An analysis of potential cumulative ecological interactions:

Hatchery programs in the Lower Columbia past and present

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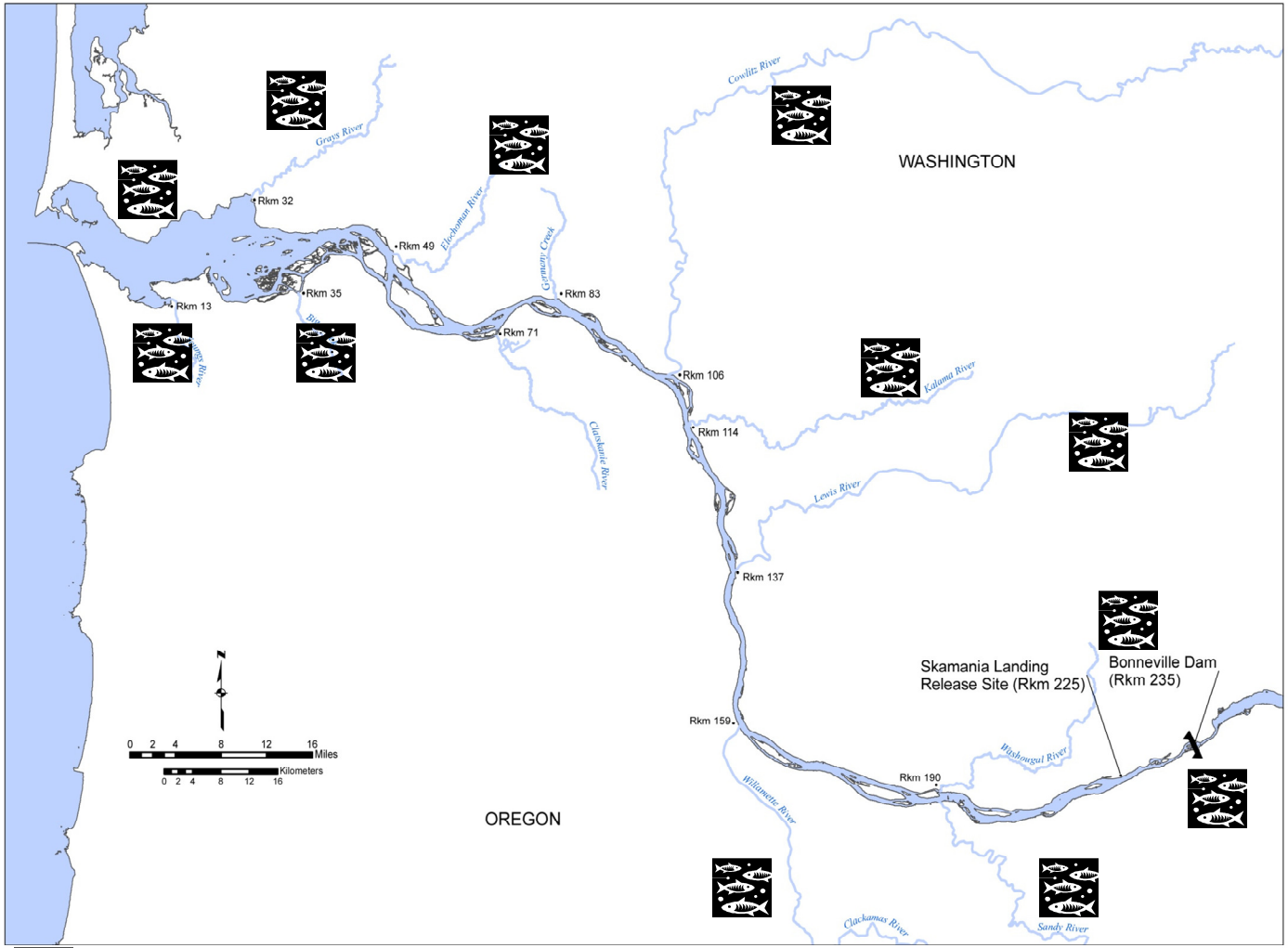
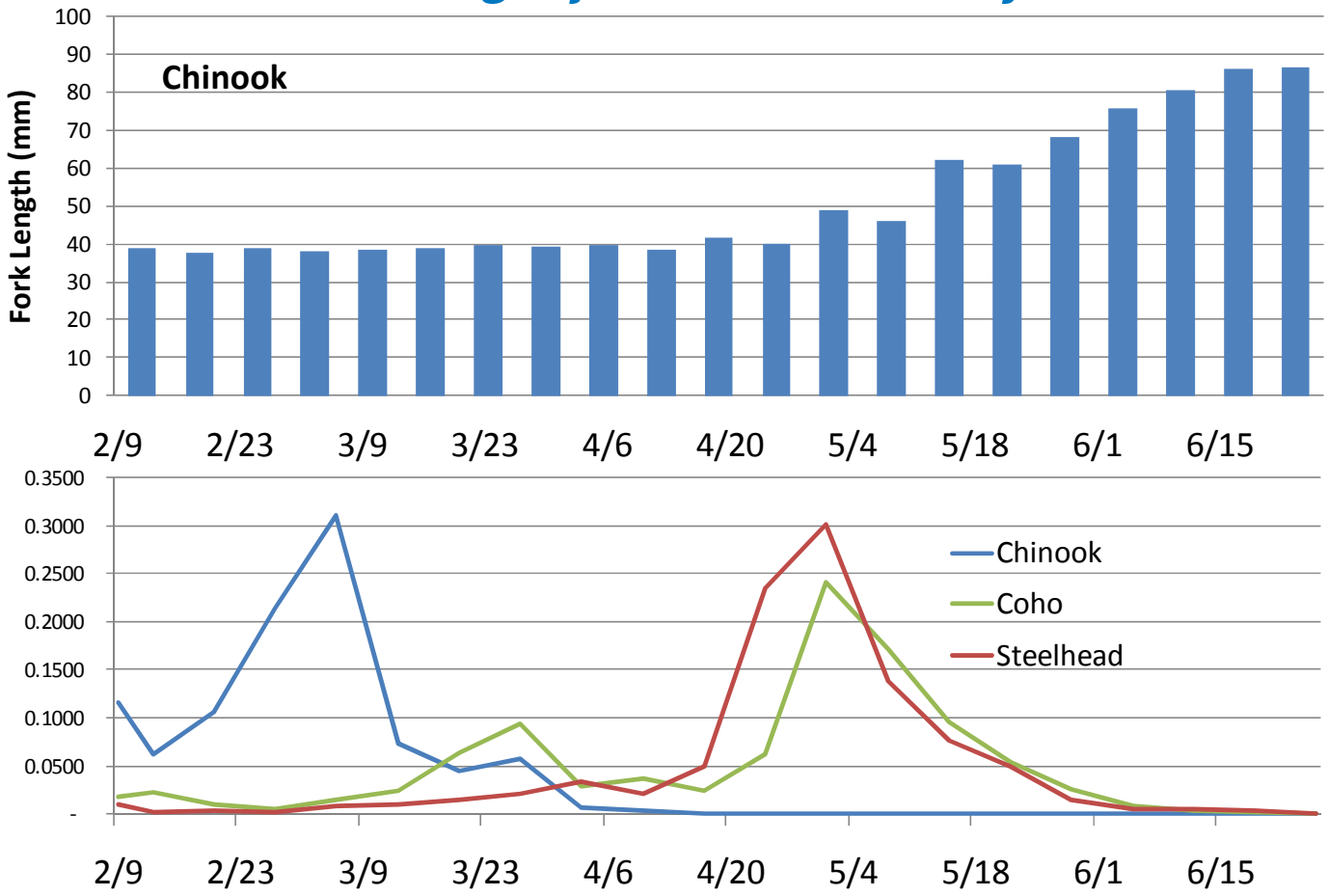
Columbia River Downstream Bonneville Dam



Hatchery

Patterns of Juvenile Migration

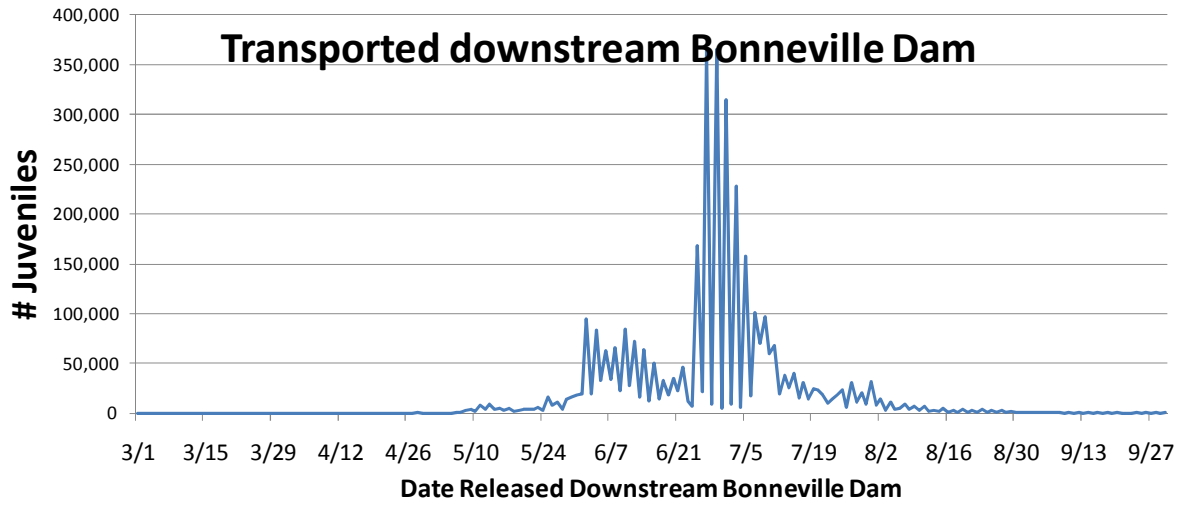
Natural origin juveniles Germany Creek

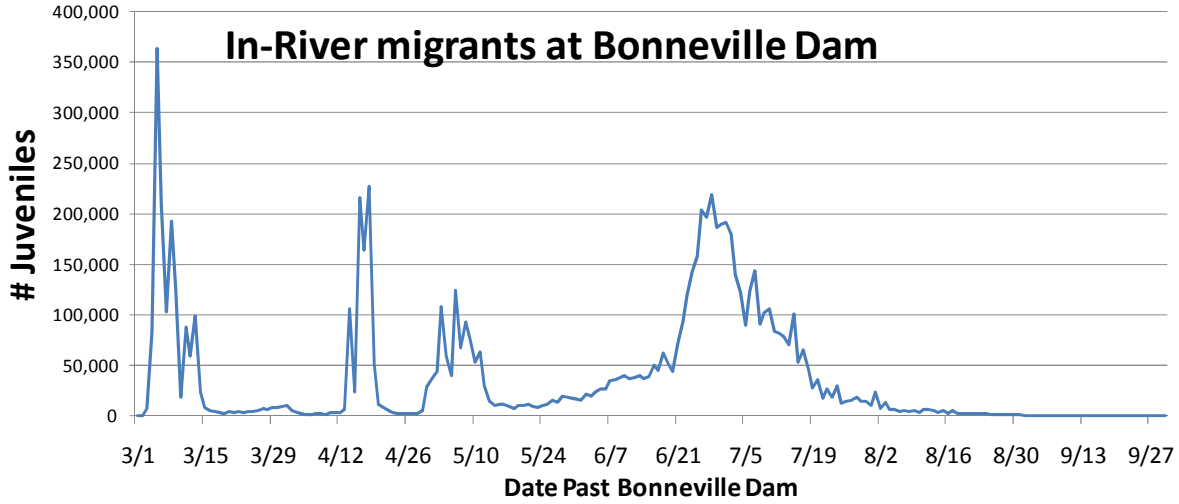


From: Washington Department of Fish and Wildlife – 2005 Intensive Monitored Watershed trap data

Patterns of Juvenile Migration

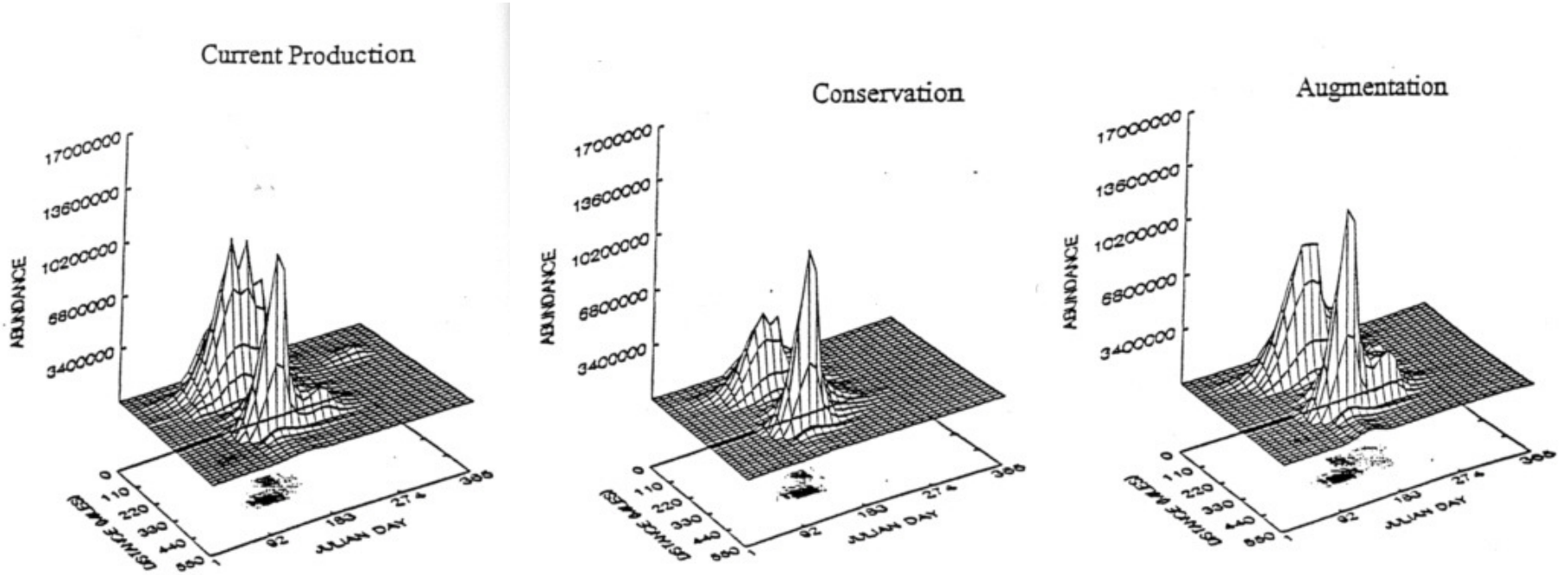
0-Age Chinook (2004-2008 Average)





Mainstem Smolt Abundance Landscape

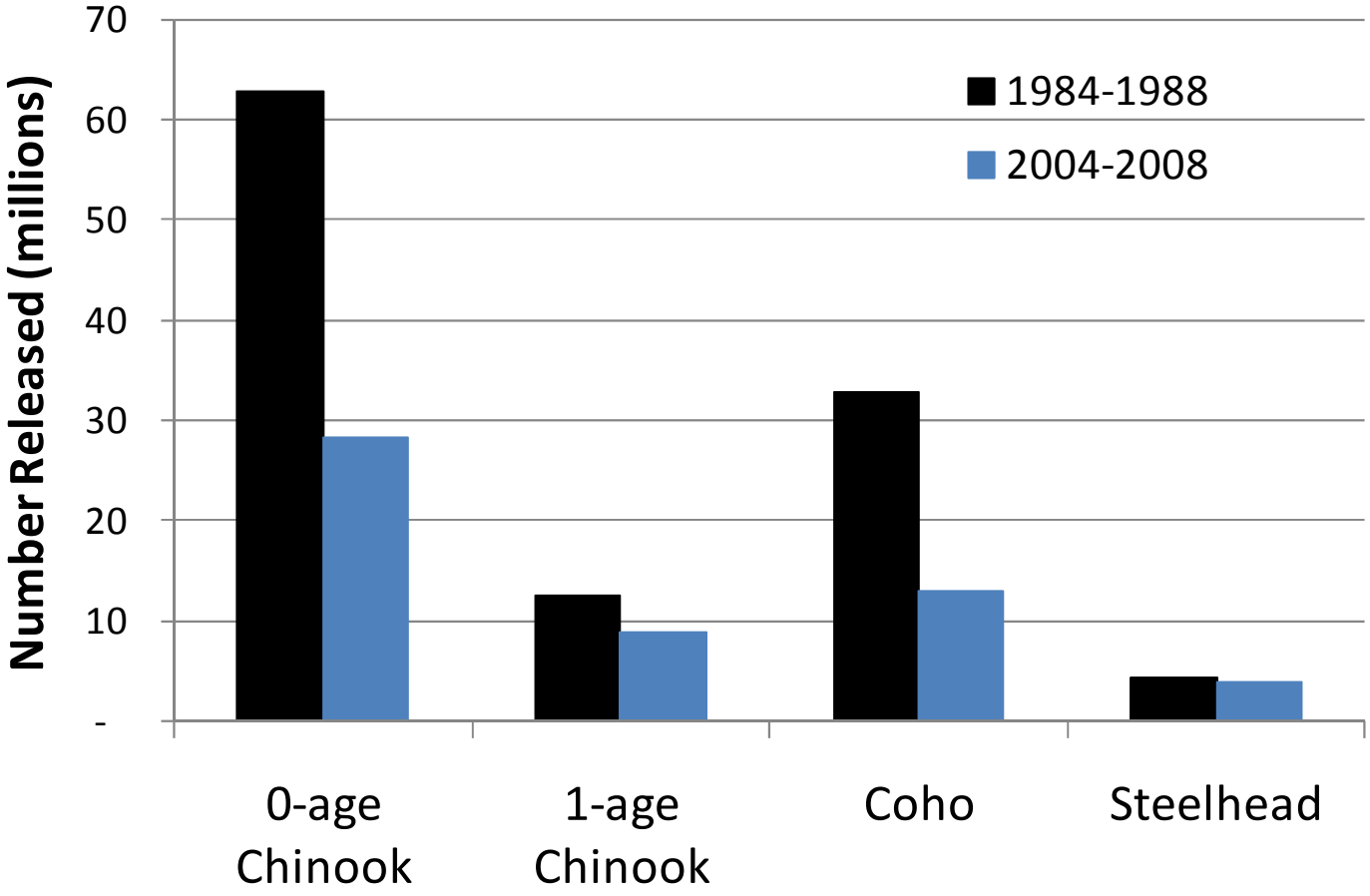
Upper Columbia Branch (1984 – 1988)



From: Mobrand and Kinnear. 1996. Analysis Exposure Naturally Produced Smolts in the Migration Corridor – a comparison among Three Alternative Hatchery Programs.

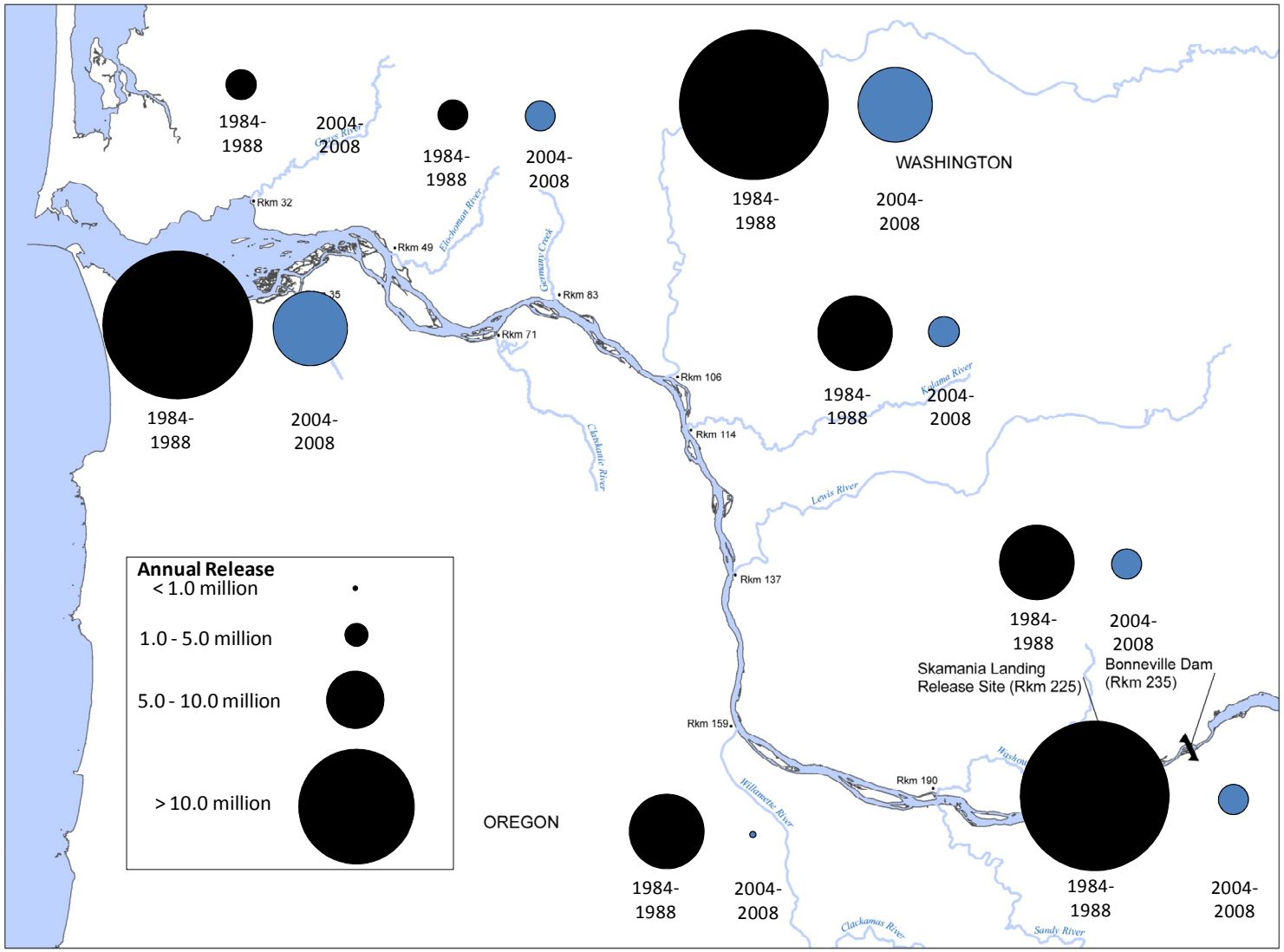
Release Hatchery Fish

Locations Downstream Bonneville Dam

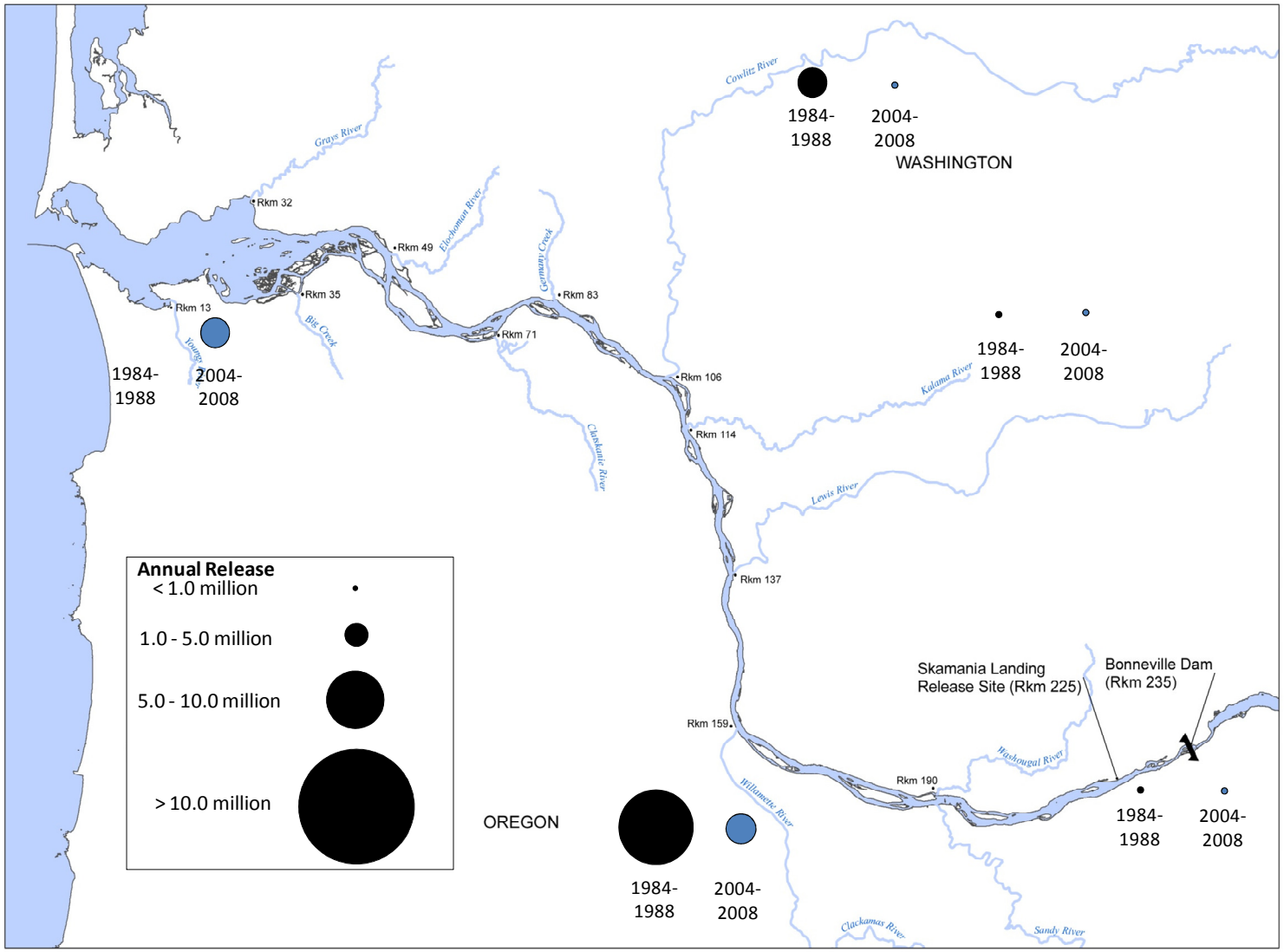


From: Fish Passage Center online Hatchery Database, March 2010 and Mobrand and Kinnear. 1996. Analysis Exposure Naturally Produced Smolts in the Migration Corridor – a comparison among Three Alternative Hatchery Programs.

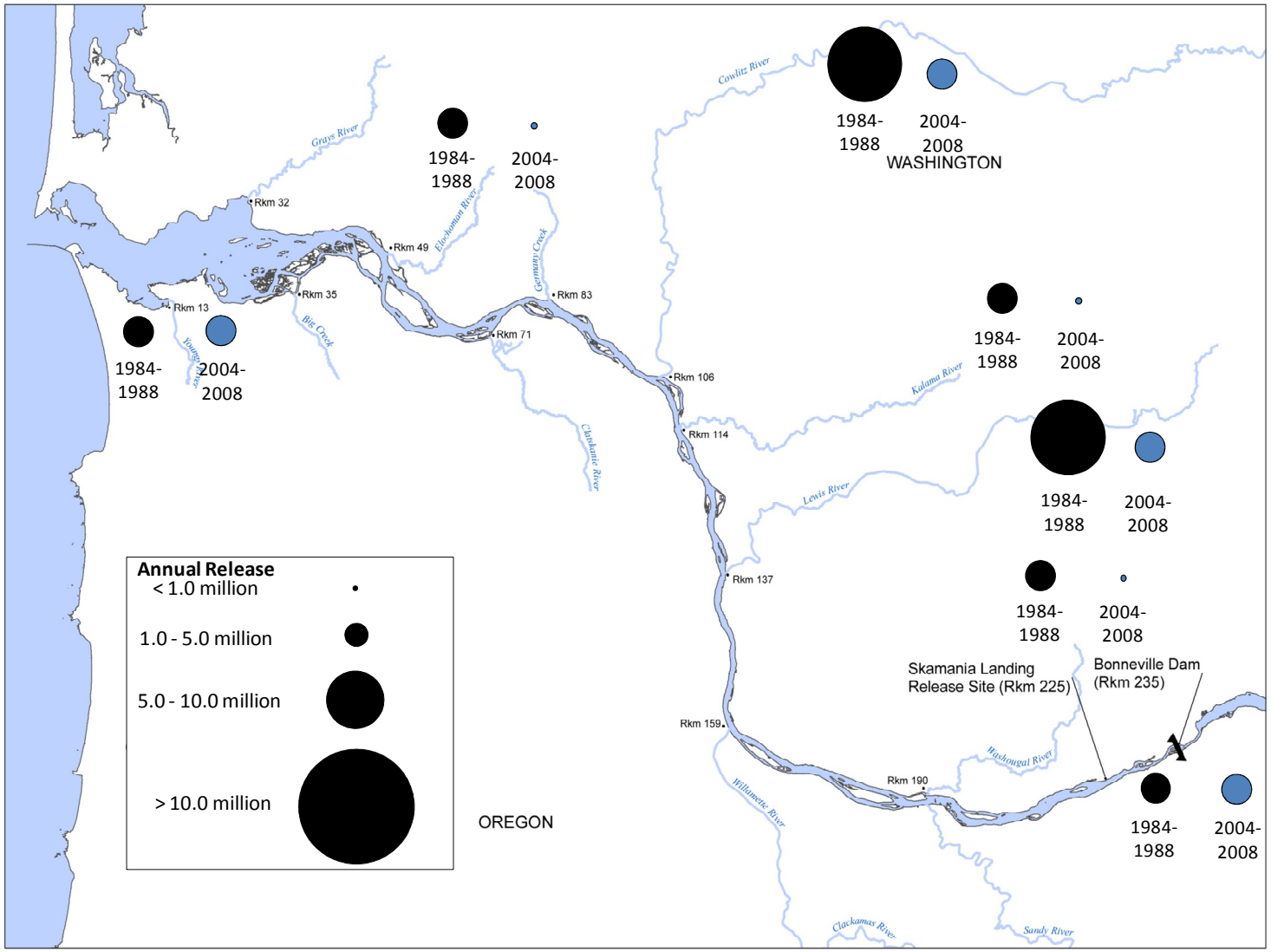
Hatchery Release 0-age Chinook



Hatchery Release 1-age Chinook



Hatchery Release Coho



Key Points

- Our analysis is limited to understanding the effect of hatchery releases on patterns of abundance and distribution
- Hatchery programs result in spikes of high abundance
- Many of these spikes coincide in space and time with key natural populations
- Current release data (2004 – 2008) suggests patterns of hatchery abundance is very different from the 1980's
- If there is an effect on natural population survival might we detect it across the historic record?

Next Steps

- Review hatchery release data to better document changes in hatchery production

- Analyze survival patterns relative to hatchery releases:
  - Can we detect effects of program changes on survival of natural populations?
  - Develop indices of ecological interaction potential

- Develop models to capture information and assumptions, explore critical factors and develop strategies to manage potential interactions

Questions?