Ecological Interactions:

Non-target Taxa of Concern Monitoring

Yakima Basin Science and Management Conference, June 14, 2012

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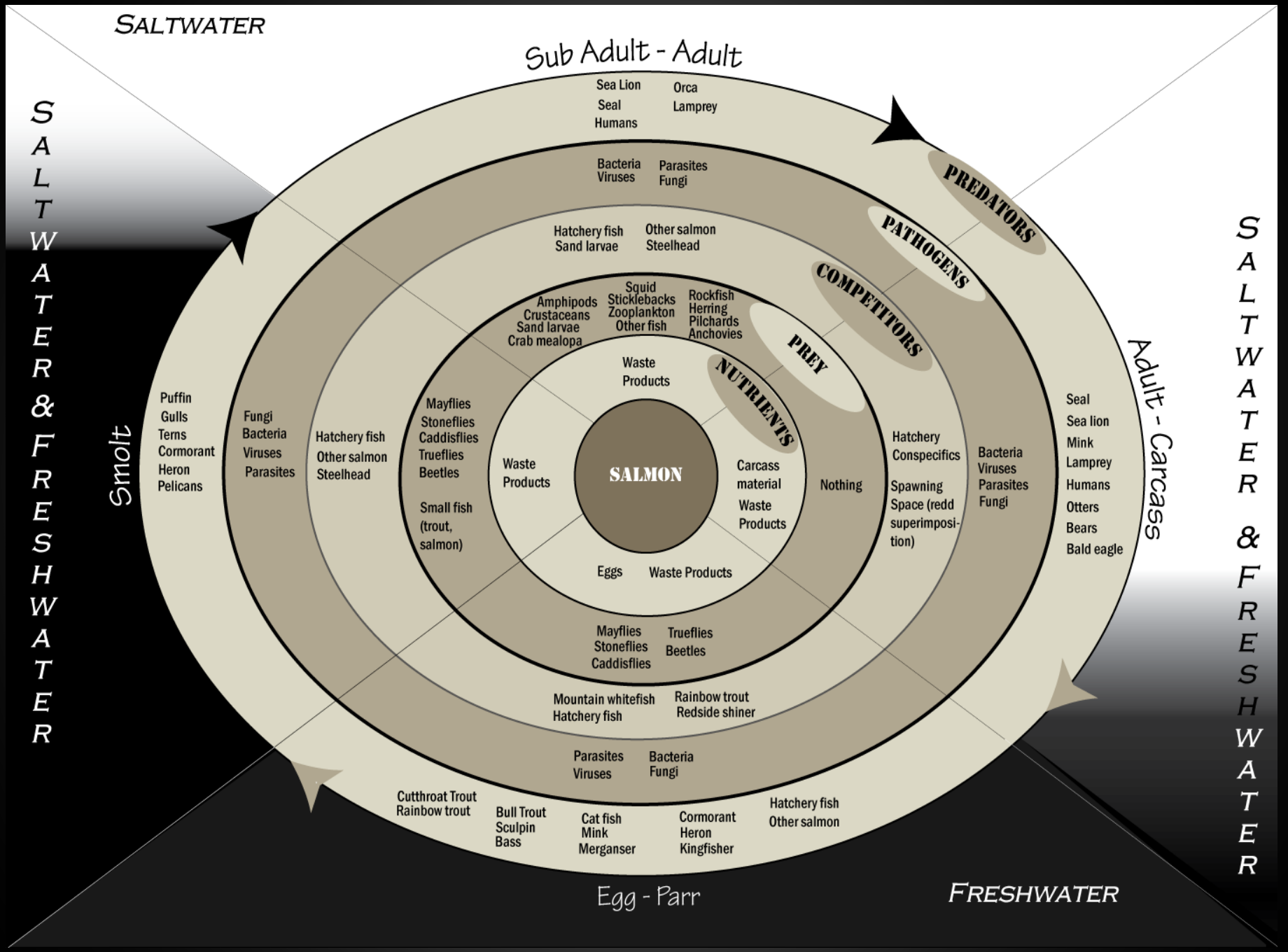
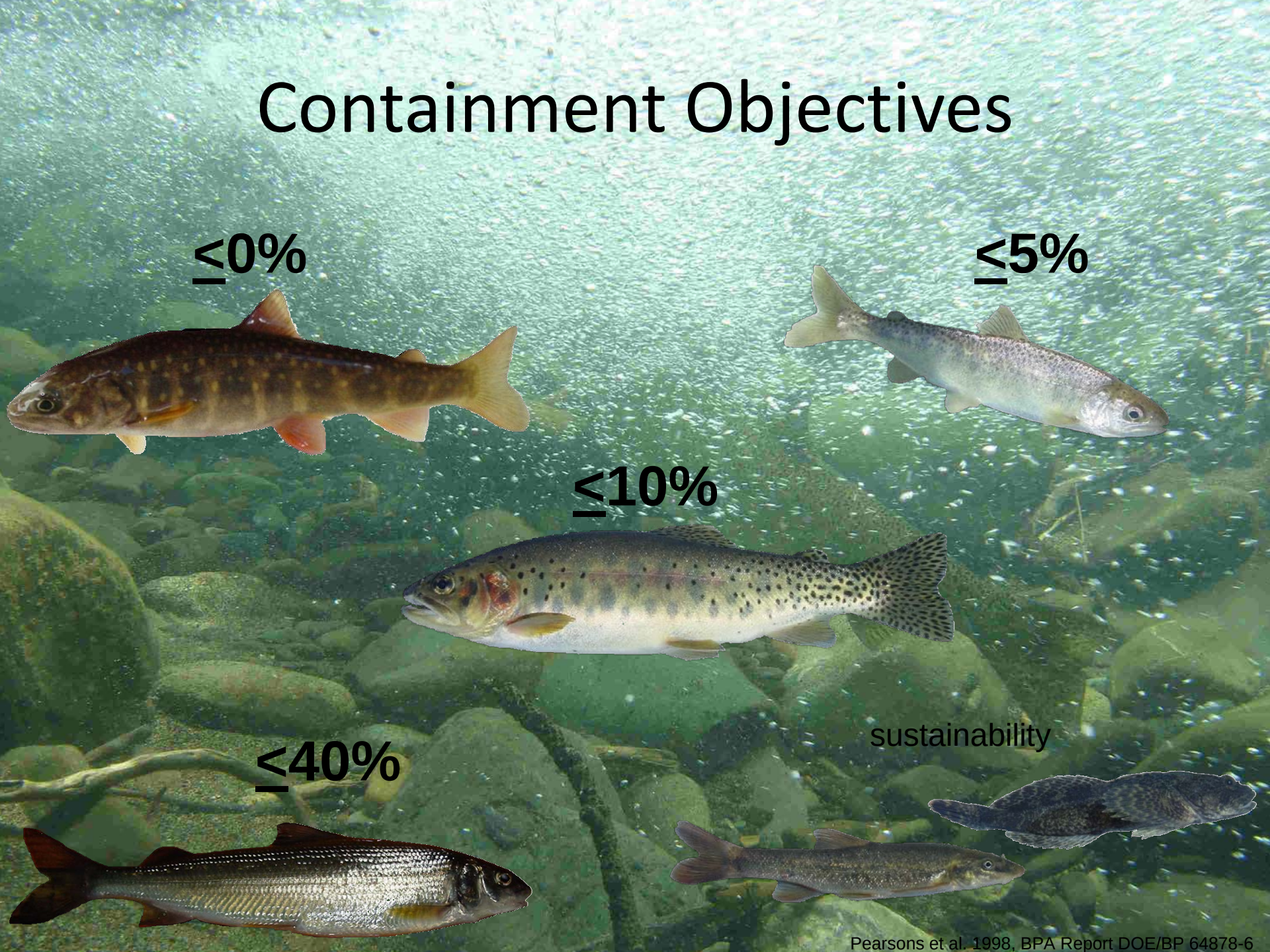
Context

- 1877- First Salmon Hatchery built in Columbia Basin (Clackamas R.; funded in-part by canneries) in response to declining catches
  - (By the way-It was still legal to harvest fish with dynamite into the 1890's)
- Hatchery infrastructure rapidly developed into the 1900's
- By 1910, over 550 million salmon and steelhead had been released into the Columbia Basin
- Over 8.3 Billion S&S released since 60's
  - YKFP- one of few programs evaluating how a production scale salmon program affects other fish species

nwcouncil.org; CBFWA.org

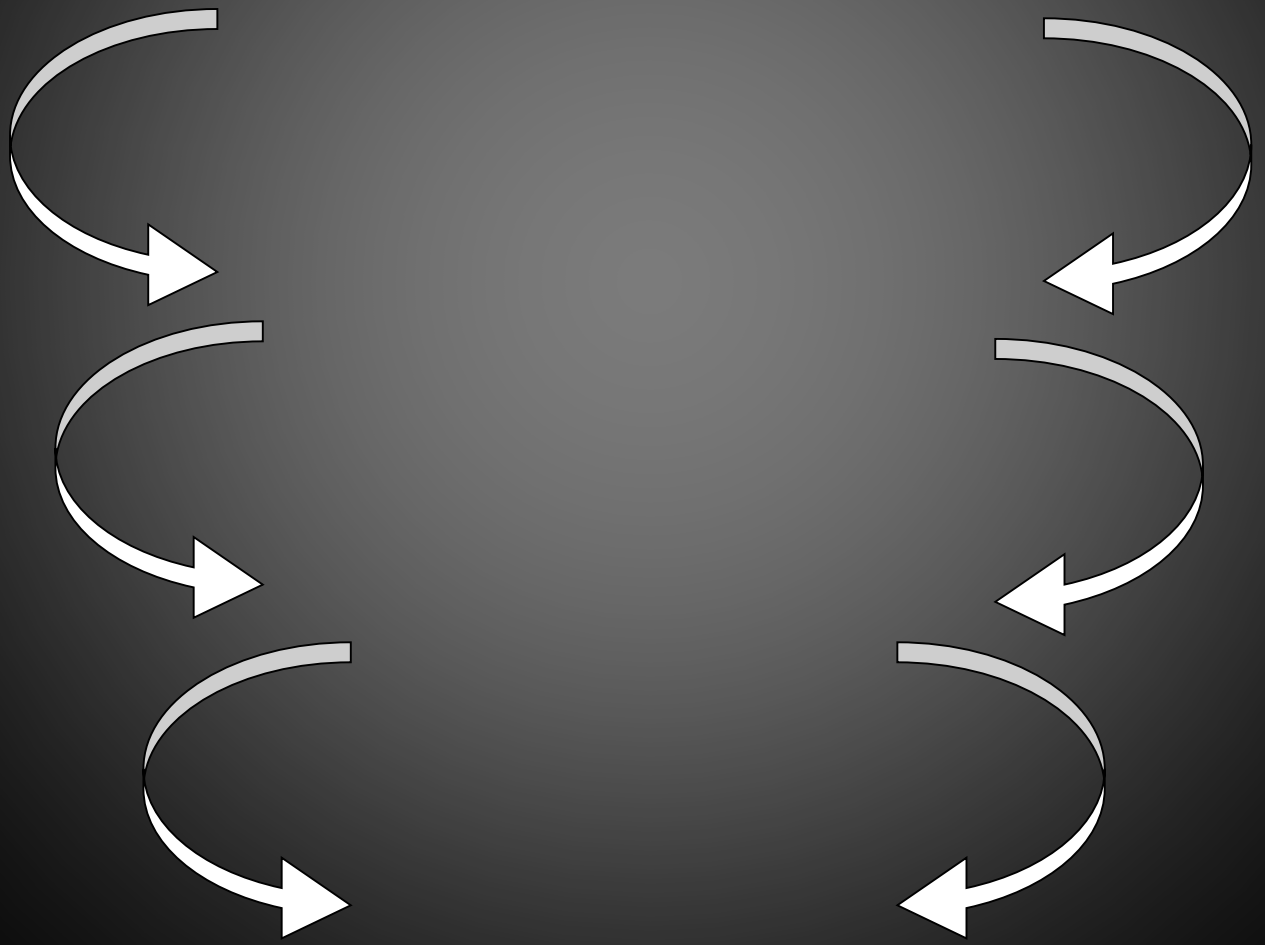

SALTWATER
Sub Adult - Adult
SALTWATER & FRESHWATER
SALTWATER & FRESHWATER
Smolt
Adult - Carcass
Egg - Parr
FRESHWATER
Sea Lion
Seal
Humans
Orca
Lamprey
Bacteria
Viruses
Parasites
Fungi
Hatchery fish
Sand larvae
Other salmon
Steelhead
Squid
Sticklebacks
Zooplankton
Other fish
Amphipods
Crustaceans
Sand larvae
Crab mealopa
Rockfish
Herring
Pilchards
Anchovies
Waste
Products
Mayflies
Stoneflies
Caddisflies
Trueflies
Beetles
Small fish
(trout,
salmon)
Waste
Products
SALMON
Carcass
material
Waste
Products
Eggs
Waste Products
Nothing
Hatchery
Conspecifics
Spawning
Space (redd
superimposi-
tion)
Mayflies
Stoneflies
Caddisflies
Trueflies
Beetles
Mountain whitefish
Hatchery fish
Rainbow trout
Redside shiner
Parasites
Viruses
Bacteria
Fungi
Cutthroat Trout
Rainbow trout
Bull Trout
Sculpin
Bass
Cat fish
Mink
Merganser
Cormorant
Heron
Kingfisher
Hatchery fish
Other salmon
Puffin
Gulls
Terns
Cormorant
Heron
Pelicans
Fungi
Bacteria
Viruses
Parasites
Hatchery fish
Other salmon
Steelhead
Bacteria
Viruses
Parasites
Fungi
Seal
Sea lion
Mink
Lamprey
Humans
Otters
Bears
Bald eagle
PREDATORS
PATHOGENS
COMPETITORS
PREY
NUTRIENTS

Containment Objectives



Pearsons et al. 1998, BPA Report DOE/BP 64878-6

Risk Management Sieve



NTTOC Summary

- Observed decreased *O. mykiss* size structure post-supplementation (BACI indicates unrelated to our supplementation program)
- Observed reduced *O. mykiss* abundance, biomass and combined salmonid biomass in vicinity of Jack Creek
  - Effect is reduced with increased distance downstream
  - Population level abundance has increased
  - Movement? Perhaps increased anadromy?
  - Harvest?

Pearsons and Temple 2007; 2010

Movement- PIT tag detections at fixed interrogation sites

Harvest- Undercover Creel Survey (Spy Camera)

PIT tag detections at fixed interrogation sites

Undercover Creel Survey (Spy Camera)

Taneum Coho Interactions

- Tributary scale experiment
- Multiple Objectives
  - 1) Determine Taneum's reintroduction potential
  - 2) Isolate coho/NTT interactions
  - 3) Determine ecological benefits of stocking (e.g. Conversion of resources to biomass)

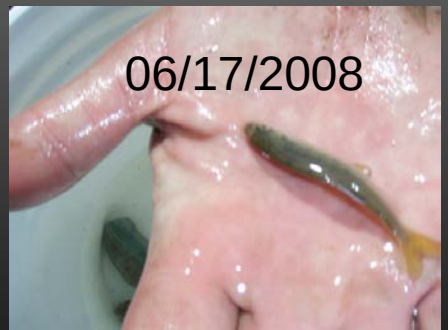
Methods

- 300 adult coho transported and released in index monitoring sites (2011-last outplant)

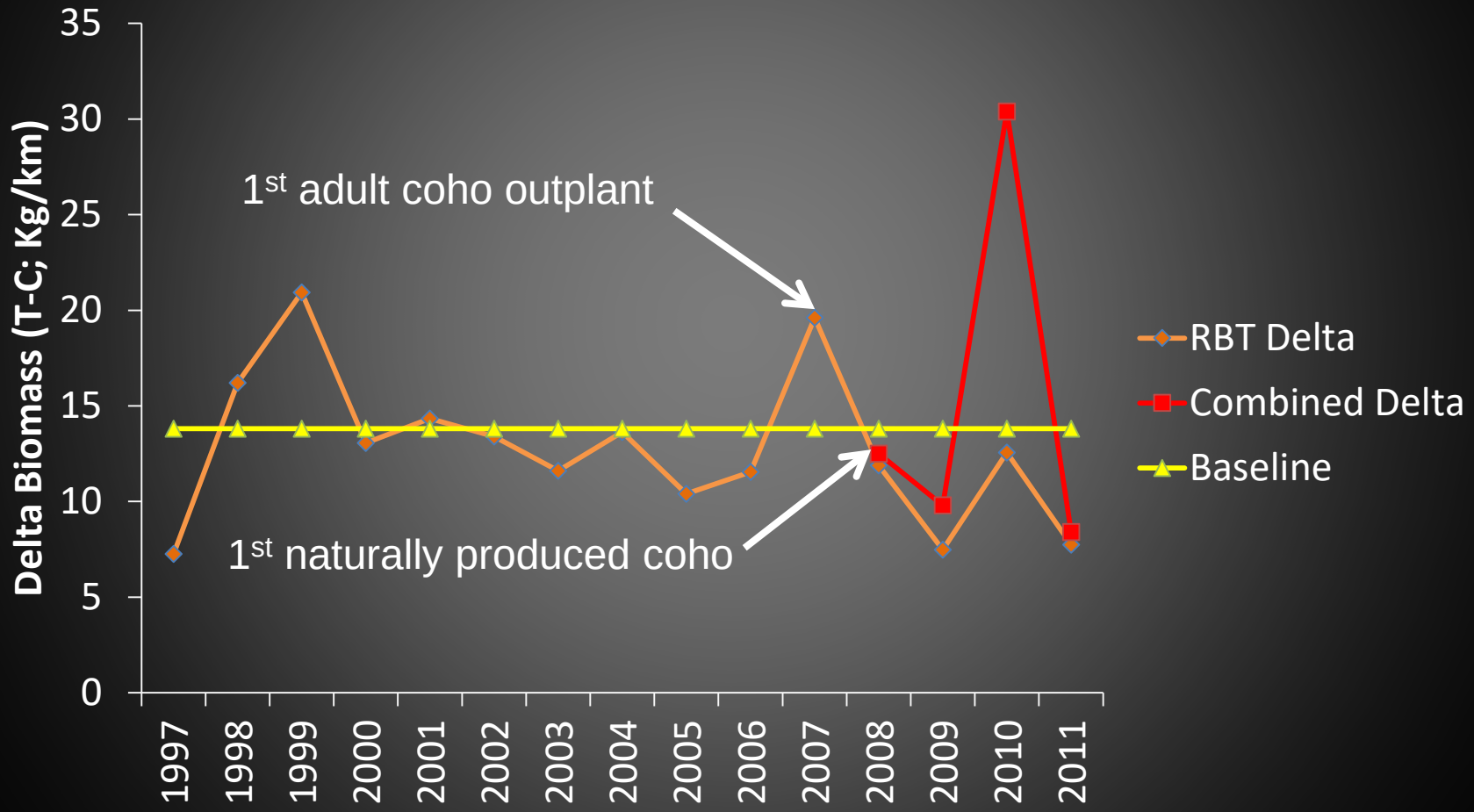
- Evaluate natural production (parr abundance)
- BACI test on NTT response variables

Observations to Date

- 1) Successful natural production in Taneum
- 2) Observed coho parr in all habitats (e.g. strong potential for interactions with NTT)
  - No significant impact to RBT abundance, size, or biomass
  - Combined rearing salmonid biomass appear below baseline levels
  - Strong environmental drivers of coho survival



Taneum Combined Salmonid Rearing Biomass

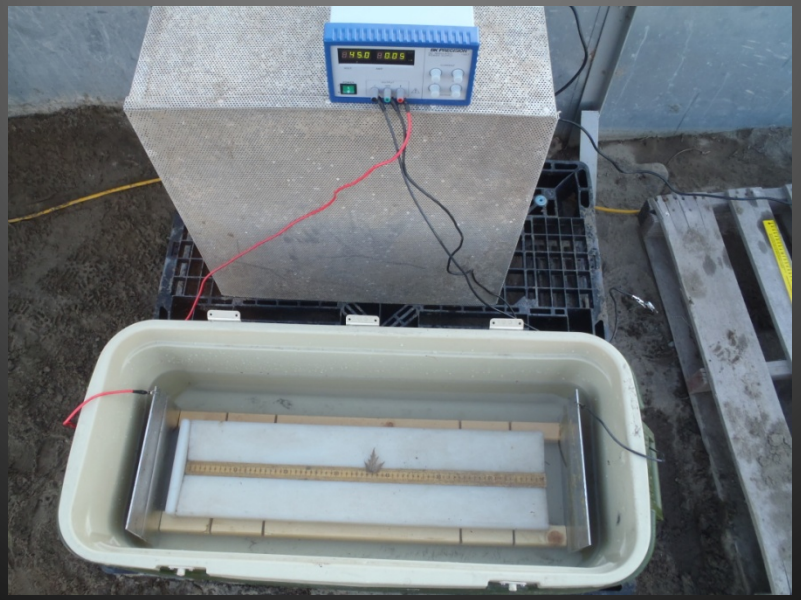


Unanticipated Benefit of Taneum Project

- Need-

- Solution- Mankus development modeled after SRL design

De Boer
Tested



EA-Performance

- Excellent. Immediate induction. Immediate Recovery
- No significant reduction in the spawning success of treated fish relative to previous years (similar redd counts)
- Inspired the development of a small prototype/portable field unit
- So What? It is a big deal because FDA regulations on fish anesthetics are preposterous
  - Only 1 approved fish anesthetic requiring 21 day isolation (and no, Ice, CO_2 , Clove Oil, are not technically legal alternatives)

Schuck et al. (WDFW Draft Doc.)

Coho Project EA

- Included as a case study in WDFW draft report
  - (policy support document for routine WDFW use)
- Plan to be included in draft manuscript (M. Schuck) to support the use of alternative, non-FDA regulated anesthesia

Wrap Up

- Continue *O. mykiss* abundance monitoring in the Teanaway (harvest and movement).
- Continue Taneum interactions study. 2012 is the last year of F1 interactions monitoring, F2 phase beginning 2012 (adults) 2013 (parr).
  - Wrap observed F1 interactions into manuscript
- Continue development of portable EA unit and test efficacy in 2012.