



*"Creating a Revolution in  
Marine Science"*

# POST Science Forum

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# Outline of Talk



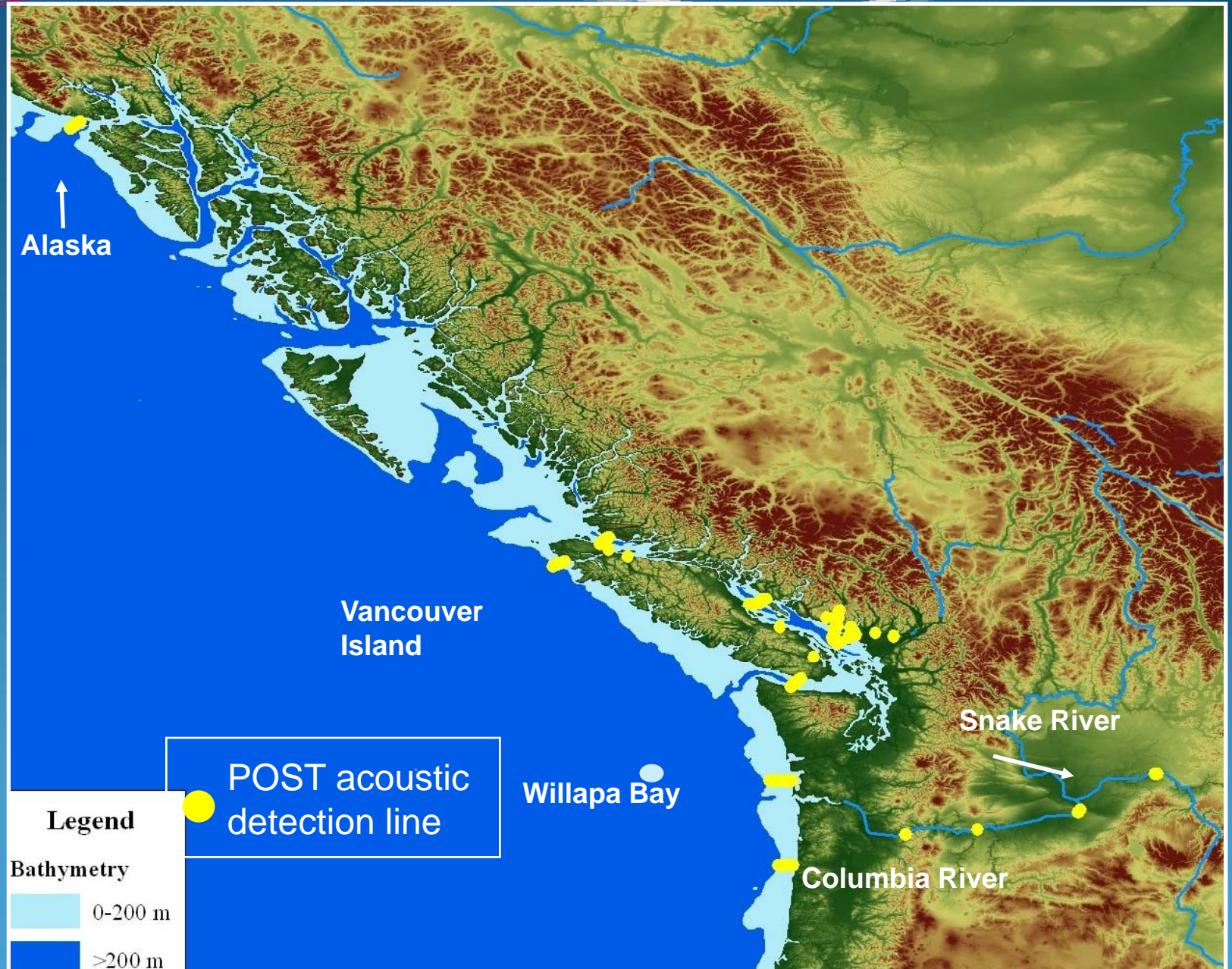
## I. Results from the 1<sup>st</sup> Generation Pilot Array

- Establishing Acoustic Tag Performance Relative to PIT Tags (PNAMP Book Chapter; Under Review)
- Fraser vs Columbia R Salmon Survival (PLoS Biology 2008)
- Endangered Sockeye Survival (Cultus Lake; CJFAS May 2009)
- Testing Delayed Mortality Theory (Snake v Yakima R Survival; CJFAS July 2009)
- Testing Differential Mortality Theory (Barged v ROR Snake R Survival)
- Comparing Freshwater and Marine Survivorship (Survival per unit time)

## II. Implications For Conservation & Management

## III. POST in the Future

# POST Pilot Array-Current Scale



Testing the Delayed Mortality  
Theory (Snake v Yakima R  
Survival; CJFAS July 2009)



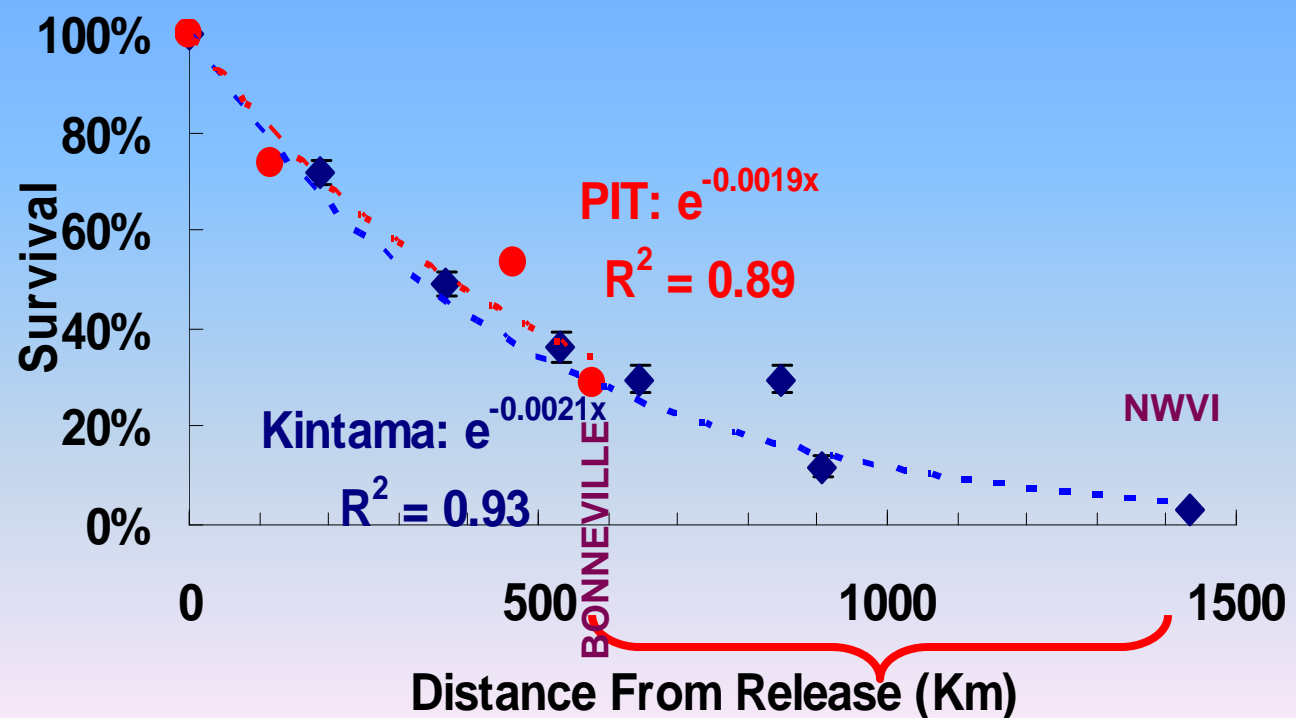
# Animation: Snake & Yakima R Spring Chinook Smolts

# Relative Survival of PIT & Kintama-POST Tagged Smolts

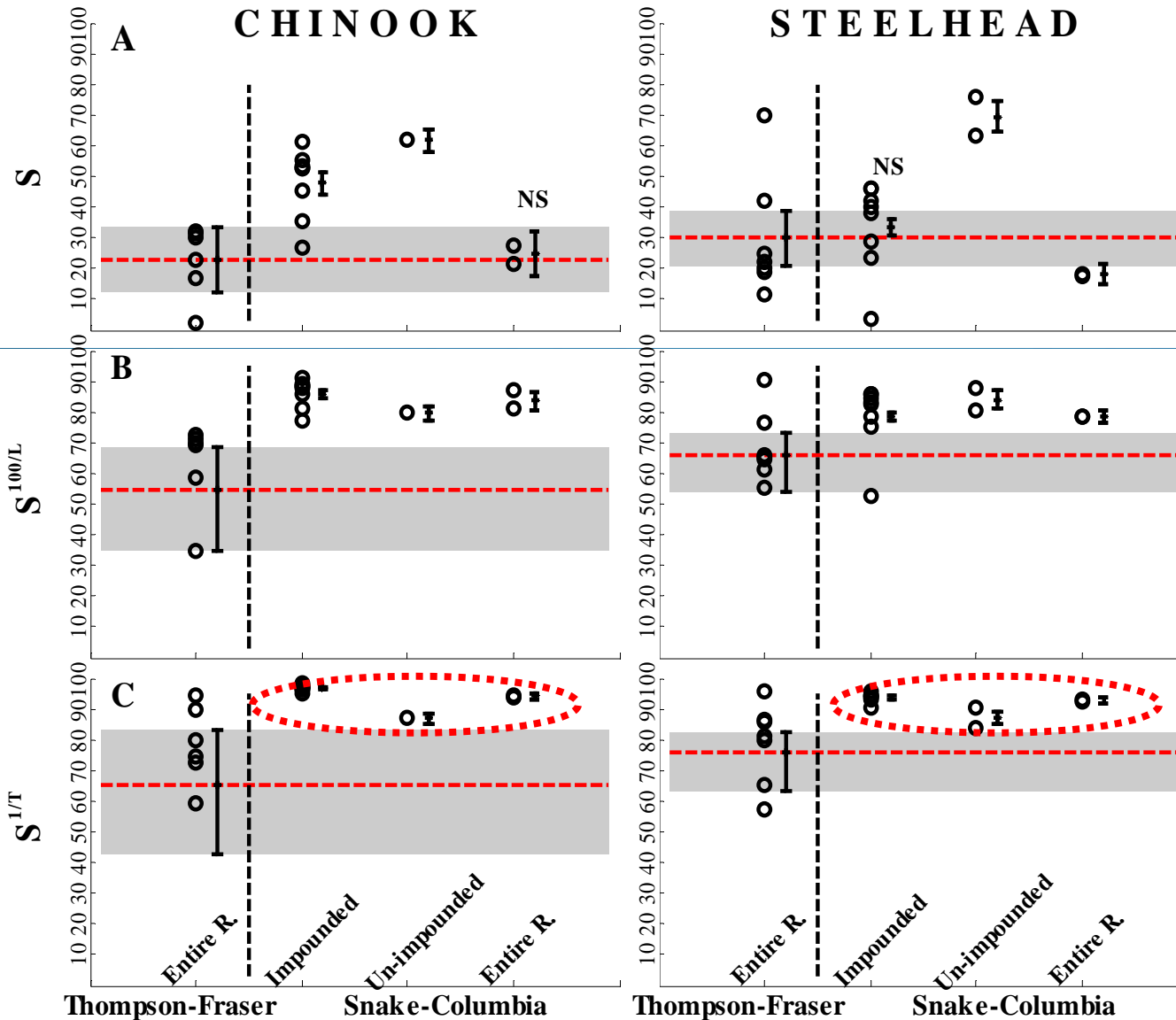


*Rechisky, E.L., D.W. Welch.  
(Submitted) "Surgical  
implantation of acoustic tags:  
Influence of tag loss and tag-  
induced mortality on free-  
ranging and hatchery-held  
spring Chinook smolts".  
PNAMP Book Chapter.*

**2008 Kintama-POST versus PIT Tags  
(Dworshak Hatchery Smolts)**



# Thompson-Fraser v. Snake-Columbia Smolt Survivals



Survival To River Mouth

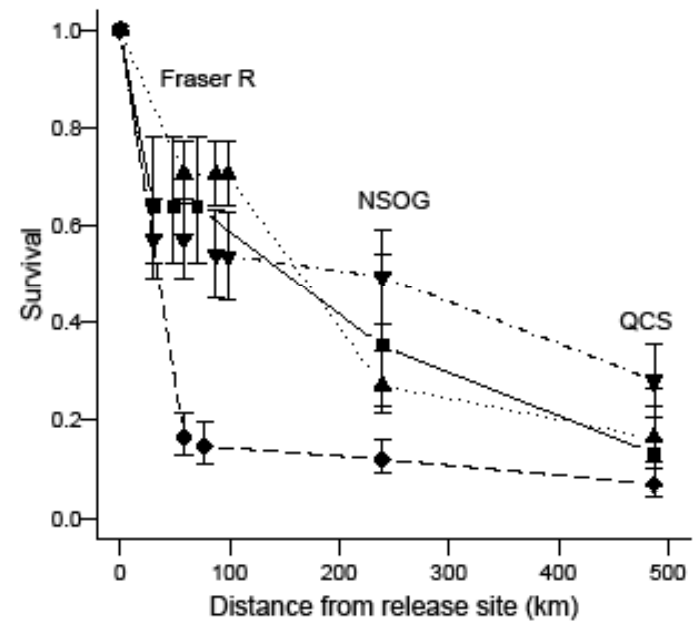
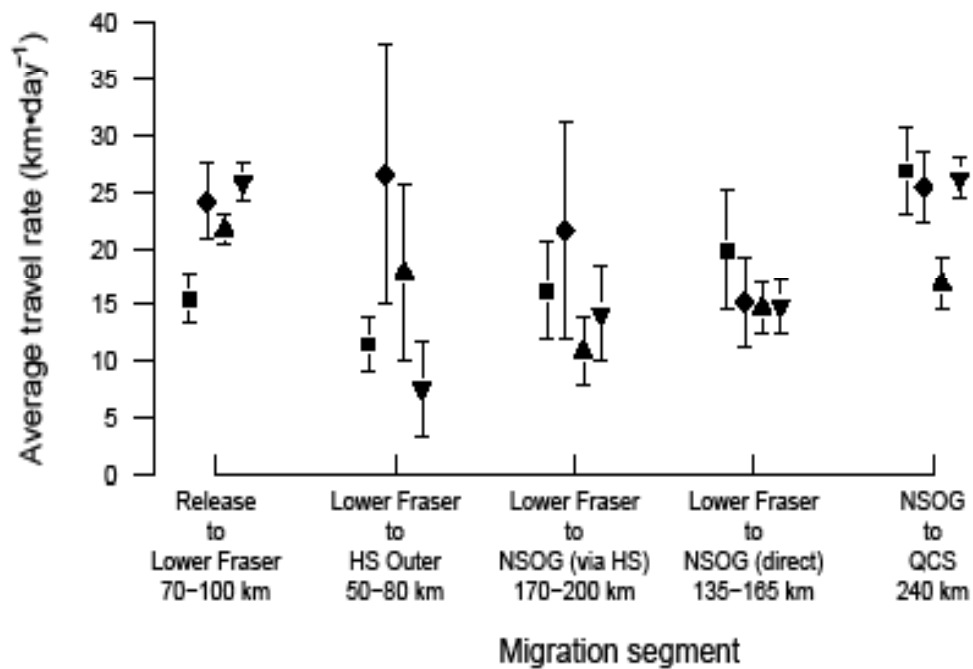
Survival per 100 Km

Survival per Day

Public Library of Science Biology (2008)

# Endangered Sockeye Survival

*“Freshwater and marine migration and survival of endangered Cultus Lake sockeye salmon smolts using POST, a large-scale acoustic telemetry array”. CJFAS 66(5):736-750; May 2009*

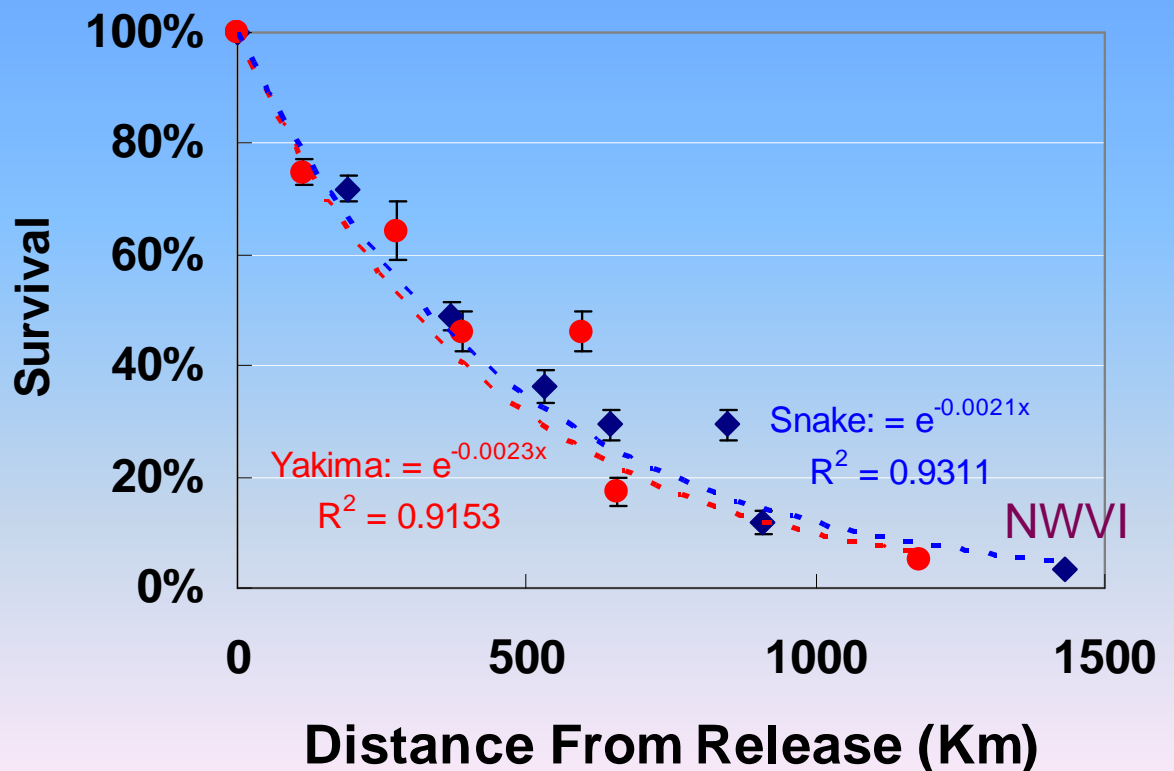


# Testing the Theory of Delayed Mortality

Rechisky, E.R., D.W. Welch, A.D. Porter, and M.C. Jacobs. (2009). "Experimental measurement of hydrosystem-induced mortality in juvenile Snake River spring Chinook salmon using a large-scale acoustic array". Canadian Journal of Fisheries and Aquatic Sciences

➤ CJFAS Paper reports on 2006 data only; 2008 results shown here

### Snake vs Yakima ROR Survival

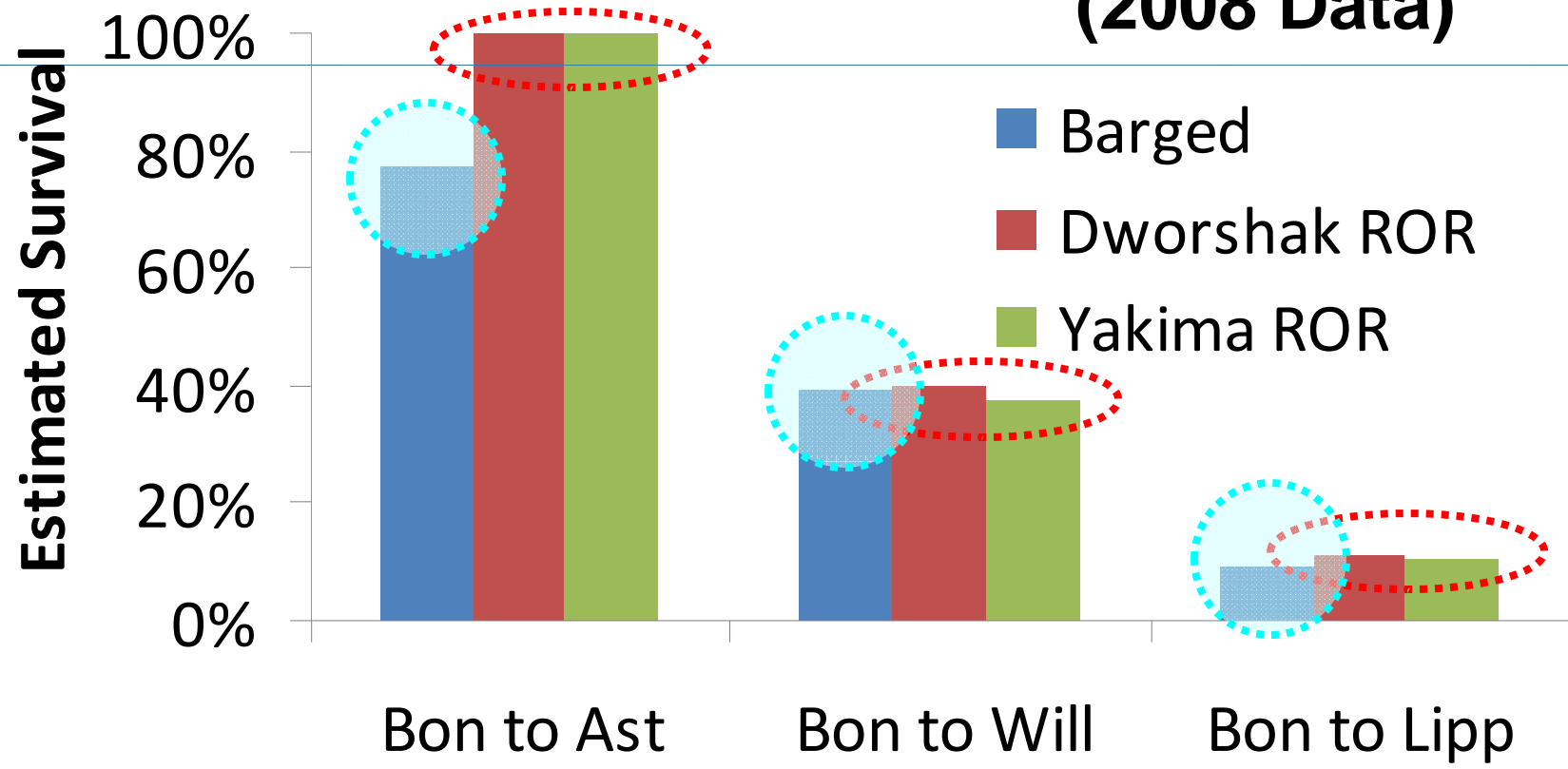


# Testing Delayed & Differential Mortality Theories:



- 1. Snake v Yakima ROR Survival
- 2. Barged vs ROR Snake R Survival

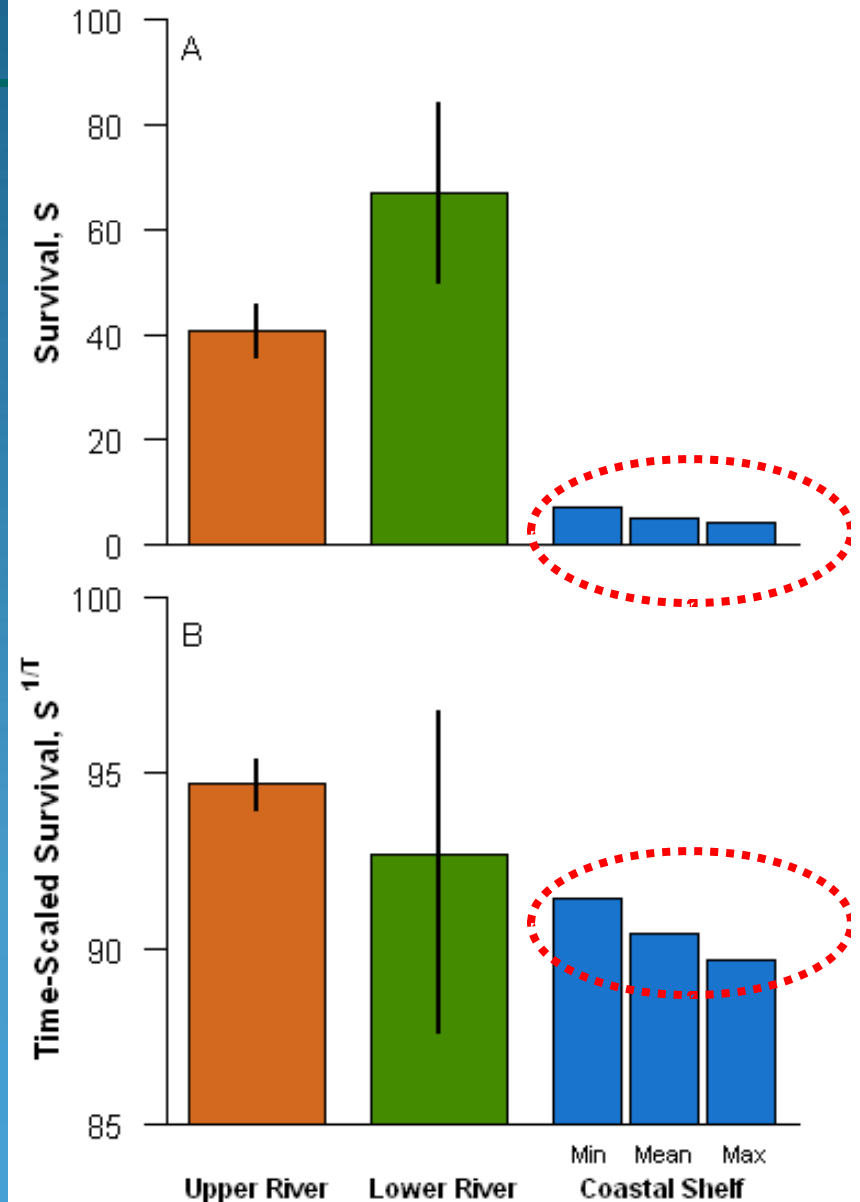
## Cumulative Survival from Bonneville Dam (2008 Data)



# Comparing Freshwater and Marine Survivorship (Survival per unit time)

C.H. Greene, B.A. Block, D.W. Welch, G. Jackson, G.L. Lawson. (2009) *Oceanography* 22(1):210-223

- Survivorship ( $d^{-1}$ ) may now be lower in the ocean than in freshwater
- If true, then much of salmon management will have to be rethought; C&M actions that help move salmon out into the ocean may have the opposite effect to what was intended



- **II. Implications For Conservation & Management:**
  - > All is not as we (implicitly) assumed
  - > Multiple results indicate that current C&M approaches use flawed assumptions
  - > Greatest legacy will be changing fisheries & marine science from an “Observational” to a “Hard” Science, where theories are testable
  - > This will lead to rapid scientific advance and (probably) better C&M

# POST's Design

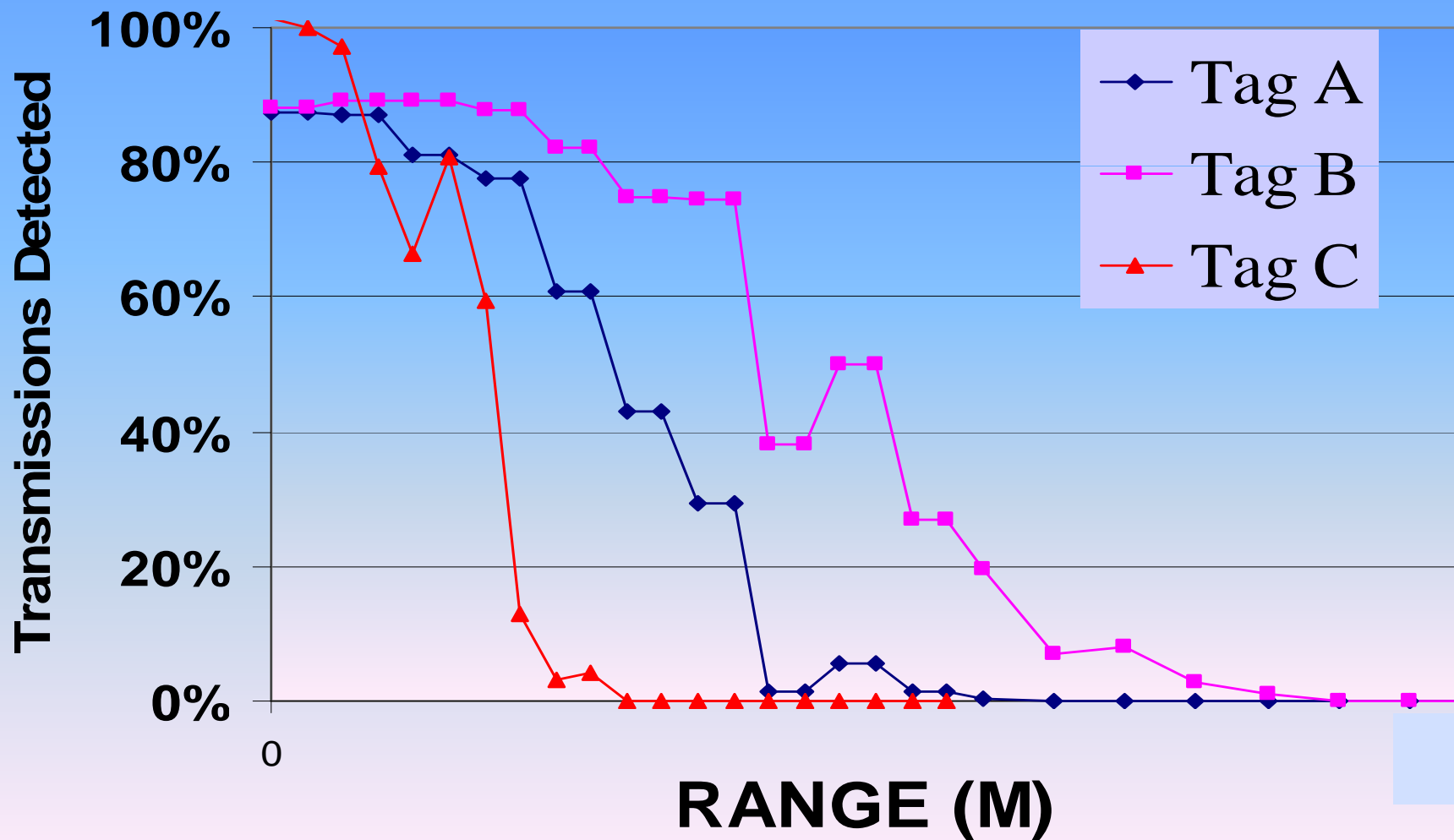


- POST was conceived in 2000, and the pilot-phase architecture designed from 2001-2003
- At that time, one small acoustic tag existed
- Now 13 major variants of acoustic tags currently available from Vemco
- New tags mean array design needs to change

# 13 Different Acoustic Tags Now Available from Vemco



## RM11 Day 3 (AUG 08)

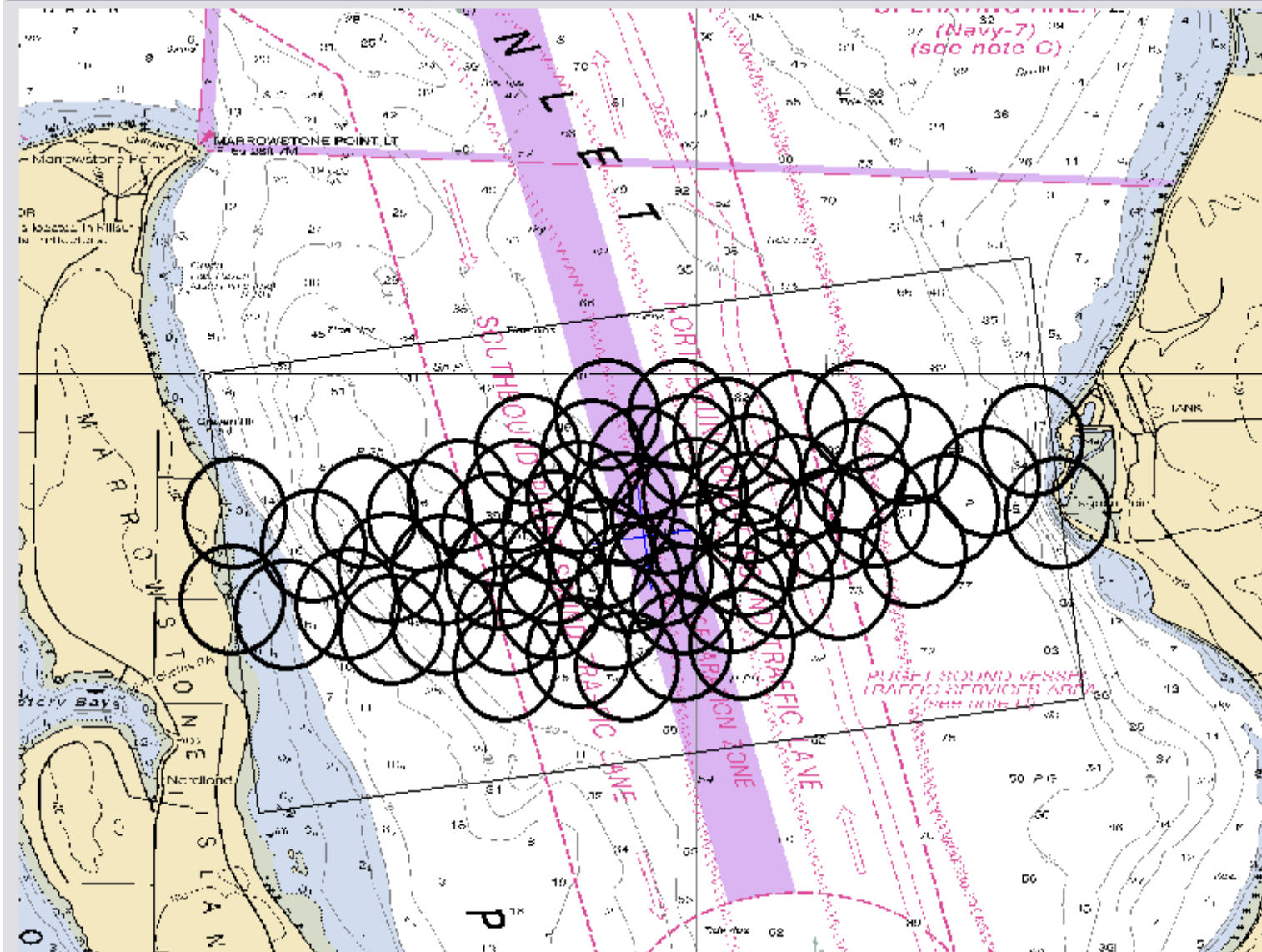


# Array Design



Transit Distance Optimizer x,y = -122.59555,48.109012

File ▾ Zoom



Iterations

Iteration	5
Current Objective	1.00
Best Objective	1.00
Initial Objective	0.10

Current Min	999.67
Current Max	3270.31
Current Mean	2273.63
Current Std Dev	599.06
Current DE	1.000

Best Min	999.67
Best Max	4222.23
Best Mean	2328.17
Best Std Dev	271.20
Best DE	1.000

Improvements	18
Last Delta	0.00
Anti-Improvements	1
Last Anti-Delta	0.00

Compactness	566.26
Initial Compactness	0.00



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# Thanks!!



**BPA**



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*Creating positive outcomes  
for future generations.*



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