The Pacific Ocean Shelf Tracking Array- A Permanent Continental-scale Array For The West Coast Of North America

Performance, Applications-- & Relevance to Yakima R Salmon Restoration

David Welch

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POST Array: Scale

POST's Operational Statistics

POST currently has 182 permanent nodes

- Core array formed of Vemco VR-3 acoustic receivers
- Each seabed node has up to 7 yr battery lifespan
- Wireless acoustic modem link
- Design of deployment systems & array architecture done by Kintama
- Some temporary nodes also seasonally in use for nearshore areas

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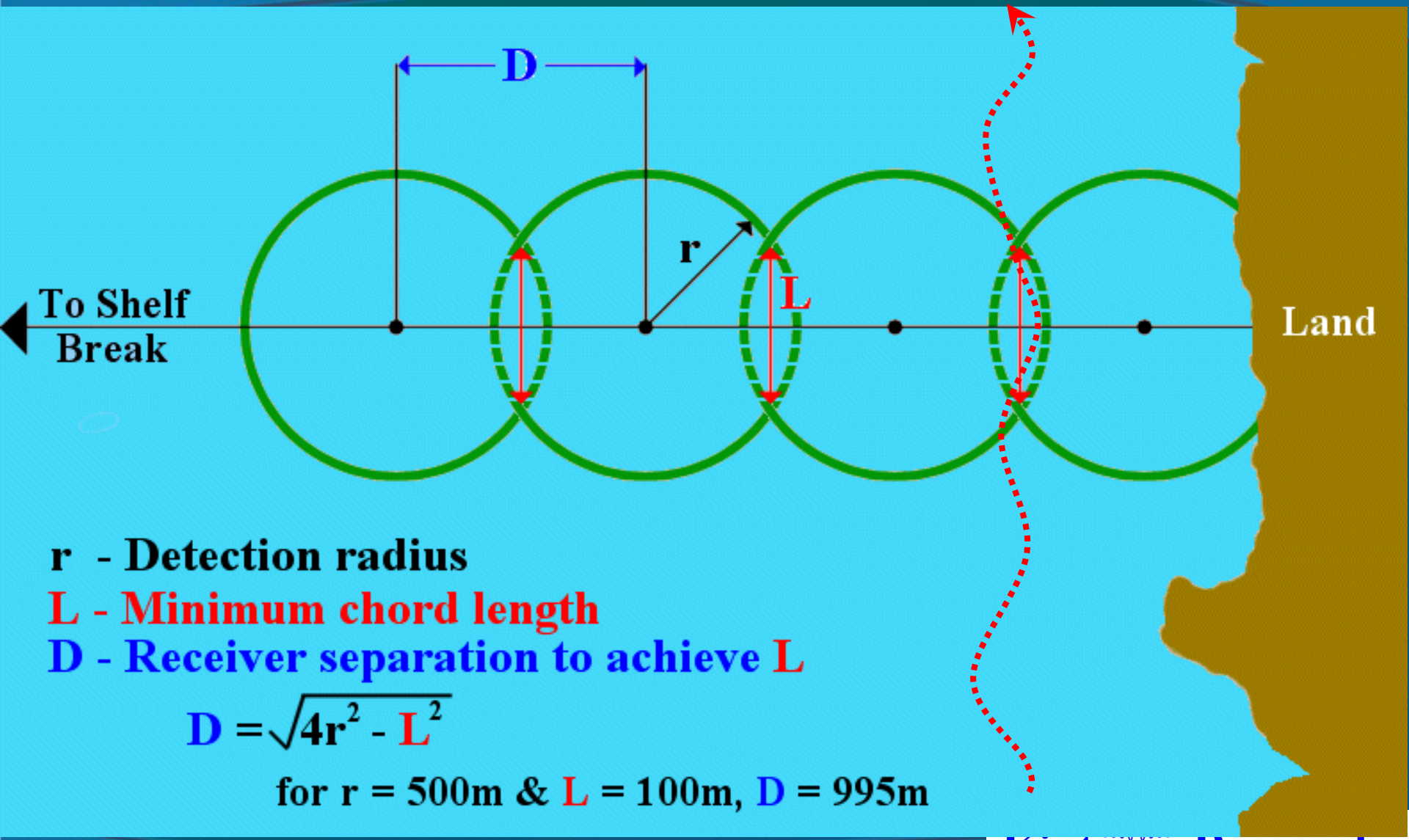
POST Array: Scale



r - Detection radius

L - Minimum chord length

D - Receiver separation to achieve L

$$D = \sqrt{4r^2 - L^2}$$

for r = 500m & L = 100m, D = 995m

Deployment of Listening Lines- 2004~05

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2006: Rollout of POST's Permanent (7yr), Wireless Platform

2006: Rollout of POST's Permanent (7yr), Wireless Platform

VR3's - Deployment (& Occasional Recovery)

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Incremental New Designs-Improved Trawler Resistance??

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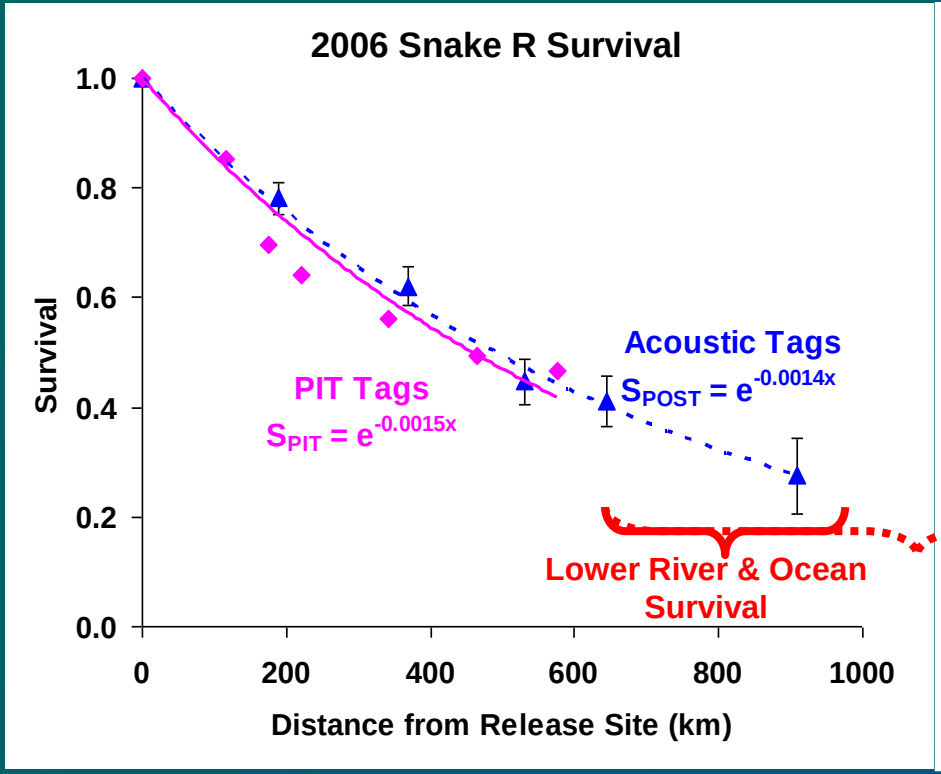
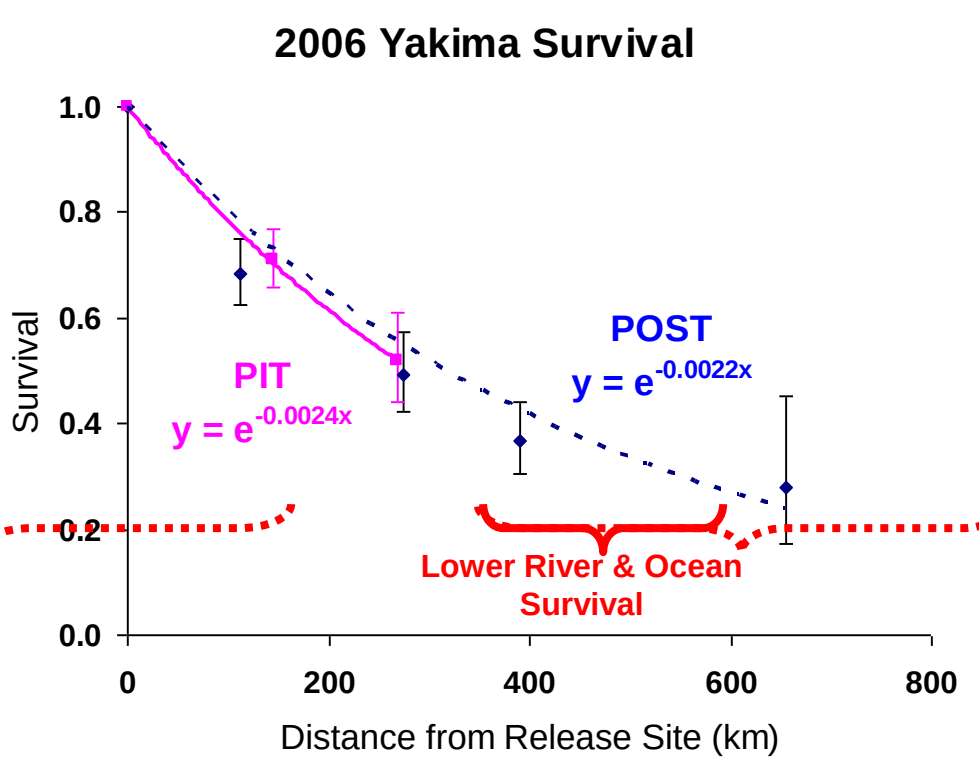
Tag Effects: In-river Survival of PIT & POST Tags (Columbia R)





**** POST's acoustic tags yielded the same survival rates as PIT tags in 2006, for the size range of smolts studied.***

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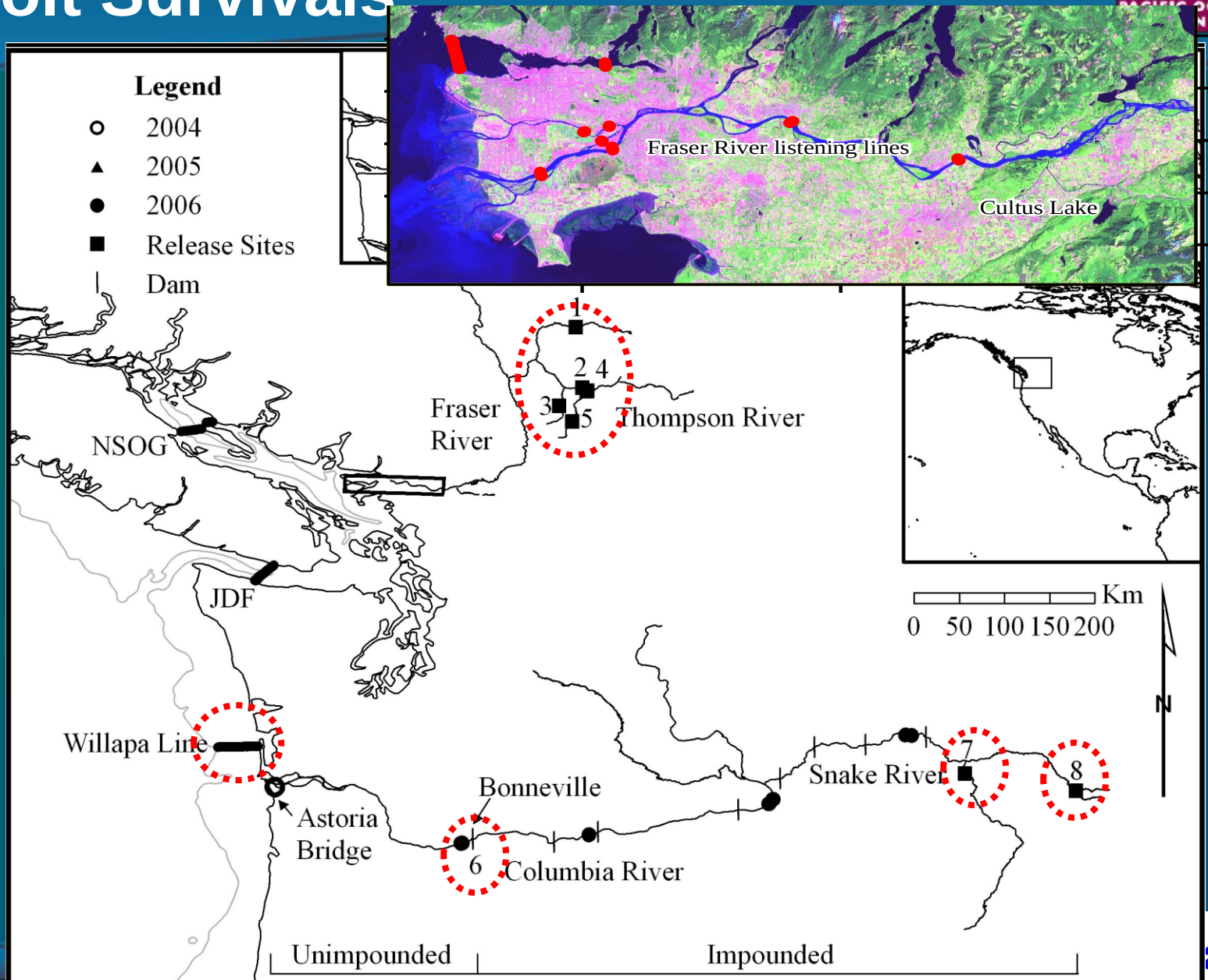
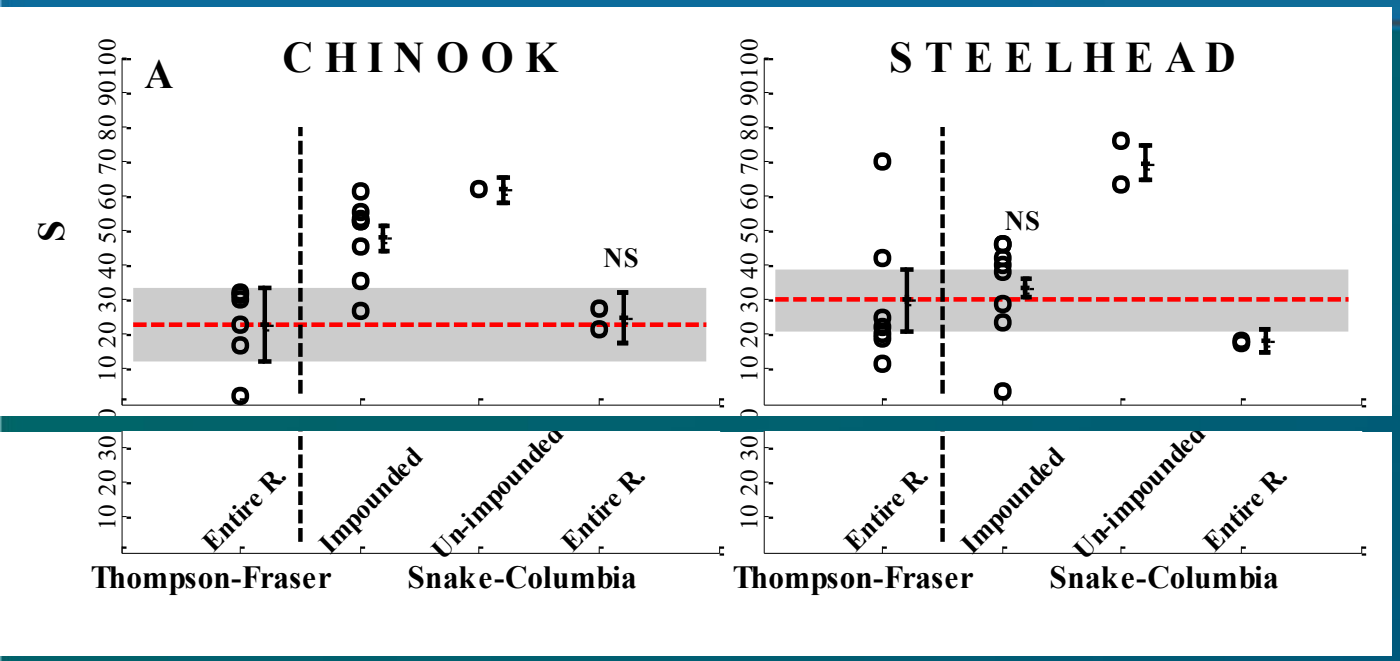
Thompson-Fraser v. Snake-Columbia Smolt Survivals



Thompson-Fraser v. Snake-Columbia Smolt Survivals



Survival To River Mouth

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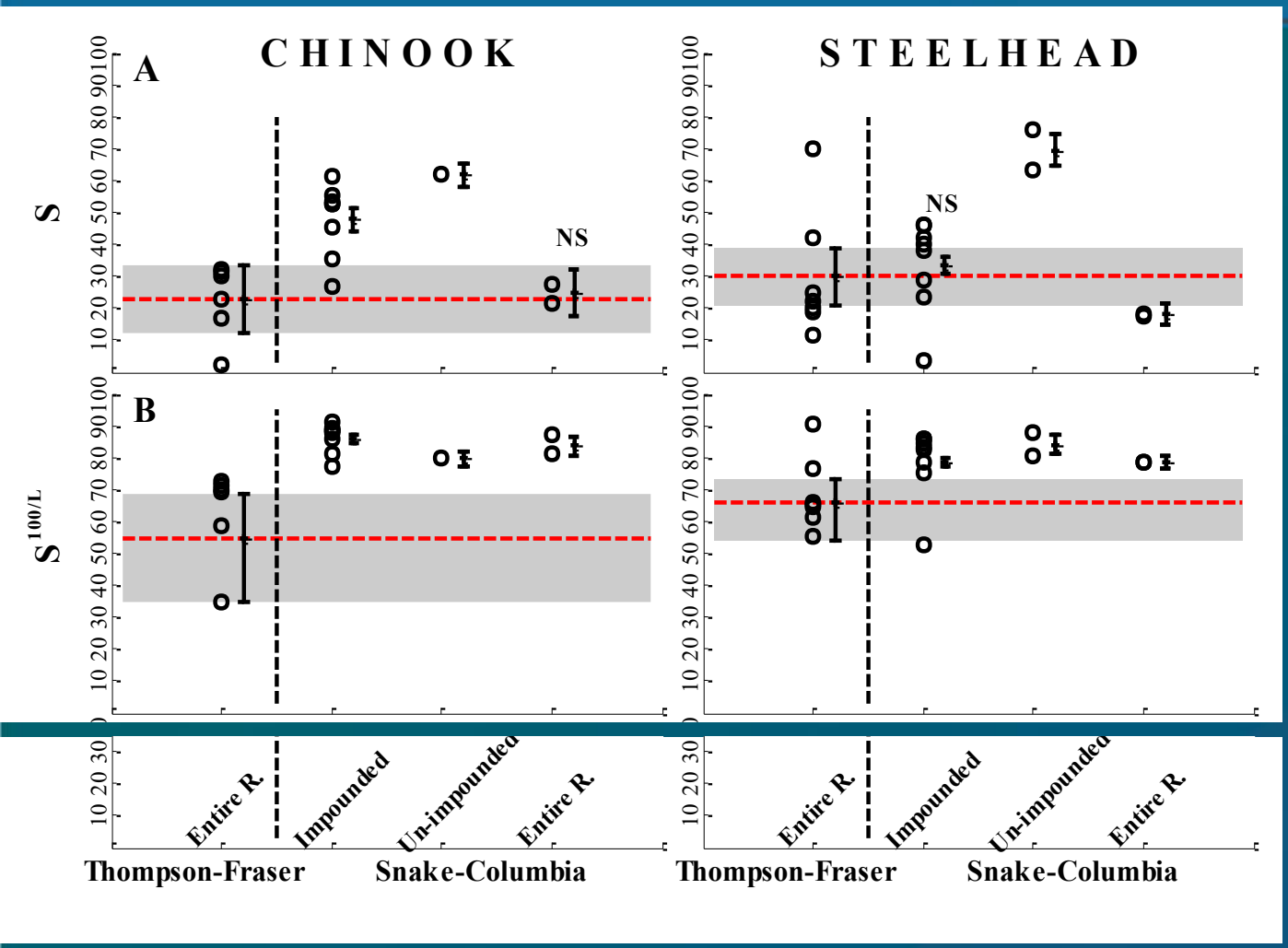
Thompson-Fraser v. Snake-Columbia Smolt Survivals



Survival To River Mouth

Survival per 100 Km

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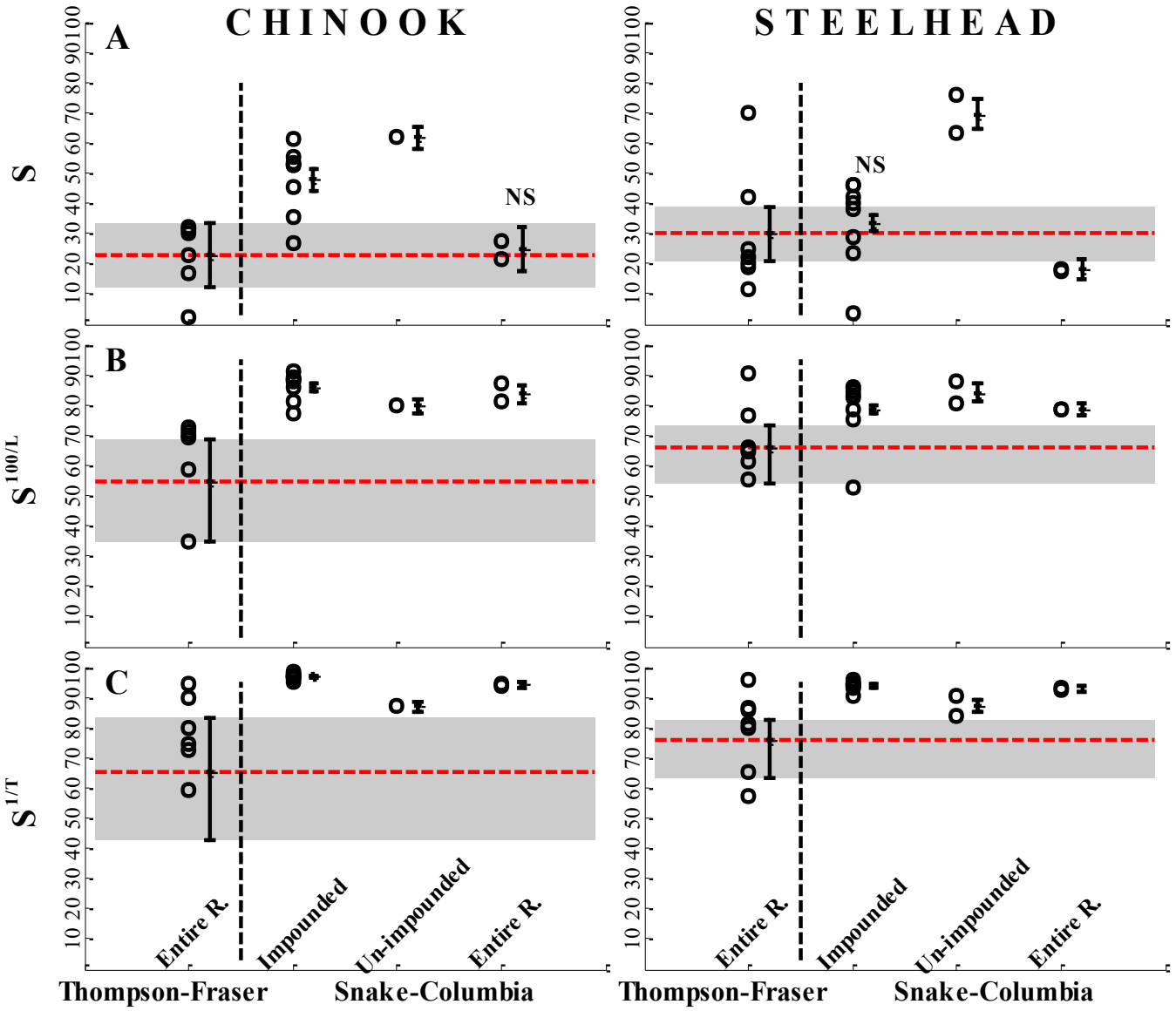
Thompson-Fraser v. Snake-Columbia Smolt Survivals



Survival To River Mouth

Survival per 100 Km

Survival per Day

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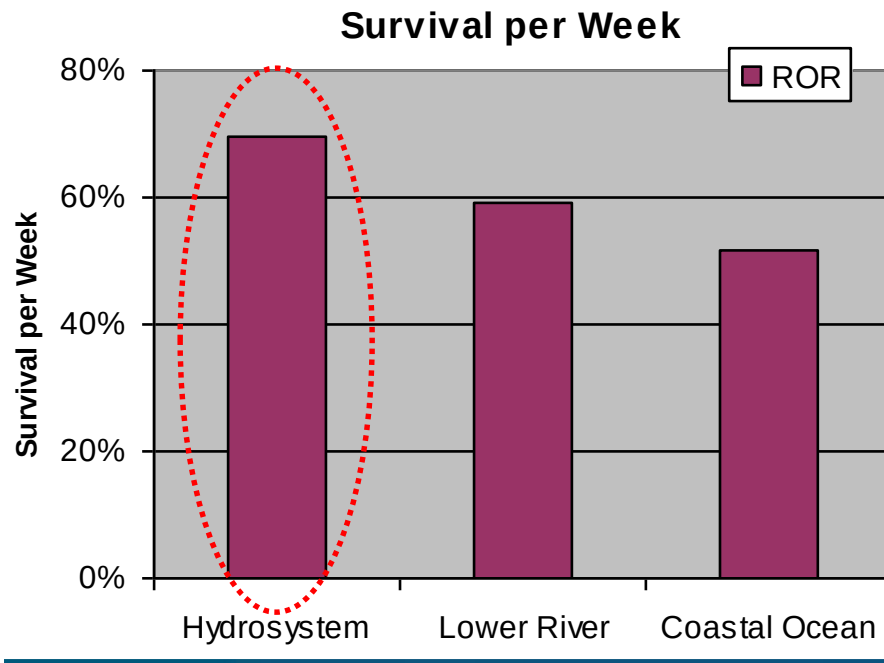
Snake R Spring Chinook- Comparative Survival (2006)

Survival Region	ROR Survival (By Region)	ROR Survival per Week
Snake R-Bonneville (Hydrosystem)	41%	69%
Bonneville-Willapa (Free-Flowing)	67%	59%
Willapa-Lippy Point (Ocean Shelf)	5%	52%



Reach specific survival calculated using CJS method & Program Mark; Lippy Point detection efficiency assumed to be 95%

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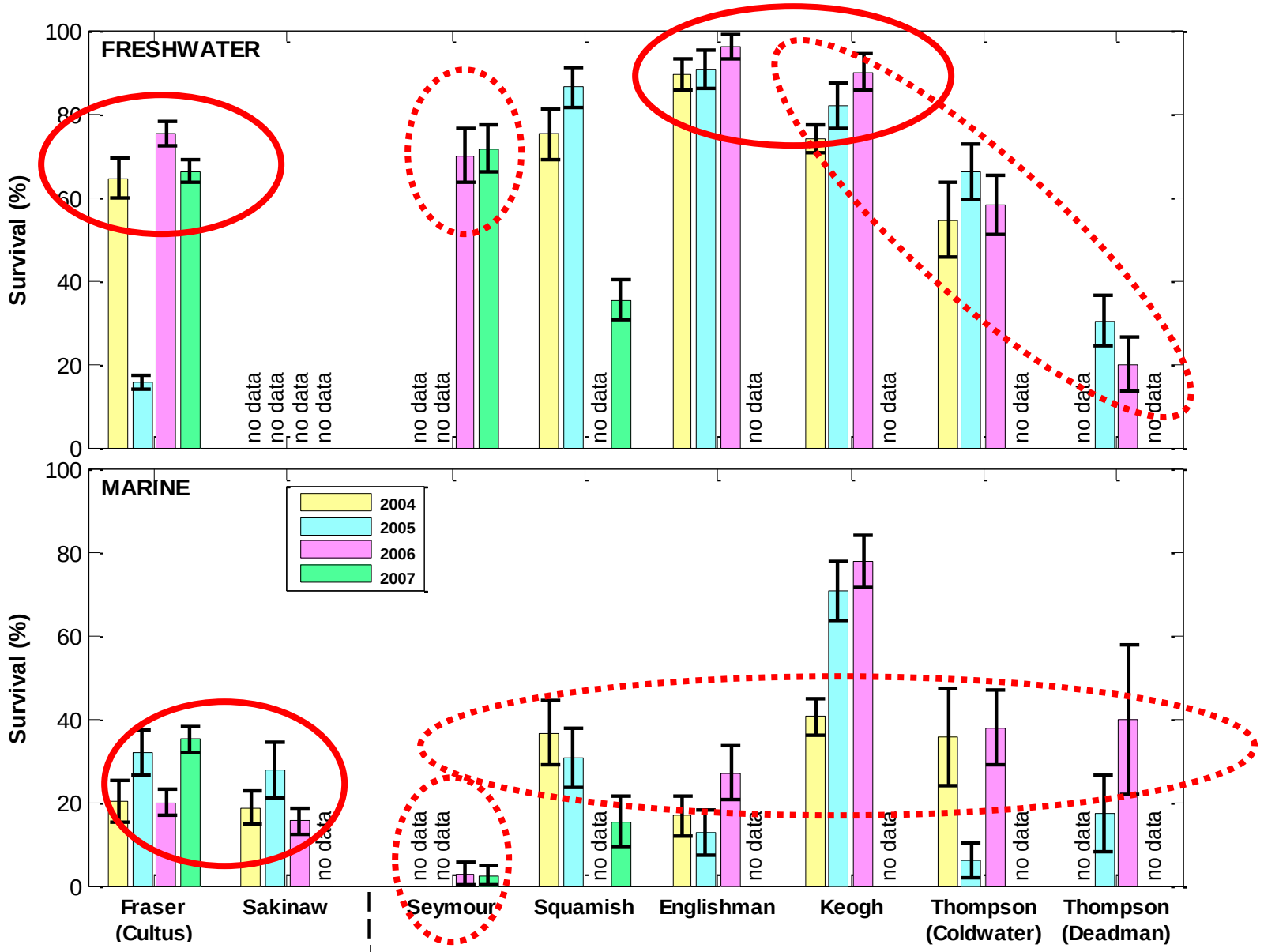
POST Array: Scale

BC Sockeye & Steelhead Survival (±1 SE)



Conclusions

1. POST in-river survivals consistent with PIT tag estimates
2. POST extends survival & movement studies into the ocean as well
3. POST measures lower survival in the ocean than thru the hydropower system.
4. POST measures better freshwater survival in the Columbia than the Fraser
5. Major Columbia R bottleneck appears to be beyond the river- i.e., the ocean

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A Philosophical Note

- **POST provides an unprecedented tool allowing direct testing of hypotheses concerning (Yakima) salmon management & recovery**
- **The history of science shows that the shift from an "*observational science model*" to an "*experimental science model*" leads to rapid progress through direct testing and rejection of hypotheses**
- **A highly efficient array can change marine (& freshwater) fisheries science from an observational to experimental science**

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Thanks!!

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