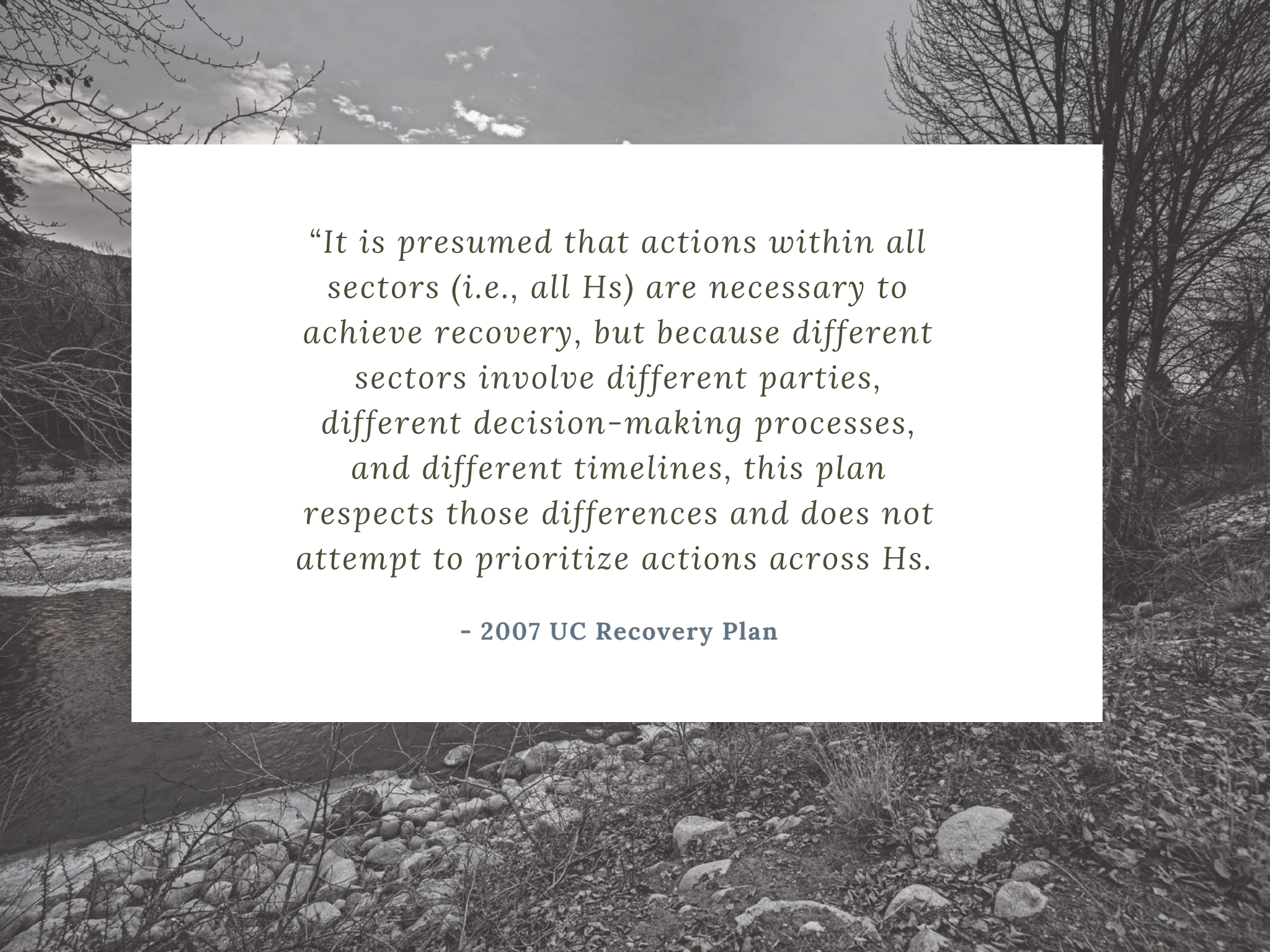
INTEGRATED RECOVERY

THE 5TH "H" HUMANS

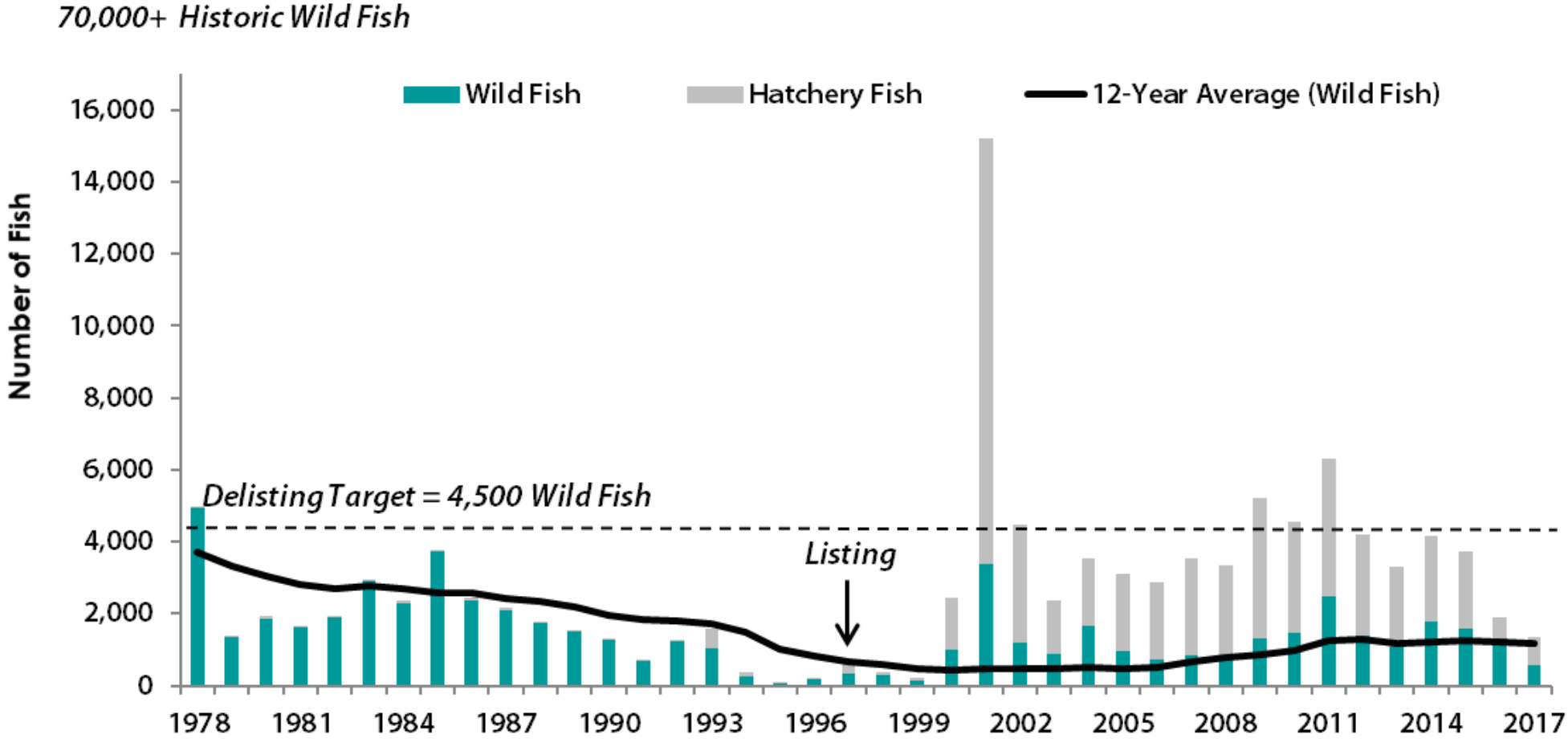
GREER MAIER, SCIENCE PROGRAM MANAGER
UPPER COLUMBIA SALMON RECOVERY BOARD



"It is presumed that actions within all sectors (i.e., all Hs) are necessary to achieve recovery, but because different sectors involve different parties, different decision-making processes, and different timelines, this plan respects those differences and does not attempt to prioritize actions across Hs.

- 2007 UC Recovery Plan

Upper Columbia Spring Chinook (Endangered)



INTEGRATED RECOVERY GOALS

1. Achieve recovery of Upper Columbia spring Chinook salmon and of Upper Columbia steelhead, which will require coordinated actions in all of the management sectors affecting salmon.

2. Engage and collaborate with sector managers in finding and implementing solutions to identified issues.

available at www.ucsrb.org

Background Summary

CONTENT

HABITAT SUMMARY

Habitat Status and Trends

Bed and Channel Form

Riparian Condition

Instream Structural Complexity

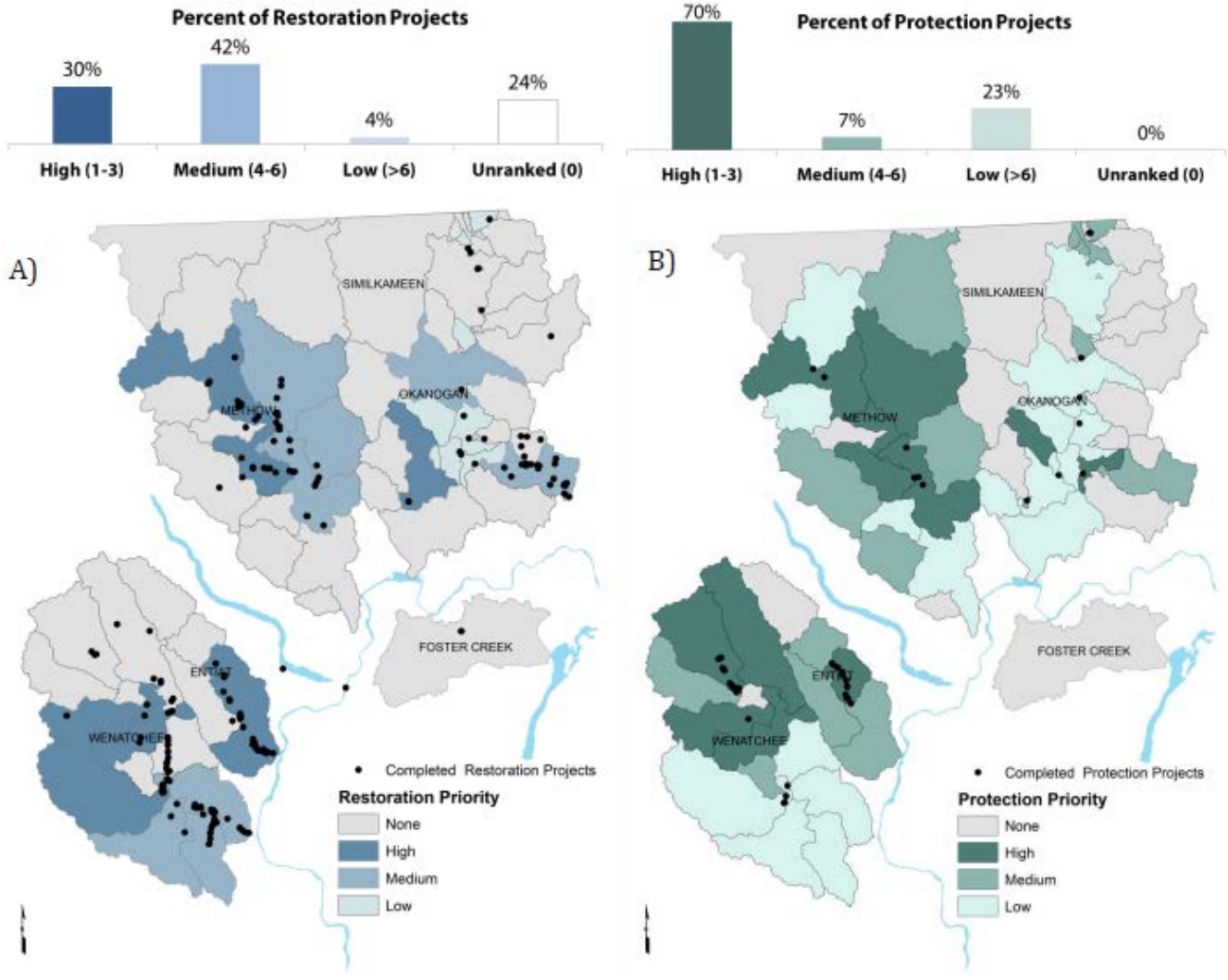
Sediment

Water Quantity

ACCOMPLISHMENTS

Over 90 million dollars have been invested in habitat restoration and protection since 1999. This has resulted in the completion of over 450 projects.

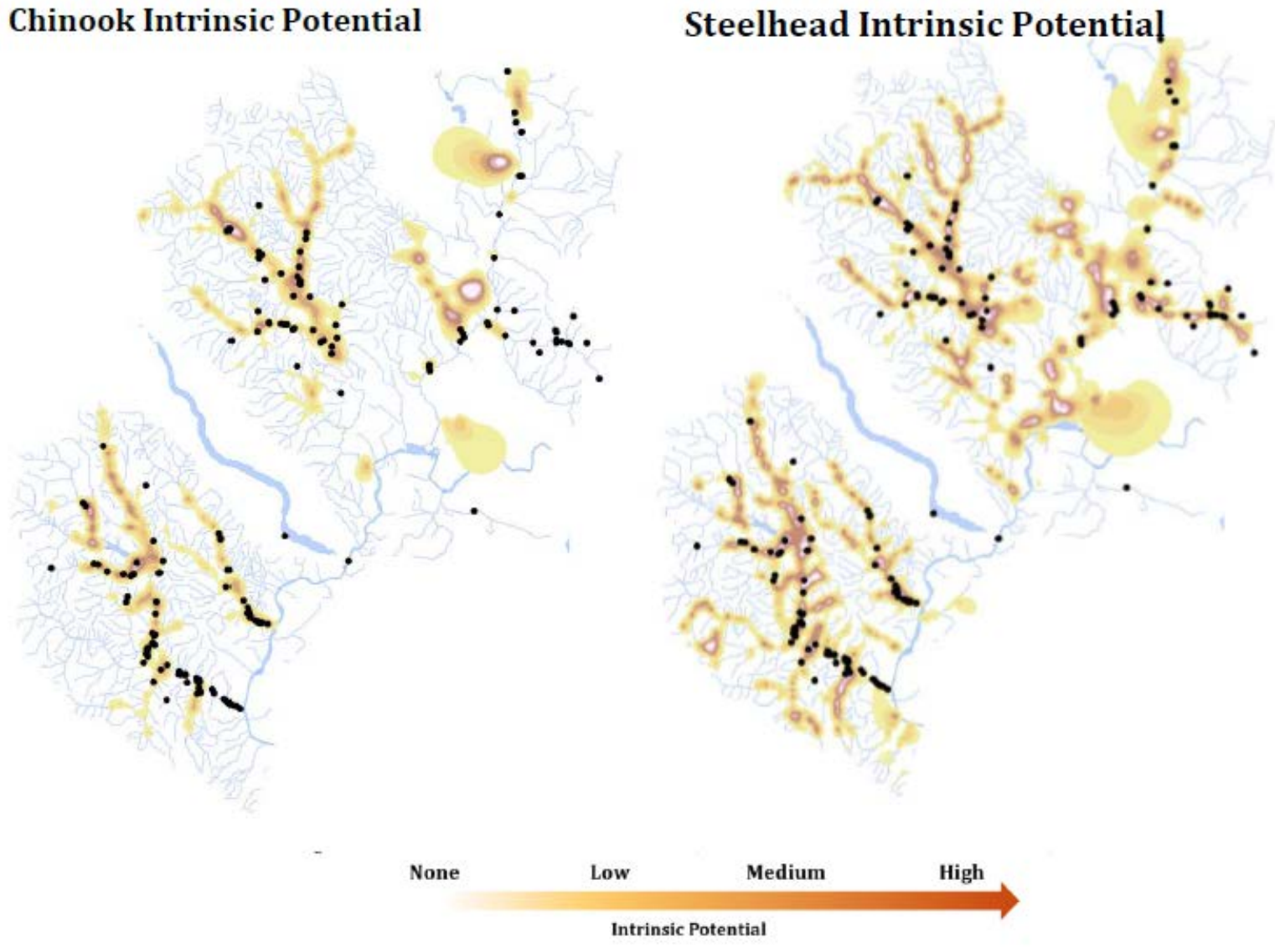
Projects and Priorities



"The majority of restoration and protection habitat projects (>50%) are concentrated in 10% of the Upper Columbia assessment units."

Projects and Priorities

"Almost 34% of projects were within high IP habitat for steelhead compared to 9% of projects within high IP habitat for spring Chinook"



How do we estimate?

BENEFITS TO FISH

Effectiveness Monitoring

Life Cycle Modeling

EDT Modeling

Habitat Status and Trends

IMW (Entiat)

UNCERTAINTIES

Habitat Status and Trends

Fish Survival Bottlenecks

Fish Response to Habitat Actions

How Habitat Actions Contribute to Recovery

TAKE-HOMES

1

Habitat impairments exist throughout the region

2

Significant accomplishments have been made in restoring and protecting habitat

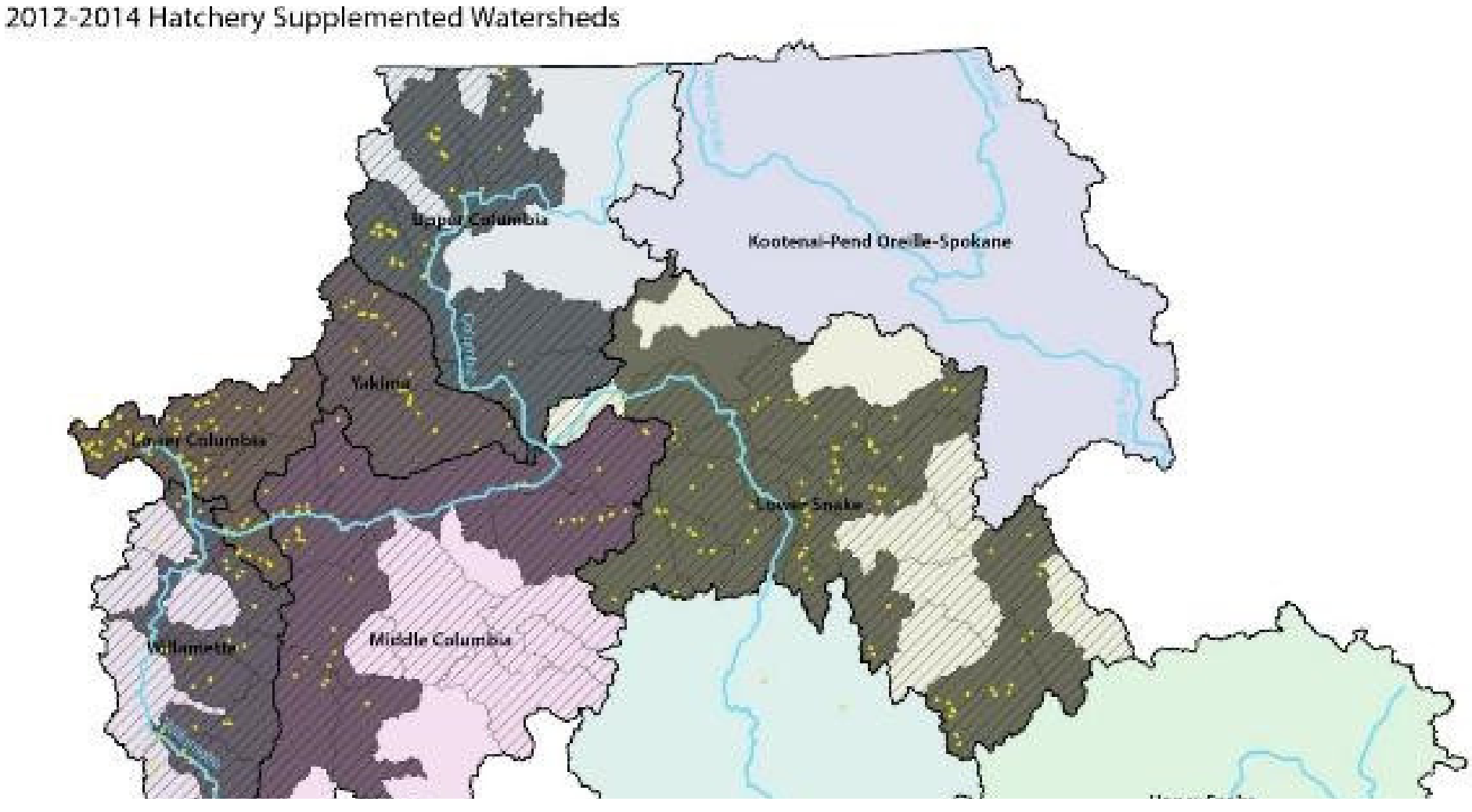
3

Projects largely target the greatest priorities

4

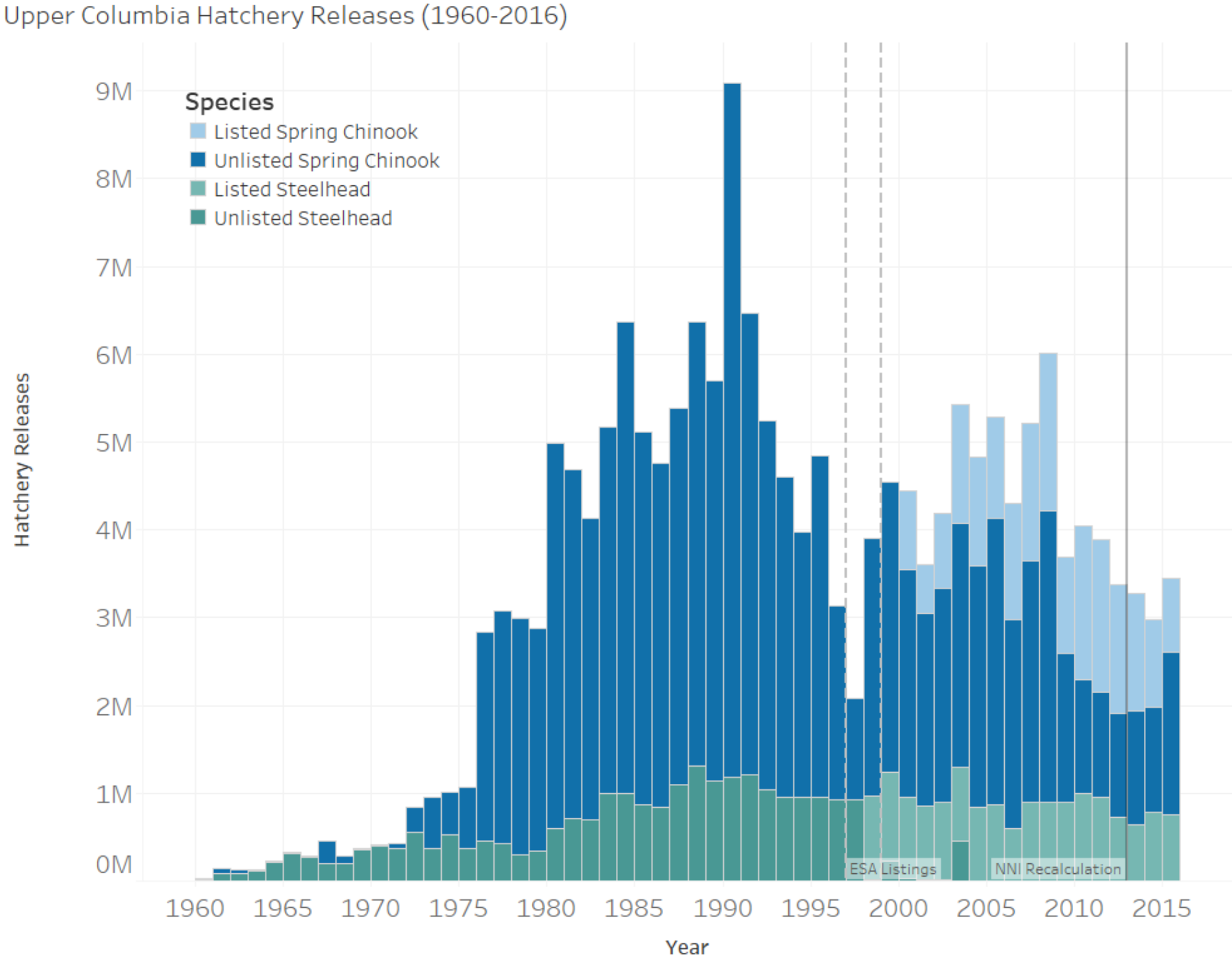
Although extensive M&E has occurred, key data gaps remain

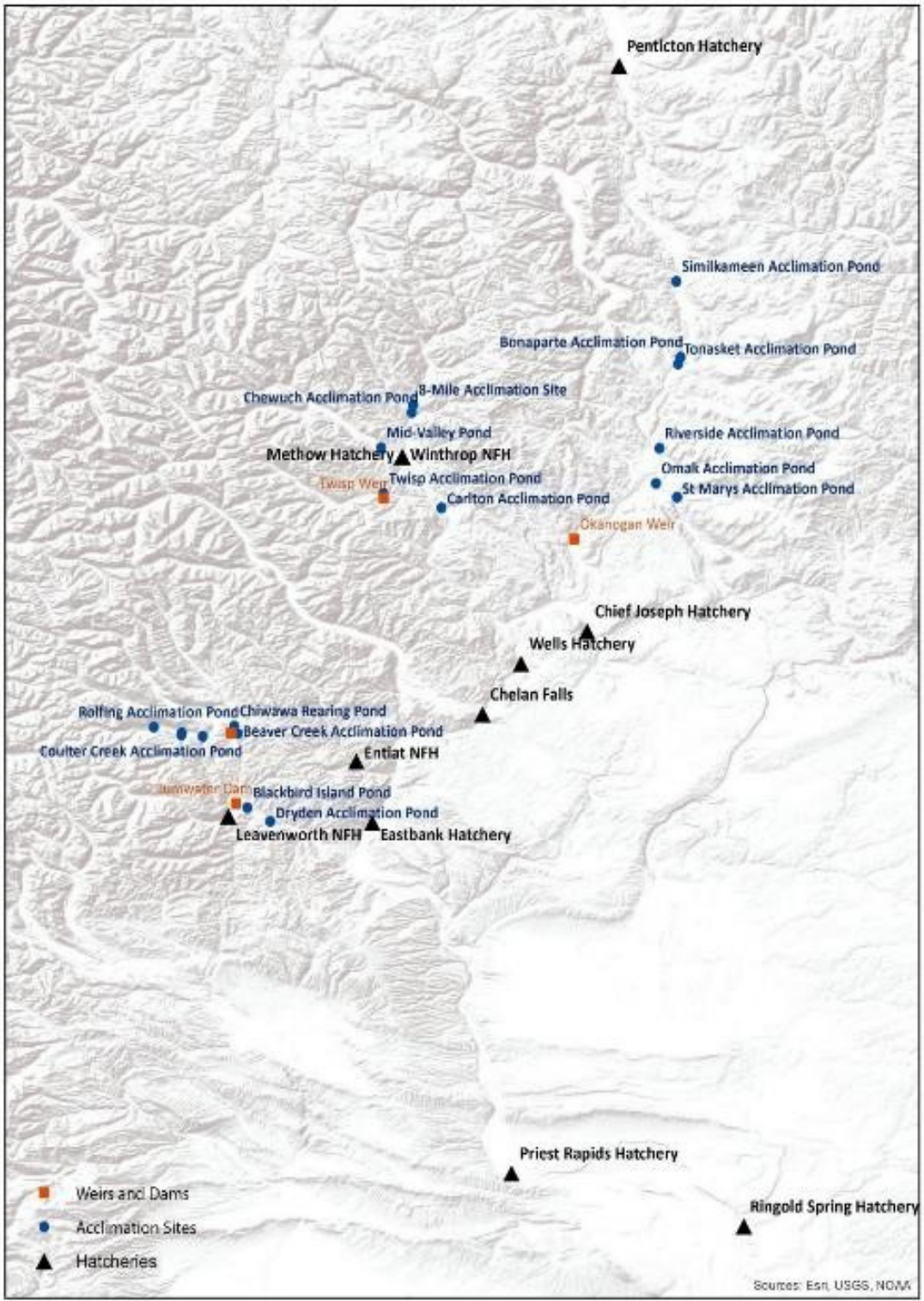
HATCHERY SUMMARY



80%

"Roughly 80% of the anadromous salmonids in the Columbia basin originate in hatcheries, and virtually all salmon and steelhead harvested in recreational fisheries are produced in hatcheries."


Upper Columbia Hatchery Releases (1960-2016)
Species
Listed Spring Chinook
Unlisted Spring Chinook
Listed Steelhead
Unlisted Steelhead
Hatchery Releases
9M
8M
7M
6M
5M
4M
3M
2M
1M
0M
ESA Listings
NNI Recalculation
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
Year

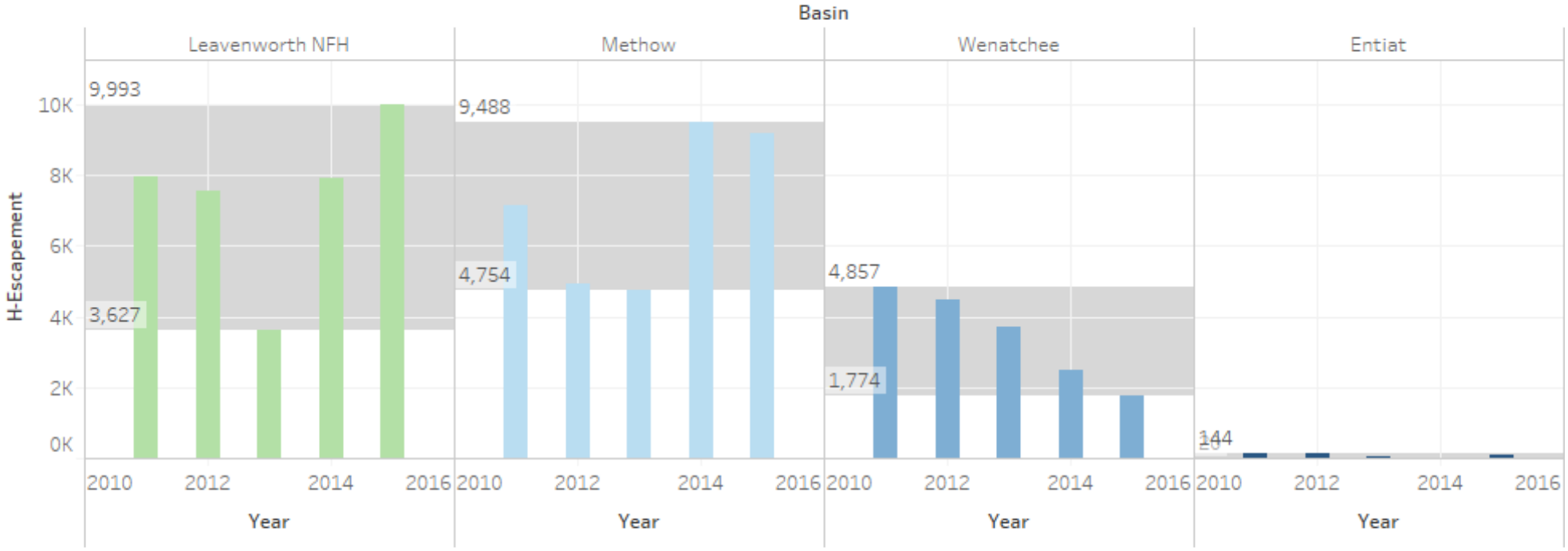


ogram	Subbasin(s)	Program Component(s)	Goals
enatchee Spring Chinook	Wenatchee	Nason, White[b] Chiwawa	Conservation
enatchee Spring Chinook	Wenatchee	Nason	Safety-Net
ethow Spring Chinook	Methow	Methow, Twisp, Chewuch	Conservation
inthrop Spring Chinook	Methow		Safety-Net
avenworth Spring Chinook	Wenatchee		Harvest
hief Joseph Spring Chinook	Okanogan		Harvest
hief Joseph Spring Chinook	Okanogan		Reintroduction
enatchee Steelhead	Wenatchee		Conservation
enatchee Steelhead	Wenatchee		Safety-Net
ells Steelhead	Methow, Columbia	Methow, Wells	Safety-Net
visp Steelhead	Methow	Twisp	Conservation
inthrop Steelhead	Methow		Conservation
kanogan Steelhead	Okanogan		Conservation
id-Columbia Coho	Wenatchee, Methow	Wenatchee, Methow	Reintroduction
iest Rapids Fall Chinook	Columbia		Harvest
ngold Springs Fall Chinook	Columbia		Harvest
helan Falls Summer Chinook	Columbia		Harvest
ells Summer Chinook	Columbia		Harvest

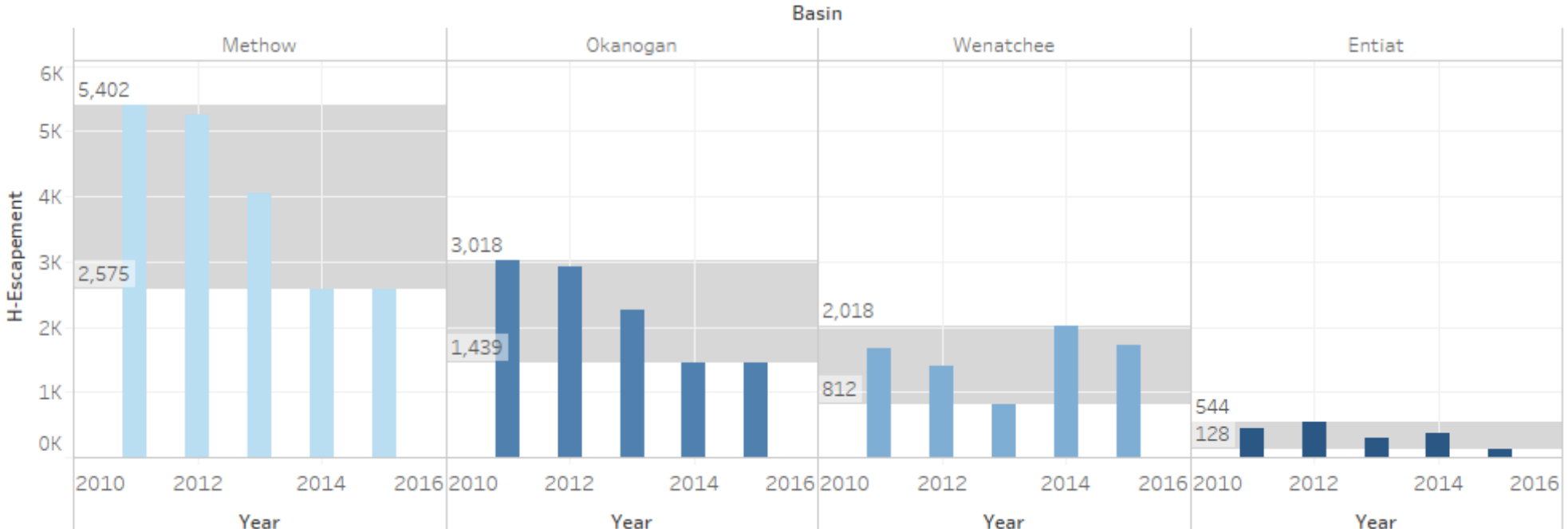
21 PROGRAMS

Programs in the Upper Columbia have a goal of either conservation, reintroduction, safety-net, or harvest. Listed species program are conservation programs.

Spring Chinook Hatchery-Origin Adult Escapement (2011-2015)



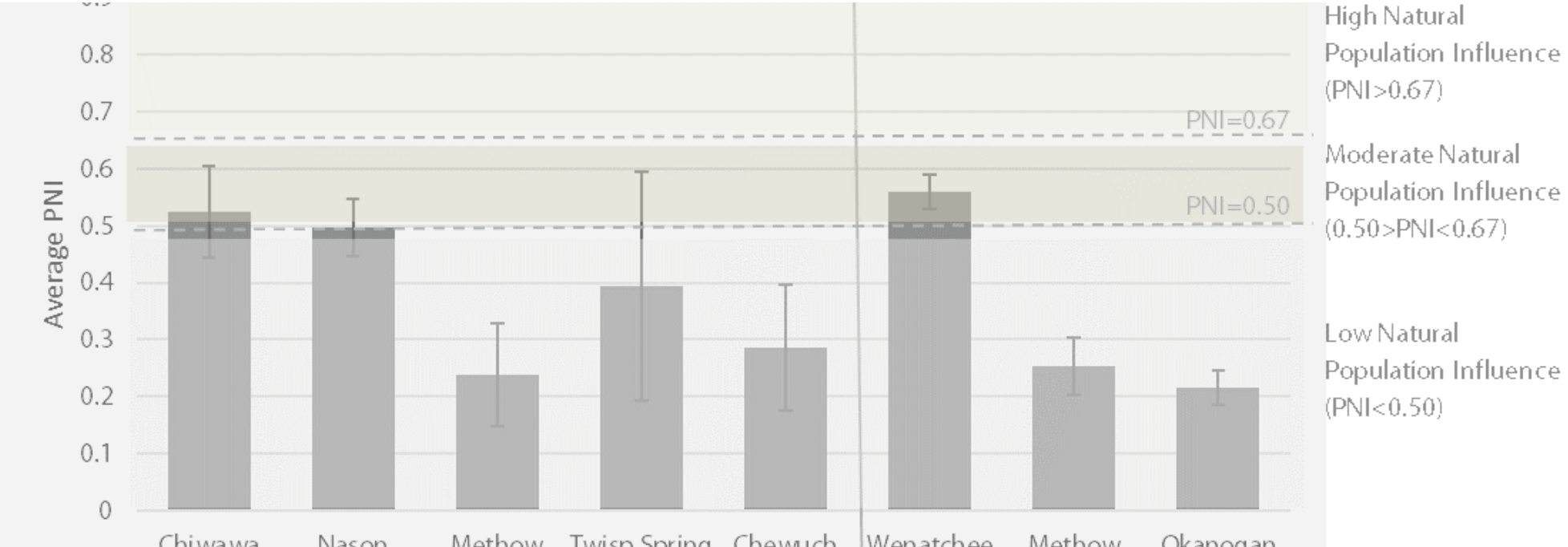
Steelhead Hatchery-Origin Adult Escapement (2011-2015)



Hatchery Influence

PNI - PHOS & PNOB

Based on PNI values reported in the most recent PUD reports (average BY2010-2015), supplemented spawning areas in the Upper Columbia have had a calculated PNI that is less than or roughly equal to 0.50. This could suggest that the hatchery environment has a greater influence on adaptation than does the natural environment



UNCERTAINTIES

Hatchery and Natural-Origin Returns

Causal Mechanisms for Hatchery/Wild Differences

Unsupplemented Stream Comparisons

Capacity and Survival Bottlenecks

Hatchery and Natural-Origin Interactions

TAKE-HOMES

1

Hatchery supplementation has been ongoing for over a century

2

Programs are managed to meet mitigation and conservation goals

3

Hatchery programs have a large effect on UC species (both positive and negative)

4

Hatchery programs operate with a large degree of uncertainty as to the effects

HYDROPOWER SUMMARY

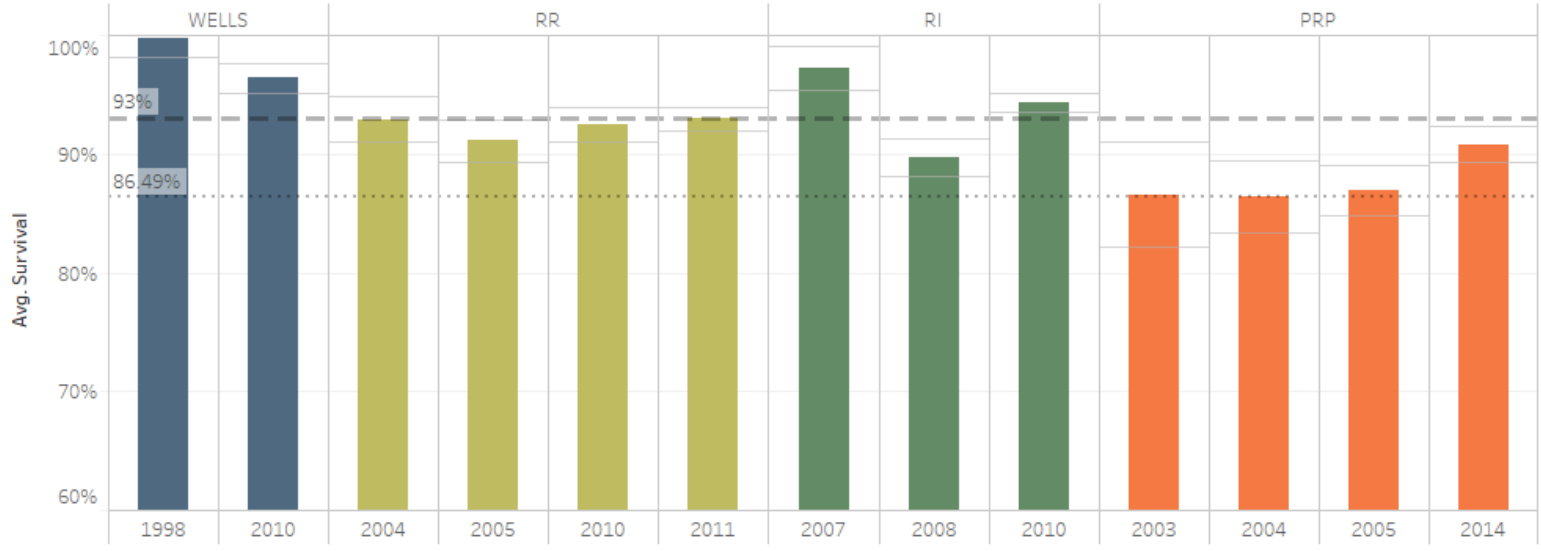
COLUMBIA RIVER HYDROPOWER

11 Major Mainstem Dams in U.S.

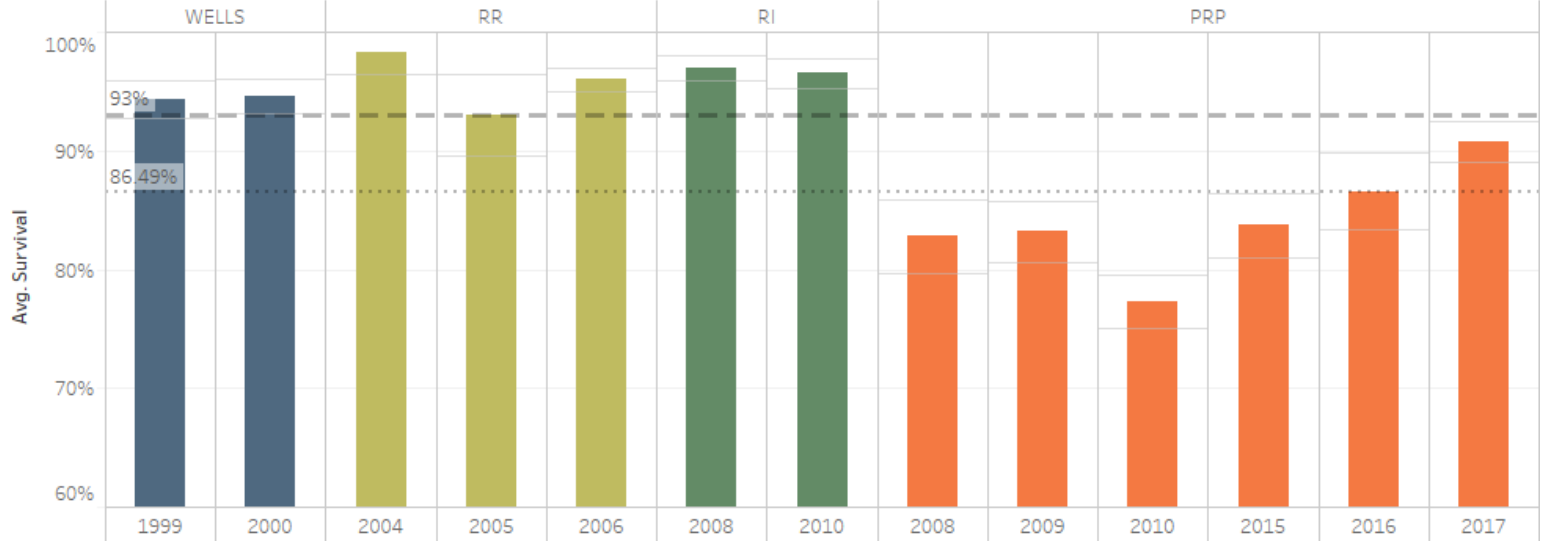
UC Fish pass through 7-9 dams as juveniles and adults/kelts

55% of historic habitat was lost above Grand Coulee/Chief Joseph Dams

Yearling Chinook- PUDs

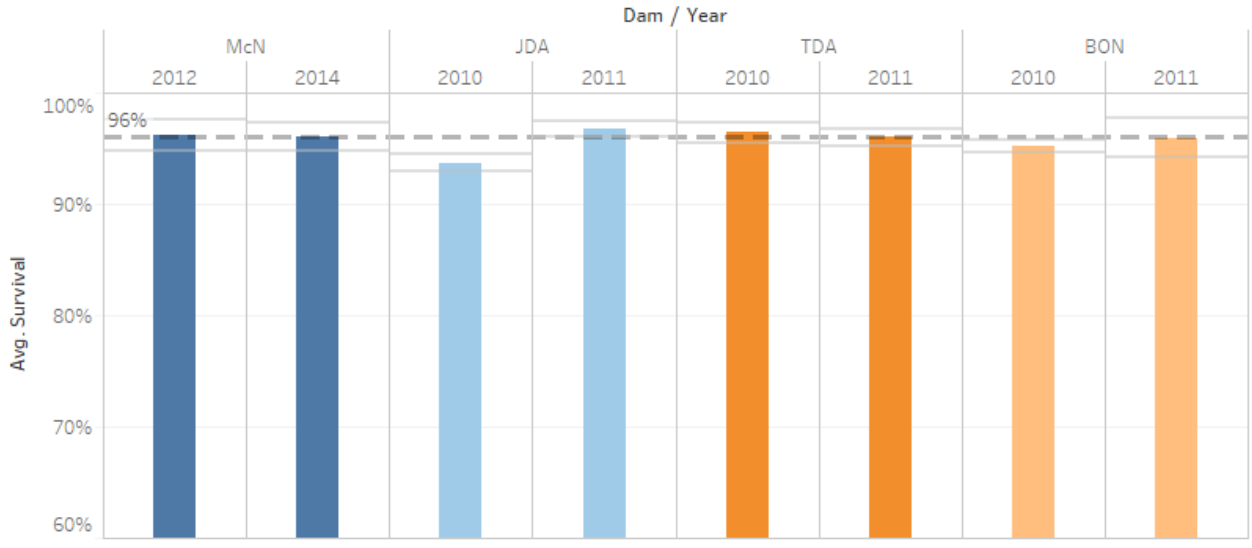


Steelhead- PUDs

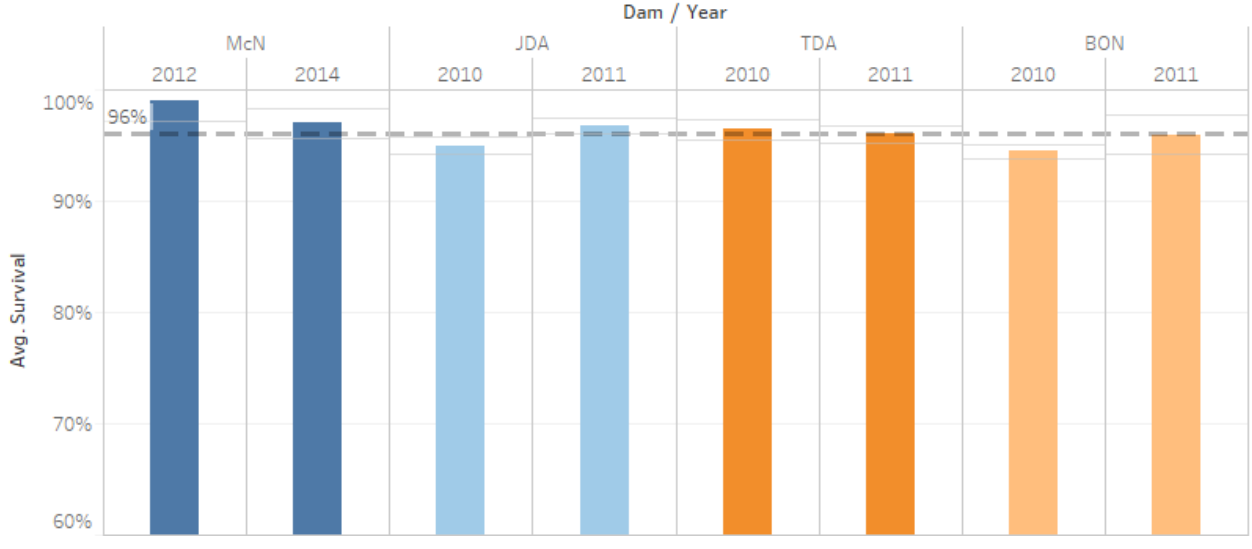


MID-COLUMBIA SURVIVAL STANDARDS

Yearling Chinook- Federal Dams



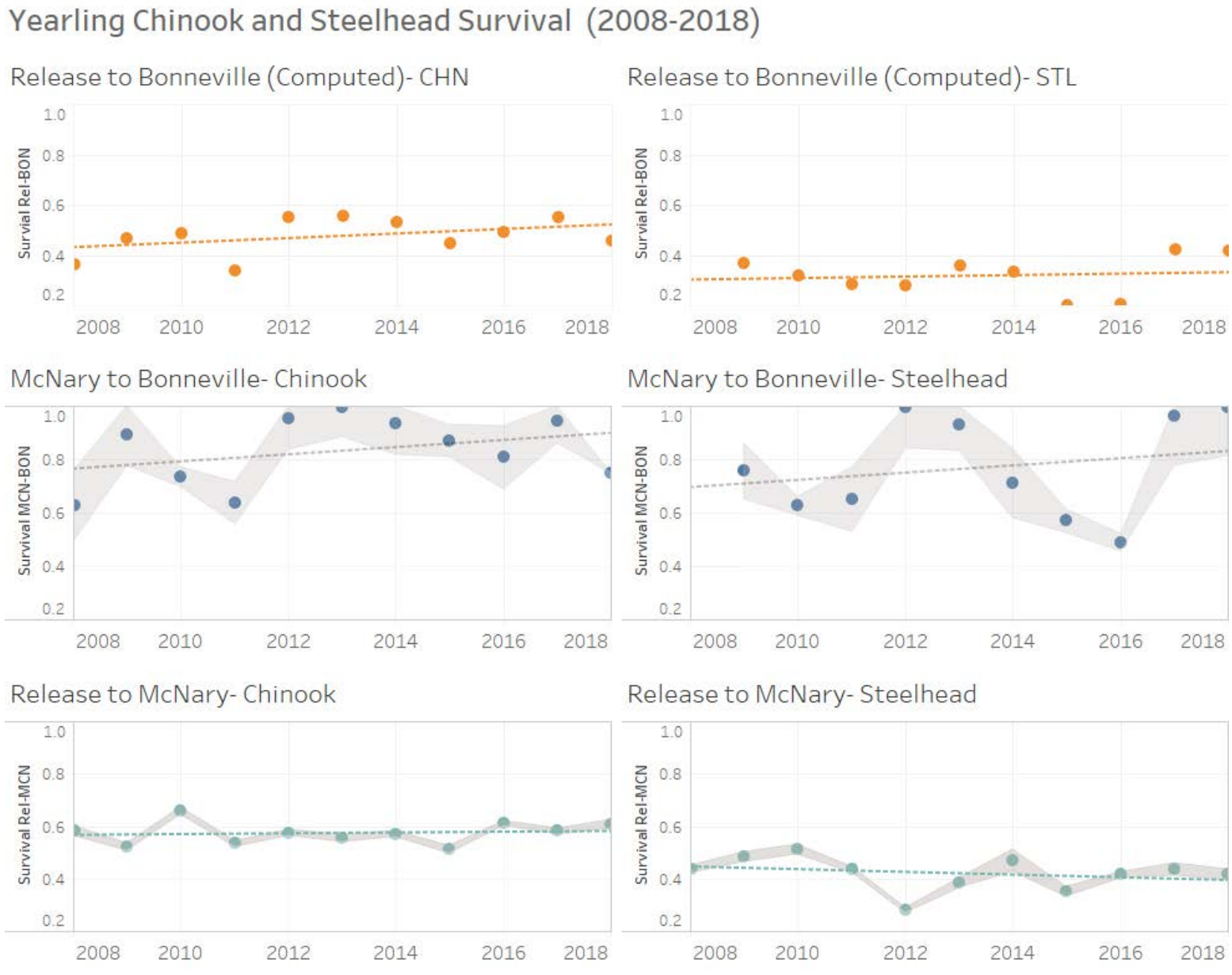
Steelhead- Federal Dams



FEDERAL SURVIVAL STANDARDS

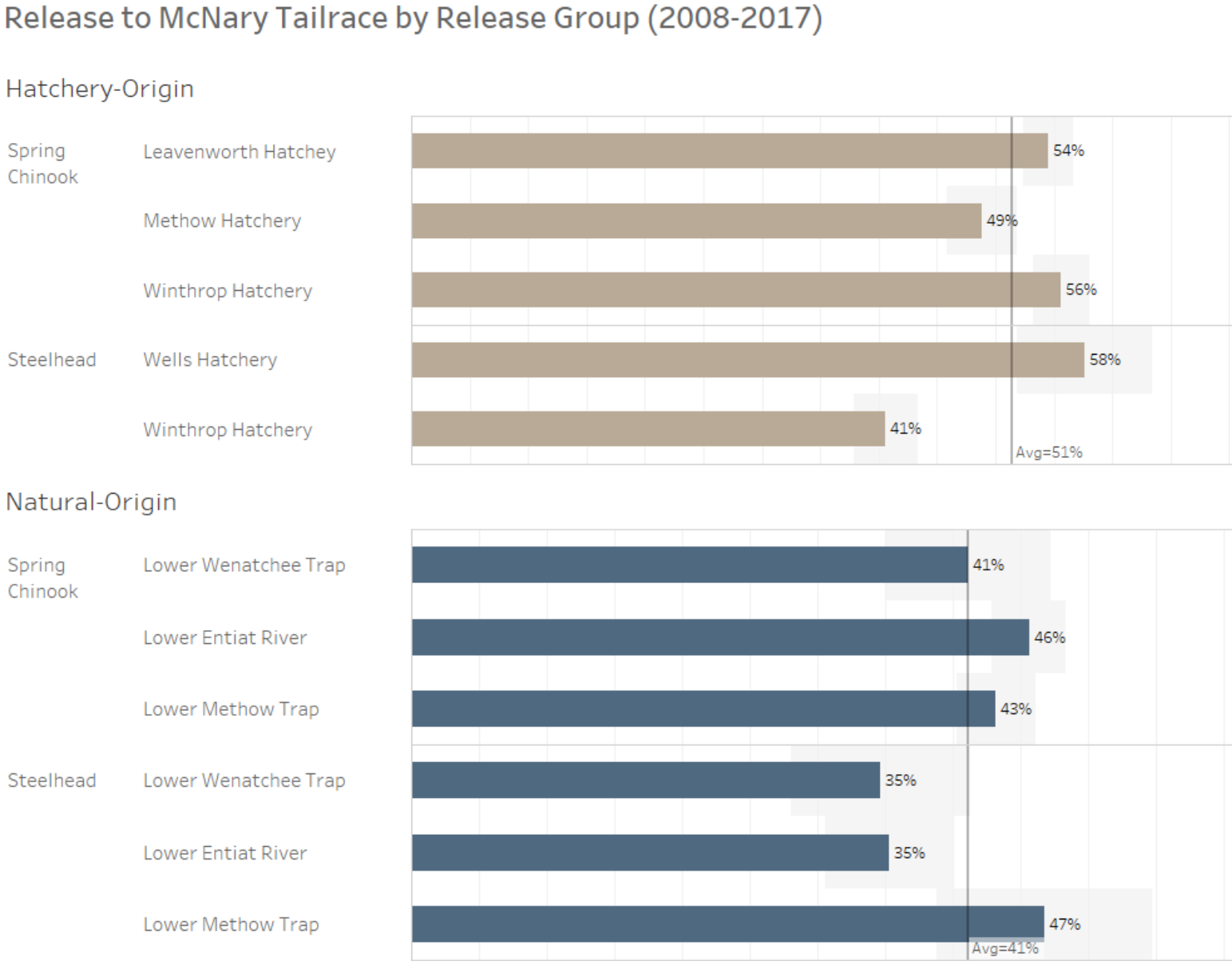
COMPOSITE (MULTIPLE-DAM) SURVIVAL

NOAA PIT-Tag Studies



COMPOSITE (MULTIPLE-DAM) SURVIVAL

NOAA PIT-Tag Studies



FACTORS FOR SURVIVAL

- Biological Factors
- Environmental Factors
- Dam and Dam Operations

UNCERTAINTIES

Baseline/pre-dam survival

The effect of life history strategies on survival

Reservoir life histories

Delayed mortality

Factors for mortality

Limitations of survival studies

TAKE-HOMES

1

Improvements have been made to adult & juvenile survival

2

Projects are meeting their survival standards

3

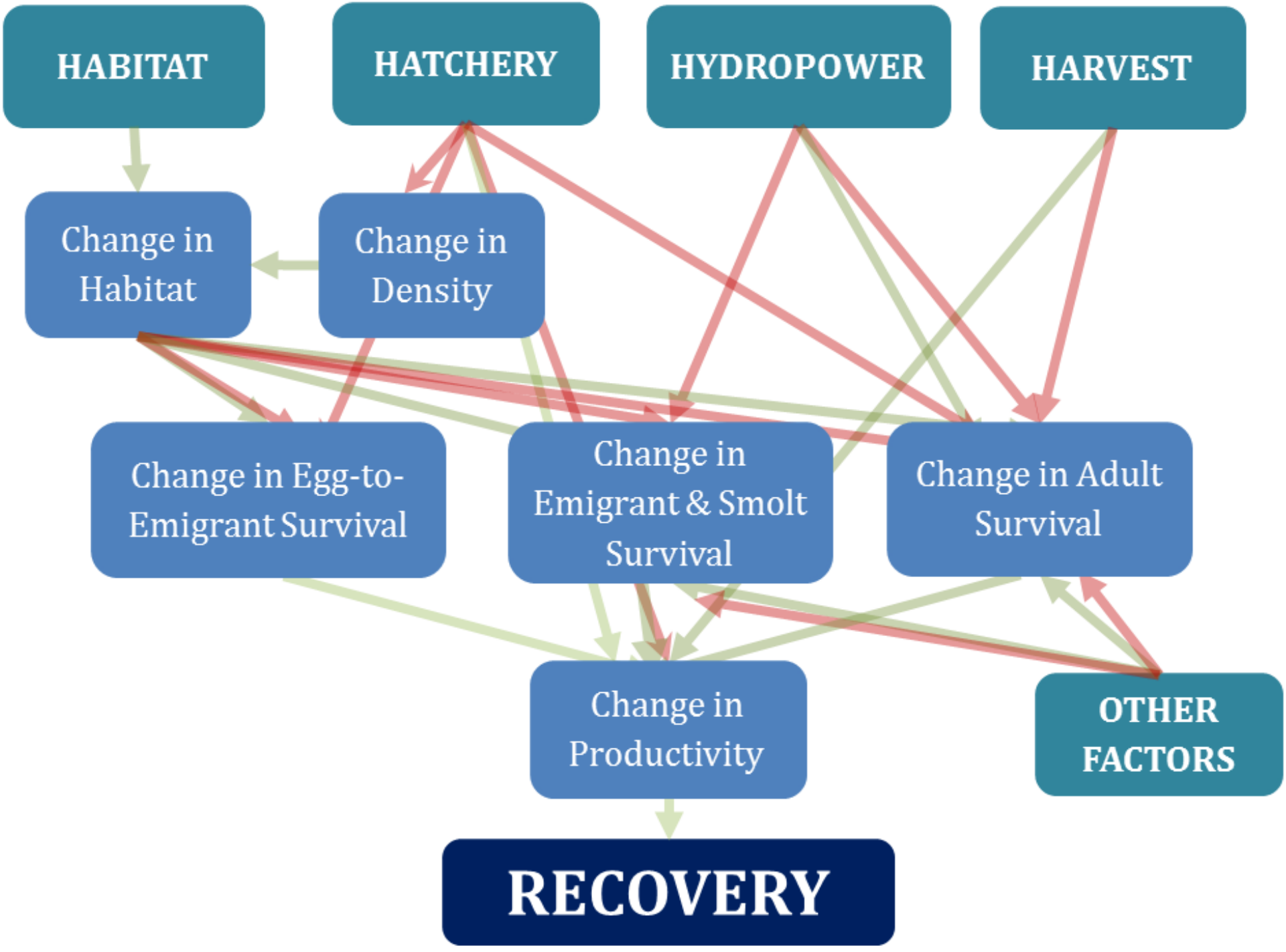
Composite survival of juveniles is 40-50%. Conversion rates for adults are 75-85%**

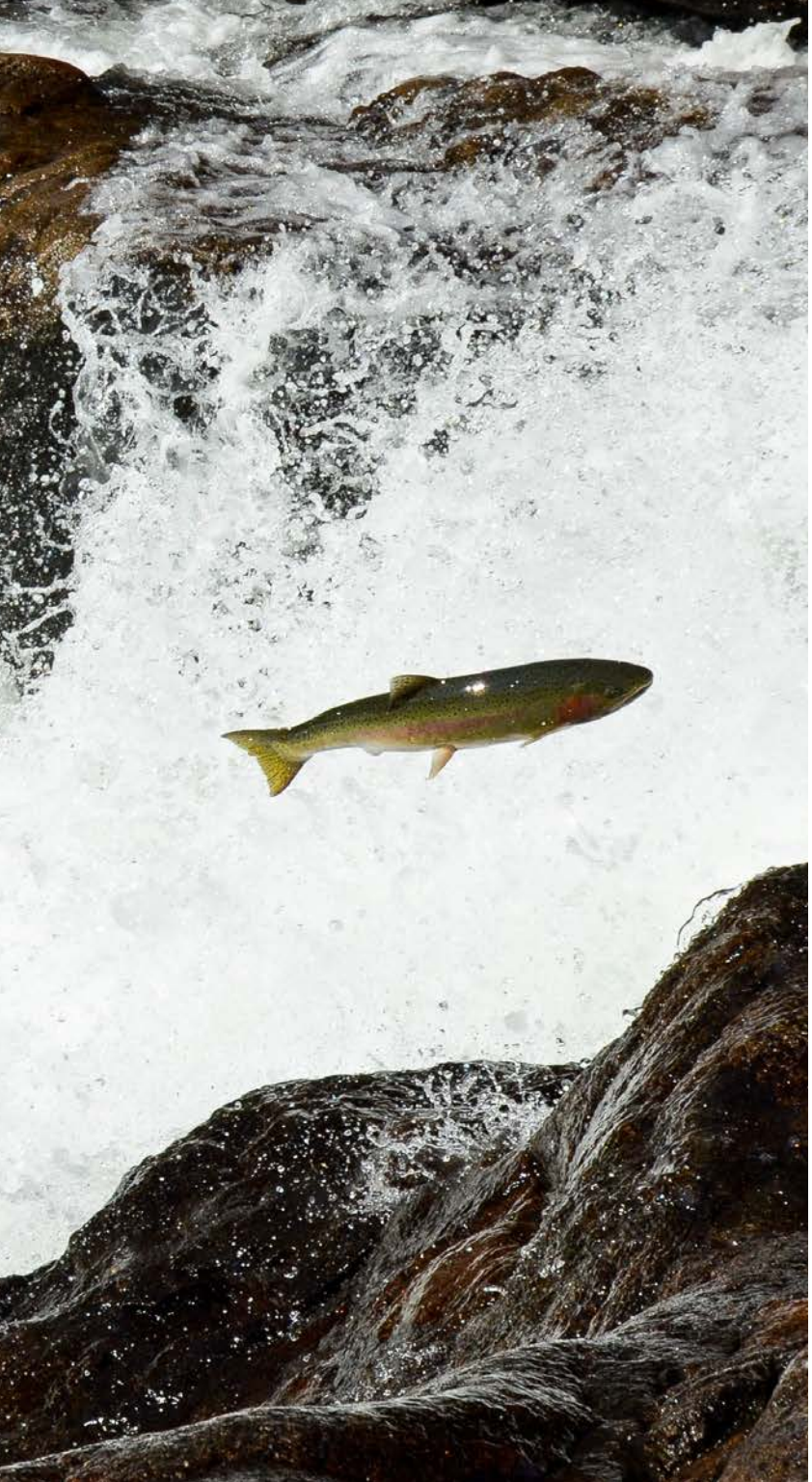
4

Although extensive M&E has occurred, key data gaps remain

PREDATION

- Birds- 10-15% (steelhead juveniles)
- Piscivores- ??? (juveniles)
- Sea lions and seals- 10- 30% (spring Chinook adults)


HABITAT
HATCHERY
HYDROPOWER
HARVEST
Change in Habitat
Change in Density
Change in Egg-to-Emigrant Survival
Change in Emigrant & Smolt Survival
Change in Adult Survival
Change in Productivity
OTHER FACTORS
RECOVERY



Achieving All-H Recovery

TURNING THREATS INTO OPPORTUNITIES

Establishing networks and connectors

Learning and evolving

Looking for win-wins

Tracking progress

Seeking opportunities for engagement

Building models for understanding

Filling data gaps for recovery

more info at www.ucsrb.org

THANKS FOR LISTENING

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