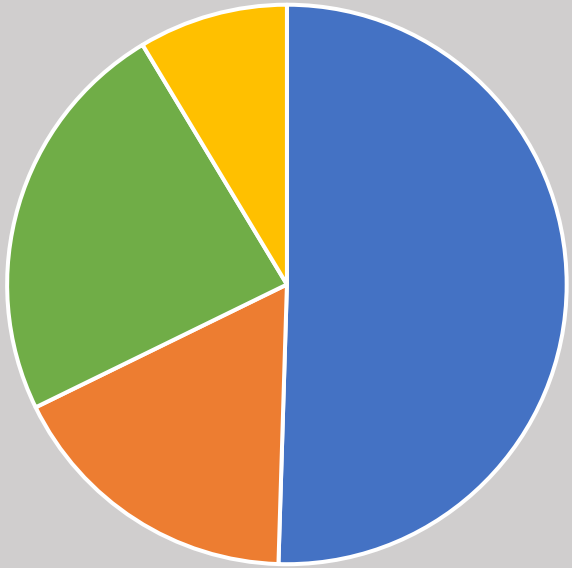
Council's Columbia River Basin Fish & Wildlife Program

Anadromous Salmon & Steelhead AP – management objectives

Other mitigation programs – above Bonneville Dam



F&W Program – above Bonneville Dam



Fishery | Supplementation | Reintroduction | Combination

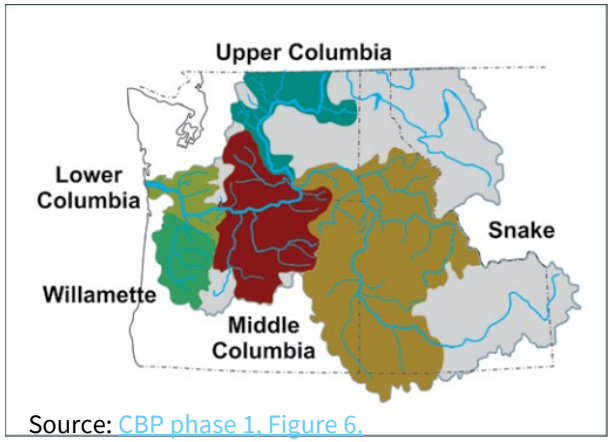
Conservation components

- Majority managed primarily for <u>fisheries</u>
- Majority managed primarily for conservation or combination <u>conservation & fisheries</u>

Council's Columbia River Basin Fish & Wildlife Program

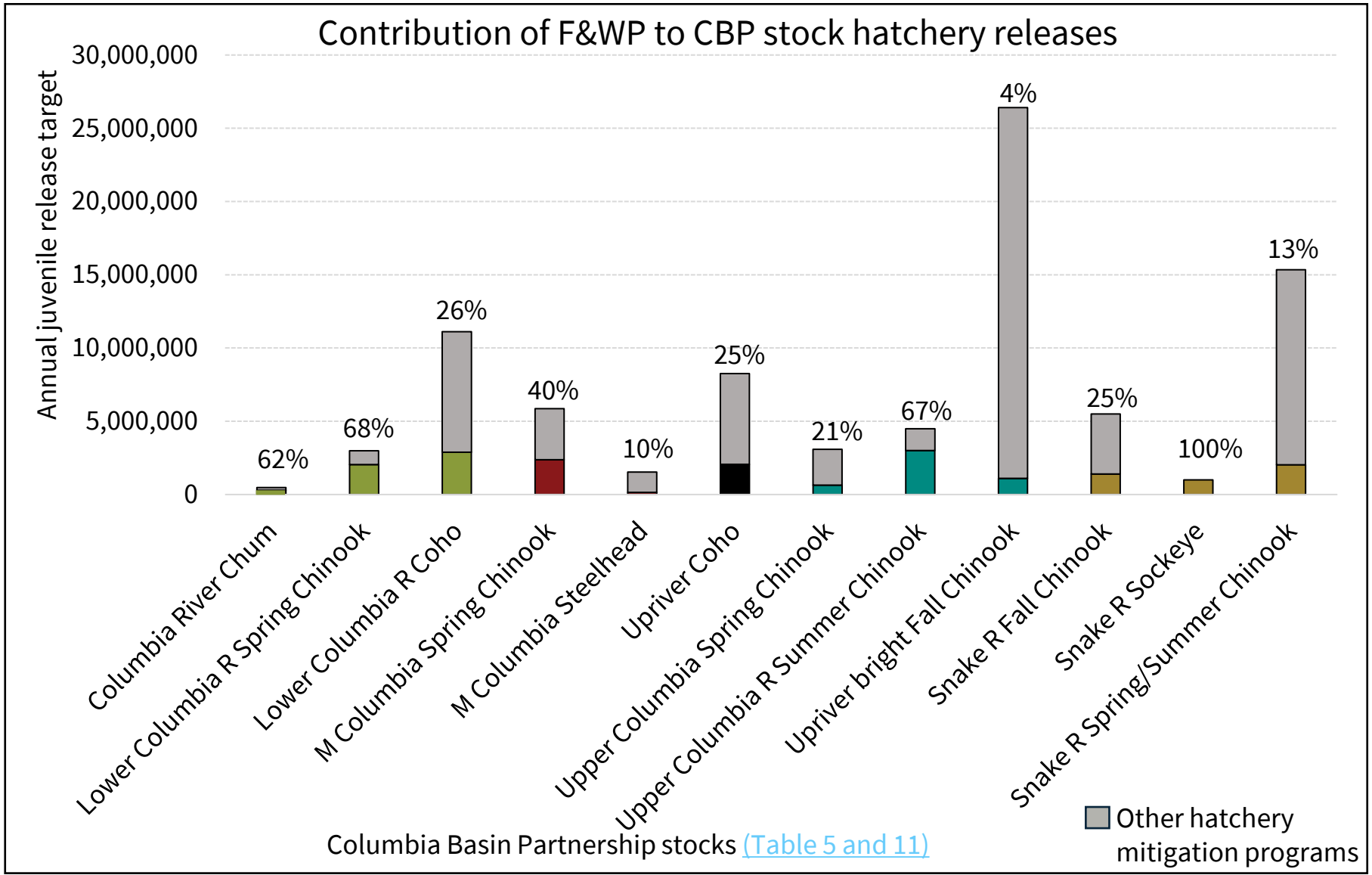
Anadromous Salmon & Steelhead artificial production

Progress toward regionally agreed-upon targets for salmon & steelhead hatchery production - 2020 Addendum



Source: CBP phase 1, Figure 6.

- Council's Program contributes to 15 of the 24 Columbia Basin Partnership stocks
  - Majority above Bonneville Dam

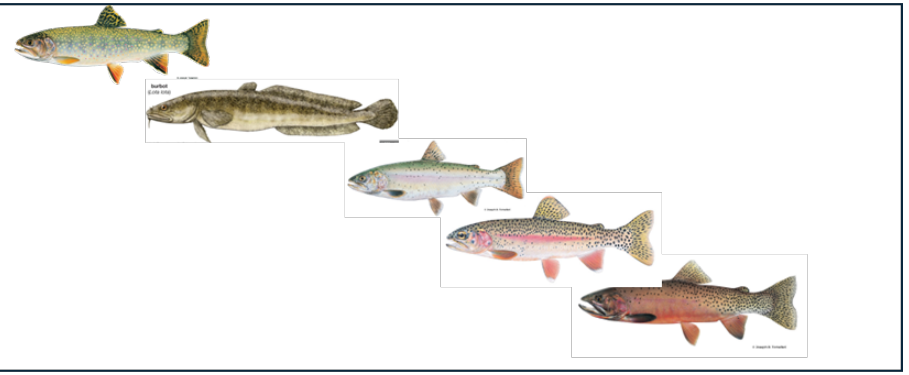


Context notes for figure:
- Upriver bright fall chinook includes Mid Columbia summer/fall and Upper Columbia fall chinook CBP stocks.
- Kelt programs not included in figure.

Council's Columbia River Basin Fish & Wildlife Program

Resident fish artificial production

Species category	Species
Resident	Brook Trout
	Burbot
	Lahontan Cutthroat Trout
	Rainbow Trout
	Westslope Cutthroat Trout



- Mitigation for hydrosystem impacts, particularly Chief Joseph, Grand Coulee, Hungry Horse
- Primarily to support and enhance tribal subsistence fisheries and non-tribal sport fisheries*

	Species	# Released - 2022
Burbot	Burbot (eggs, larvae, juveniles)	17,431,408 [Juvenile target = 225,000]
Trout	Rainbow Trout	1,127,049
	Westslope Cutthroat Trout	129,525
	Lahontan Cutthroat Trout	43,785
	Brook Trout	5,940

*In addition to native fish conservation (Burbot and Westslope Cutthroat Trout)

Council's Columbia River Basin Fish & Wildlife Program

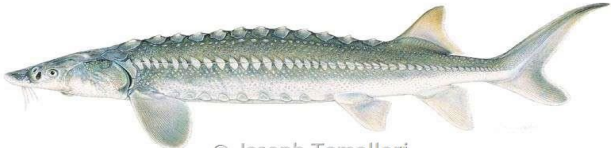
Resident fish artificial production

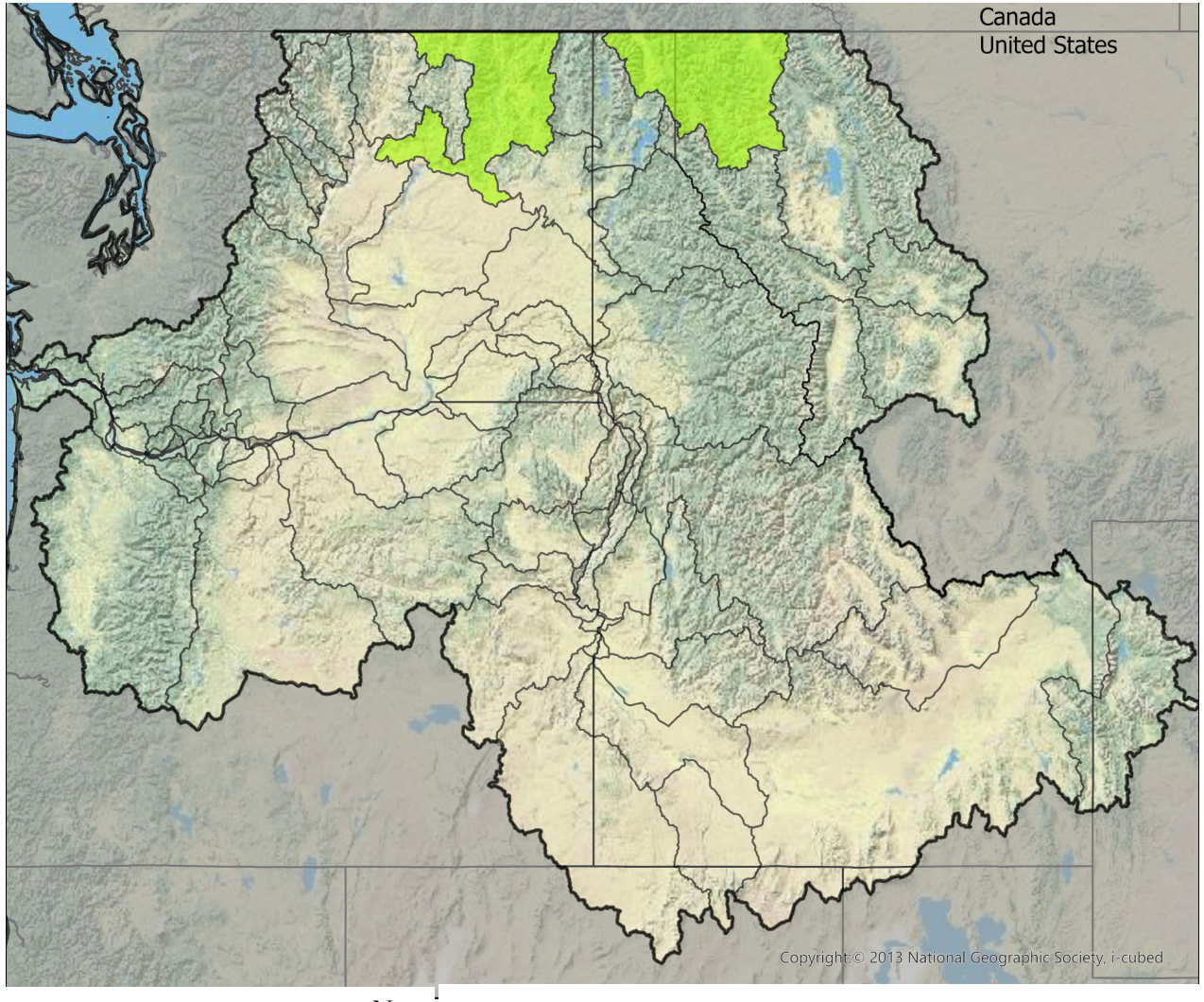
1. Colville Tribal, 2. Sherman Cr., 3. Spokane Tribal, 4. Kalispel Tribal, 5. Kootanai Tribal, 6. Twin Rivers, 7. Sekokini Springs. Trout ponds (no facility): 8. Coeur d'Alene Tribe, 9. Nez Perce Tribe, 10. Duck Valley reservation. Other facilities that support FWP resident AP include Creston NFH and Ford Hatchery, and Lake Roosevelt Net Pens.

- 7 hatchery facilities
- 3 support facilities
- 13 production programs
  - Majority occur where anadromous fish passage is blocked by dams
  - Interim fisheries using resident fish as alternative source of harvest where native populations and habitats are actively being recovered and need protection
  - Rebuilding resident fish populations affected by the hydrosystem

Council's Columbia River Basin Fish & Wildlife Program

White Sturgeon artificial production





Subbasins where hatchery releases of White Sturgeon occur

- 2 production programs
  - Lake Roosevelt Sturgeon Recovery
  - Kootenai River Native Fish Conservation Aquaculture Program
- 3 facilities
- Preserve remaining genetic diversity
- Rebuild natural age-class structure

Council's Columbia River Basin Fish & Wildlife Program

Pacific Lamprey artificial production

Subbasins where hatchery releases of Pacific Lamprey occur

- 6 active lamprey projects in the Program:
  - Research, monitoring & evaluation
  - Habitat restoration & protection
  - Reintroduction and supplementation actions (translocation and artificial production)
- Of which, 2 projects (YN and CTUIR) include AP components
  - Extensive research & development of methods for aquaculture
  - First experimental releases in 2021

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

Part III.

- Overview – F&W Program artificial production: facilities and programs
- **AP program highlights**

Council's Columbia River Basin Fish & Wildlife Program

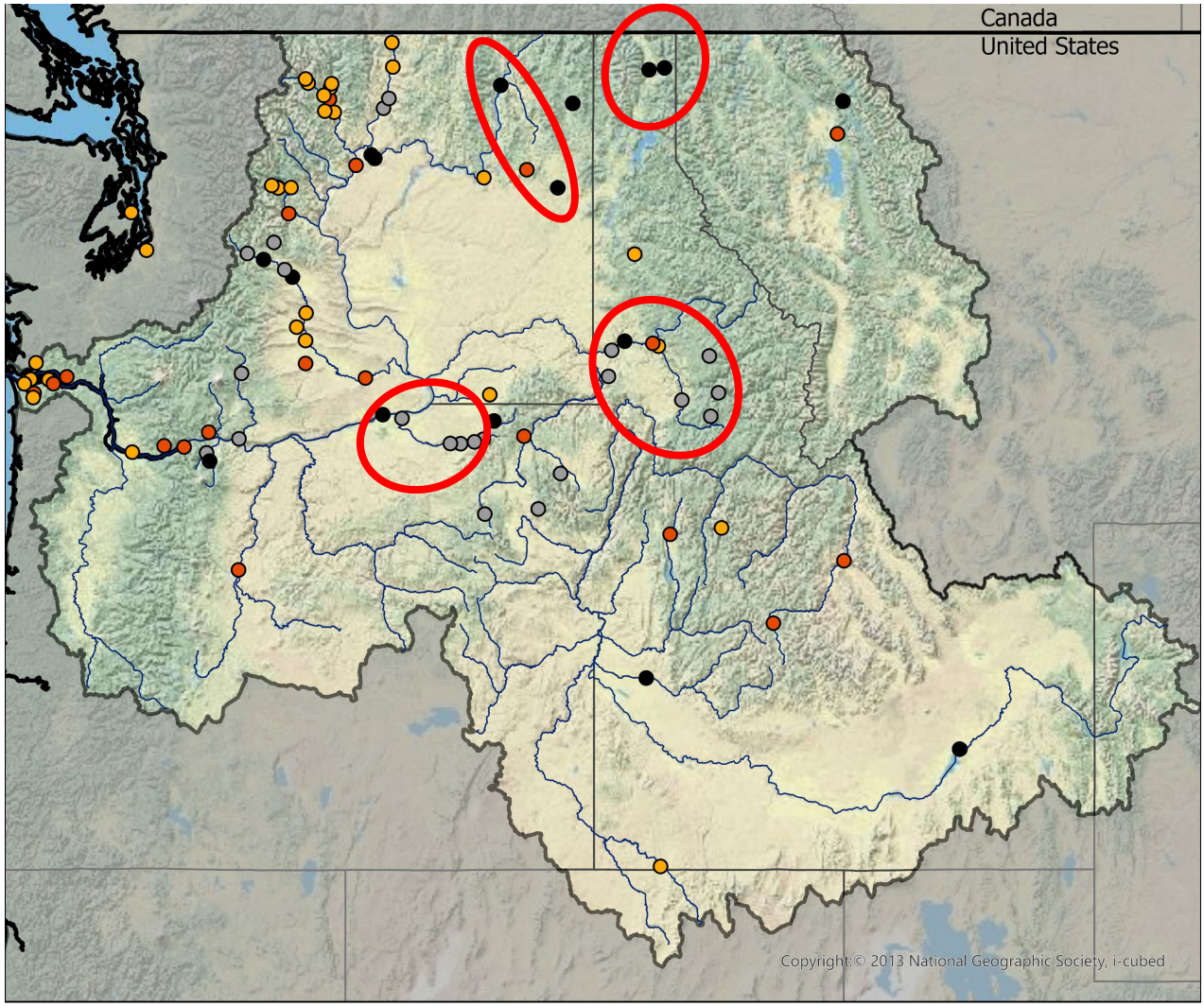
Artificial production program highlights

<u>Purpose of section</u>

Highlight the critical role hatcheries play in the basin through 4 examples:

- Snake River Fall Chinook
- Umatilla River Spring Chinook
- Lake Roosevelt resident fish program
- Kootenai River native fish conservation

How are programs working toward achieving their management objectives? – fish for conservation and/or harvest.



Council's Columbia River Basin Fish & Wildlife Program – AP program highlights

Snake River Fall Chinook

Comprehensive program,
Mitigation responsibility:

- BPA
  - NPCC F&WP (1.4m)
  - LSRCP (5.4m)
- Idaho Power (1.0m)

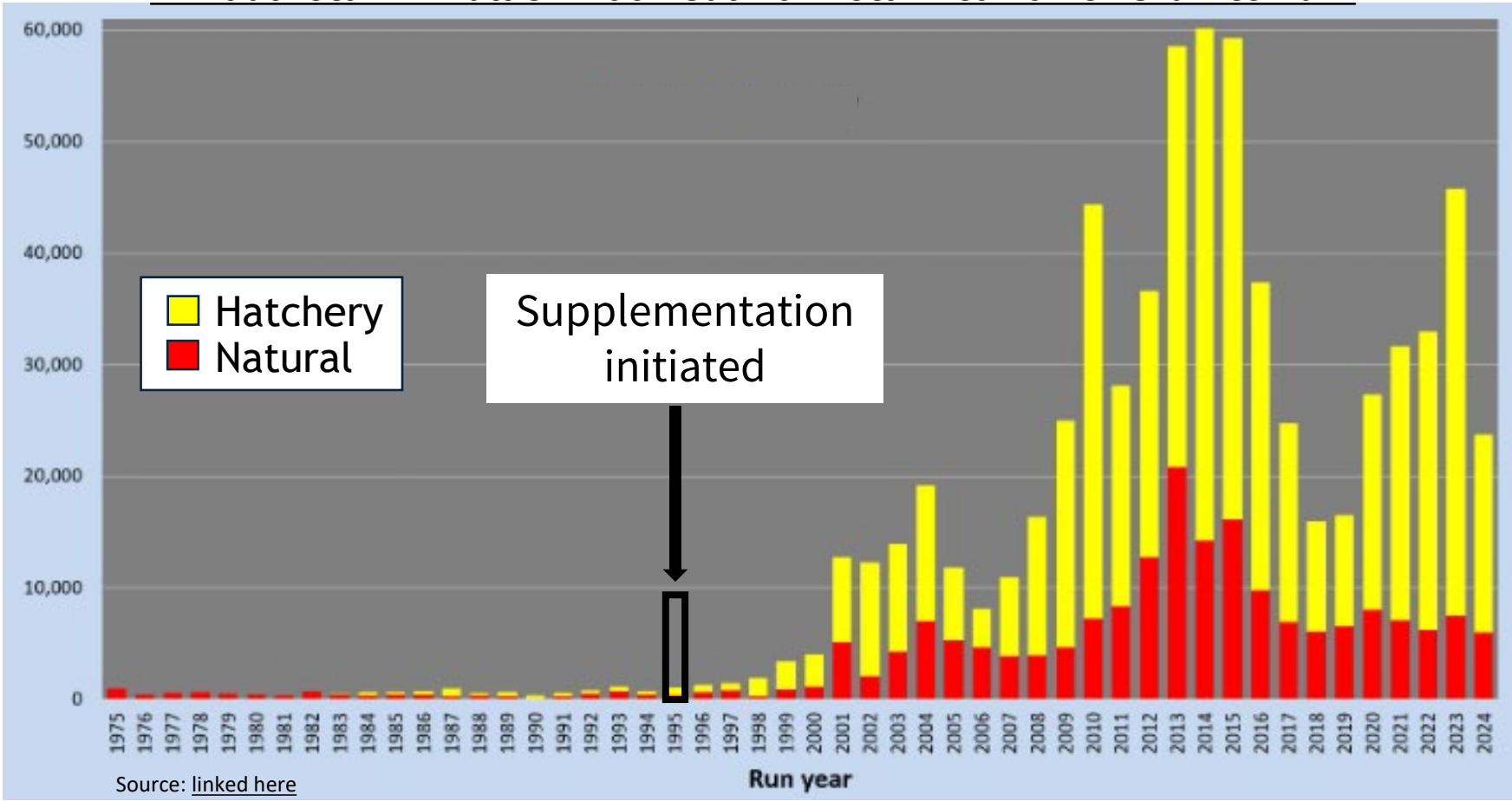
NPCC F&WP component:

- Nez Perce Tribal Hatchery
- 3 acclimation sites (transferred from F&WP to LSRCP in 2019)

Nez Perce Tribal Hatchery – Snake River Fall Chinook

- Mitigation – hydrosystem
- Funding – BPA
- Management objective – Supplementation & Fishery

Annual return # Fall Chinook Salmon return to Lower Granite Dam



Source: linked here

Council's Columbia River Basin Fish & Wildlife Program – AP program highlights

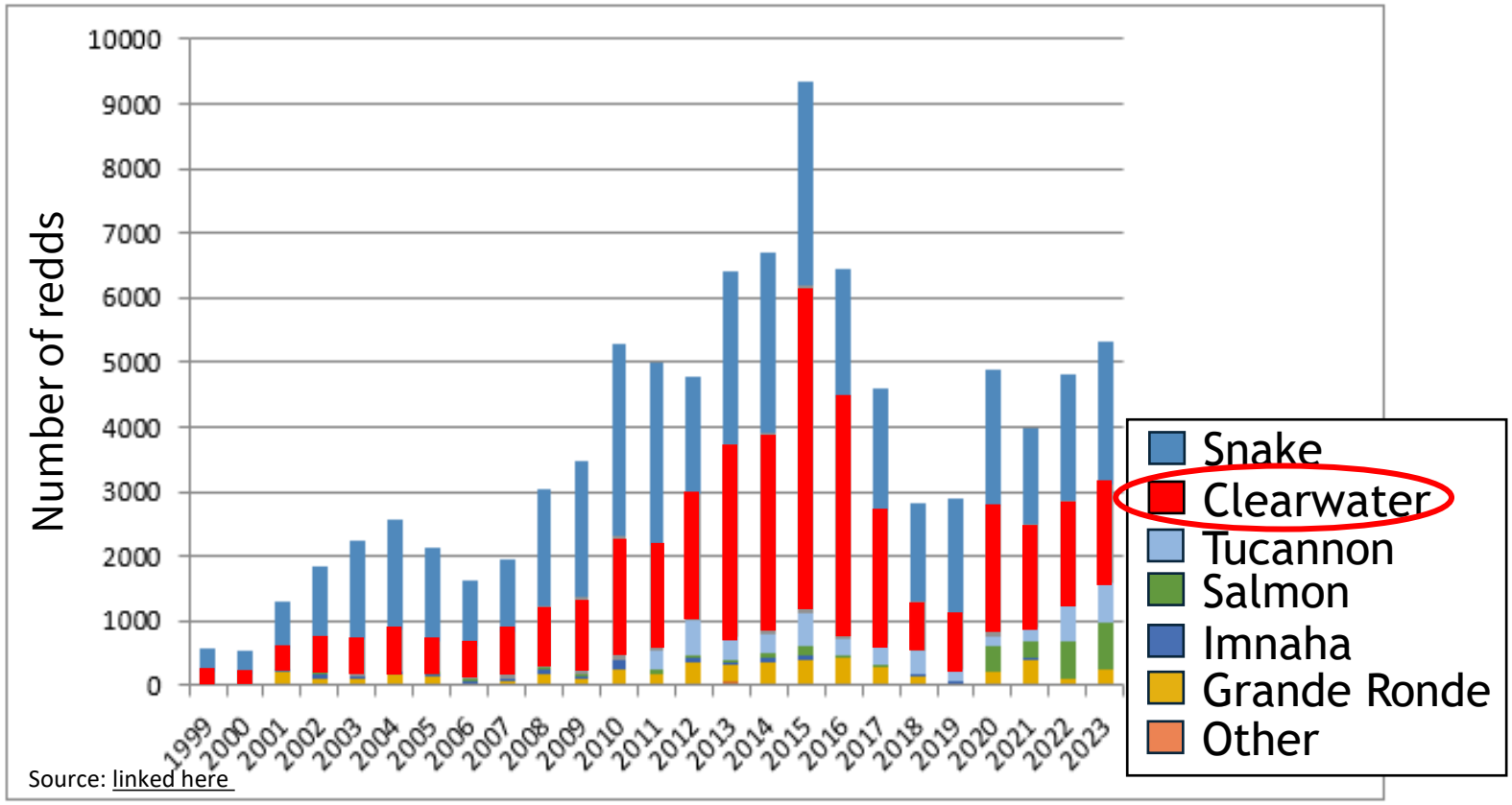
Snake River Fall Chinook

Nez Perce Tribal Hatchery – Snake River Fall Chinook

- Mitigation – hydrosystem
- Funding – BPA
- Management objective – Supplementation & Fishery

- Connection to **Supplementation** management objective:
  - Demonstrated natural spawning

fall Chinook redds counted in the Snake River and tributaries



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Council's Columbia River Basin Fish & Wildlife Program – AP program highlights

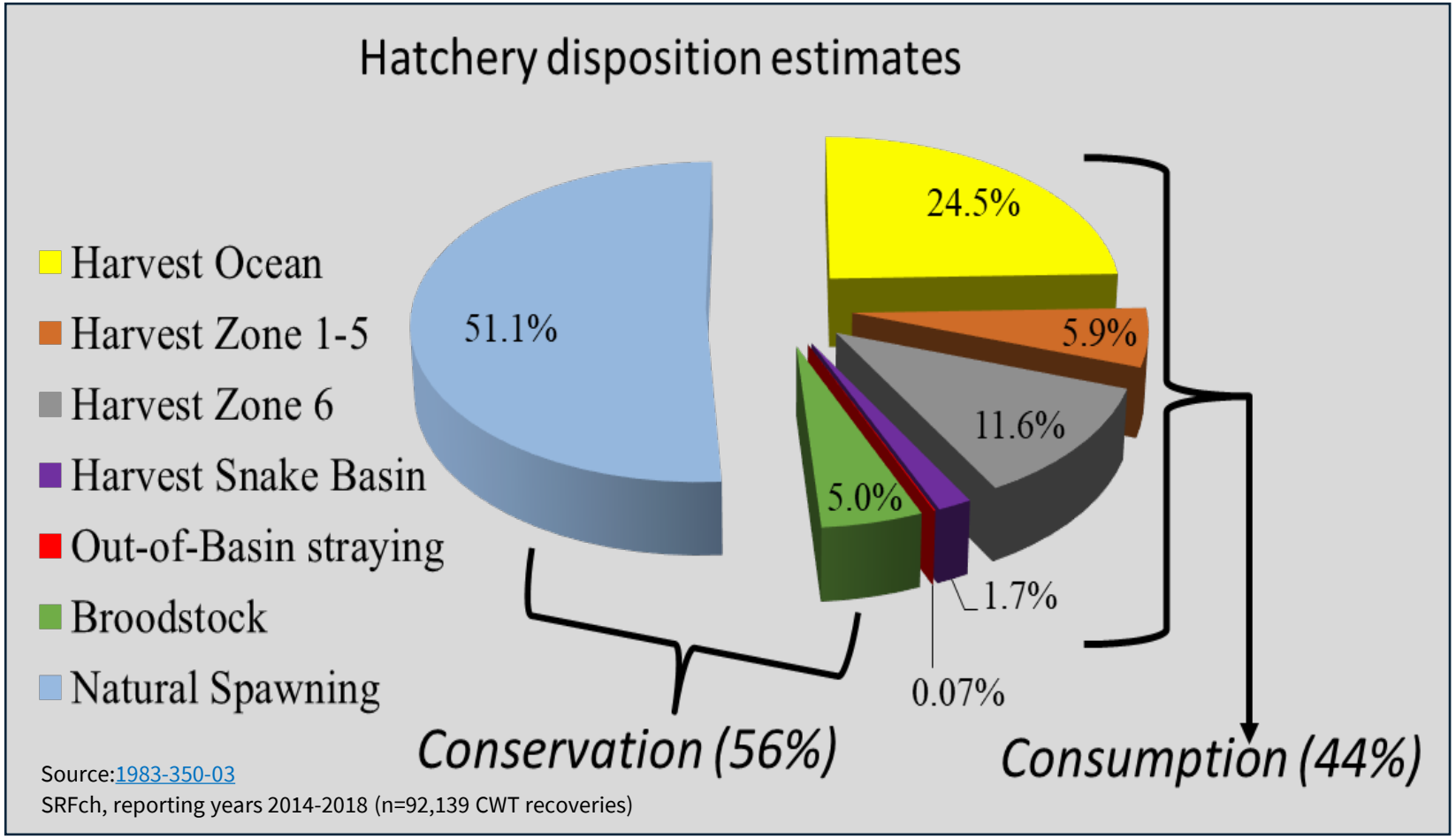
Snake River Fall Chinook

Nez Perce Tribal Hatchery – Snake River Fall Chinook

- Mitigation – hydrosystem
- Funding – BPA
- Management objective – Supplementation & Fishery

- Connection to **Fishery** management objective:
  - Fish for natural spawning and supporting both treaty & non-treaty fisheries

August 18, 2024 – 150 boats non-treaty fishing for Fall Chinook, confluence of the Snake & Clearwater.



Council's Columbia River Basin Fish & Wildlife Program – AP program highlights

Umatilla River

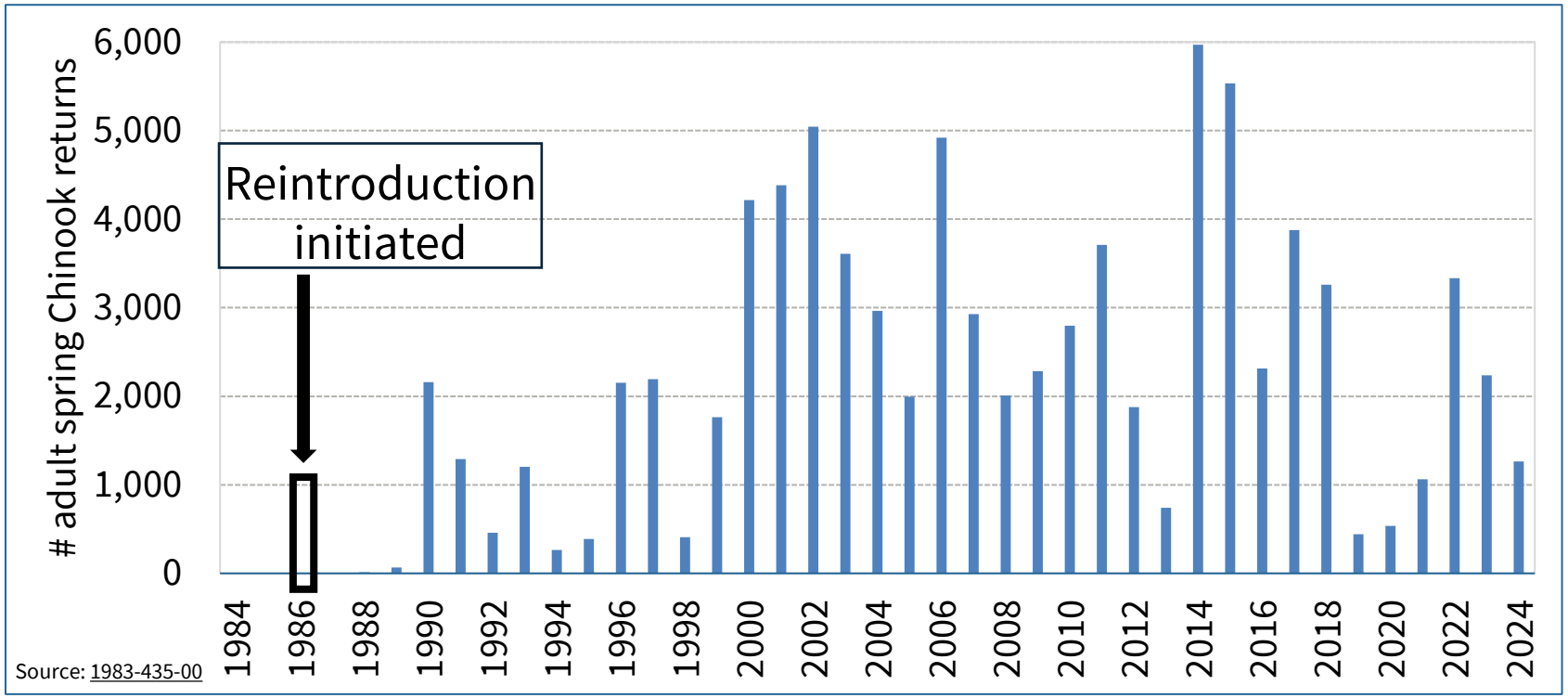
- 1980s - Comprehensive plan to supplement Steelhead and re-establish Salmon (extirpated early 1900s)
- Umatilla Hatchery and satellites – 1990s

Infrastructure limitations
- Well water shortages limiting production
- Chiller issues have led to early emergency releases

Umatilla River Spring Chinook

- Mitigation – hydrosystem
- Funding – BPA
- Management objective – Reintroduction, Supplementation, Fishery

Connection to **Reintroduction** management objective:
- Demonstrated adult returns
- Tribal subsistence fishery in most years



Council's Columbia River Basin Fish & Wildlife Program – AP program highlights

Lake Roosevelt resident fish

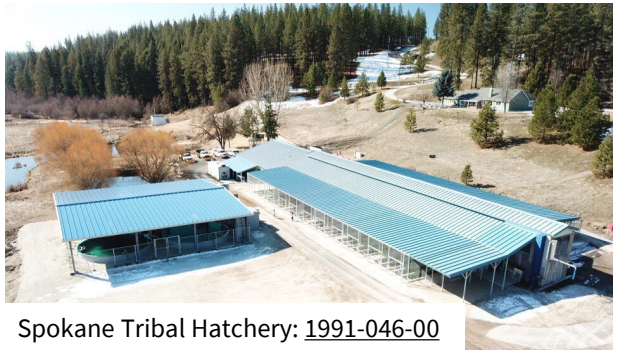
- Anadromous fish extirpated above Grand Coulee Dam – 1941.
- Blocked area mitigation – 2 hatchery facilities built nearly 50yrs later.

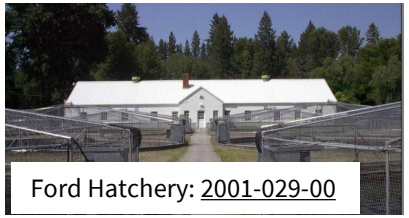
Lake Roosevelt hatcheries program– rainbow trout

- Mitigation – hydrosystem
- Funding – BPA (including BIA cost-share at Spokane Tribal)
- Management objective – Fishery

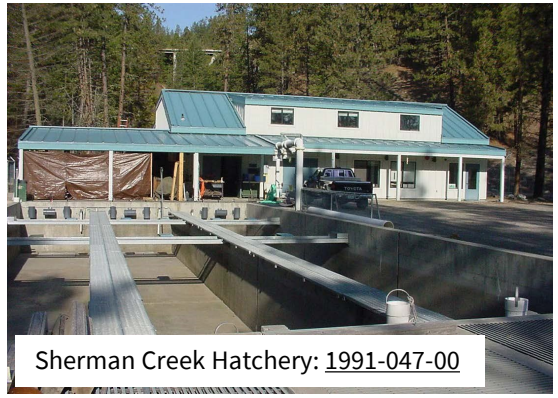
- Produce triploid Rainbow Trout for tribal subsistence fisheries and non-tribal sport fisheries.
  - Kokanee program ceased in 2020.
- Trout released in Lake Roosevelt and in Spokane Indian Reservation lakes.


Source: 1991-046-00


Spokane Tribal Hatchery: 1991-046-00


Ford Hatchery: 2001-029-00


Lake Roosevelt net pens: 1995-009-00


Sherman Creek Hatchery: 1991-047-00

Council's Columbia River Basin Fish & Wildlife Program – AP program highlights

Kootenai River Native Fish Conservation Aquaculture Program

- Kootenai Tribal Sturgeon Hatchery - 1989
- Twin Rivers Sturgeon and Burbot Hatchery - 2015

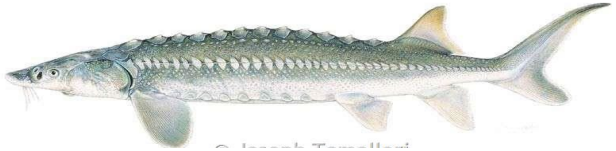
Kootenai Tribal: 1988-064-00

Twin Rivers: 1988-064-00

Sturgeon and Burbot programs

- Mitigation – hydrosystem
- Funding – BPA
- Management objective
  - Native fish conservation (Sturgeon)
  - Reintroduction and supplementation (Burbot)

- Conservation aquaculture to prevent extirpation of endangered Kootenai Sturgeon:



  - Preserving existing gene pool
  - Rebuilding age-class structure

- Extensive research & development of methods for Burbot aquaculture for restoration

  - Rebuilding functional spawning stock
  - Dispersal throughout recovery area
  - Increased abundance enough to support fishery

Outline

I. Approach to Program Performance

II. Components of artificial production (AP) Categorical Assessment

III. Implementation of artificial production measures in the Program

IV. Resources and considerations ahead of the next Program Amendment

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

Part IV.

- Considerations
- Resources: Hatchery website and Program Tracker tool

Key topics for region to consider ahead of the next Program amendment process

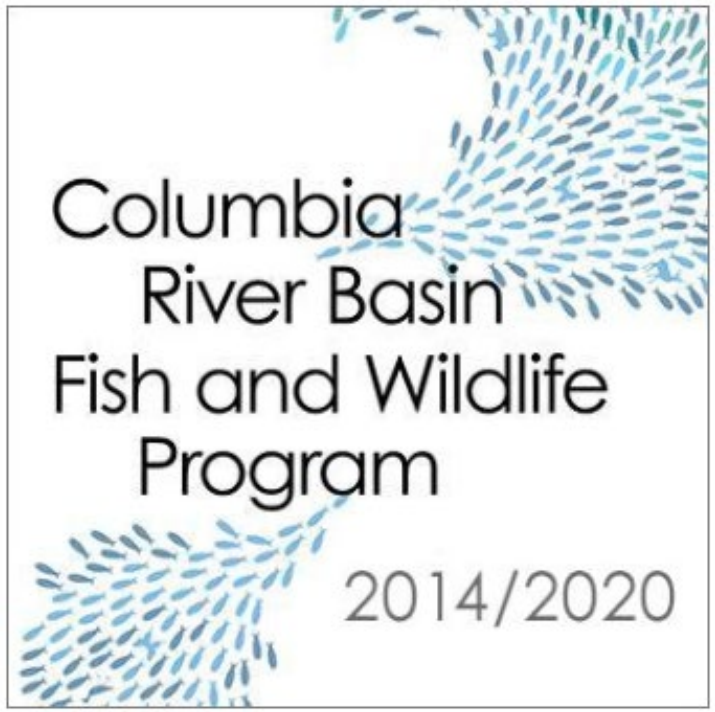
1. Adequacy of hatchery facility and AP program funding
    - Annual Operations & Maintenance
    - Certainty of asset management plans to address non-recurring maintenance needs

2. Data management
    - A wealth of hatchery data exist, but compiling data comprehensively and with appropriate context remains a challenge.

3. Anticipation of any changes in the artificial production in the Program
    - Facilities
    - Production programs

Council's Columbia River Basin Fish & Wildlife Program – Resources and considerations

Meeting mitigation requirements is dependent on healthy hatchery infrastructure

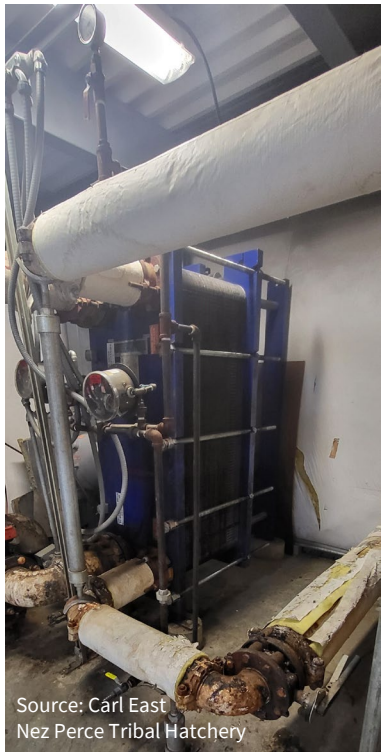


- Top emerging Program priority in the 2014 Program
  - *Provide for funding long-term maintenance of the assets that have been created by prior program investments*
- Council and BPA asset management plans
- Council support regional approach via letters to OR, WA, and ID senators - 2021
  - *"A regional approach to adequately fund all hatchery operations and maintain and modernize hatchery infrastructure to meet their intended goals is critical to meeting federal mitigation obligations in the entire Columbia River Basin"*

Council's Columbia River Basin Fish & Wildlife Program – Resources and considerations

Meeting mitigation requirements is dependent on healthy hatchery infrastructure

- Recent progress to address ~$1B in deferred & non-recurring maintenance at Federal hatchery mitigation facilities


Source: Carl East
Nez Perce Tribal Hatchery


Recirculating aquaculture tanks
Melvin R. Sampson Hatchery

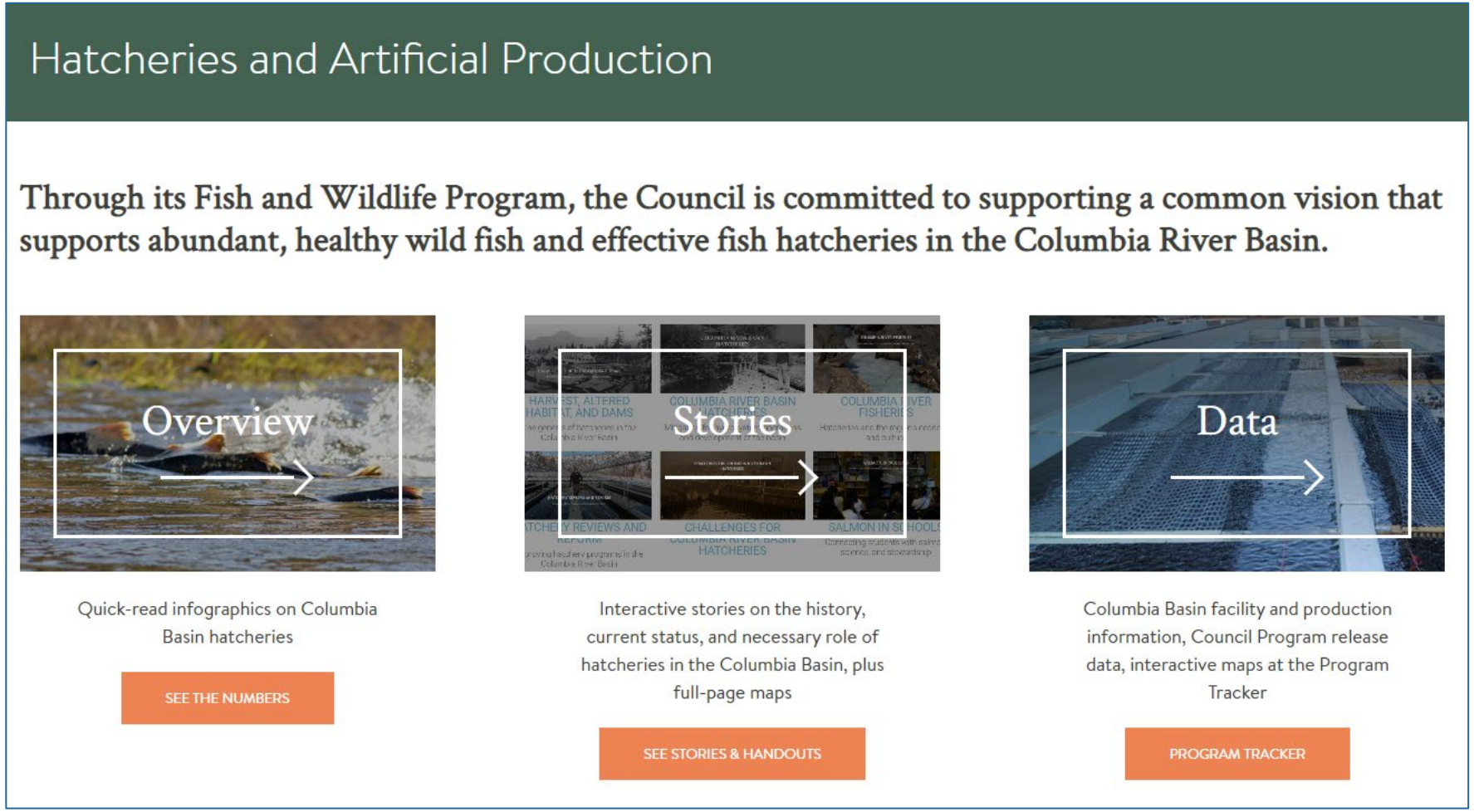

Source: Carl East
Nez Perce Tribal Hatchery

Funding commitment	Source (linked below)	Committed for
$25 million	BPA Reserves Distribution Clause	NPCC F&W Program hatcheries
$25 million	BPA Reserves Distribution Clause	Lower Snake River Compensation Plan hatcheries
$200 million	U.S. Government Commitments	Lower Snake River Compensation Plan hatcheries
$240 million	Inflation Reduction Act	NW hatcheries that support Tribes
$60 million	Mitchell Act	Mitchell Act hatcheries

- Modernization, upgrades, & maintenance
  - Considerations for efficiencies in water use/re-use
  - Considerations for climate resilience

Council's Columbia River Basin Fish & Wildlife Program – Resources and considerations

https://www.nwcouncil.org/fish-and-wildlife/hatcheries/



<u>Overview & Stories</u>

- Broad overview resource on the Basin's AP

<u>Data (program tracker tool)</u>

- Technical, policy, management resource
- Organization & Context
  - All mitigation programs
  - Management objectives
- Data (F&WP-specific)
  - AP programs and release numbers
  - Other indicators (in development)

Questions & Discussion

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