Survival and Travel Time of Migrating Salmonid Smolts in the Snake and Lower Columbia Rivers

Update with Preliminary 2014 Data

Anadromous Fish Evaluation Program
Annual Review
December 11, 2014

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Northwest Fisheries Science Center
NOAA Fisheries

Outline

- Summary of migration conditions, juvenile travel time, and juvenile survival through the hydropower system

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- Interplay of factors – what's new and interesting?

- Only those fish left to migrate in-river
- Only juvenile data, not survival to adult

2014 Spring Survival Summary

- Flow, spill, and water temperature all near long-term average
- Surface passage and spill continue to promote shorter travel times
- A little over one-third of smolts transported

2014 Spring Survival Summary

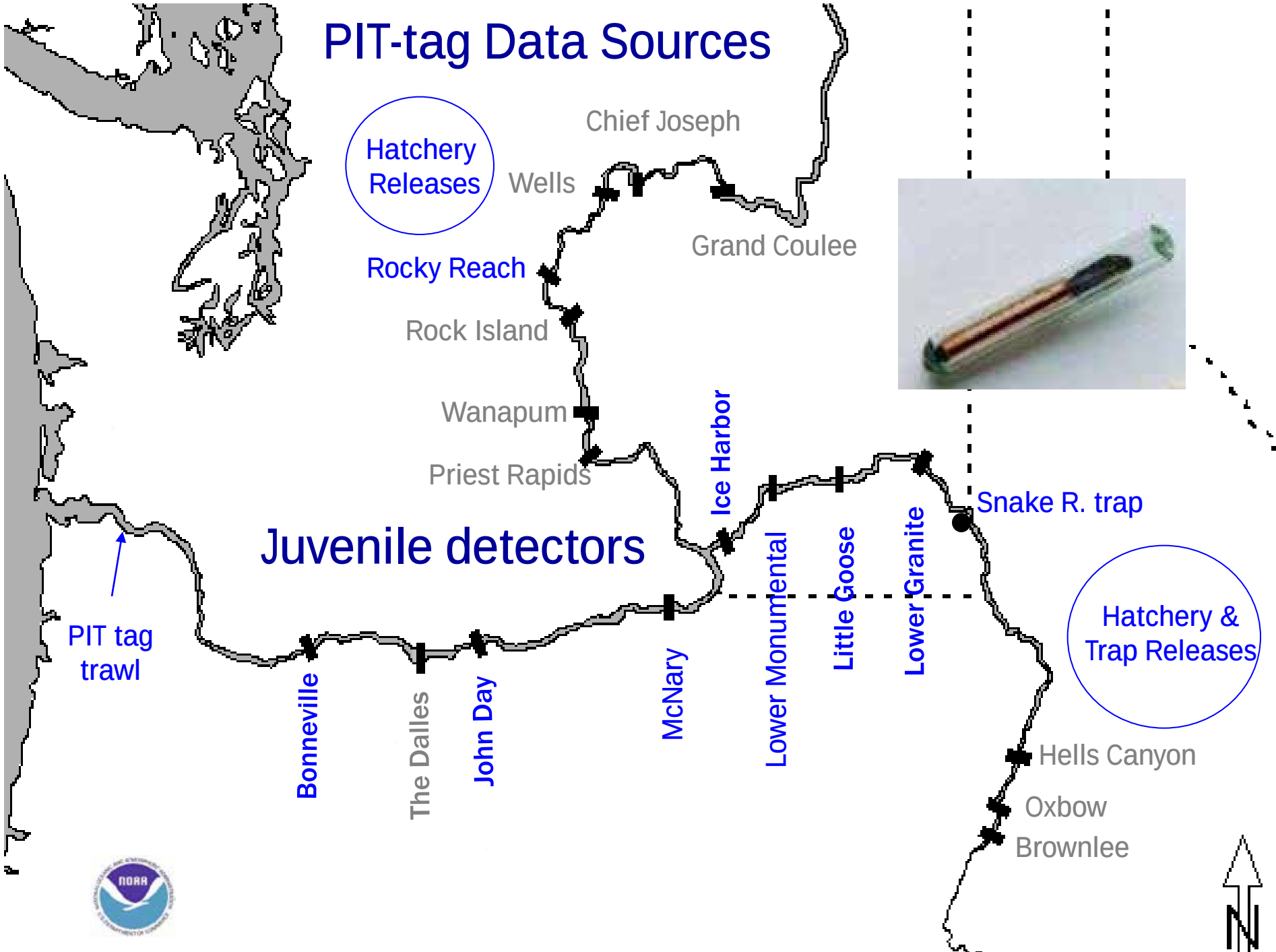
- Survival through hydrosystem just under 50% for yearling chinook, near long-term average

- Survival through hydrosystem very high (71%) for sockeye

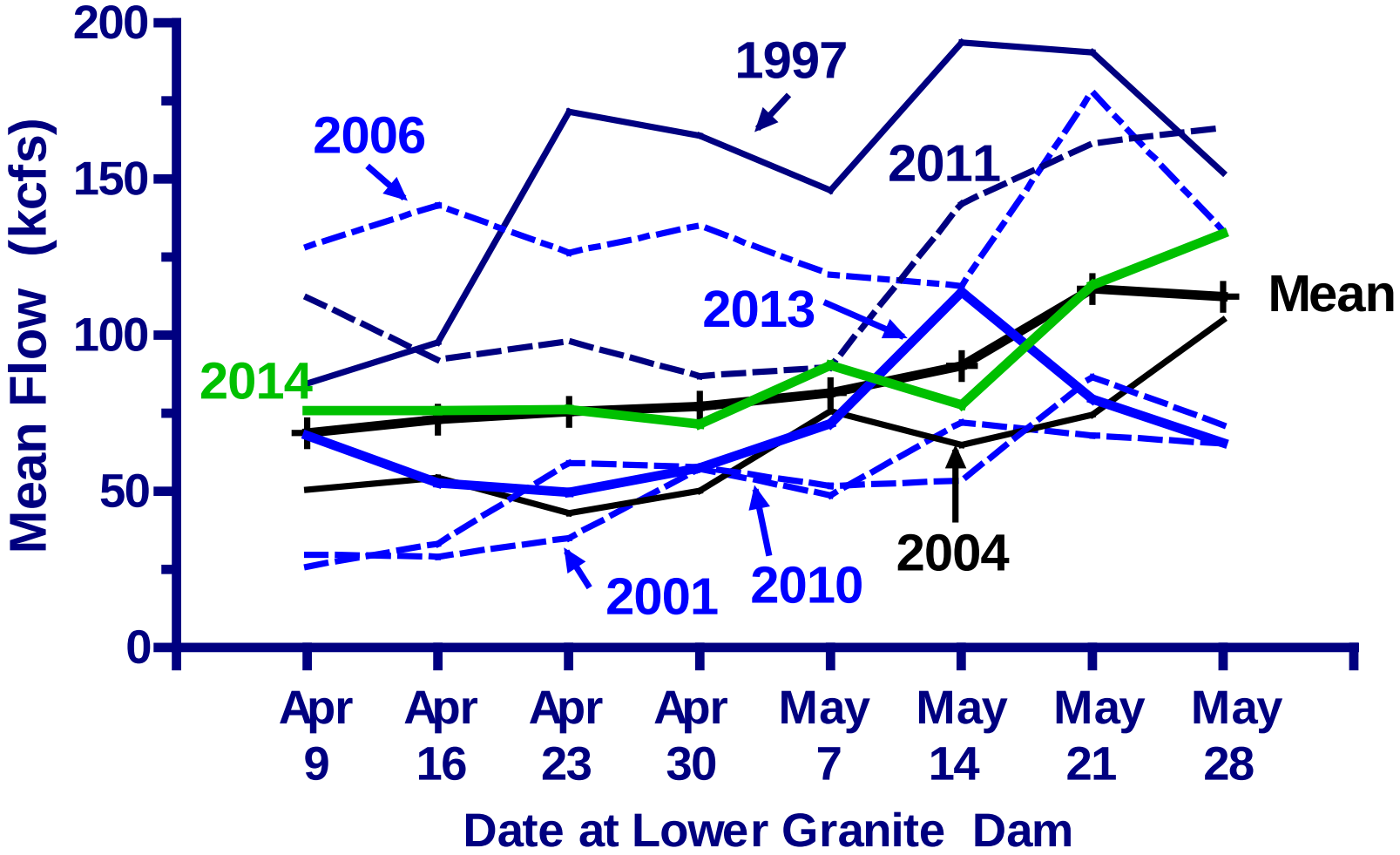
2014 Spring Survival Summary

- Survival from LGR to MCN near long-term average for steelhead
- Very high steelhead estimate for steelhead MCN-BON, probably due to model assumption violations

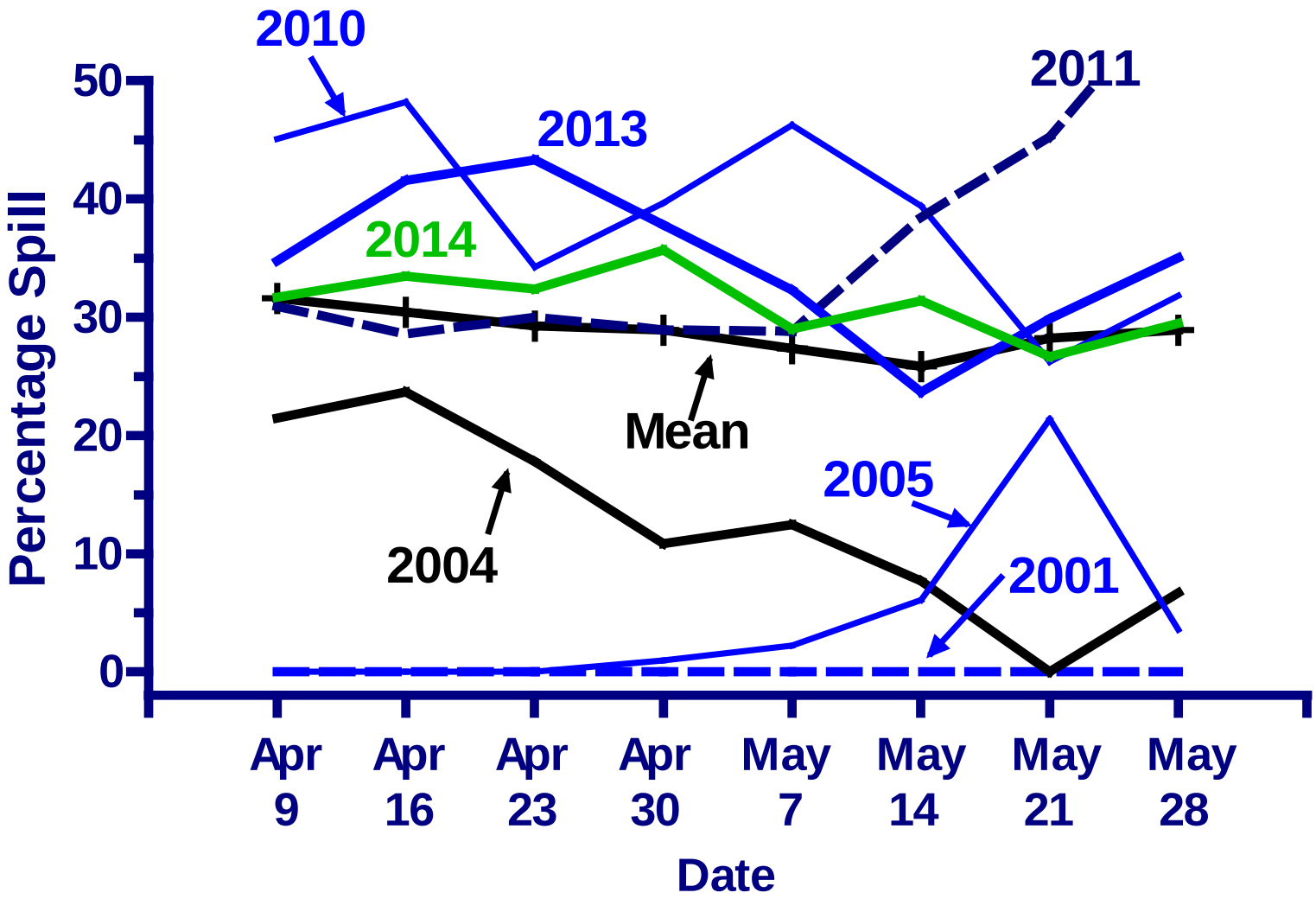
PIT-tag Data Sources



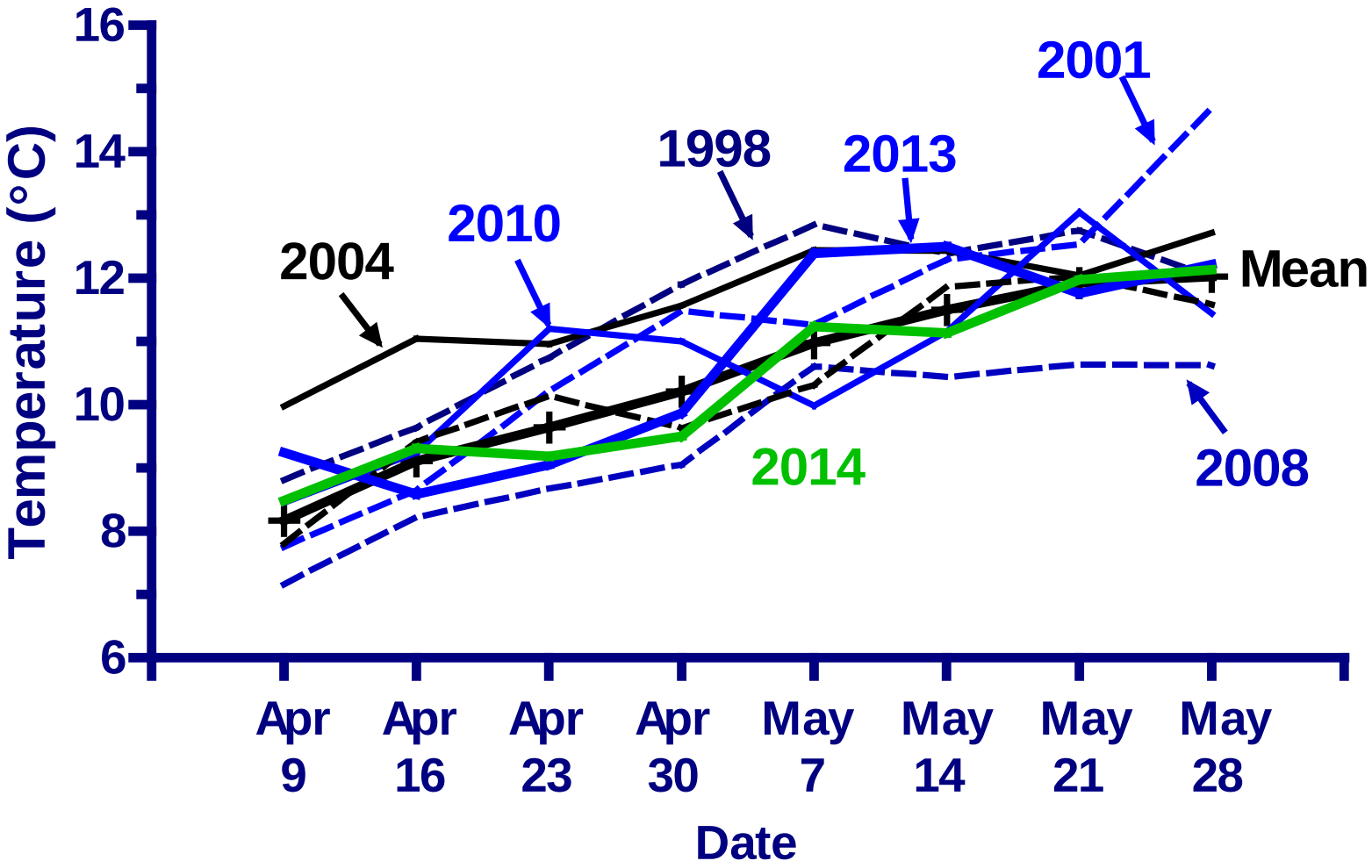
Weekly Mean Flow (kcfs)
Lower Granite Dam



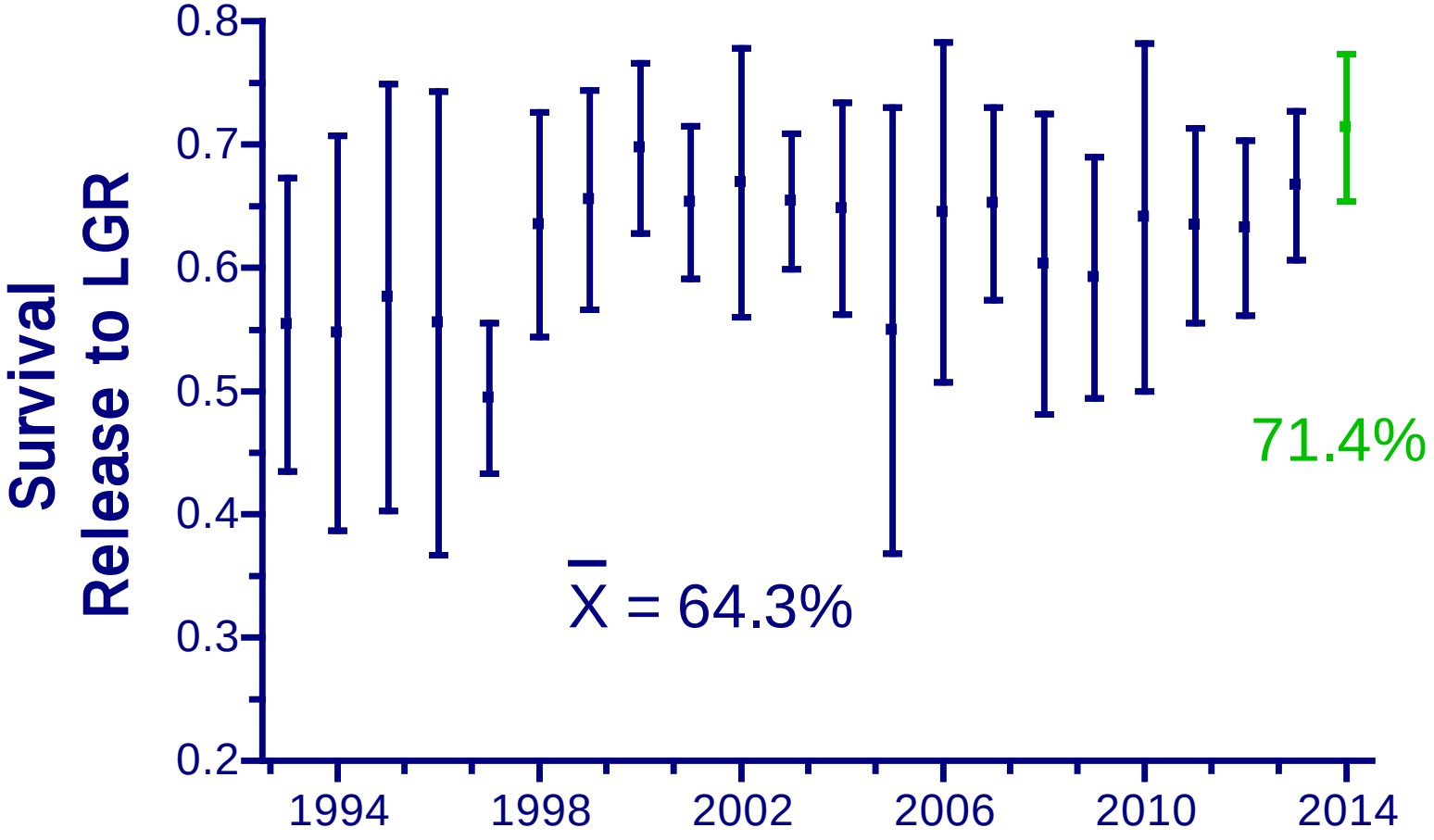
Weekly Mean %Spilled
LGR, LGS, LMN



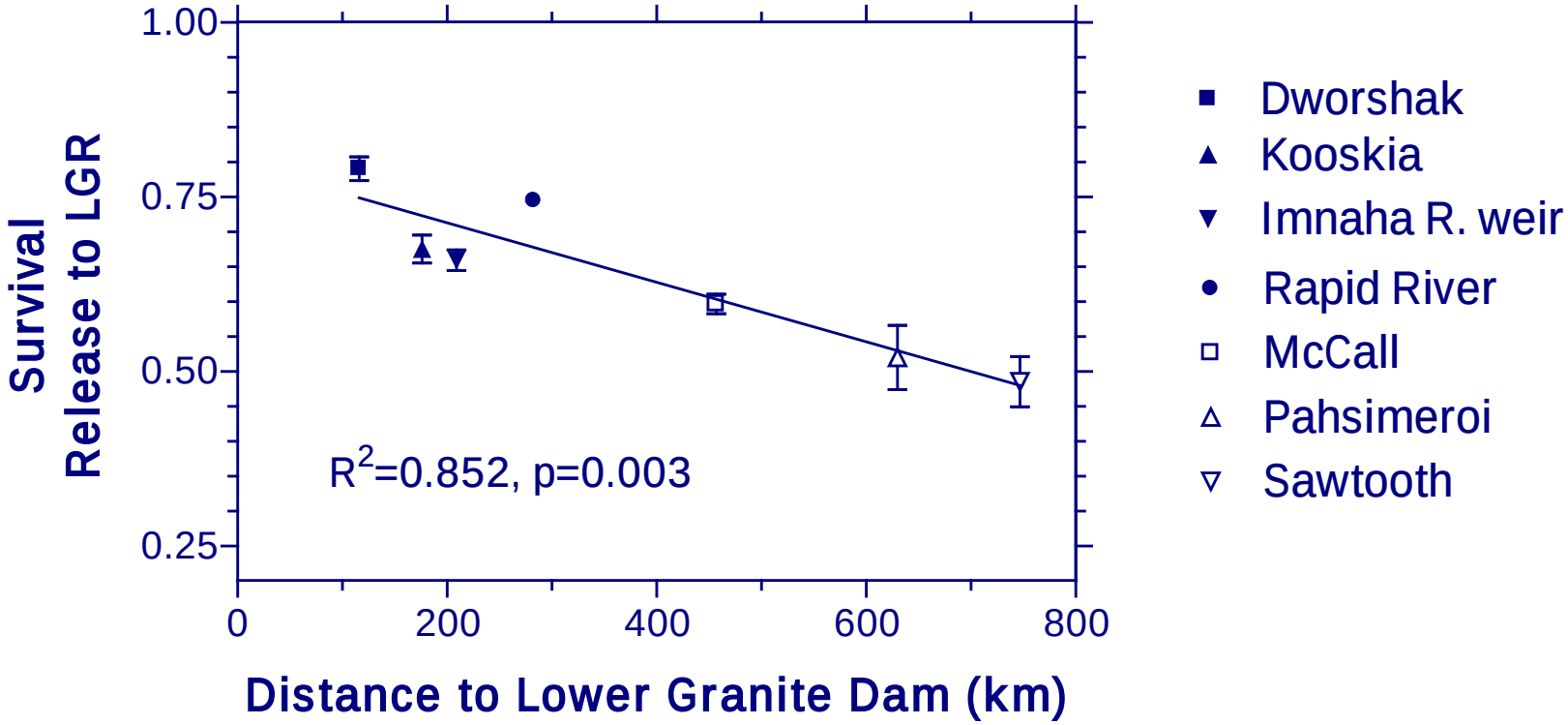
Weekly Mean Temperature
Little Goose Dam



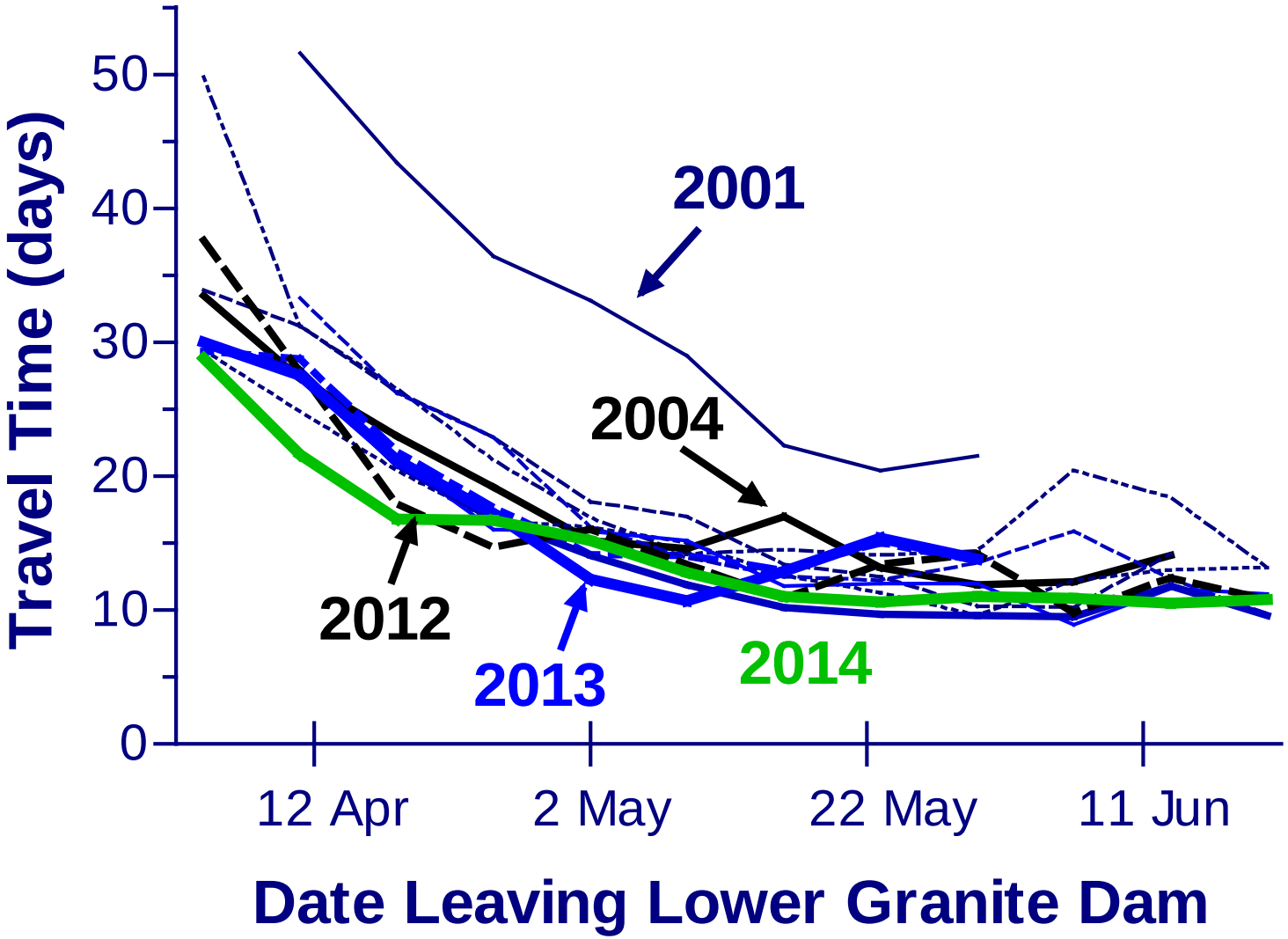
Yearling Chinook
Snake River Basin Hatcheries
Mean of Index Groups



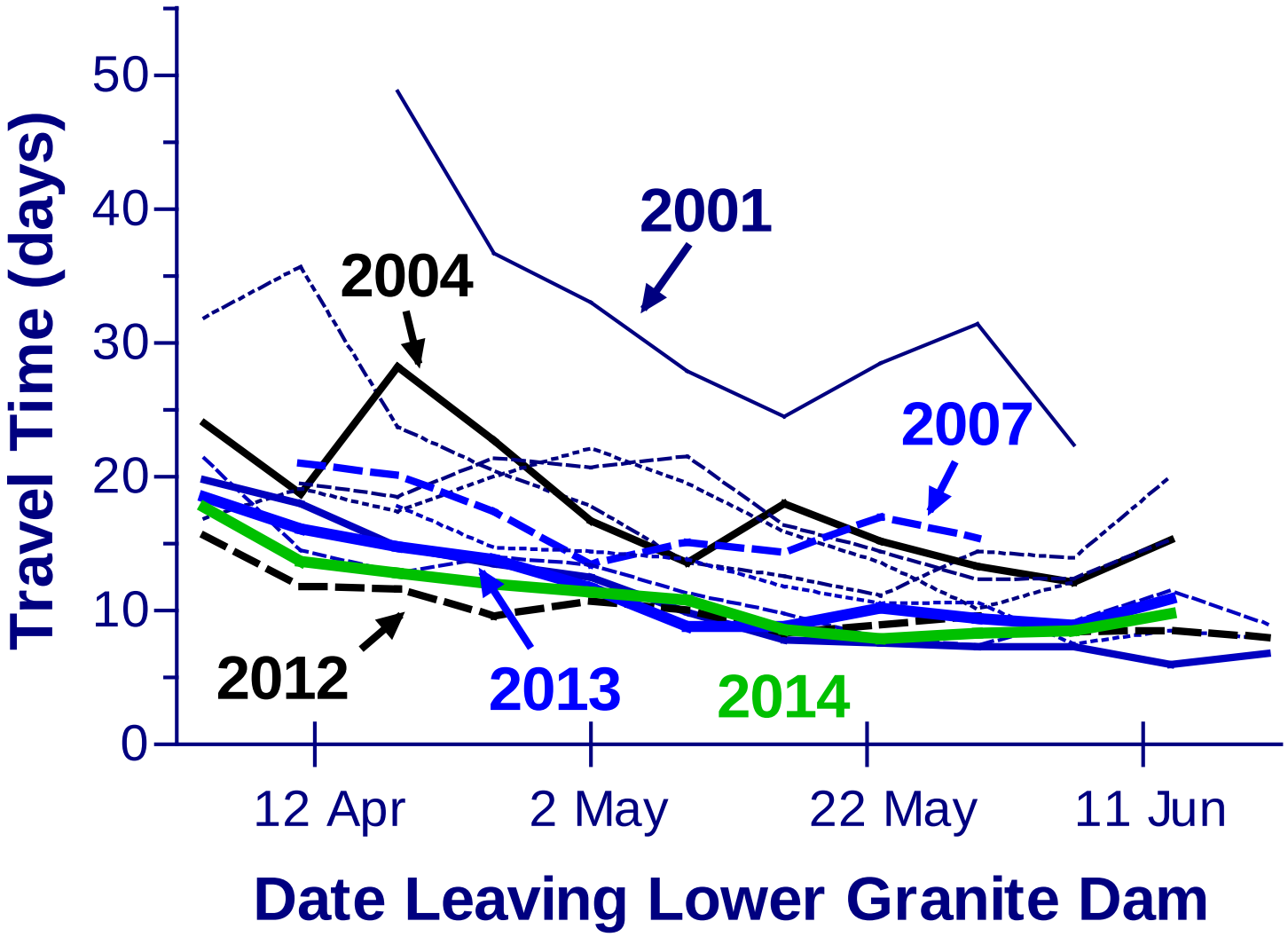
Hatchery yearling Chinook (Mean 2002-2014)

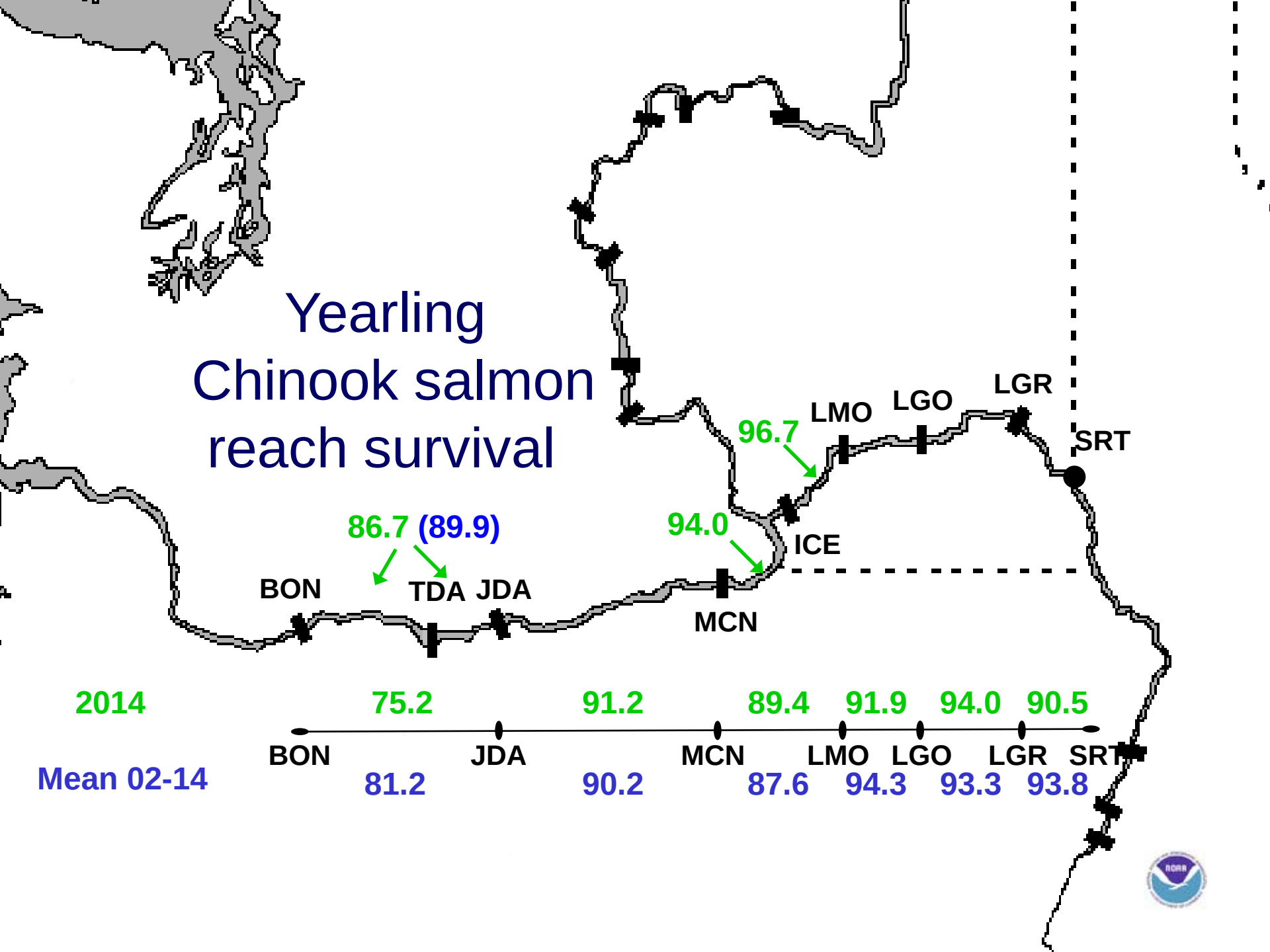


Yearling Chinook Median Travel Time Lower Granite to Bonneville (461 km)

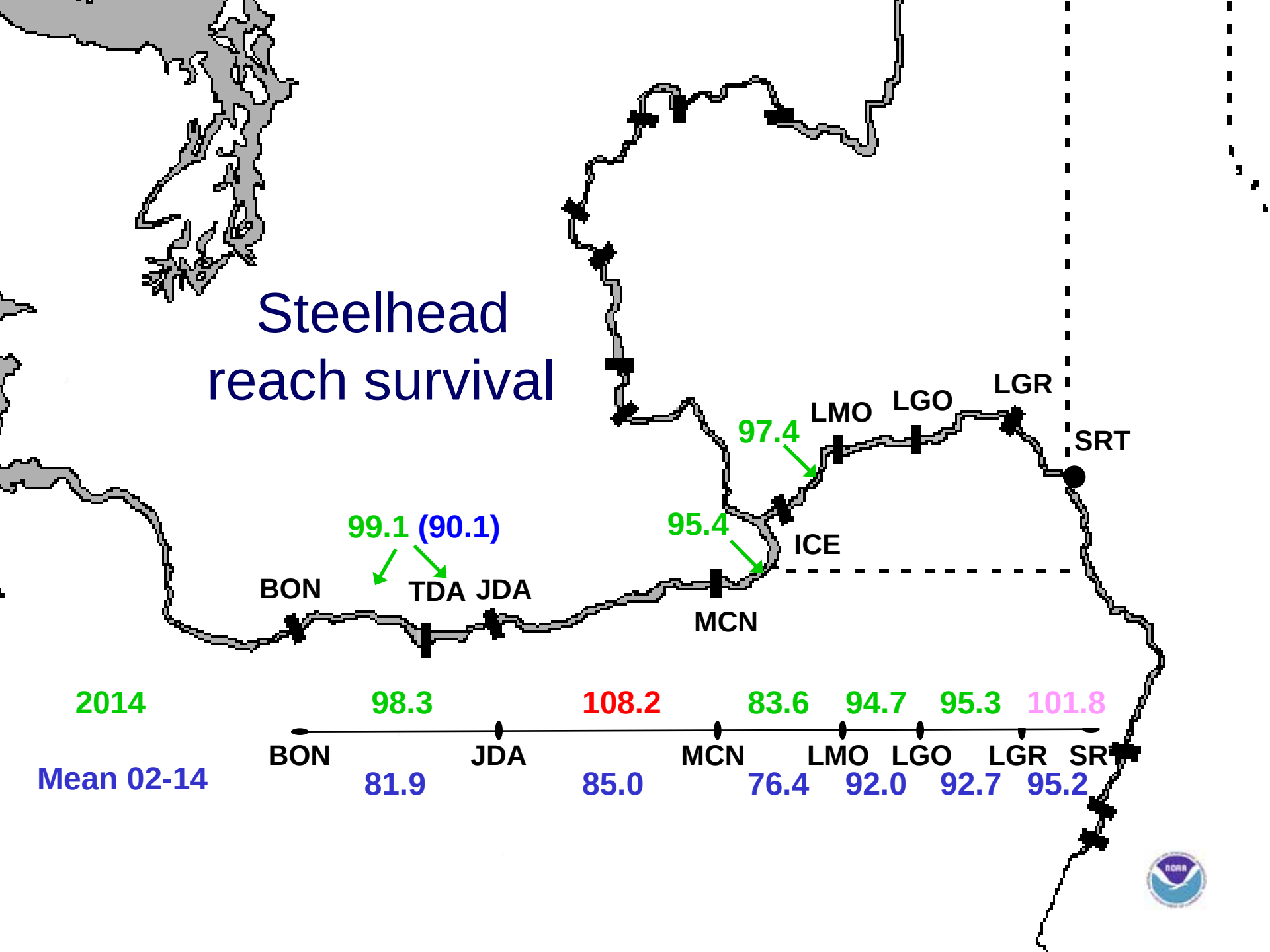


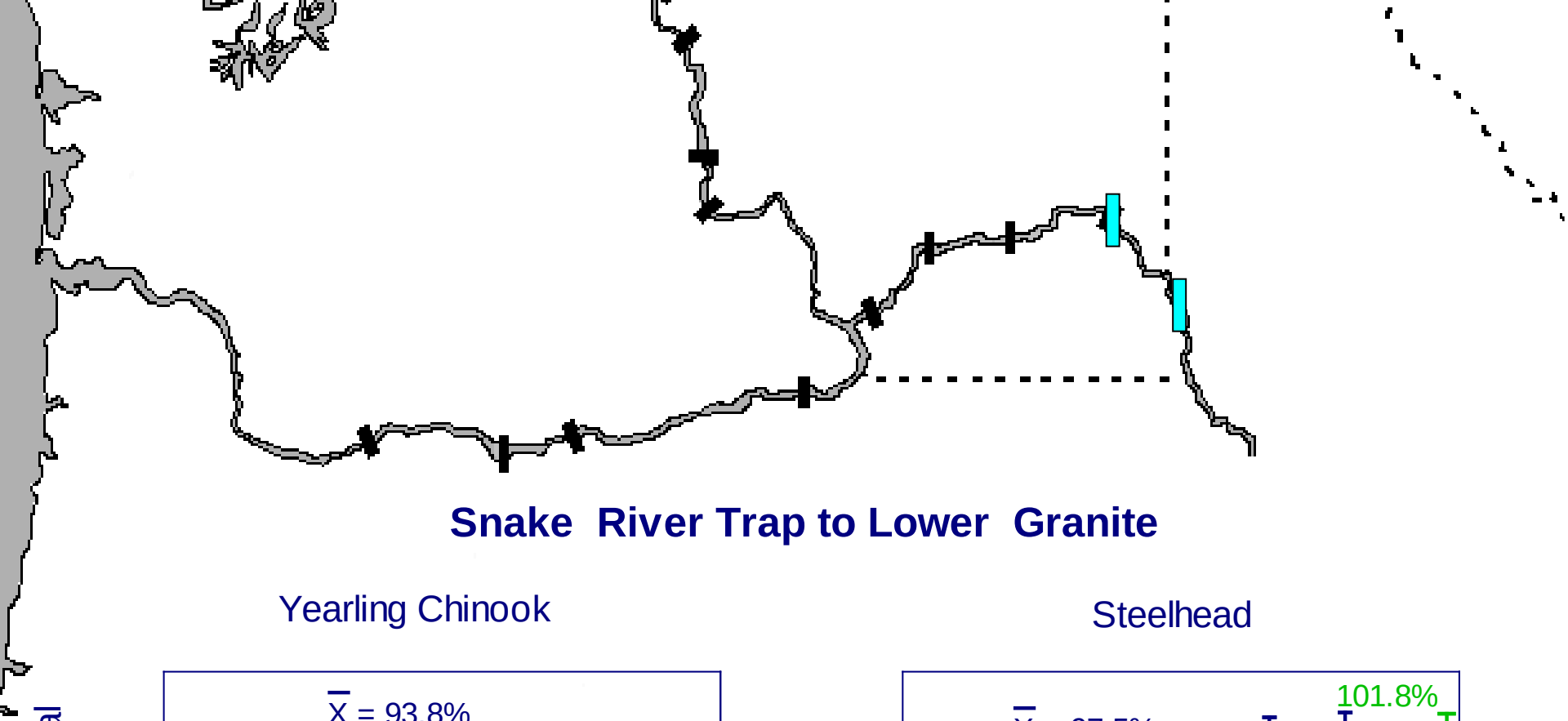
Steelhead Median Travel Time
Lower Granite to Bonneville (461 km)



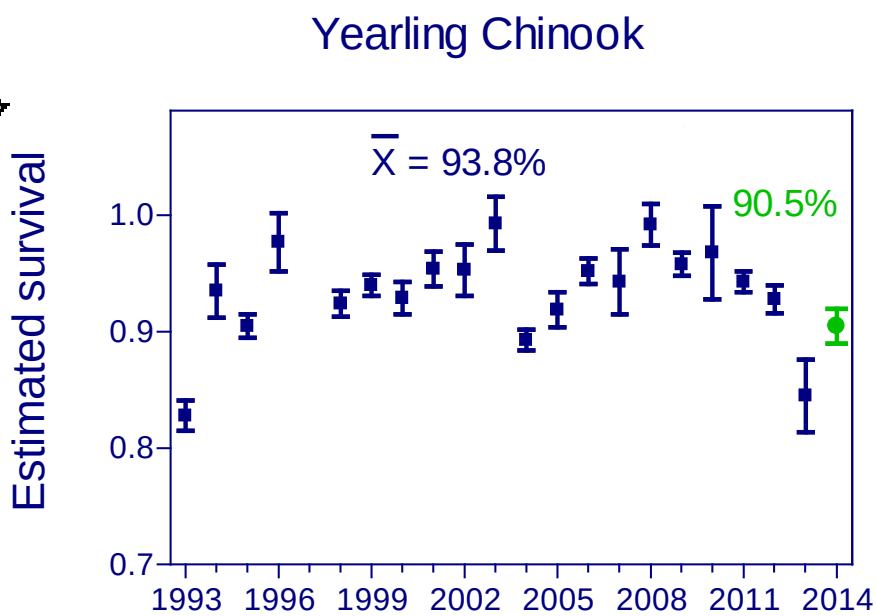

Yearling
Chinook salmon
reach survival
86.7 (89.9)
94.0
96.7
BON
TDA
JDA
MCN
ICE
LMO
LGO
LGR
SRT
2014
75.2
91.2
89.4
91.9
94.0
90.5
BON
JDA
MCN
LMO
LGO
LGR
SRT
Mean 02-14
81.2
90.2
87.6
94.3
93.3
93.8

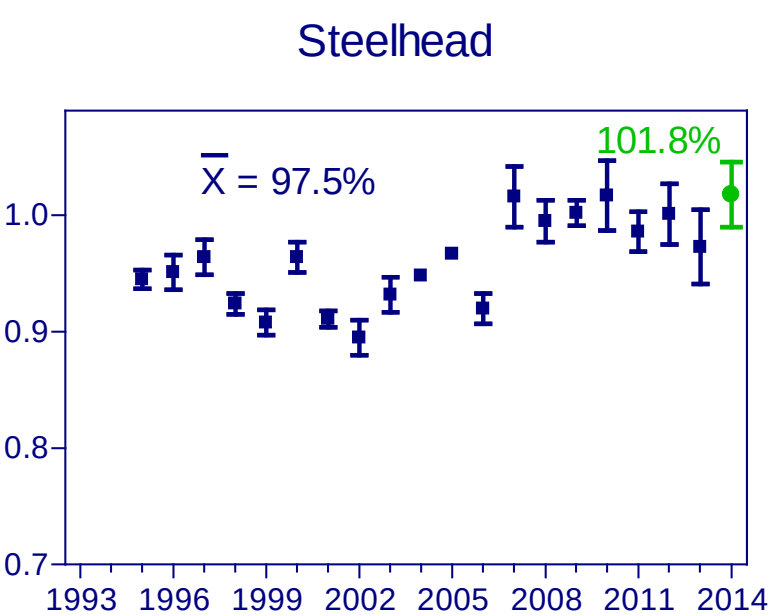
Steelhead reach survival

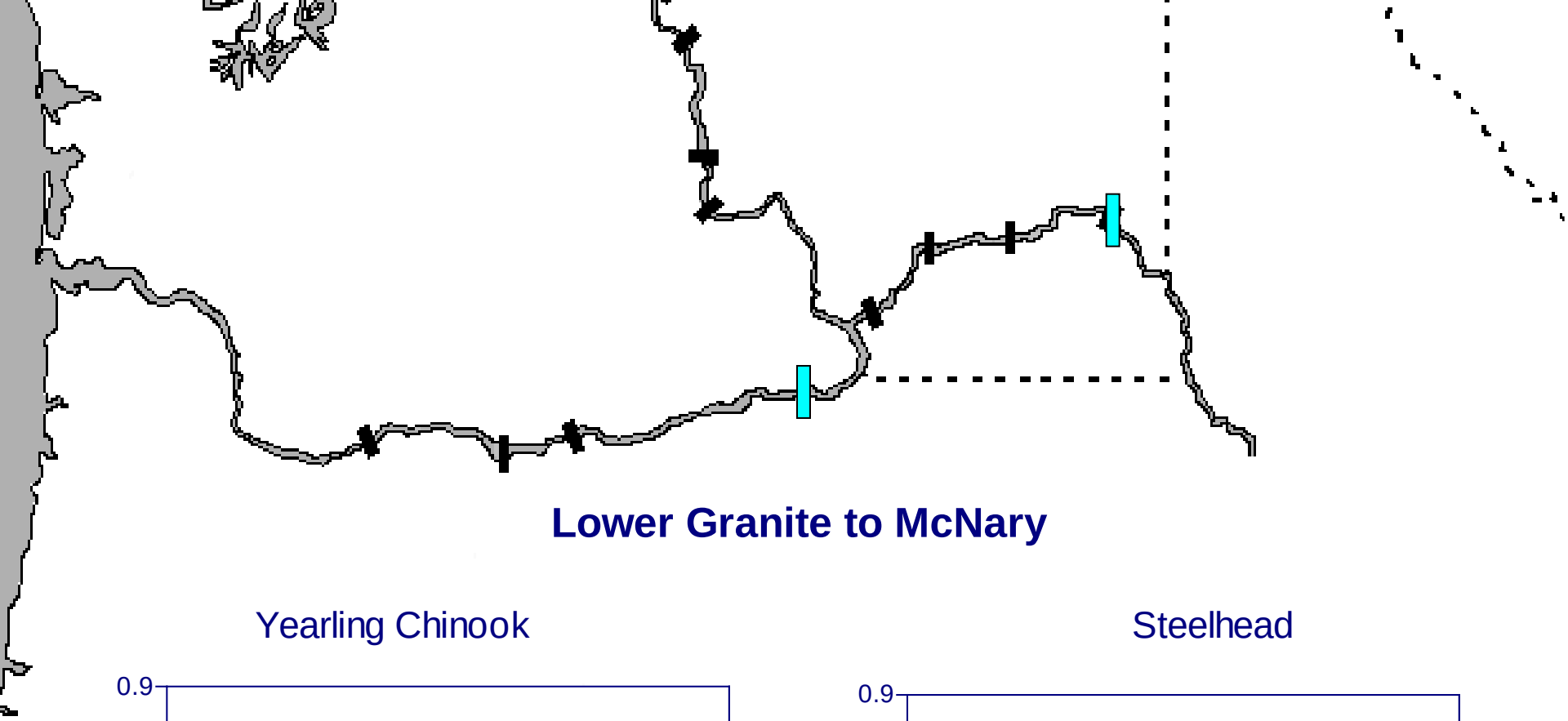




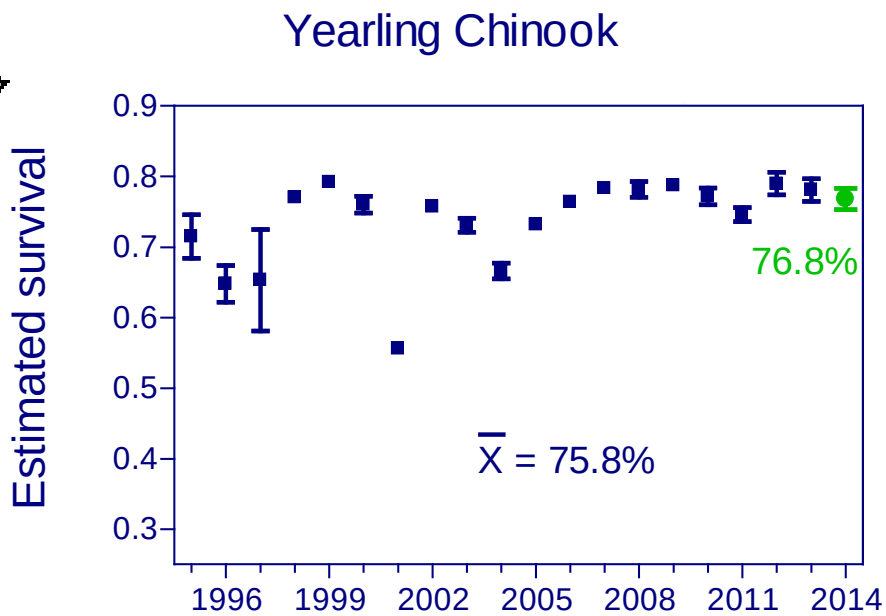
Snake River Trap to Lower Granite

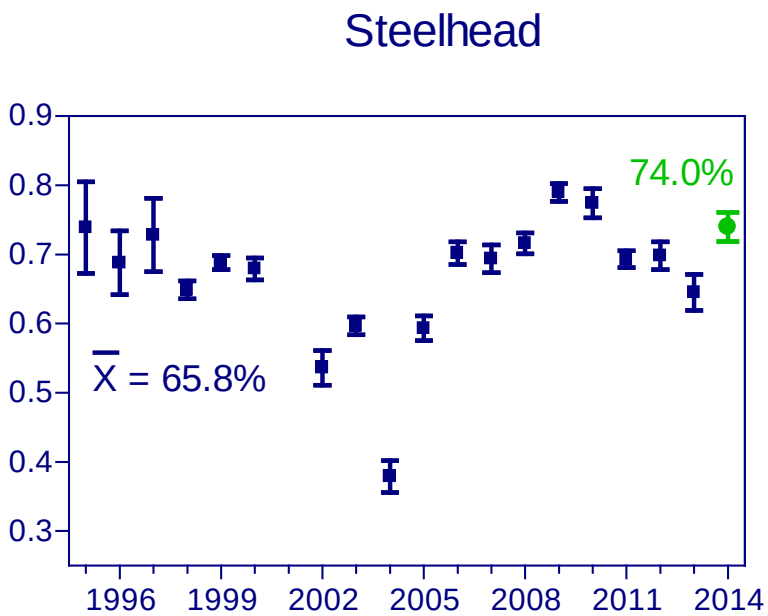


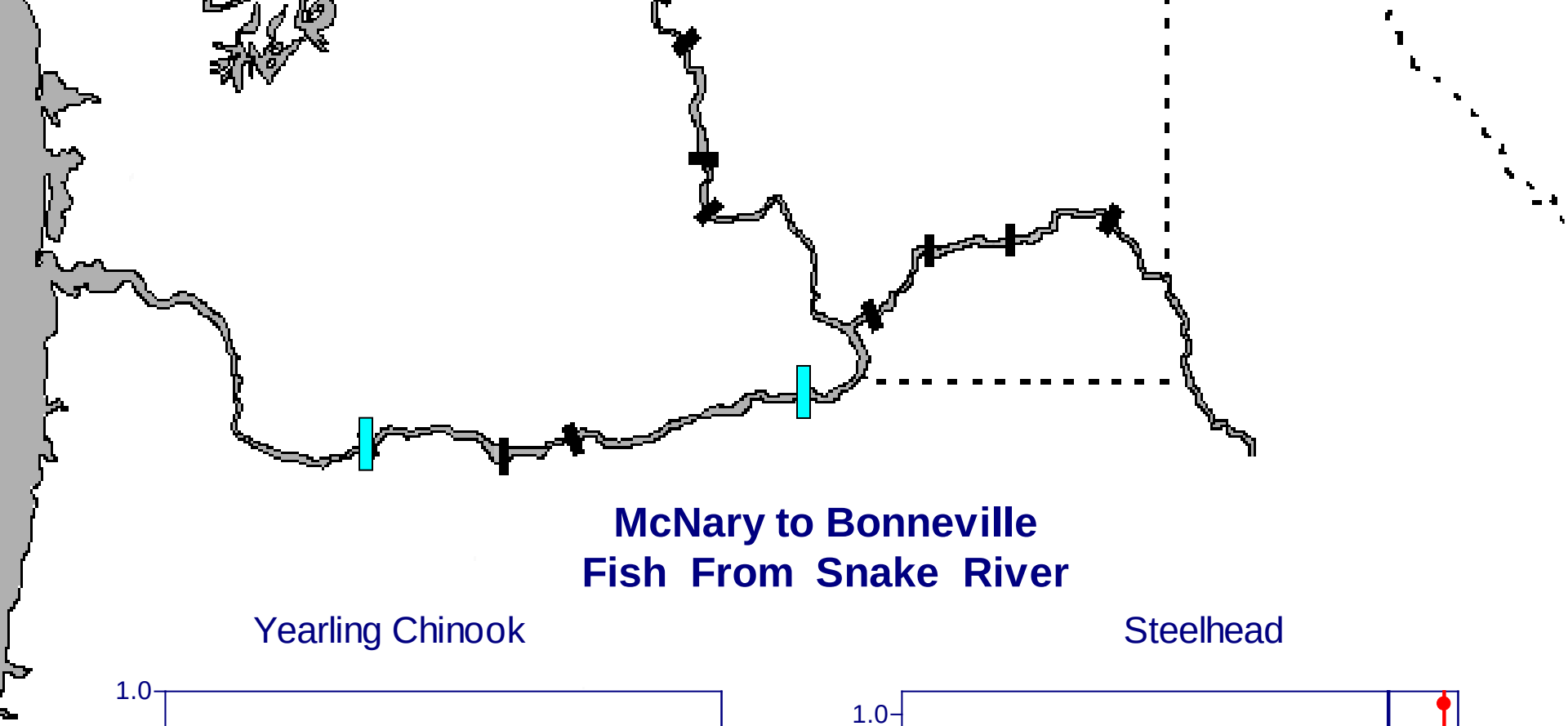




Lower Granite to McNary

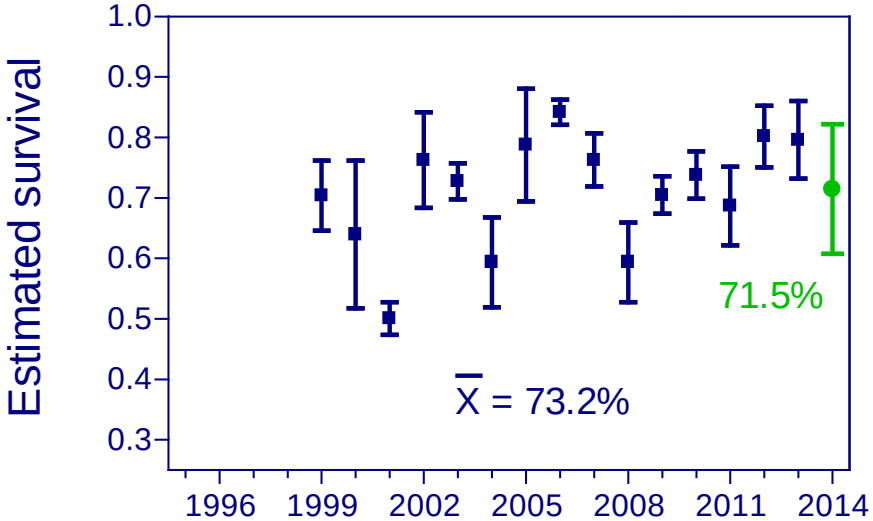




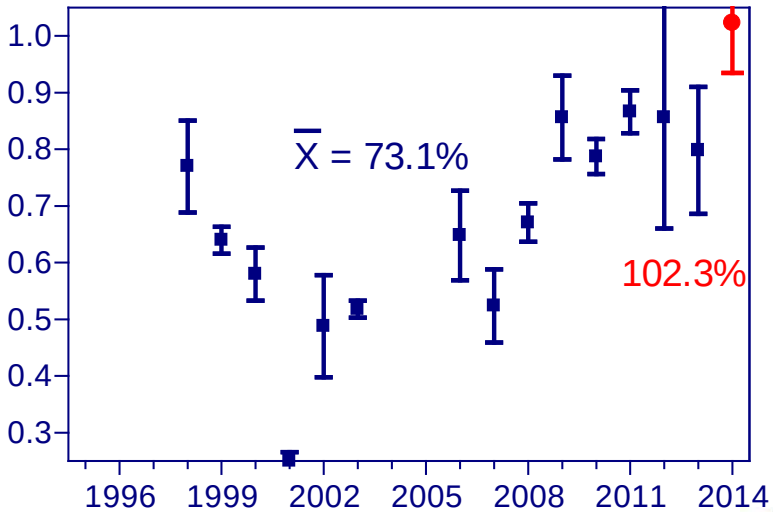


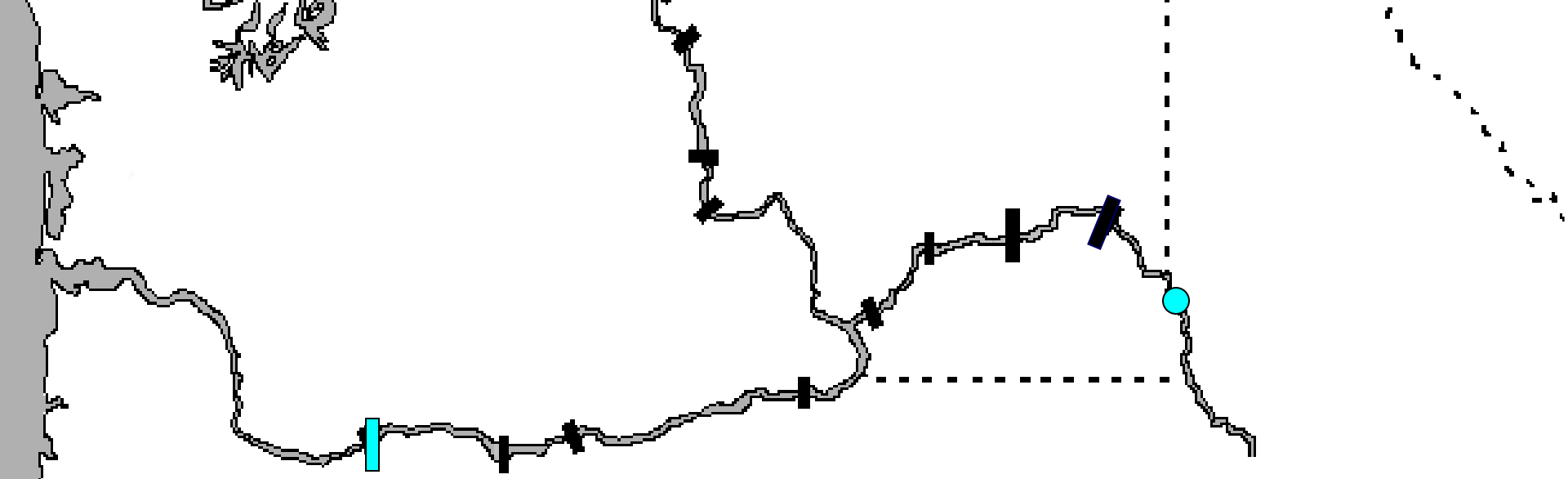
McNary to Bonneville
Fish From Snake River

Yearling Chinook



Steelhead





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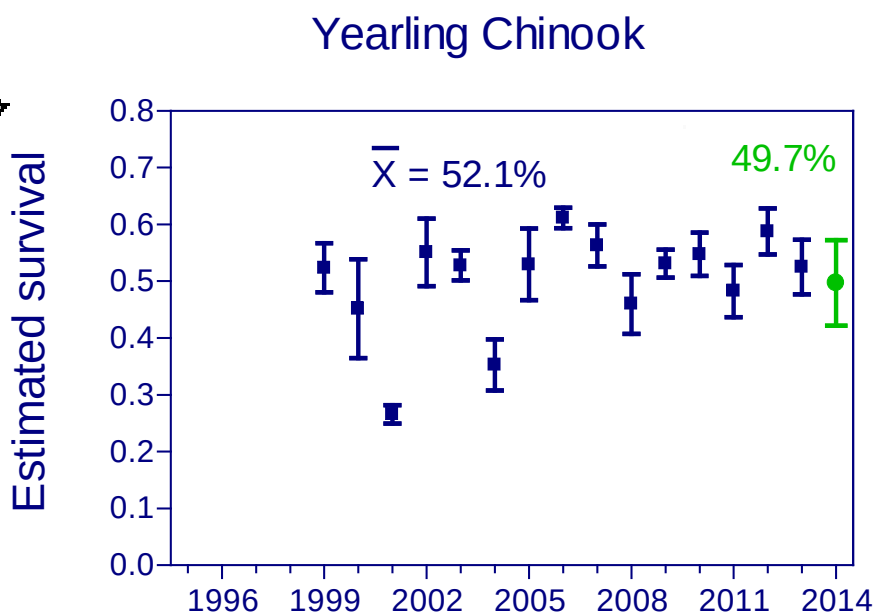
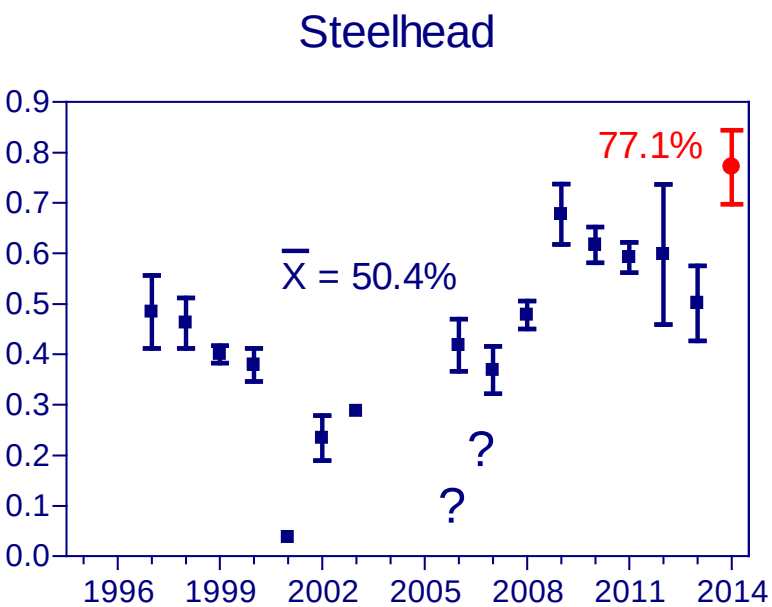
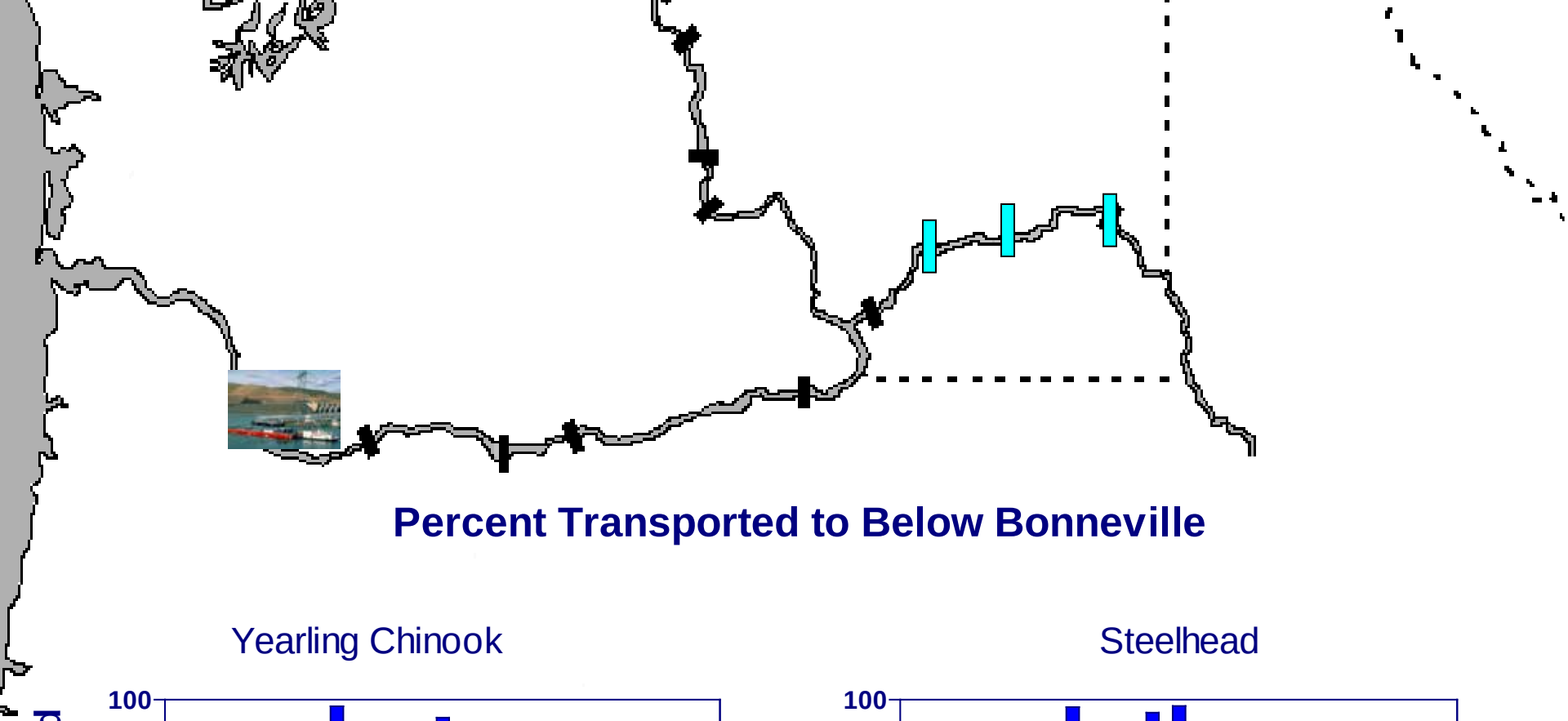


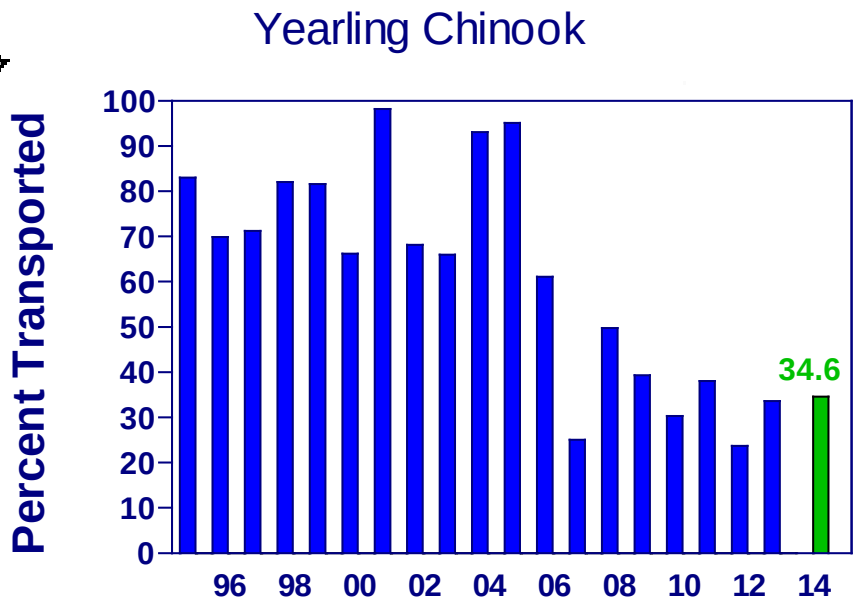


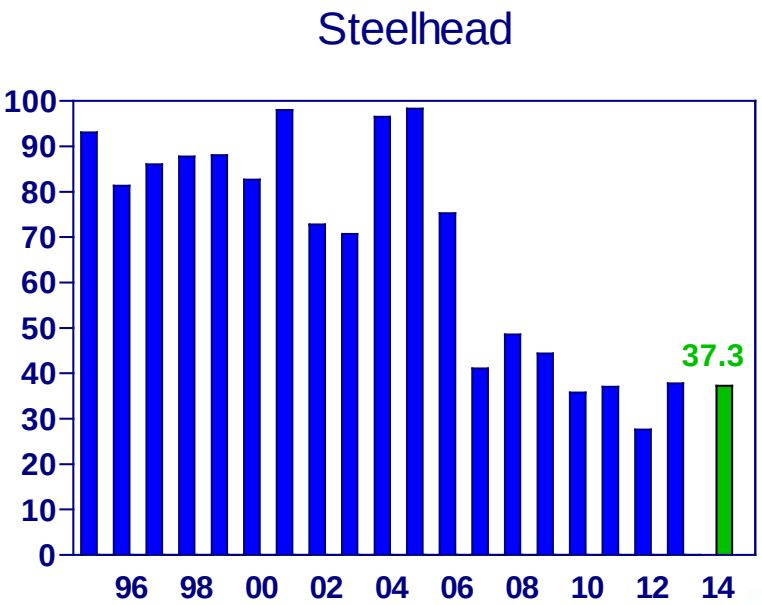
Preliminary estimates of transport % for 2014

- 31% wild Chinook
- 38% hatchery Chinook
- 40% wild steelhead
- 35% hatchery steelhead



Percent Transported to Below Bonneville





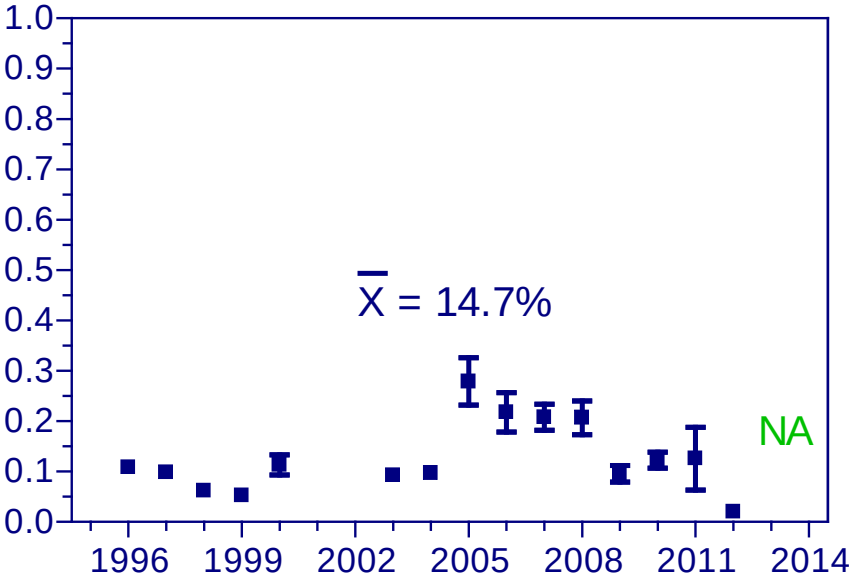
Percentage Transported Function Of:

- Arrival Distribution of Smolts
- Daily Probability of Entering JBS
- Daily Probability of Transport from JBS

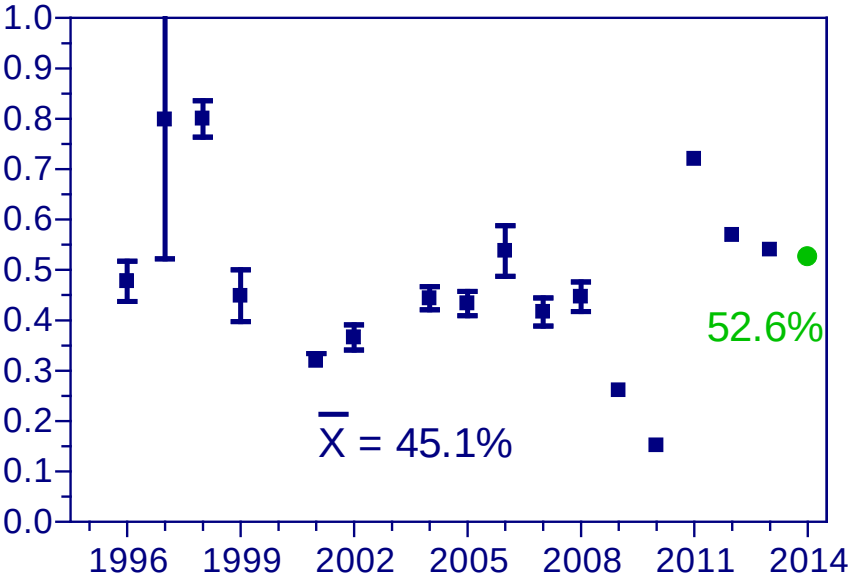
Sockeye Survival

Snake River Sockeye
Redfish Lake to Lower Granite

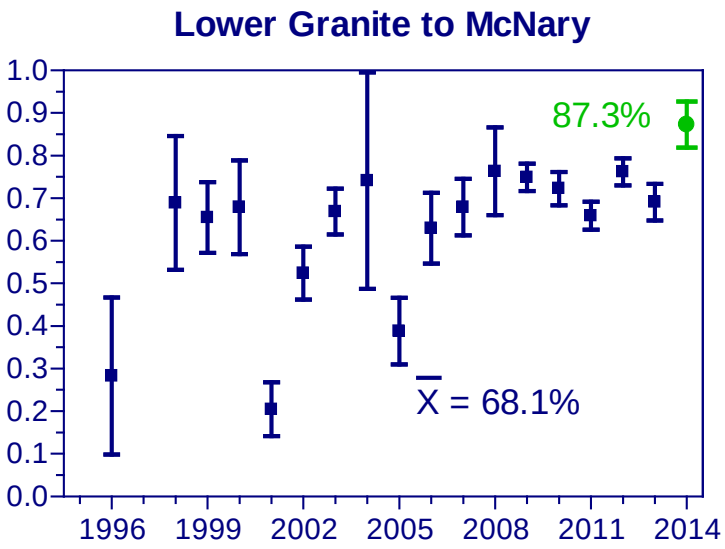
Released as parr in fall

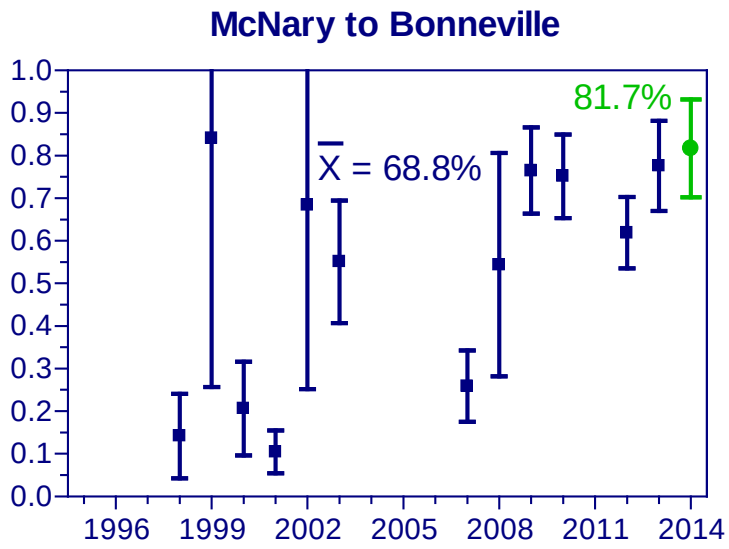


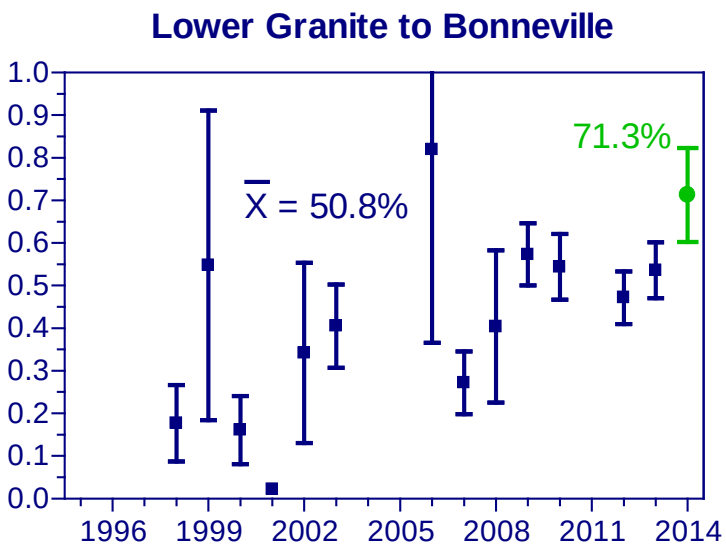
Released as smolts in spring



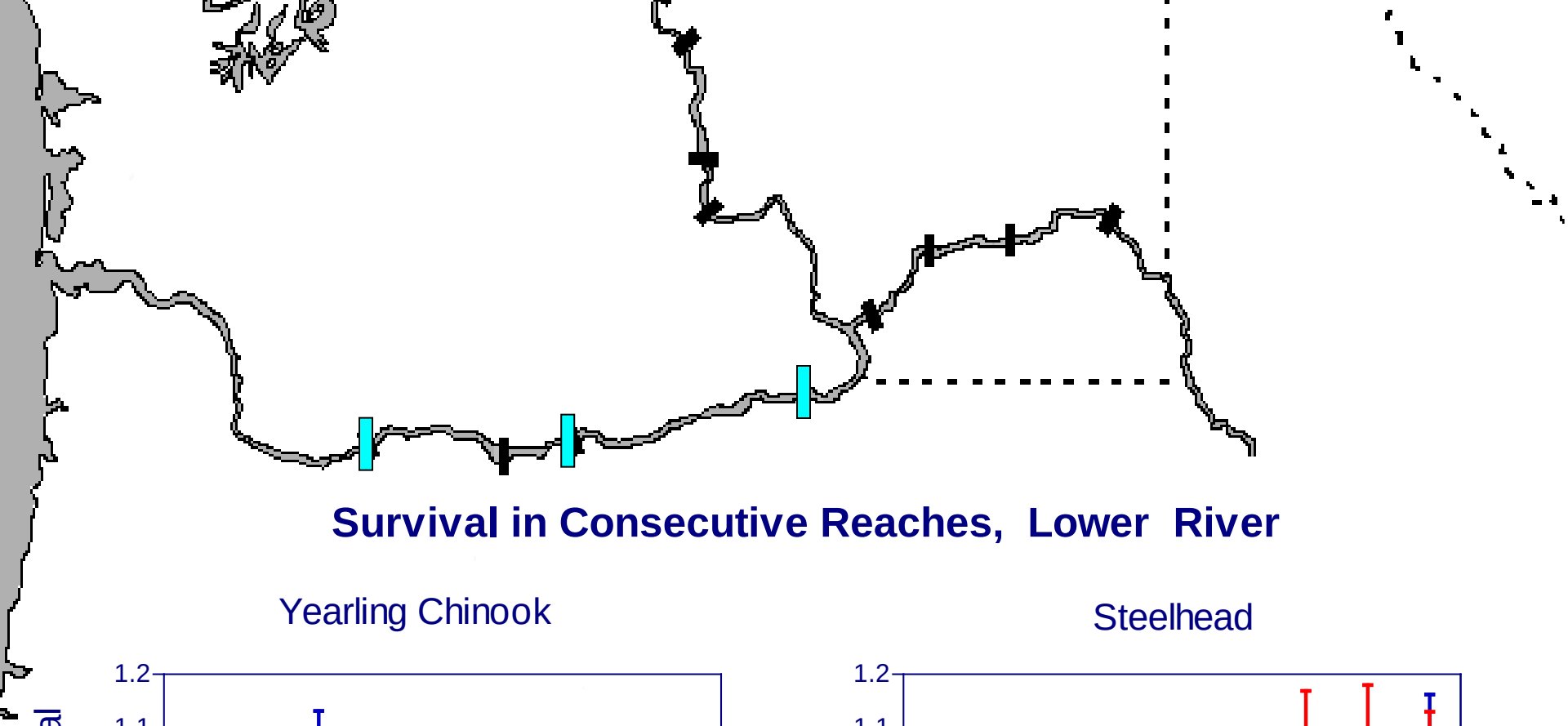
Snake River Sockeye
Smolts Migrating in Spring



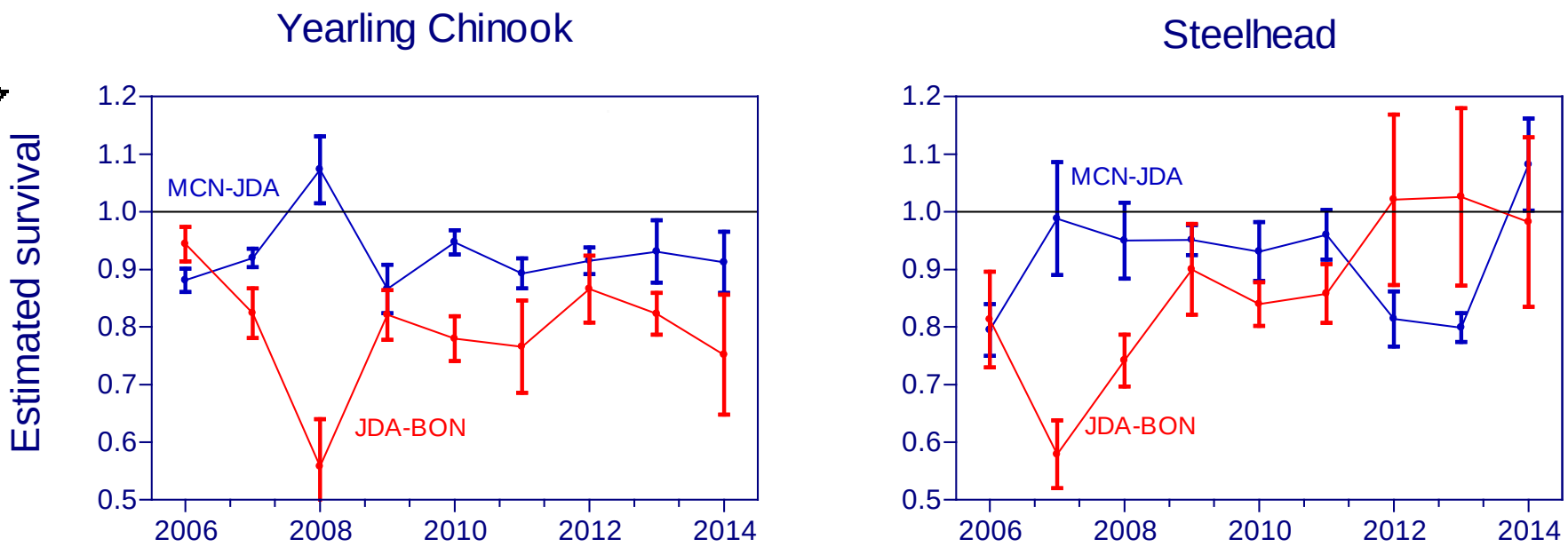




Steelhead Estimates in Lower River?



Survival in Consecutive Reaches, Lower River



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$$S_{(MCN\text{-}JDA)} > S_{(JDA\text{-}BON)}$$

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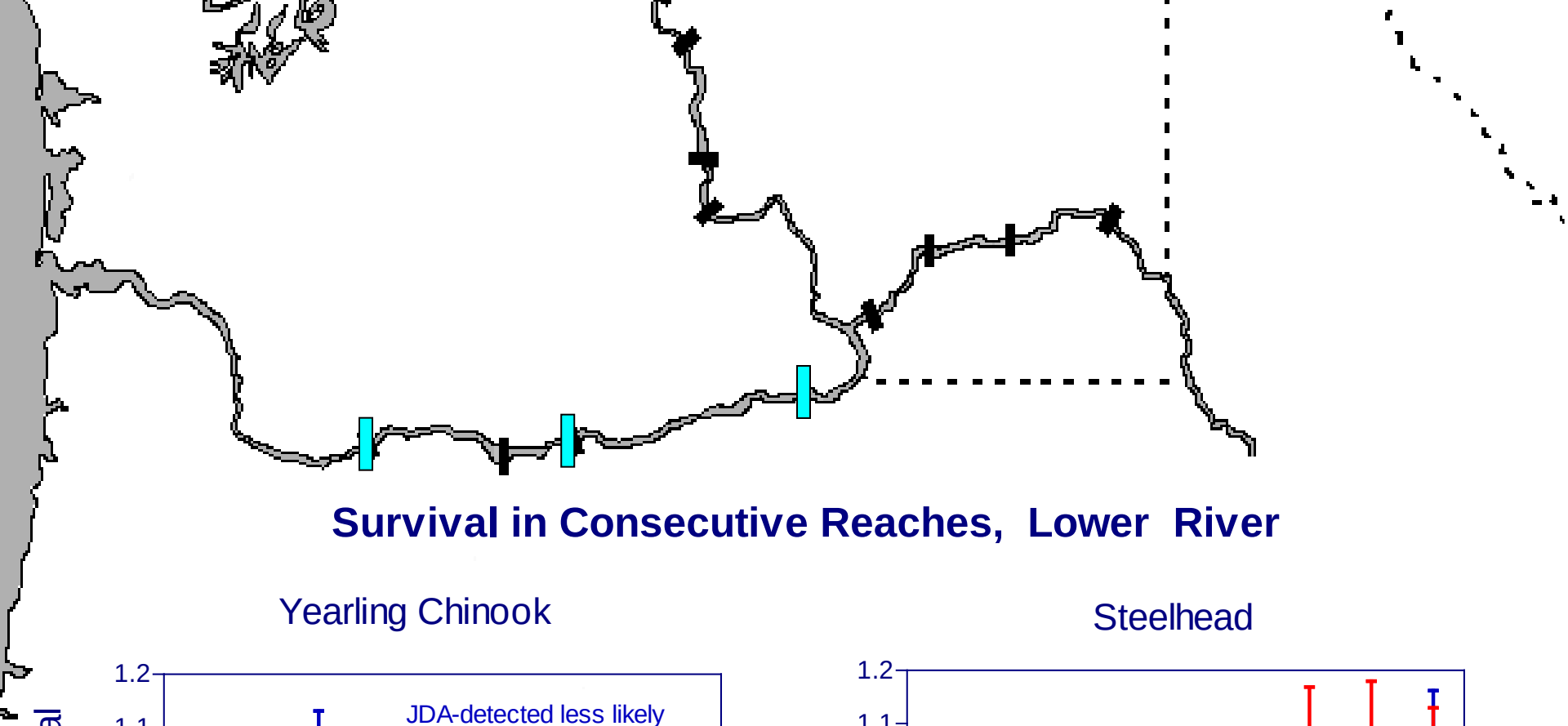

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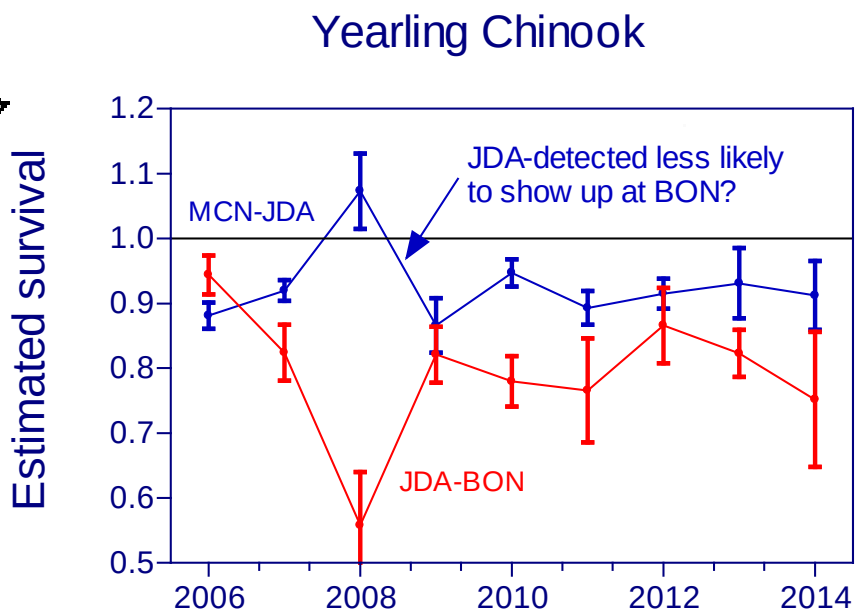

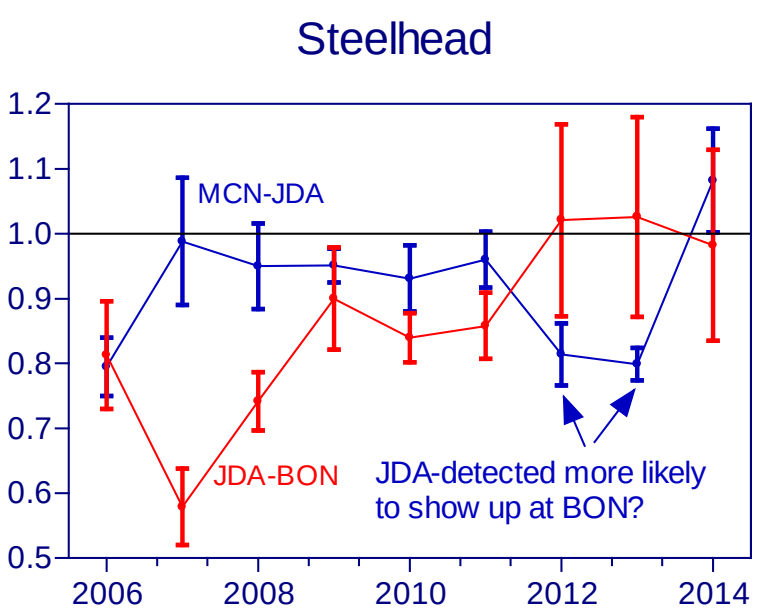

Survival Estimates in Lower River

- Effect on overall MCN-BON survival is less, as correlation and bias cancels out to some degree

- MCN-BON estimates have been fairly constant

Questions