

LSRCP

Snake River Fall Chinook Salmon Program Review

Summary and
Future Direction

August 6-7, 2013
Clarkston, WA



Management Puzzle Pieces



Abundance



Mitigation



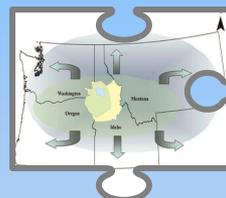
Lyons Ferry Hatchery



Productivity



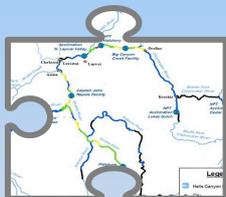
FCAP



Habitat



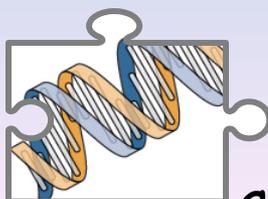
Nez Perce Tribal Hatchery



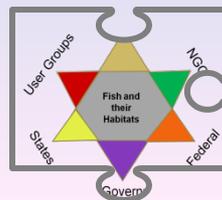
Distribution



Harvest



Diversity



Communication



Idaho Power Company

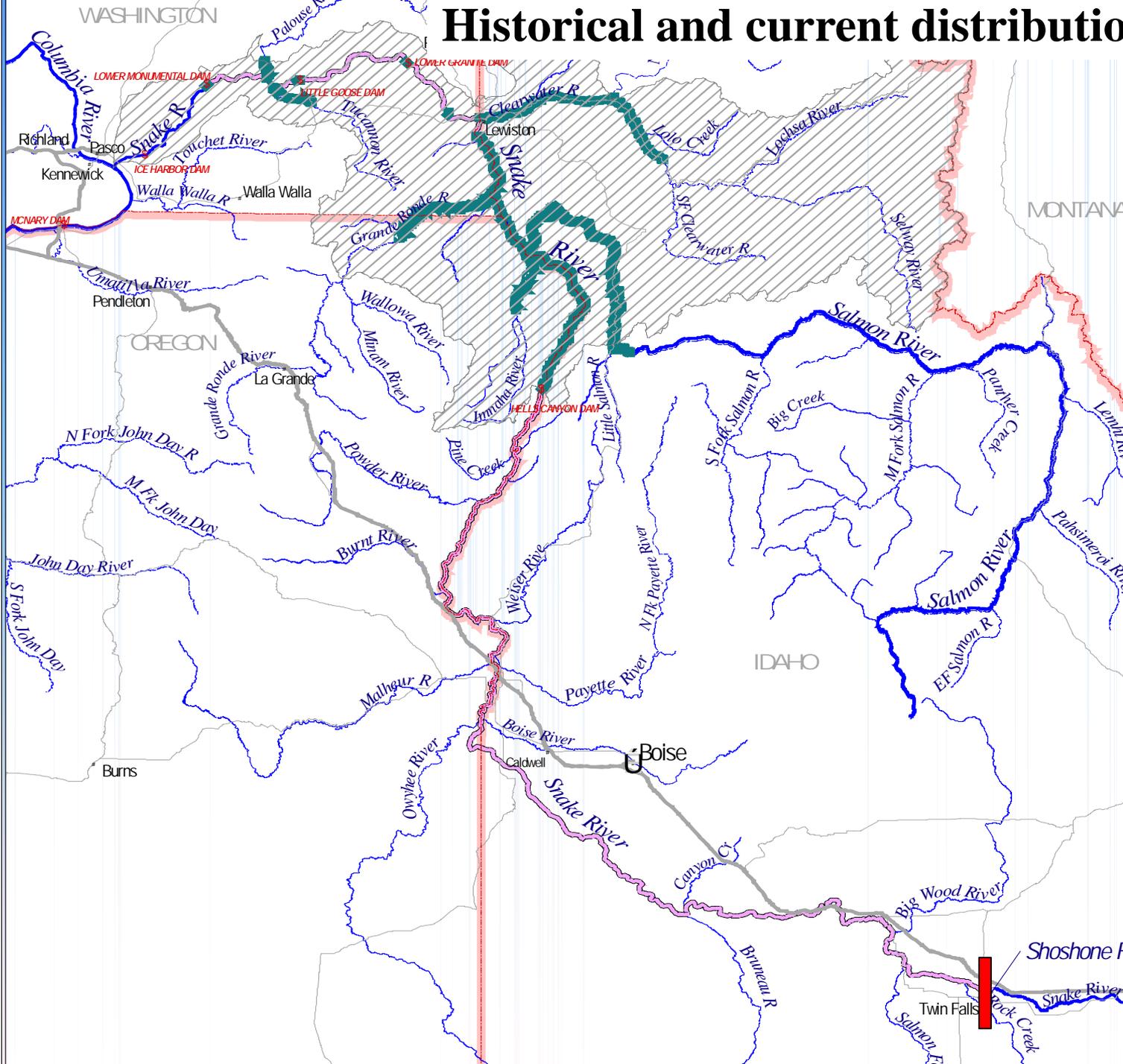
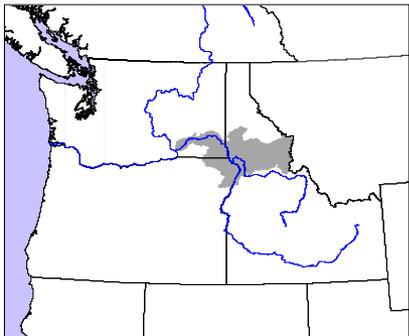
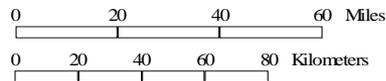
Presentation Outline

- Population structure and status
- Hatchery operations and goals
 - Release
 - Return
- Legal mandates
- Management assumptions
- Adaptive management
 - Actions taken
 - Future direction

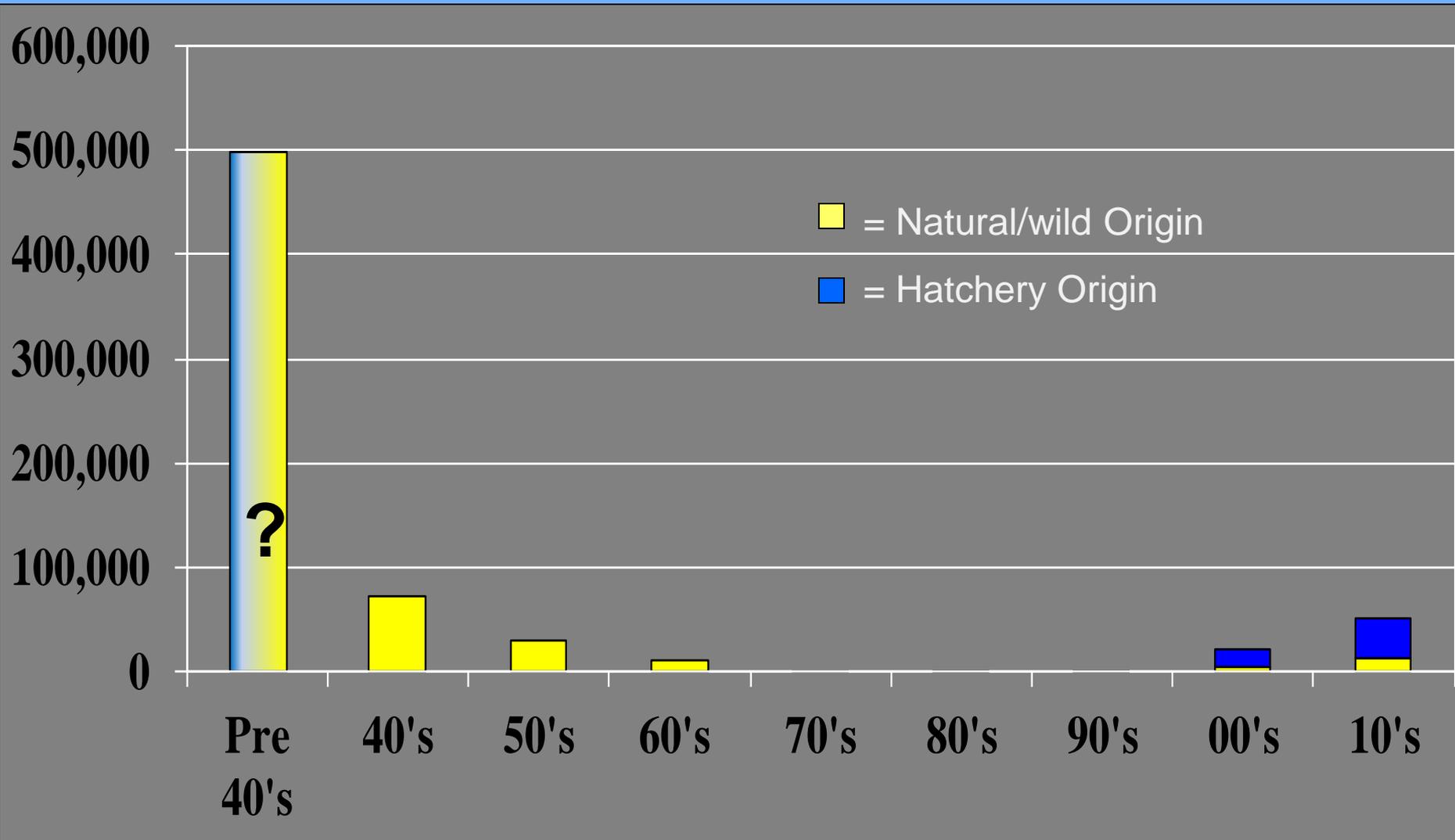
Snake River Fall Chinook

Historical and current distribution

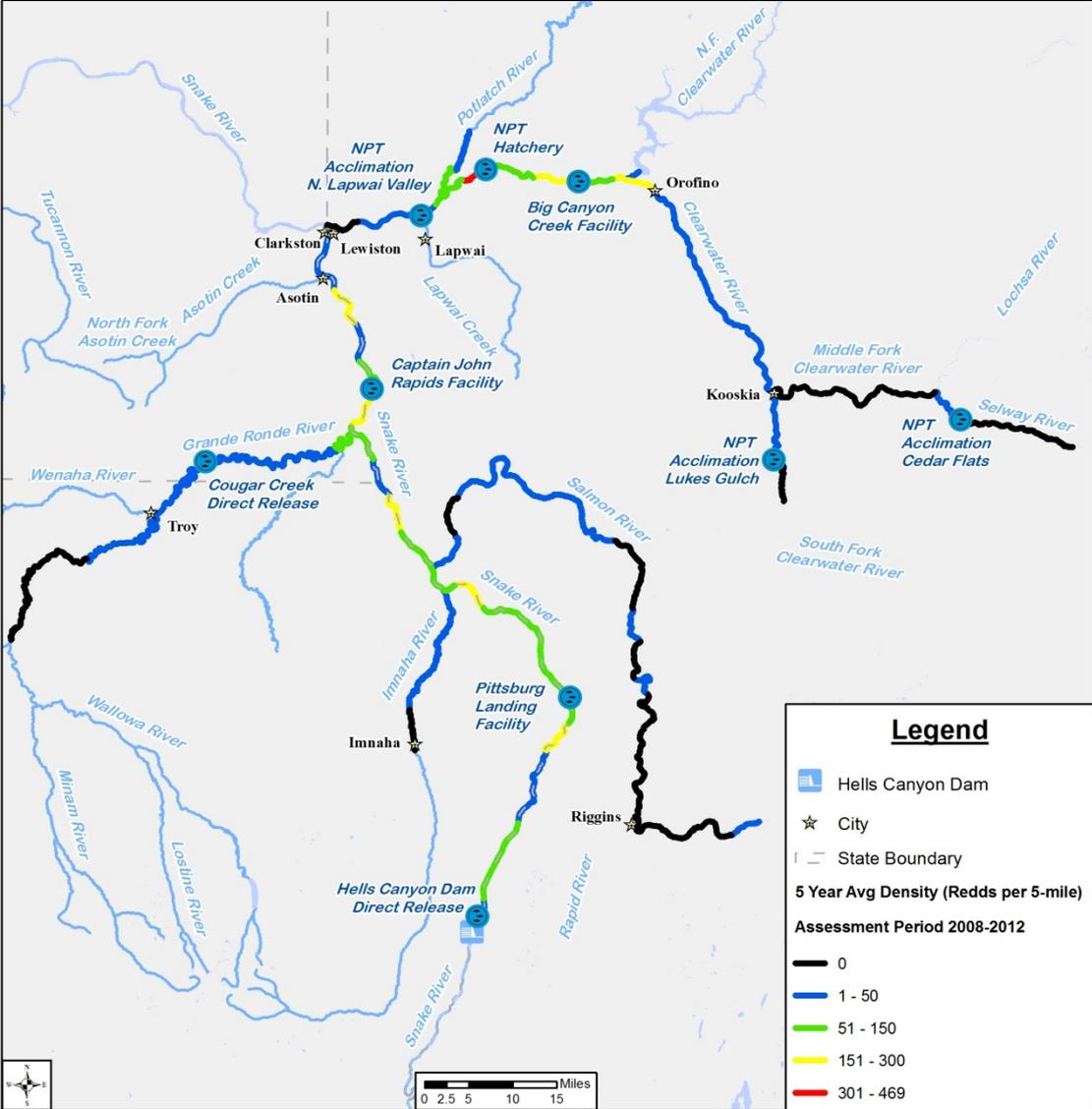
-  Fall Chinook ESU
-  current fall chinook spawning
-  historic fall chinook spawning



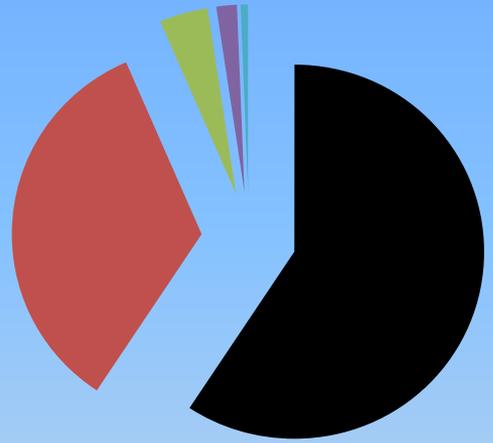
Average Fall Chinook Adult Returns to Snake River Basin by Decade



Fall Chinook Salmon Spawner Distribution Upstream of Lower Granite Dam

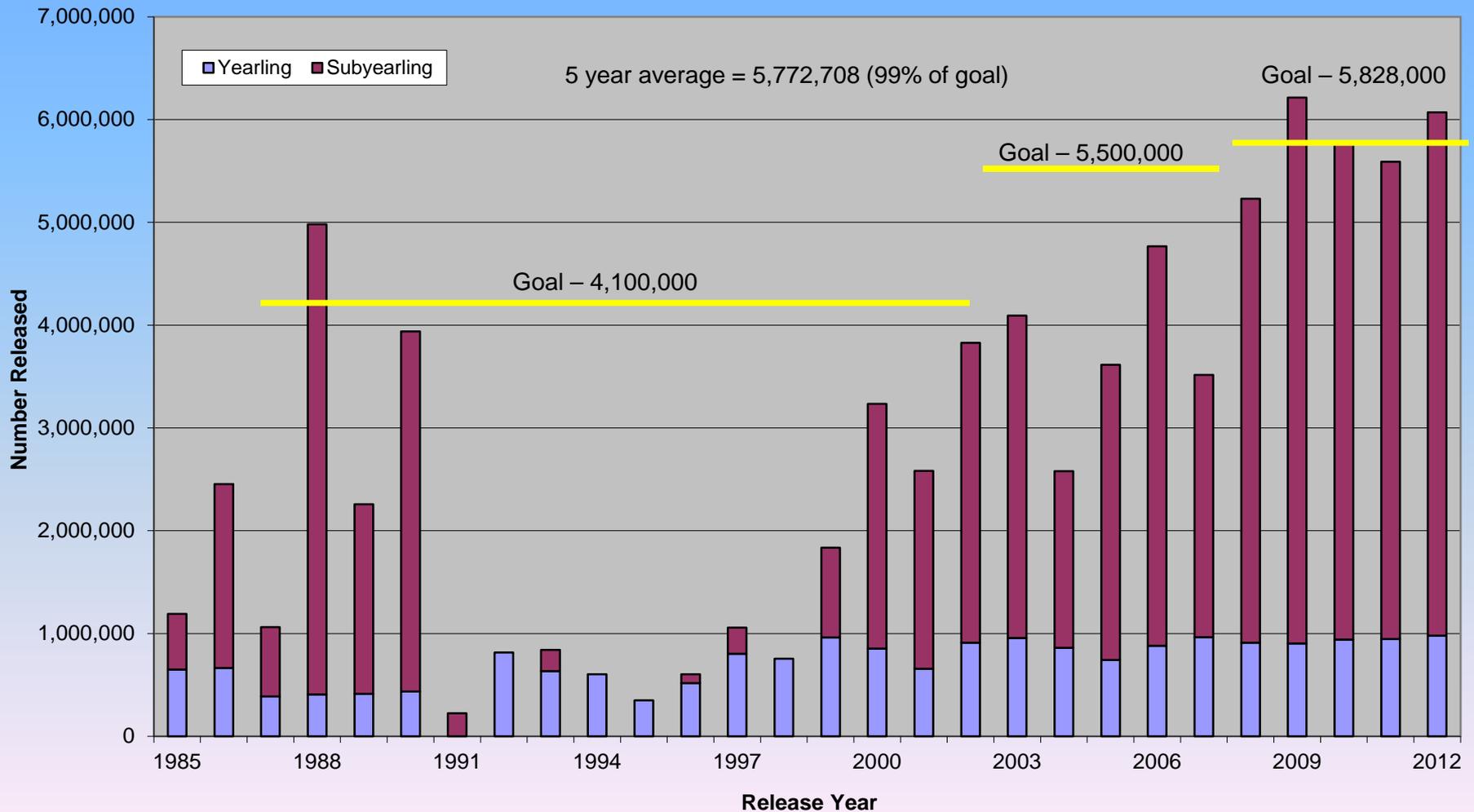


5 year average redd distribution



- Snake (59%)
- Clearwater (34%)
- Grande Ronde (4%)
- Imnaha (2%)
- Salmon (1%)

Hatchery Release Totals in Snake River Basin





Escapement Goal for Coho Salmon in the Snake River Basin

Lyons Ferry - 18,300
NPTH - 3,750
IPC - 2,700

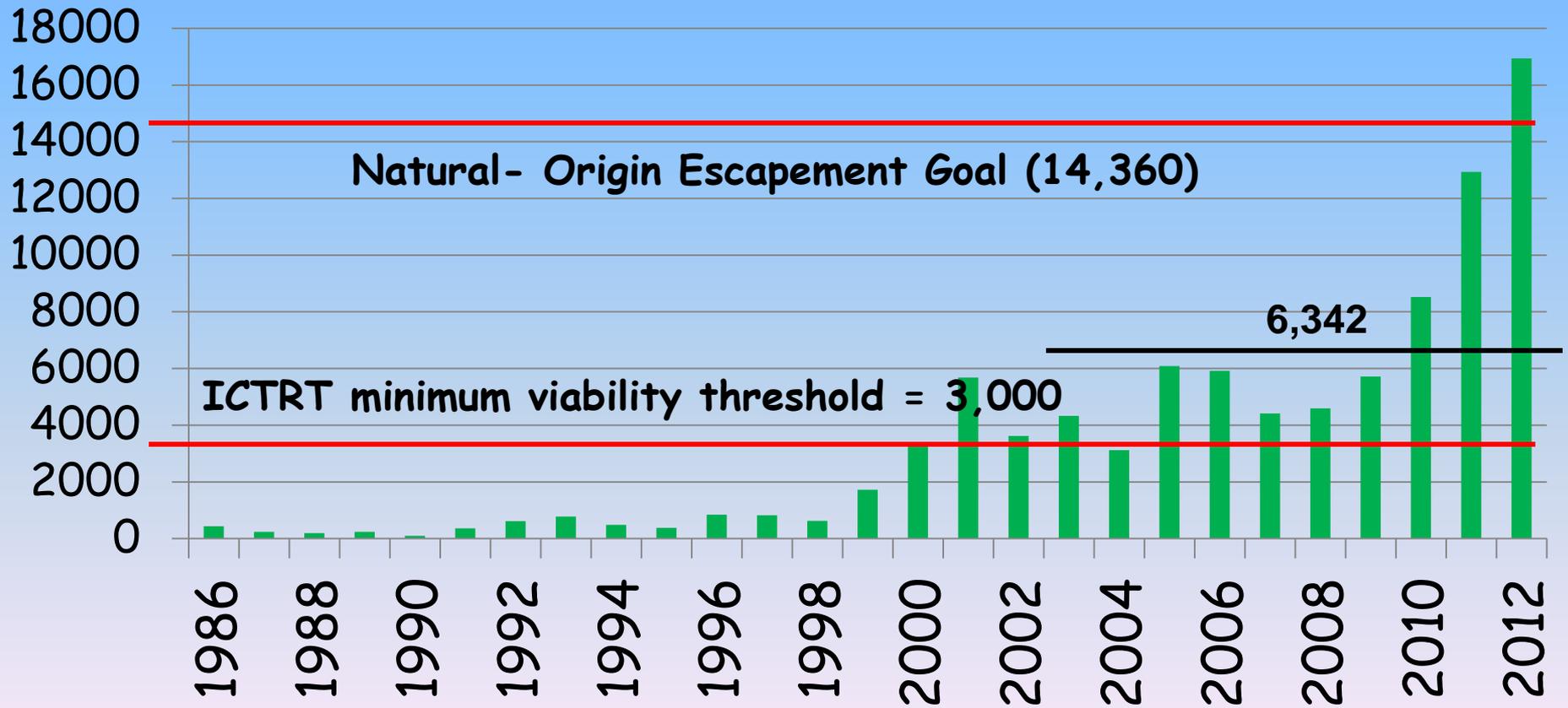


Management Escapement Goal (24,750)

Fall Chinook Salmon Escapement to Snake River Basin



Natural



Snake River Fall Chinook Salmon

2010 Adult fall Chinook disposition estimates, hatchery + natural

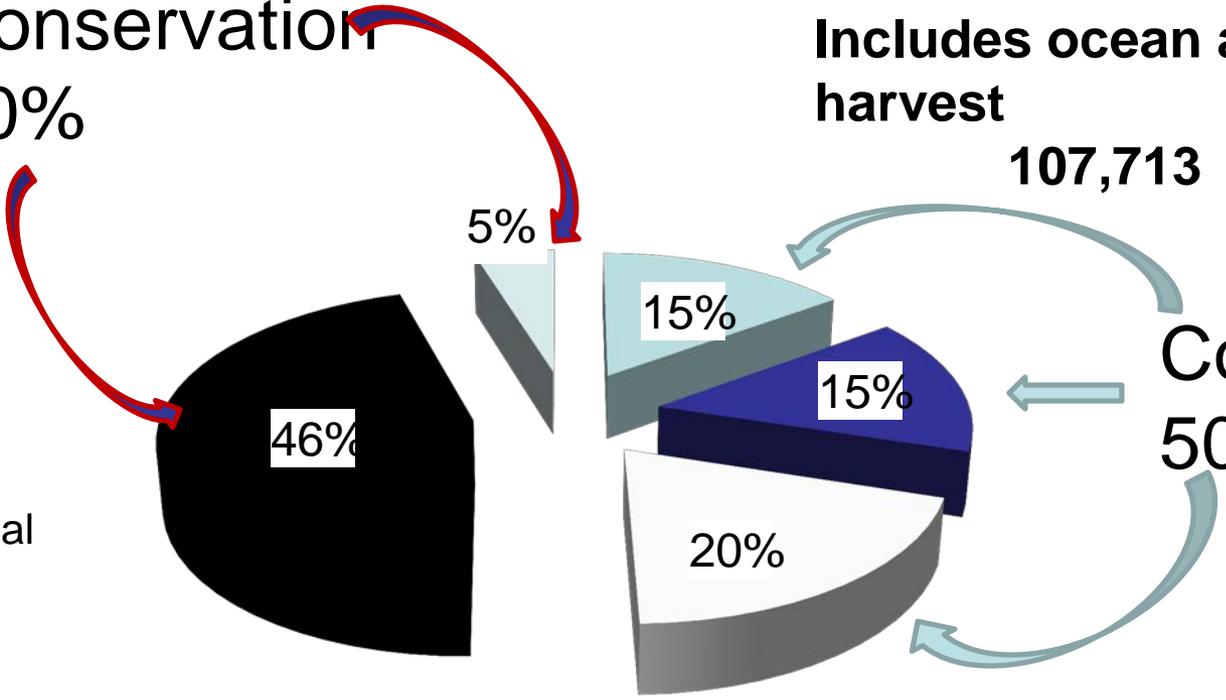
Conservation
50%

Total SR fall Chinook in 2010
Includes ocean and freshwater harvest

107,713

Consumption*
50%

- Commercial
- Sport
- Treaty
- Natural spawning
- Broodstock



*Non-selective fisheries

Legal Mandates

Snake River Fall Chinook Hatchery Production

- Lower Snake River Compensation Plan - Public Law 94-587, 99-662, 103-316
- Idaho Power Company Hells Canyon Settlement Agreement
- Nez Perce Tribal Hatchery - Pacific Northwest Electric Power Planning And Conservation Act 16 U.S.C. § 839-839h
- U.S. vs. Oregon 2008-2017 Management Agreement
- Columbia Basin Treaty Tribes Accords
- FCRPS Biological Opinion
- ESA/Hatchery Genetic Management Plan

Management Objectives

- 1) Natural production - Maintain and enhance natural production in supplemented.
- 2) Life History - Maintain life history characteristics and genetic diversity in supplemented and unsupplemented populations.
- 3) Genetic Diversity - Operate hatchery programs so that life history characteristics and genetic diversity of hatchery fish mimic natural fish.
- 4) Non-Target Populations - Effects of hatchery programs on non-target (same species) populations remain within acceptable limits.
- 5) Fisheries - Restore and maintain treaty-reserved tribal and non-treaty fisheries.

Management Objectives

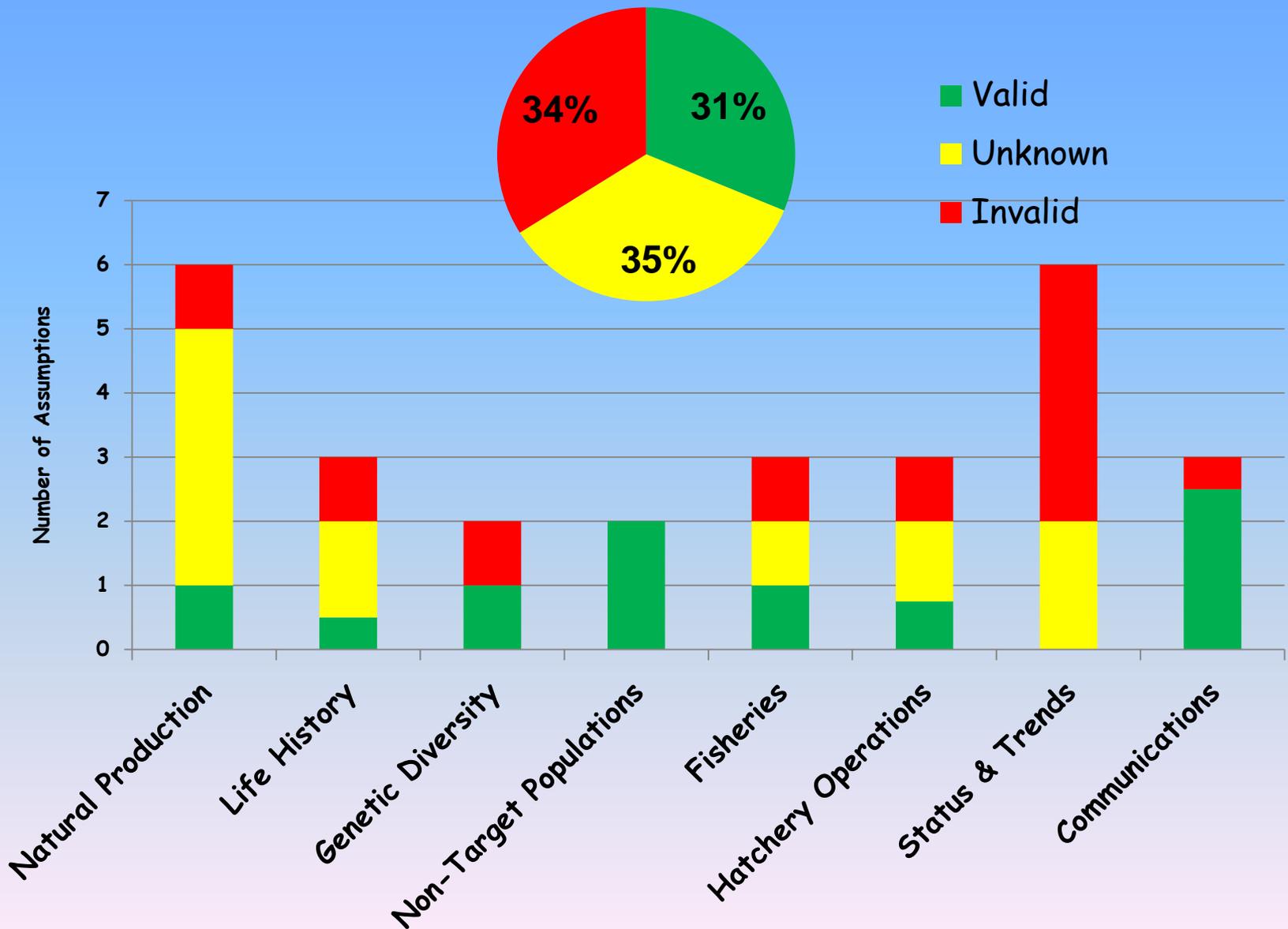
- 6) Hatchery Operations - Operate hatchery programs to achieve optimal production effectiveness while meeting priority management objectives for natural production enhancement, diversity, harvest, impacts to non-target populations.
- 7) Status and Trends - Understand the current status and trends of natural-origin population and their habitats.
- 8) Communications - Coordinate monitoring and evaluation activities and communicate program findings to resource managers.

Management Objective 2 - Maintain life history characteristics and genetic diversity in supplemented and unsupplemented populations.

Assumptions

- a) Adult life history characteristics in supplemented populations remain similar to pre-supplementation population characteristics - UNKNOWN.
- b) Juvenile life history characteristics in supplemented populations remain similar to pre-supplemented population characteristics - INVALID.
- c) Population level and within population genetic characteristics are not suppressed by supplementation – VALID/UNKNOWN.

Management Assumption Status



Nature of Unknown Assumptions

- Reproductive Success
- Spawner Distribution
- Natural Productivity
- Percent Hatchery Origin Spawners (pHOS) and Natural Origin Broodstock (pNOB)
- Age at Return for NORs
- Sub-population Genetic Structure
- Ocean and Mainstem Harvest
- Hydro-system Operations
- Habitat Function and Capacity
- Delisting Criteria
- Standardized Database(s)

Nature of Invalid Assumptions

- Post release survival
- Juvenile emigration timing
- Age at return
- Accurate run forecasting
- Adequate trapping facilities
- Full utilization of habitat
- Relationship of VSP to habitat
- Regional Communications

Hatchery Operations Past and Present

Category	Past	Present
Hatchery Facilities	Lyons Ferry	Lyons Ferry FCAP (acclimation ponds) Nez Perce Tribal Hatchery Irrigon/Oxbow
Purpose	Egg Bank/Mitigation	Supplementation/ Mitigation
Release Location	Downstream of Lower Granite Dam (limited by broodstock)	Upstream and Downstream of Lower Granite Dam
Broodstock	Mostly HxH (limited by high # strays)	HxN (up to 30% natural)

Adaptive Management Actions

Hatchery

- Selective mating
- Increased pNOB
- Rearing vessel netting and cleaning
- Representative marking

Hydro-system

- Summer spill
- Transportation

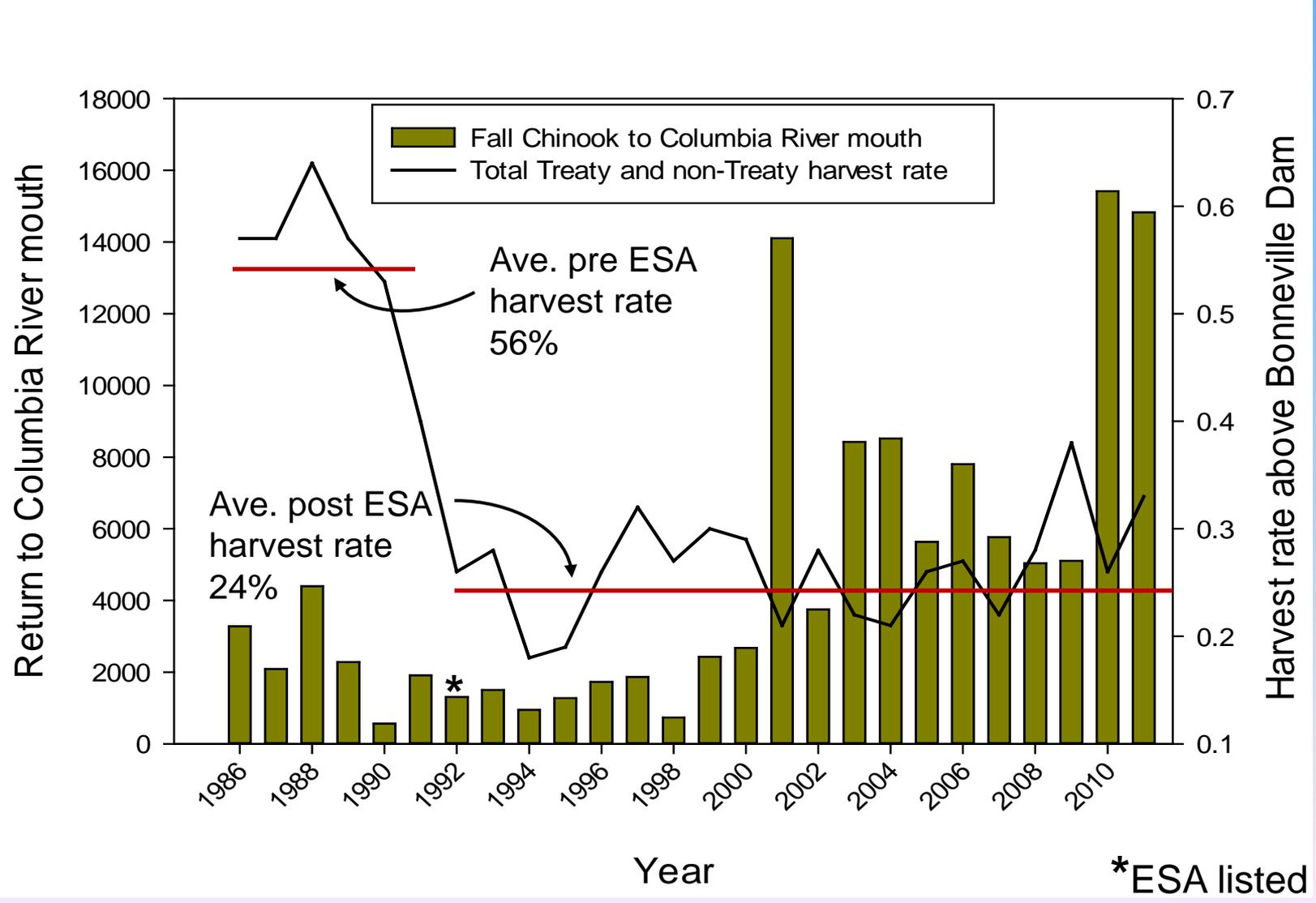
Habitat

- Summer flow augmentation
- Stable spawning flows
- Reduced power peaking

Harvest

- Abundance based
- Non-selective and selective

Snake River wild fall Chinook river mouth size and total in-river harvest rates



*ESA listed

Things we now know

- **Adult abundance has increased significantly**
 - Getting closer to meeting in and out of basin mitigation goals
 - Natural-origin adult abundance above delisting criteria.
 - Total abundance is well below historical levels
- **Adult distribution via annual aerial redd counts.**
 - 70/30 rule between Snake and Clearwater.
 - Large number of hatchery fish on the spawning grounds
- **Significant mainstem state and tribal harvest via coded-wire tag recoveries and creel surveys.**

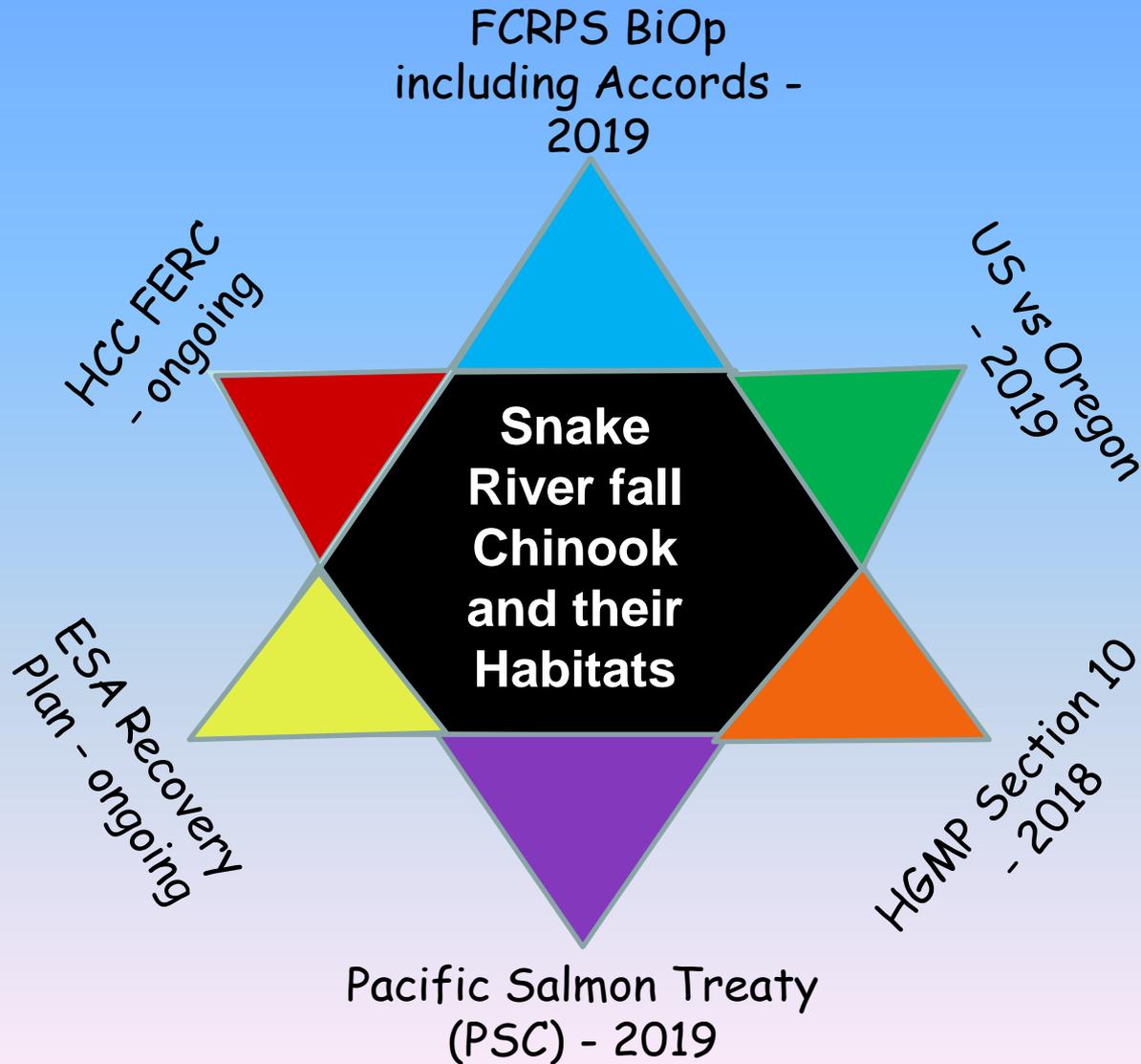
Things we now know, and don't know

- **Fall Chinook abundance has increased**
 - changes in management or environmental improvements?
- **Management effects?**
 - Hatchery production/Supplementation
 - Meeting full broodstock objectives
 - Increased number of naturally-spawning hatchery fish
 - Reduced proportion of out-of-basin strays
 - Smaller size and age at return
 - Decreased ocean and lower Columbia River harvest rates
 - Allowed for increased adult returns to the Snake River
 - Corridor improvements = survival benefits
 - Summer transport/spill
- **Environmental effects?** (ocean, long-term weather patterns)
 - Increased SARs/productivity - similar to other stocks/species

Things we don't know

- The level of contribution to increased adult abundance from supplementation compared to contributions from large increases in total hatchery production & higher SARs
- The contribution/influence of hatchery fish on natural fish productivity
- The productive capacity of remaining habitat (altered and dynamic).
- Whether hatchery programs are affecting the life history structure of the natural population
- Long-term viability of an ESU with only a single extant population spatial structure and diversity

PENDING LEGAL AND MANAGEMENT AGGREEMENT REVISIONS



Critical Uncertainties

- Definition and quantification of mini-jack and jacks.
- Origin assignment of individual unmarked/untagged fish.
- Validation of run-reconstruction estimates of natural-origin returns.
- Reproductive success of hatchery-origin returns.
- Distribution of hatchery-origin spawners.
- Variable harvest rates and CWT sampling on clipped and unclipped.

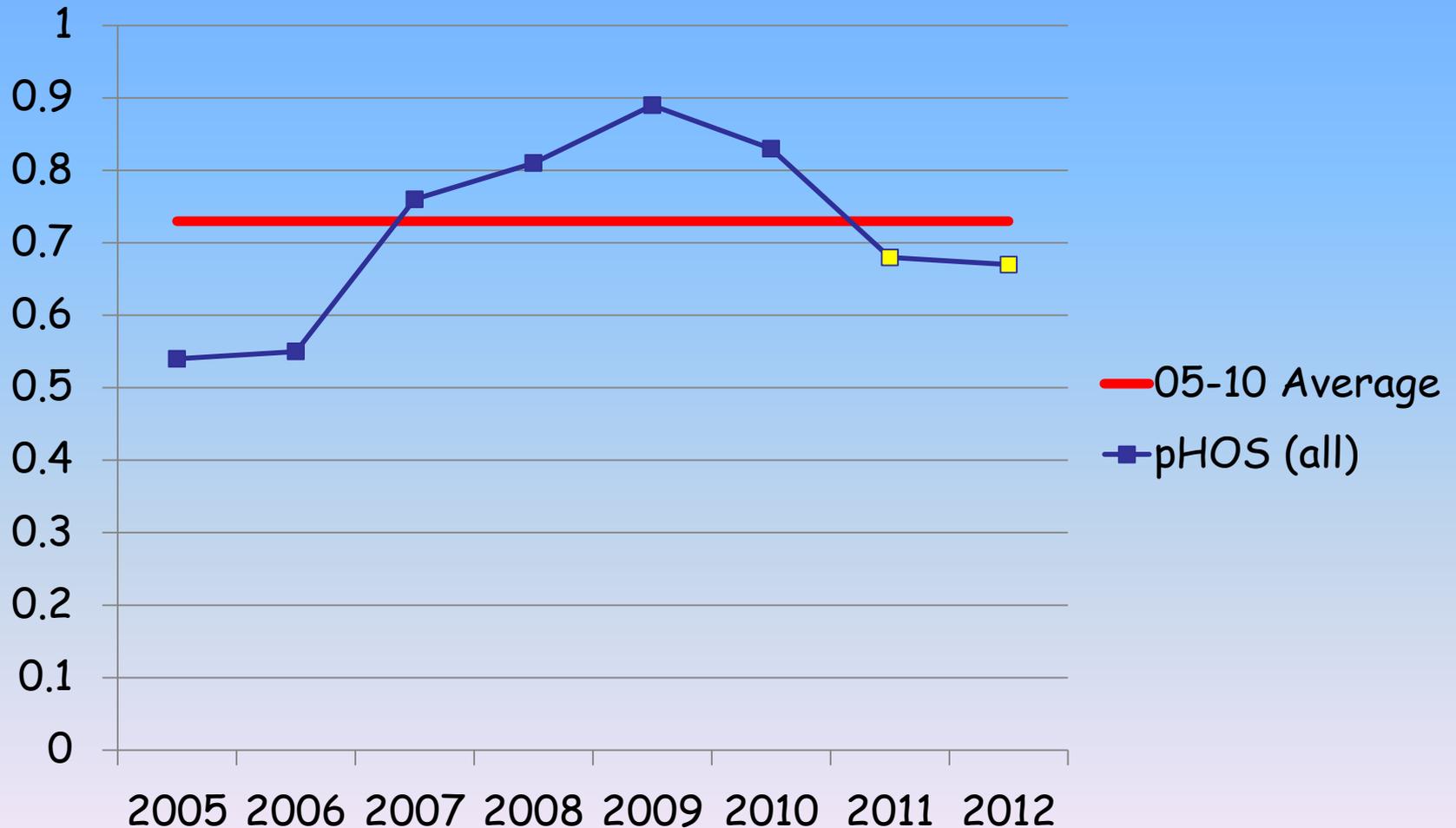
New Research, Monitoring, and Evaluation

- Parentage Based Tagging.
- Adult fall back and release site fidelity.
- Run-reconstruction.
- Spawning, rearing, and overwintering locations.
- Juvenile life cycle modeling.
- Genetics of subpopulation structure.
- Adaptive management/research findings symposium.

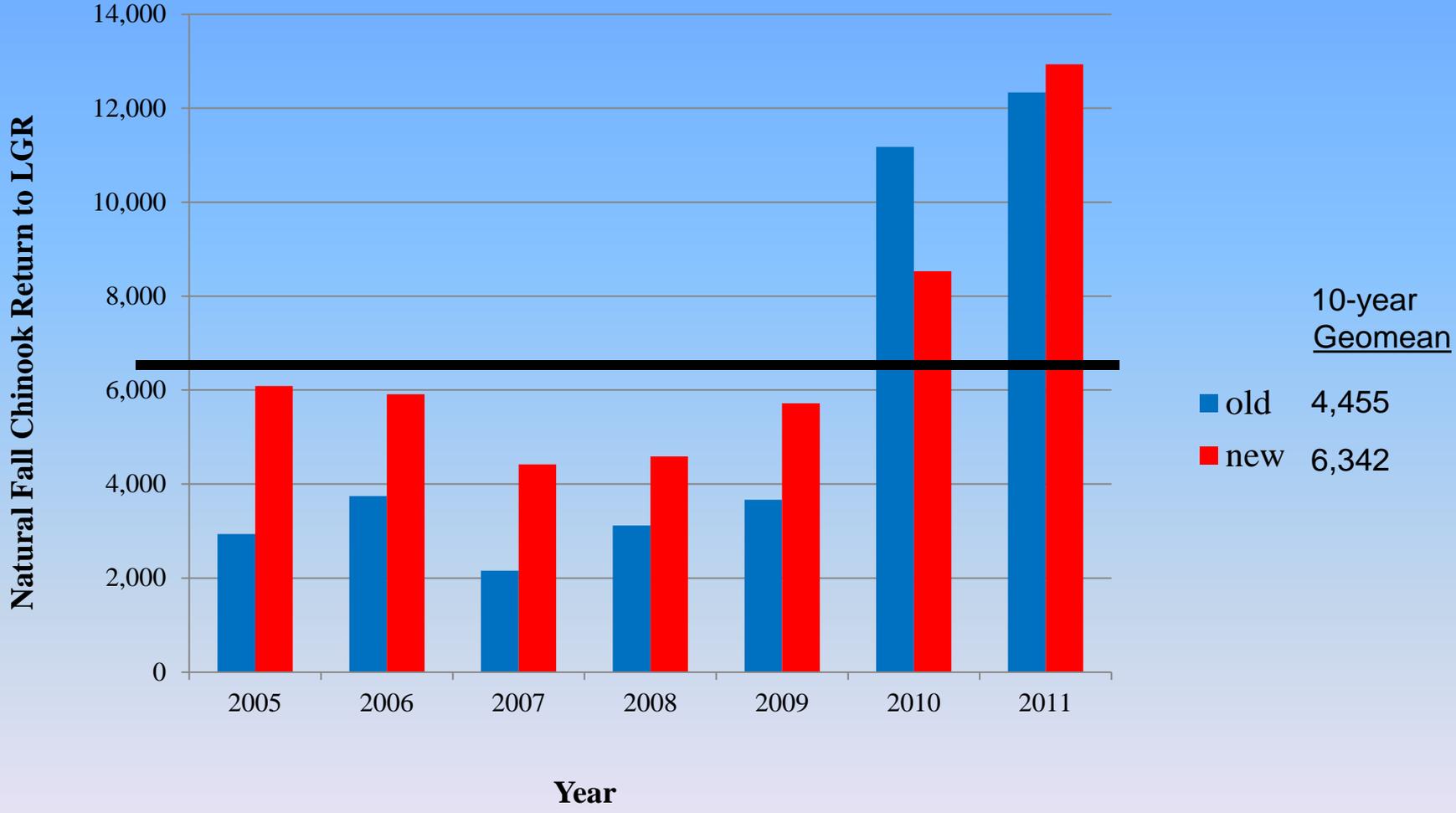
Fidelity and Fallback

	Return Reach					
Release Group	Downstream of Lower Granite Dam	Lower Granite Reservoir	Clearwater River	Lower Snake River	Upper Snake River	Salmon River
Lower Clearwater SY						
Lower Clearwater Y	(6)	(12)	85.9%	12.7%	2.1%	0.0%
Upper Clearwater SY						
Lower Snake SY						
Lower Snake Y	(3)	(9)	29.3%	59.3%	9.0%	0.7%
Grande Ronde SY						
Couse Creek SY						
Upper Snake SY						
Upper Snake Y	(4)	(9)	1.2%	43.2%	56.0%	0.0%
Lyons Ferry Y						
Lyons Ferry SY						

Percent Hatchery Origin Spawners (pHOS)



Retrospective Run-Reconstruction



Things we will know by 2018

- total escapement upstream of Lower Granite Dam (LGR),
- abundance of natural-origin returns (NOR),
- abundance of hatchery-origin returns,
- percentage of the hatchery-origin fish in the naturally spawning population (pHOS) at the population scale,
- percentage of the natural-origin fish used in hatchery broodstocks (pNOB),
- genetic diversity and effective population size of natural and hatchery-origin population segments ,

Things we will know by 2018

- spawning distribution,
- fidelity of subyearling hatchery production groups to release site areas,
- spawning distribution upstream of LGR of Lyons Ferry Hatchery on-station released fish,
- magnitude of predation on juvenile fall Chinook by smallmouth bass and channel catfish in the Snake River,
- best management strategy for juvenile passage through hydrosystem (COE Consensus Study),

Things we will know by 2018

- age-at-return for natural and hatchery-origin fish,
- relative performance of various hatchery life stage at release and release type strategies.

Things we may have an improved understanding by 2018

- productivity of the naturally spawning population,
- percentage of the hatchery-origin fish in the naturally spawning population (pHOS) at spawning aggregate scales,
- relative magnitude juvenile production from some spawning aggregates,
- density dependent relationships between spawner abundance and juvenile production,
- relationship of juvenile fish growth and survival to food availability and abundance,
- range of juvenile spatial and temporal rearing patterns,

Things we may have an improved understanding by 2018

- heritability of age-at-emigration, and
- pre-season run forecasts.

Things we will still lack an understanding by 2018

- relative reproductive success of hatchery and natural-origin spawners,
- magnitude of mini-jack returns and their contribution to natural spawning,
- differential use of habitats by hatchery and natural-origin fish,
- abundance of basin-wide juvenile production,
- impact of sturgeon on juvenile production (egg consumption),

Things we will still lack an understanding by 2018

- impact of avian predation on juvenile fish upstream of Lower Granite Dam, and
- ecological processes supported (or hindered) by an abundance (or scarcity) of natural spawners.

Cooperative and Joint Management Effort

	Funding Source	Implementers
Hatcheries	LSRCP BPA/NPCC IPC	WDFW, NPT, IPC, CTUIR, ODFW, IDFG
Monitoring and Evaluation	LSRCP BPA/NPCC BLM IPC COE PSC	Redd counts (NPT, IPC, USFWS, WDFW) Juvenile behavior and survival (USFWS, NPT, USGS, NOAA) Hatchery performance (WDFW, NPT) Run reconstruction (WDFW, NPT, IPC, NOAA, UI, USvOR-TAC)

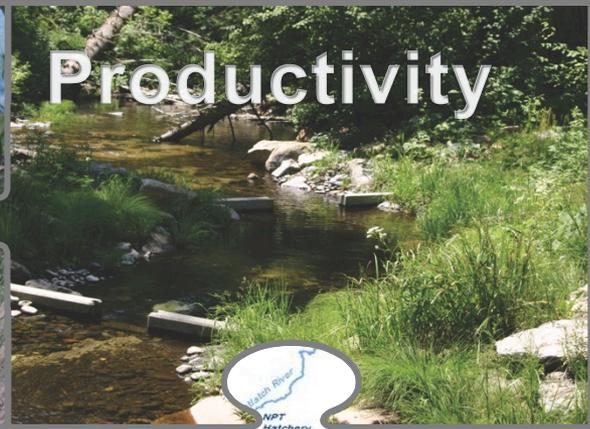
“Our fate and the fate of the fish are linked.”



Abundance



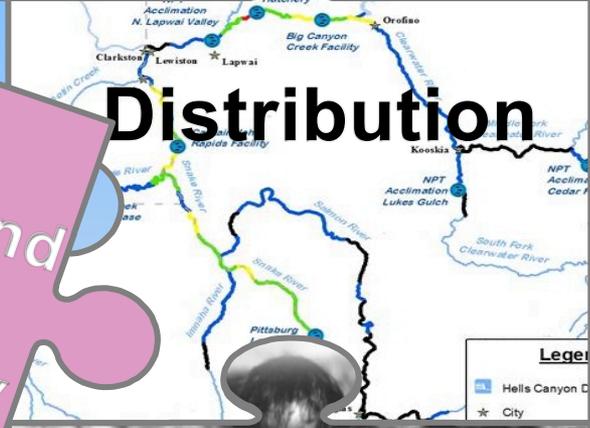
Treaty Harvest



Productivity



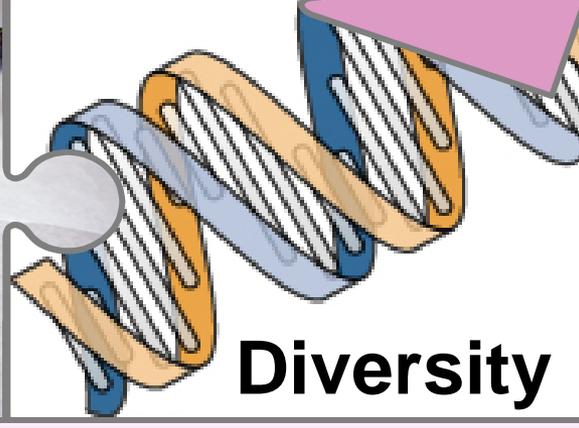
Non-treaty Harvest



Distribution



Mitigation



Diversity



Sustainability

Acknowledgements

- Hatchery Staffs
- M&E and Harvest Monitoring Staffs
- Fish Marking
- LSRCP
- Extensive coordination and collaboration between states, tribes, feds, and Idaho Power Company



Mark Schuck Retirement Party - September 7th

