

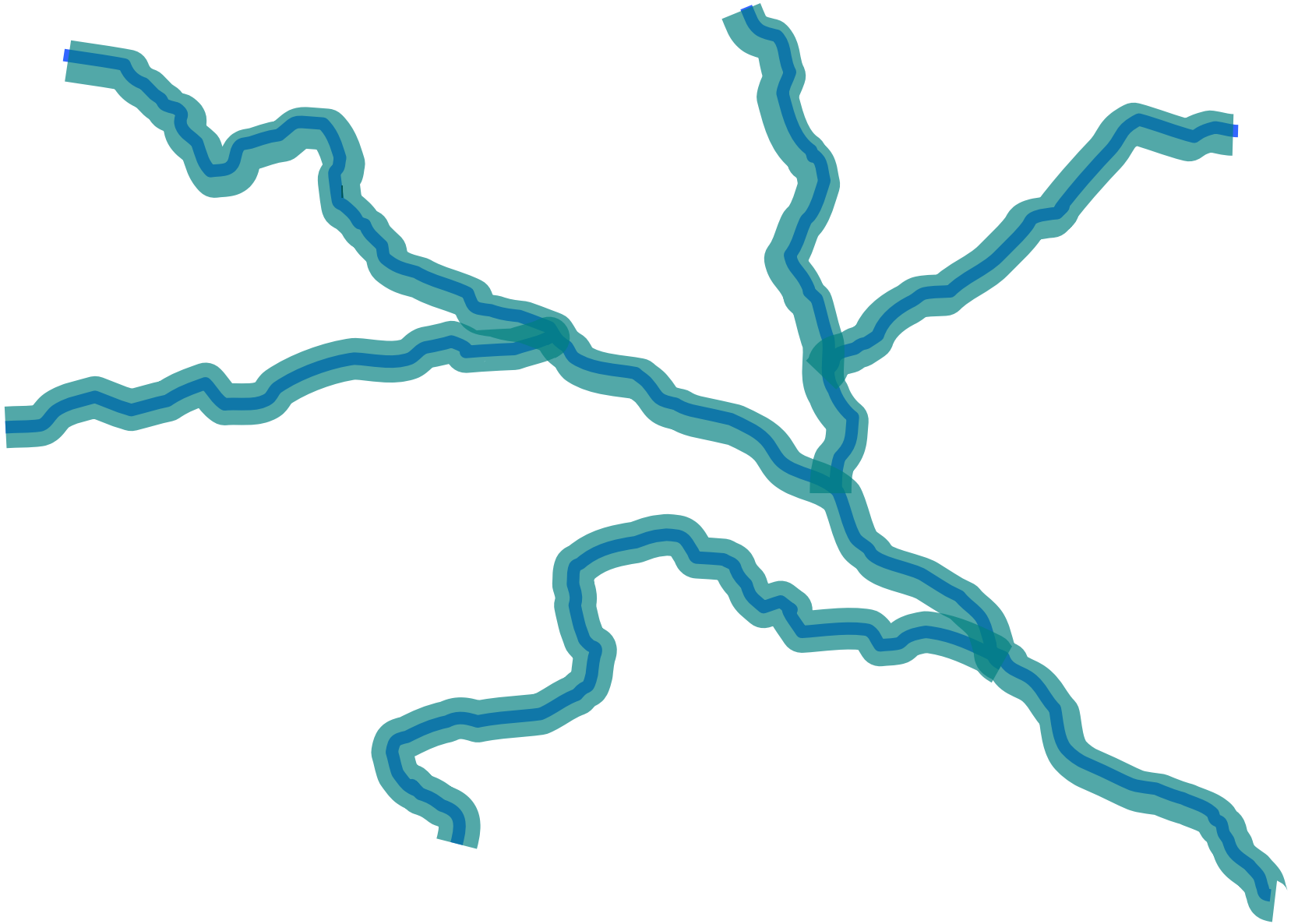
Homing patterns of hatchery-reared and wild Yakima River Spring Chinook salmon

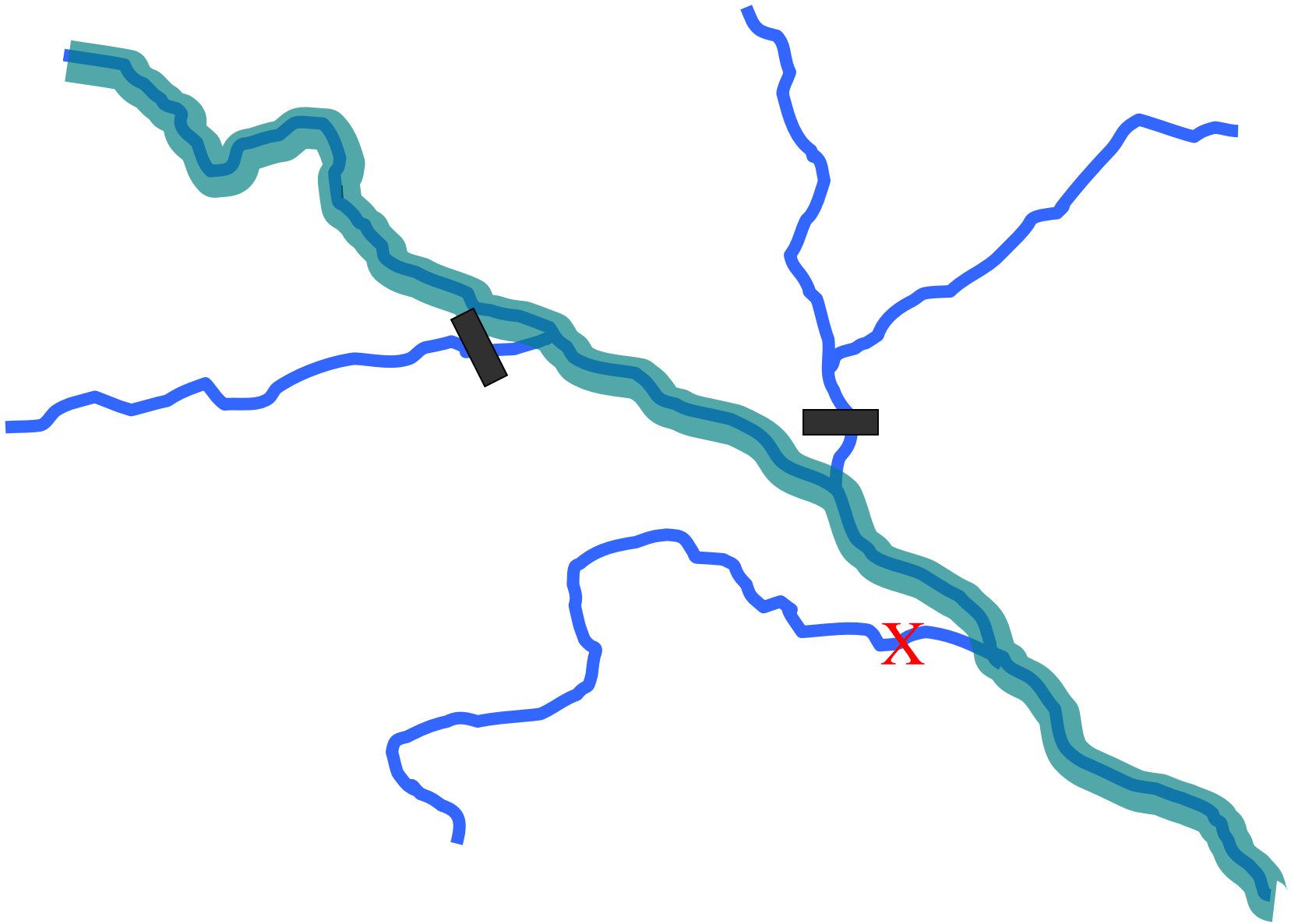
**Andrew Dittman
Donald Larsen
Mary Moser
Darran May
Michelle Havey
Dave Fast
Mark Johnston**

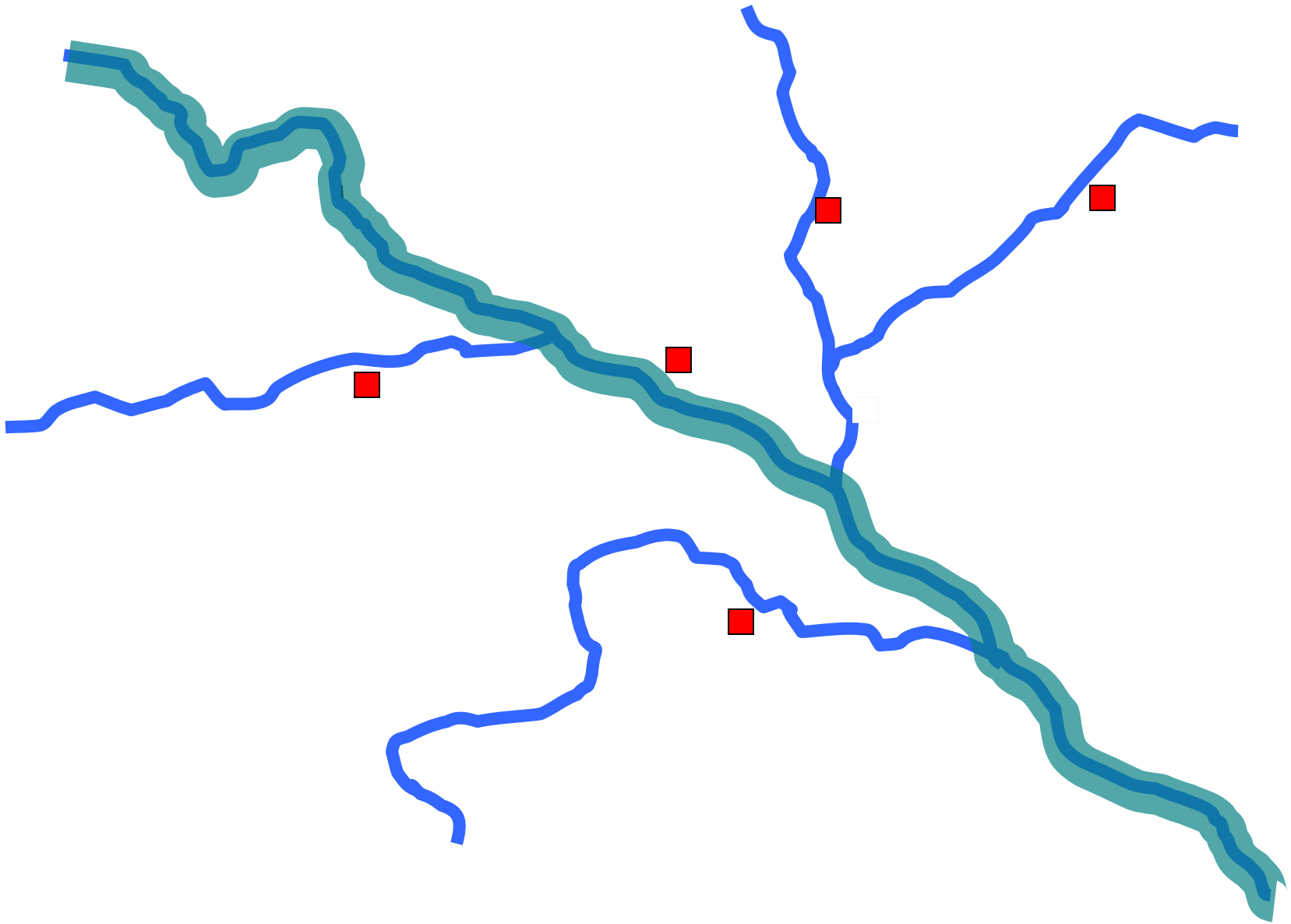


Outline

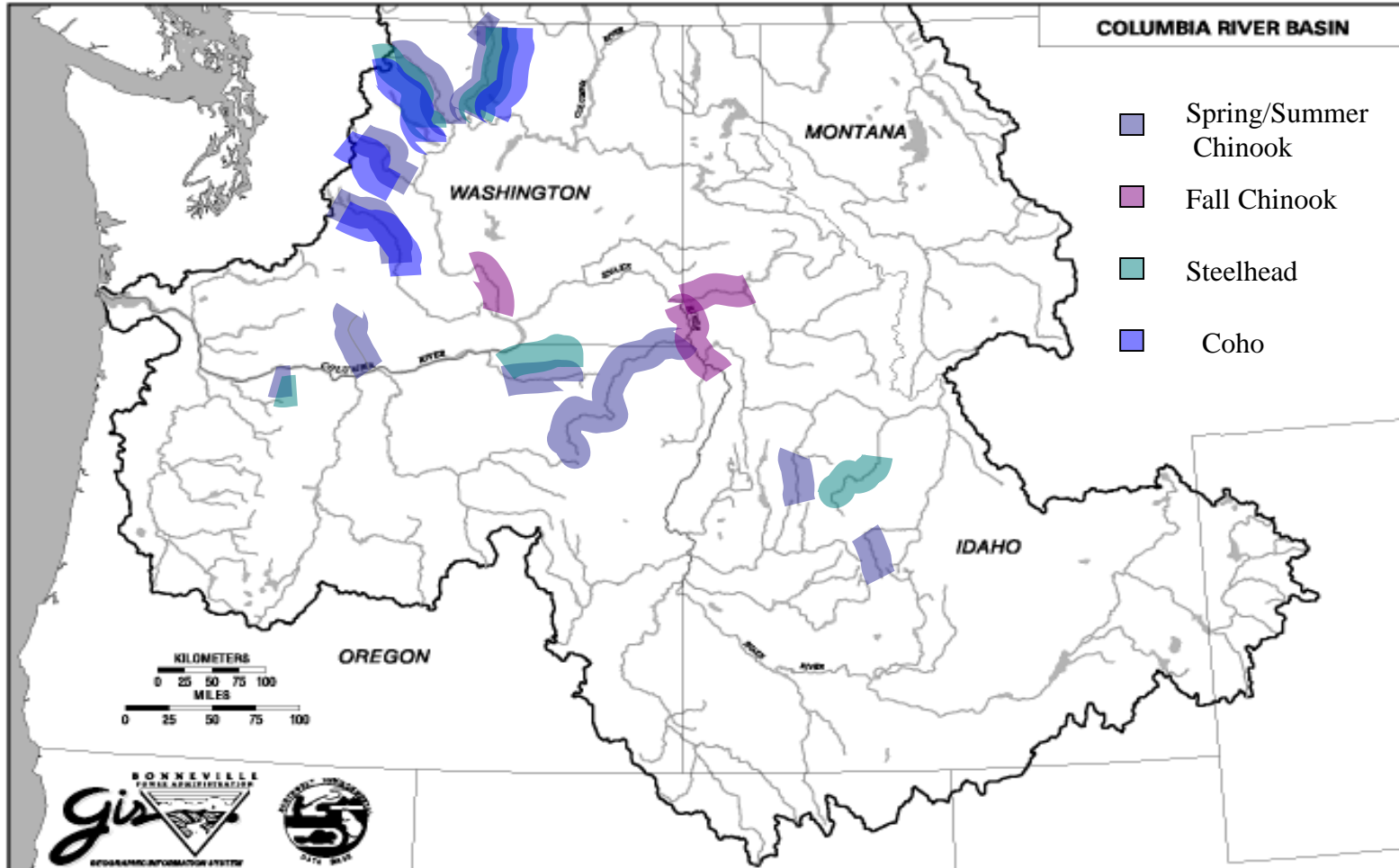
- Homing and imprinting**
- The role of satellite acclimation facilities in supplementation and salmon recovery**
- The YKFP project**
- Homing patterns of Yakima Spring chinook**



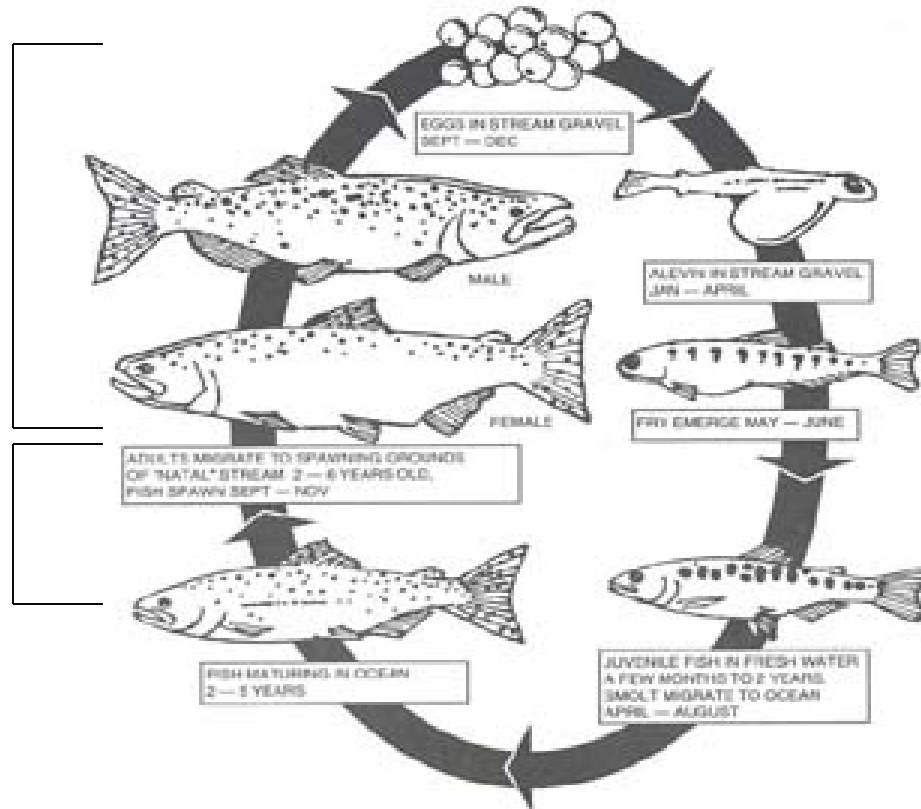




The growing role of acclimation facilities in supplementation programs



Spring chinook salmon: imprinting and homing



LIFE CYCLE OF CHINOOK SALMON

Homing to the natal site, acclimation site; Spawning site selection; Mate choice

Homing to the natal watershed; holding areas

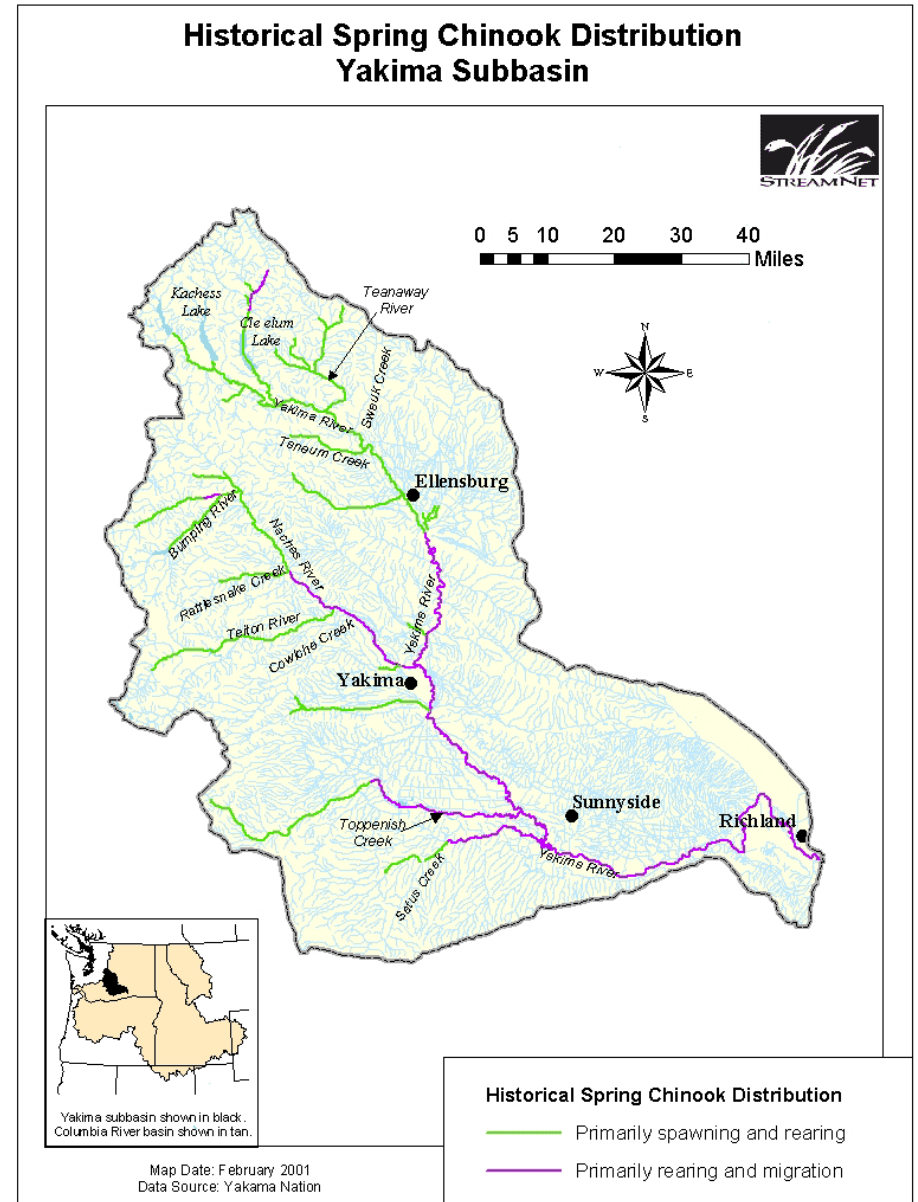
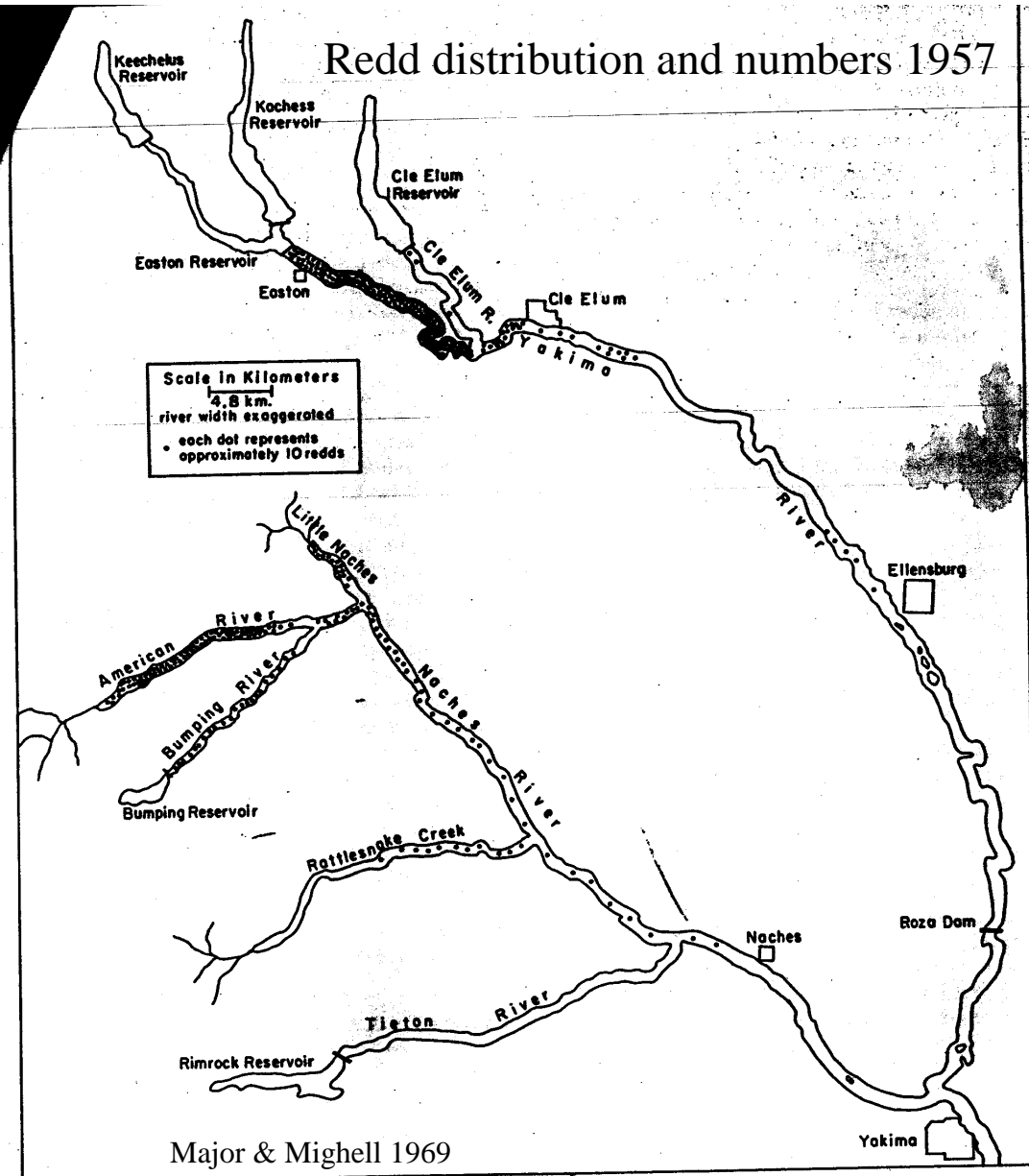
Presumed sensitive periods for imprinting

Smolting: sensitive period for imprinting; transfer to acclimation sites

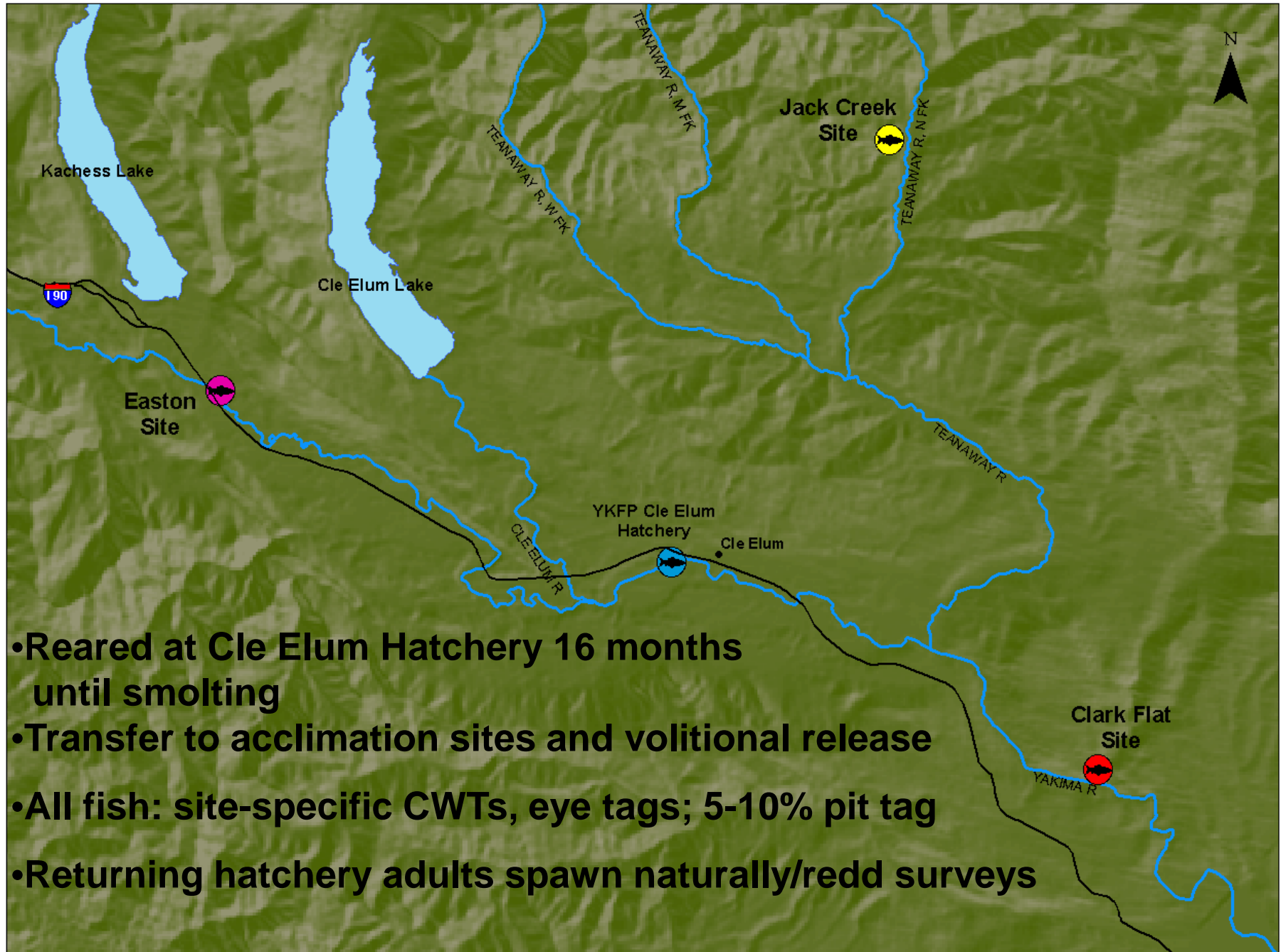
Outline

- Homing and imprinting
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Yakima River Spring chinook population



YKFP Spring chinook supplementation research program



- Reared at Cle Elum Hatchery 16 months until smolting
- Transfer to acclimation sites and volitional release
- All fish: site-specific CWTs, eye tags; 5-10% pit tag
- Returning hatchery adults spawn naturally/redd surveys

Objectives

Identify and compare the spatial and temporal patterns of homing in wild/naturally spawning vs. hatchery-reared fish

-Efficacy of Acclimation

-Recolonization of underutilized habitat

-Wild vs. Hatchery

-Pre- vs. post supplementation

Methods

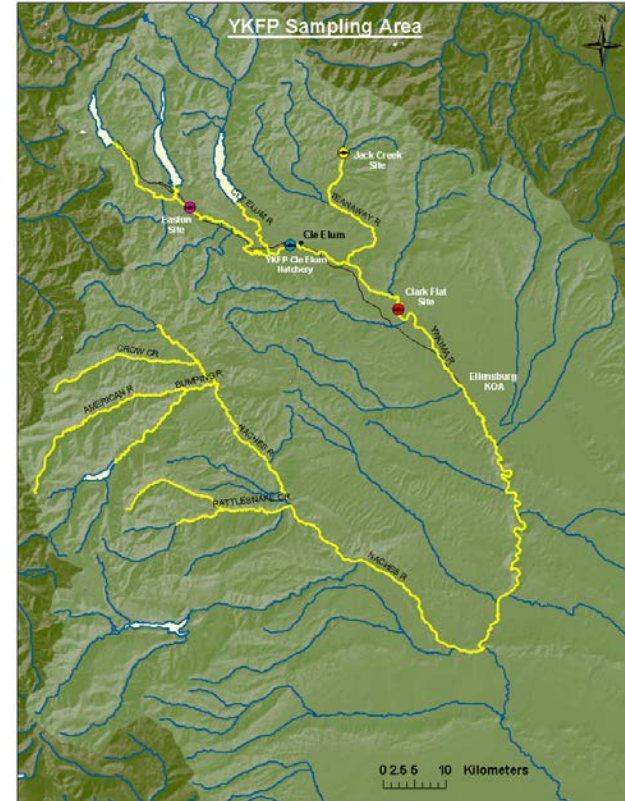
Comprehensive surveys of upper Yakima Basin

Carcasses

- GPS location (3 m accuracy); date
- hatchery/wild
- male/female; jack, precocious
- length, scale
- tag location, recovery
- egg retention; disease
- dna, otolith
- carcass mark/recapture
- goo factor

Redds

- Yakima biologists survey and flag (color coded by date) all redds in upper Yakima
- GPS mapping of all redds in the upper Yakima at end of spawning season

















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Easton Launch

Carrelot

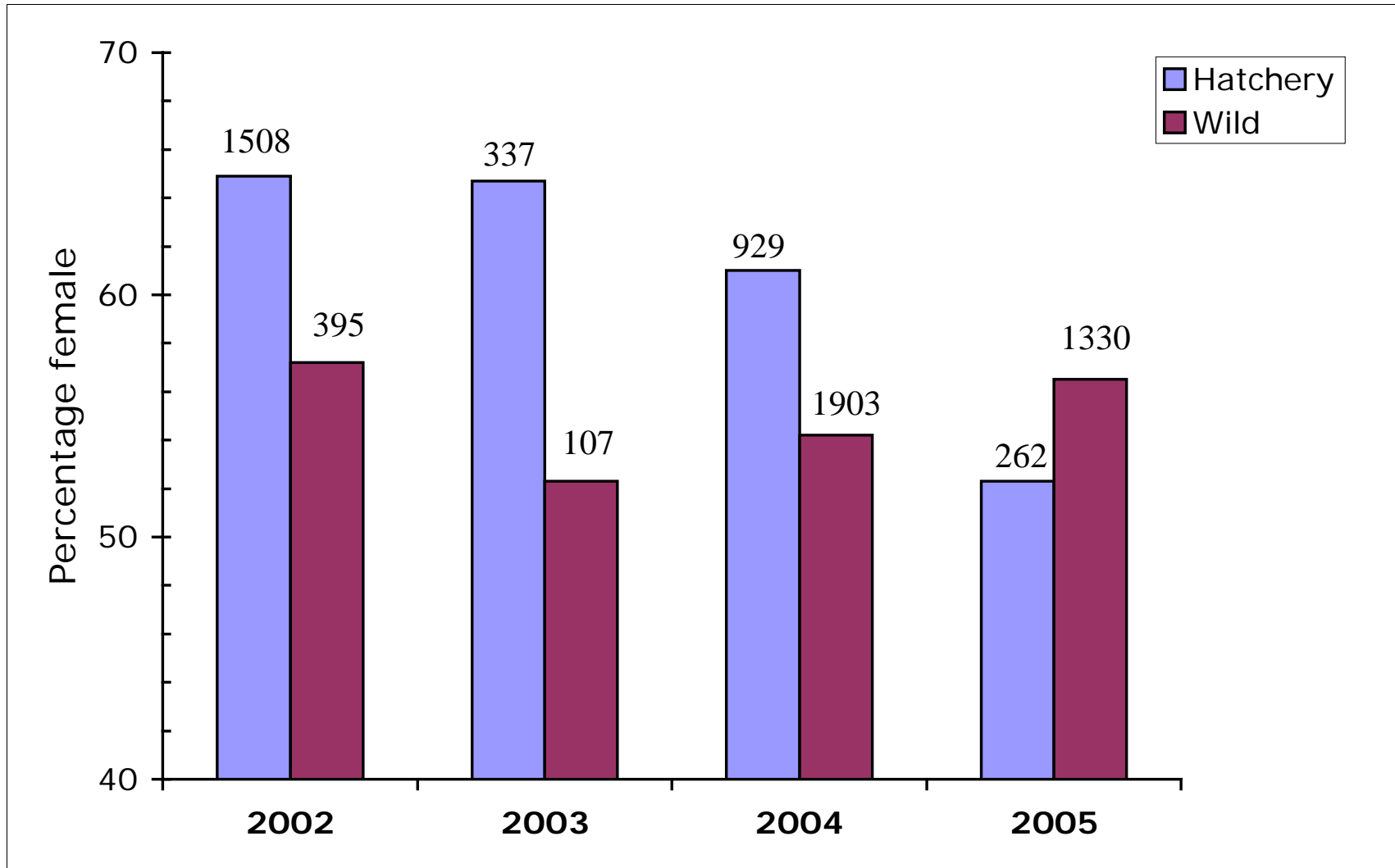
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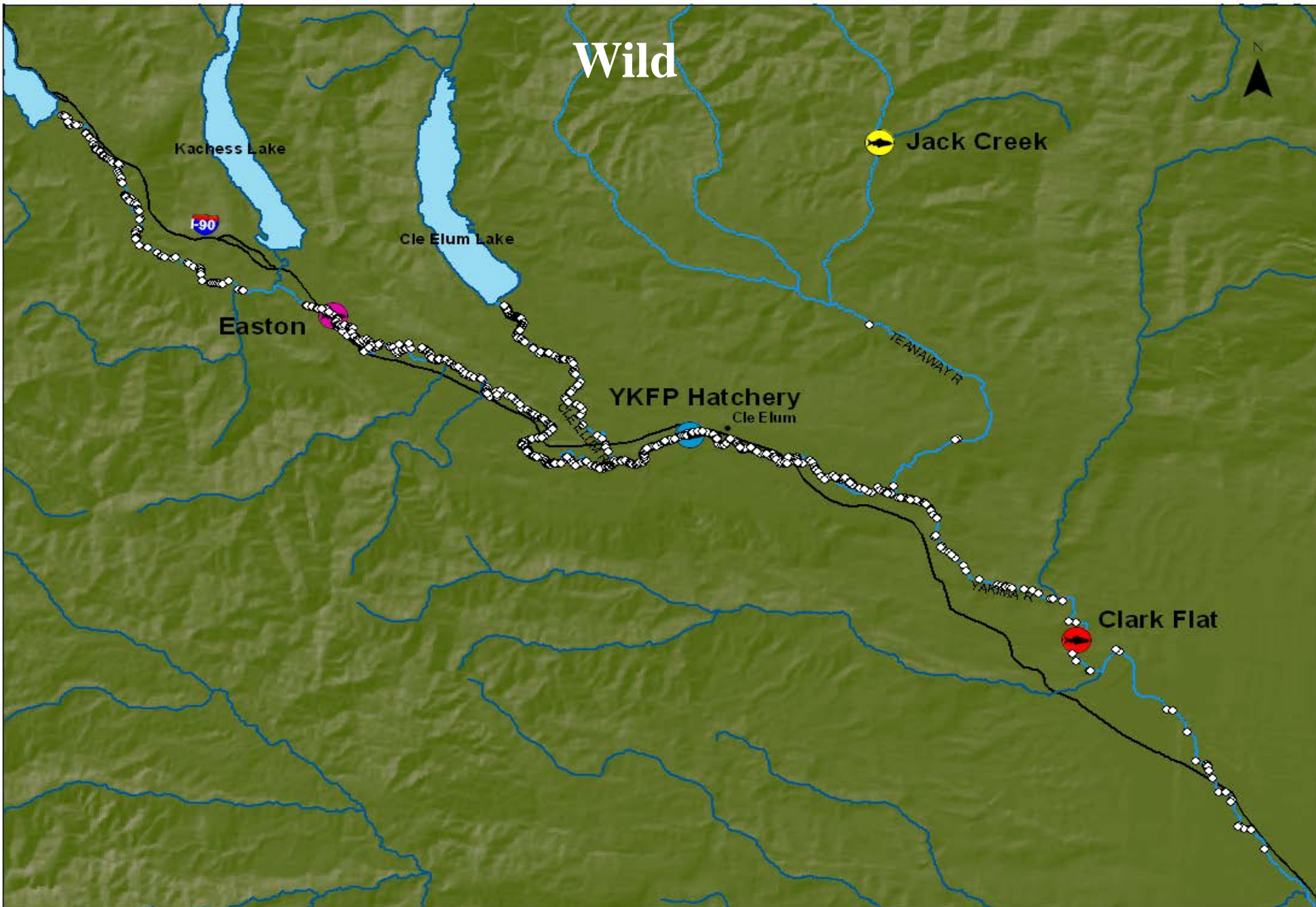
Carcass % recovery rates

	2002	2003	2004	2005
Total	2112/8091(26.1)	655/3258 (20.1)	3025/10187 (31.9)	1688/5717 (29.5)
Hatchery Adults	6112 (24.7)	1036 (32.5)	2876 (32.5)	627 (41.8)
Wild Adults	1820 (21.7)	394 (27.2)	6436 (29.7)	4386 (30.3)
Hatchery Jacks	71 (12.6)	1105 (7.6)	204 (16.2)	530 (8.5)
Wild Jacks	89 (3.4)	723 (7.8)	671 (10.9)	174 (6.3)

Carcass survey data summary



Wild



Kachess Lake

Cle Elum Lake

Jack Creek

I-90

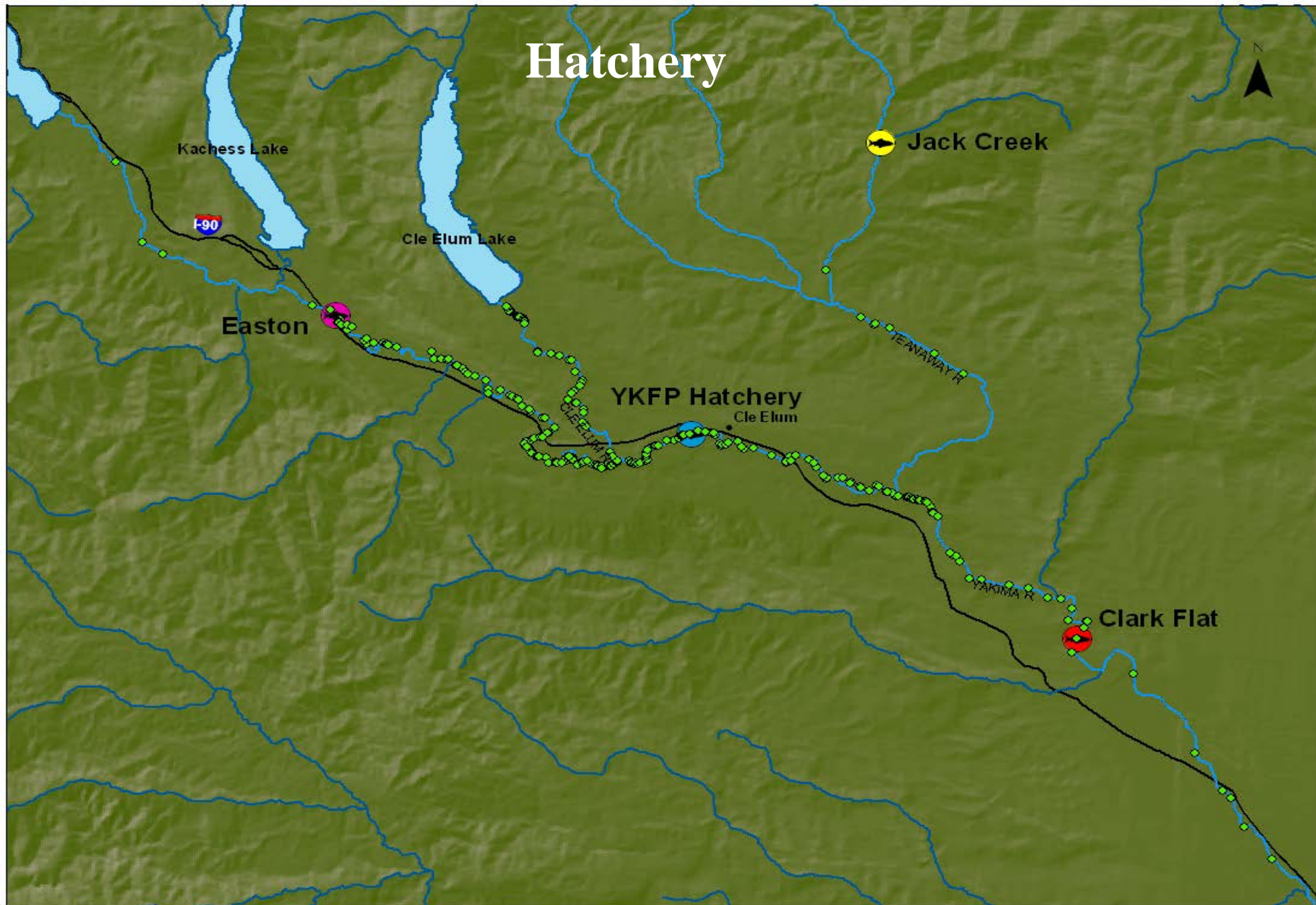
Easton

YKFP Hatchery
Cle Elum

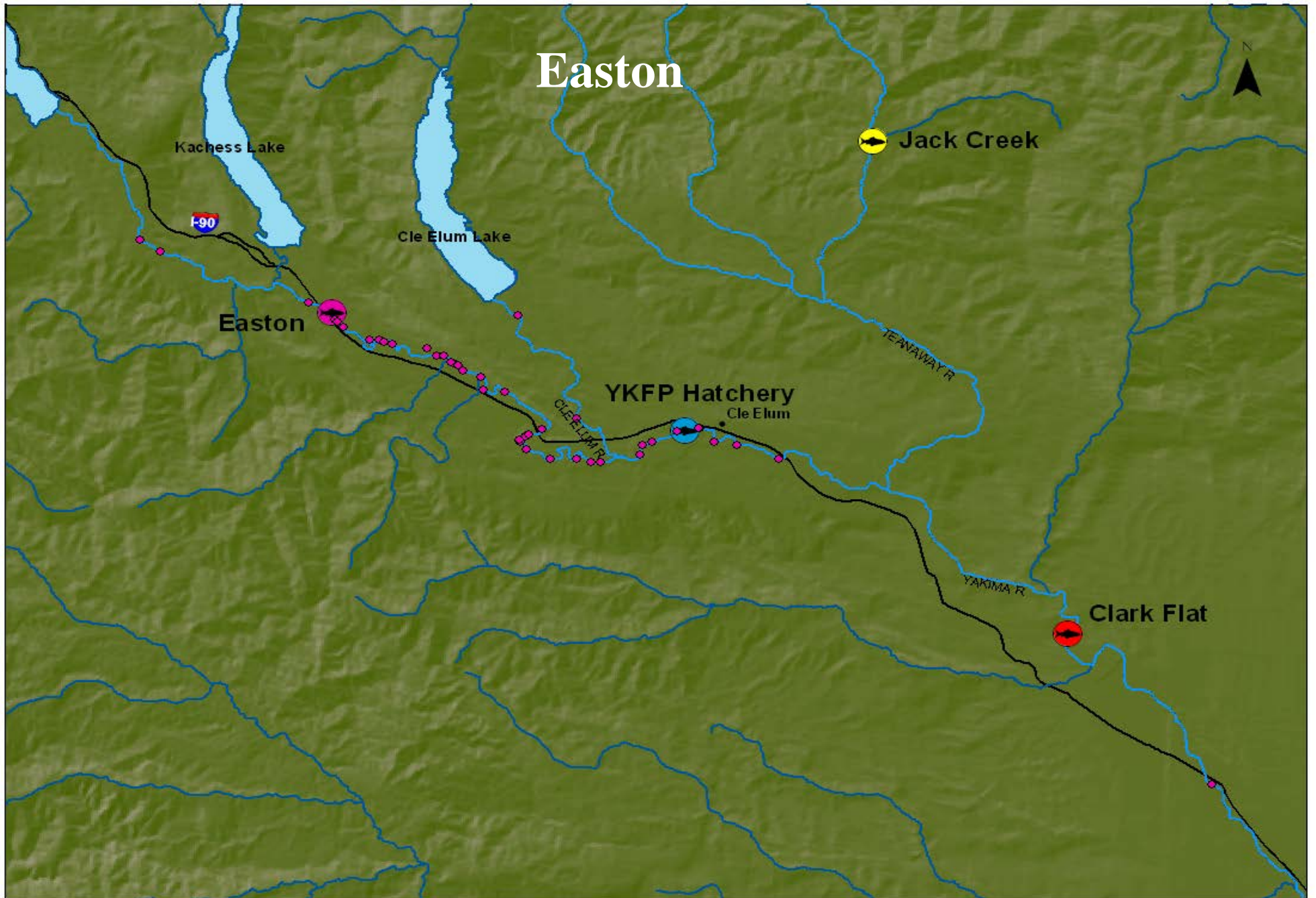
TEANAWAY R.

Clark Flat

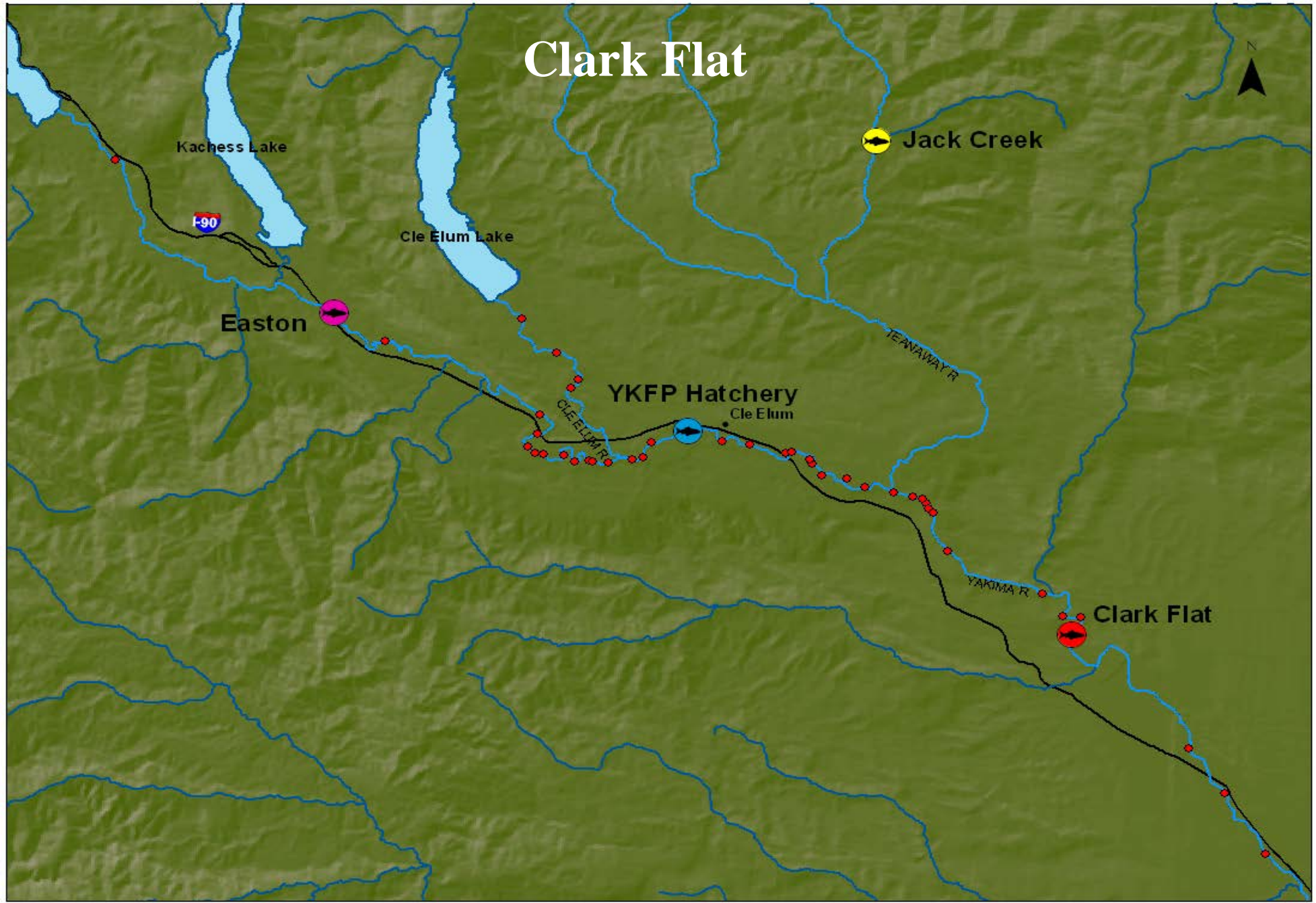
Hatchery



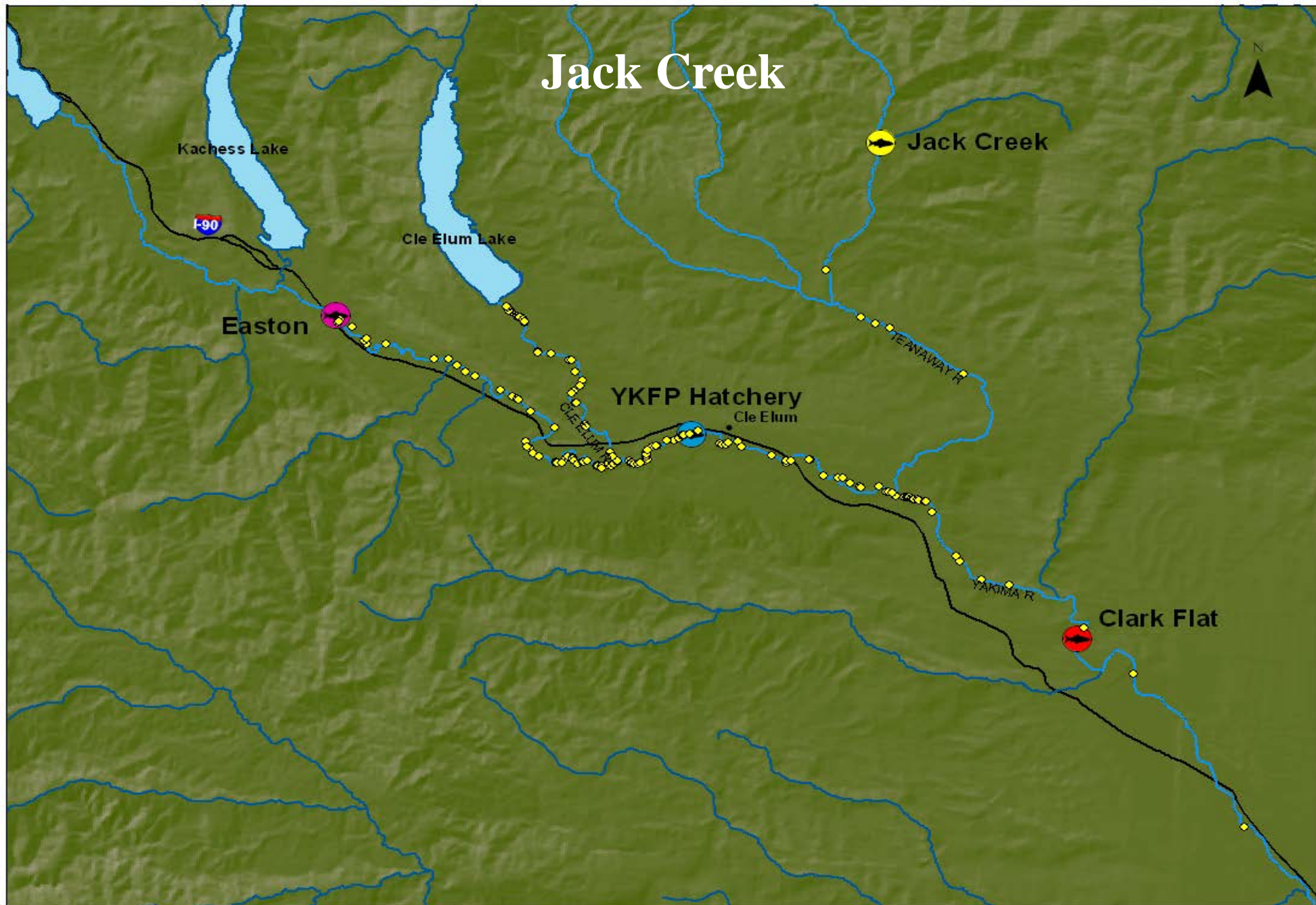
Easton



Clark Flat



Jack Creek



Tributary distribution of spawners

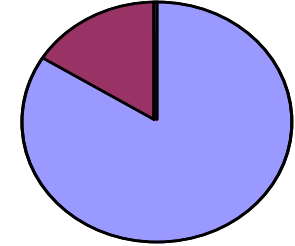
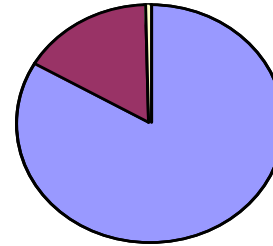
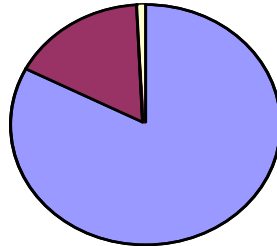
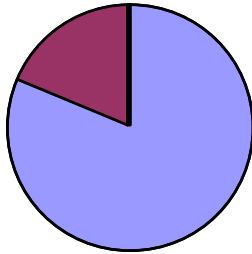
2002

2003

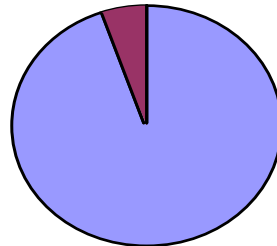
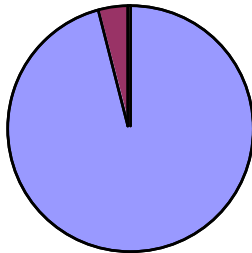
2004

2005

Wild



Easton



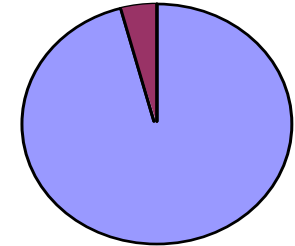
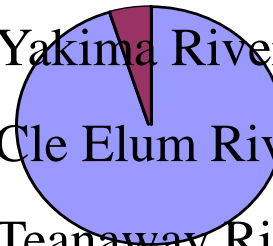
Yakima River



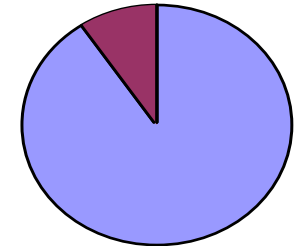
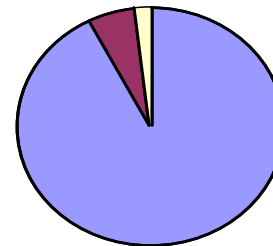
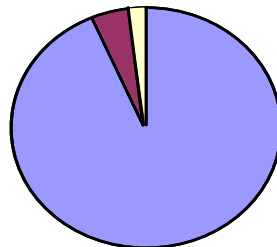
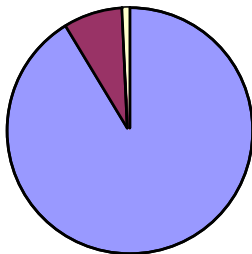
Cle Elum River



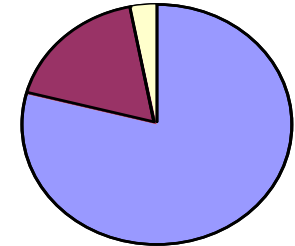
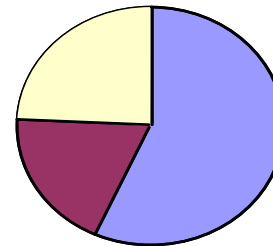
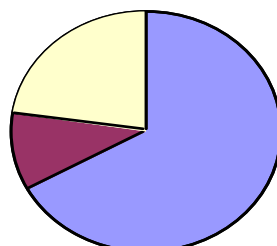
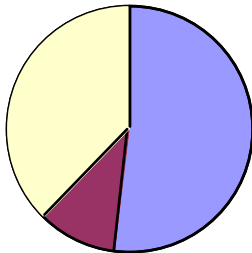
Teanaway River



Clark Flat



Jack Creek



Conclusions

- Salmon can/do imprint and home to release sites as evidenced by homing of Jack Creek fish to the Teanaway R. and proximity of Easton fish to their release site.**
- Habitat selection or behavioral interactions may be an important contributing factor in spawning site selection given the high densities in specific areas that are used by all fish regardless of origin**
- Releases of smolts from acclimation facilities did increase the number of returning spawners in underutilized habitat - although percentages of Teanaway spawners.**
- Hatchery-reared fish were recovered in almost all spawning areas utilized by wild fish suggesting the potential for impacts of hatchery fish on the wild population.**
- Fish released from the Easton acclimation site upstream from the central hatchery demonstrated the highest homing fidelity.**

Future studies

- 1) Continue mapping of homing and spawning locations of wild and YKFP supplementation salmon (e.g. interannual variation; density dependence, habitat changes - e.g. Suncadia)**
- 2) Linkages between homing and habitat in spawning site selection**
- 3) Assess efficacy of acclimation/off site release in recolonization of underutilized habitat (Experimental manipulations - e.g. direct release, time of acclimation; reproductive success of Teanaway fish)**
- 4) Physiological and behavioral (radiotelemetry) assessments of imprinting and homing**

Acknowledgements



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