Agenda Item E.2.a
Supplemental NMFS PowerPoint 1
(*Electronic Only*)
September 2015

# Sacramento River Winter-run Chinook Salmon Update

## Pacific Fishery Management Council Meeting
## Sacramento, CA

Brycen Swart

September 11, 2015

NOAA FISHERIES
West Coast Region

# Sacramento River Water Temperature Management

## Water Rights Order 90-5

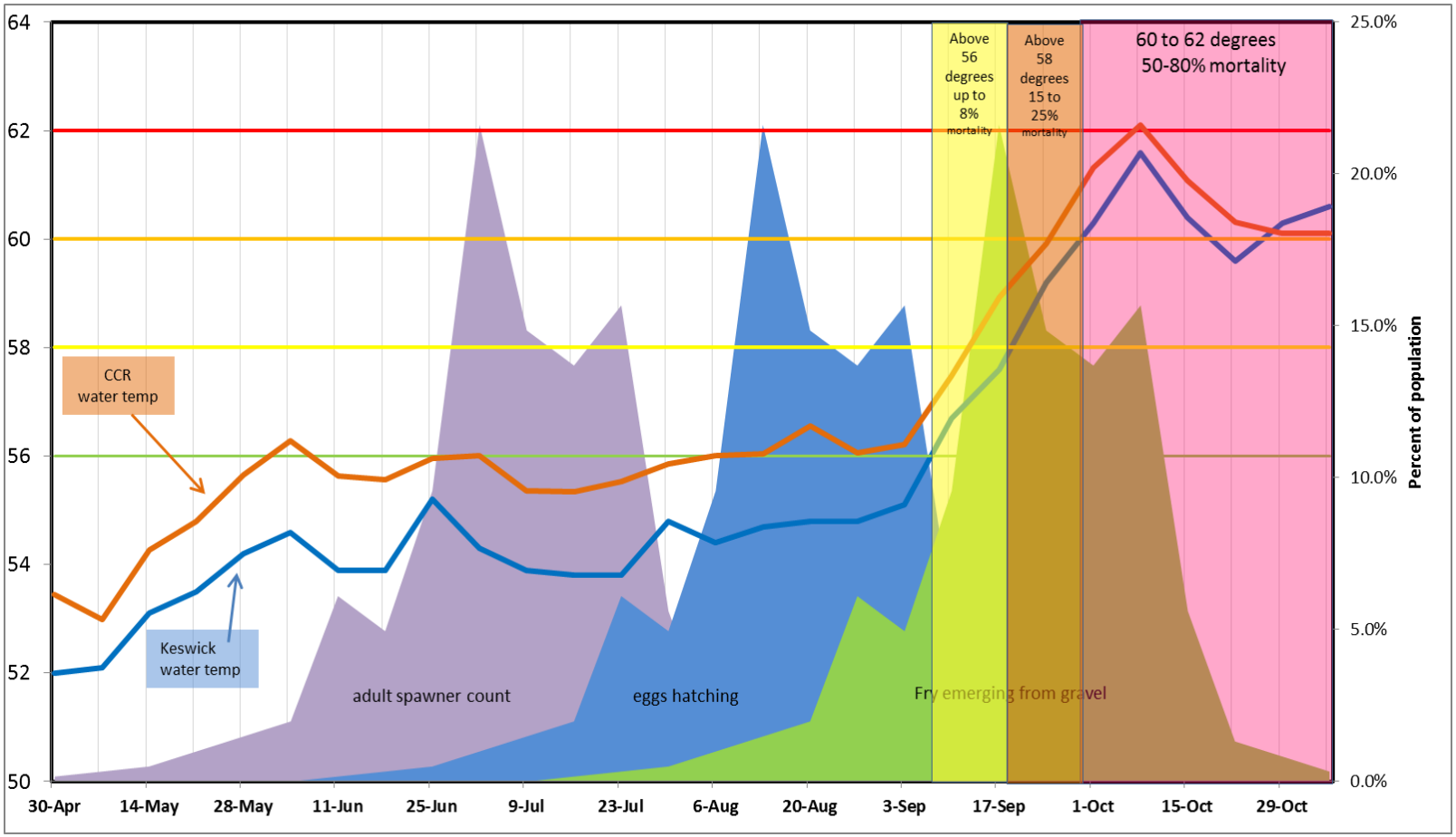
- Establishes 56º F daily average water temperature compliance point in the Upper Sacramento River for fisheries protection
- Location varies every year based on:
  - Projected Shasta storage
  - Water contractor commitments
  - Delta water quality criteria

## 2009 OCAP Biological Opinion RPA

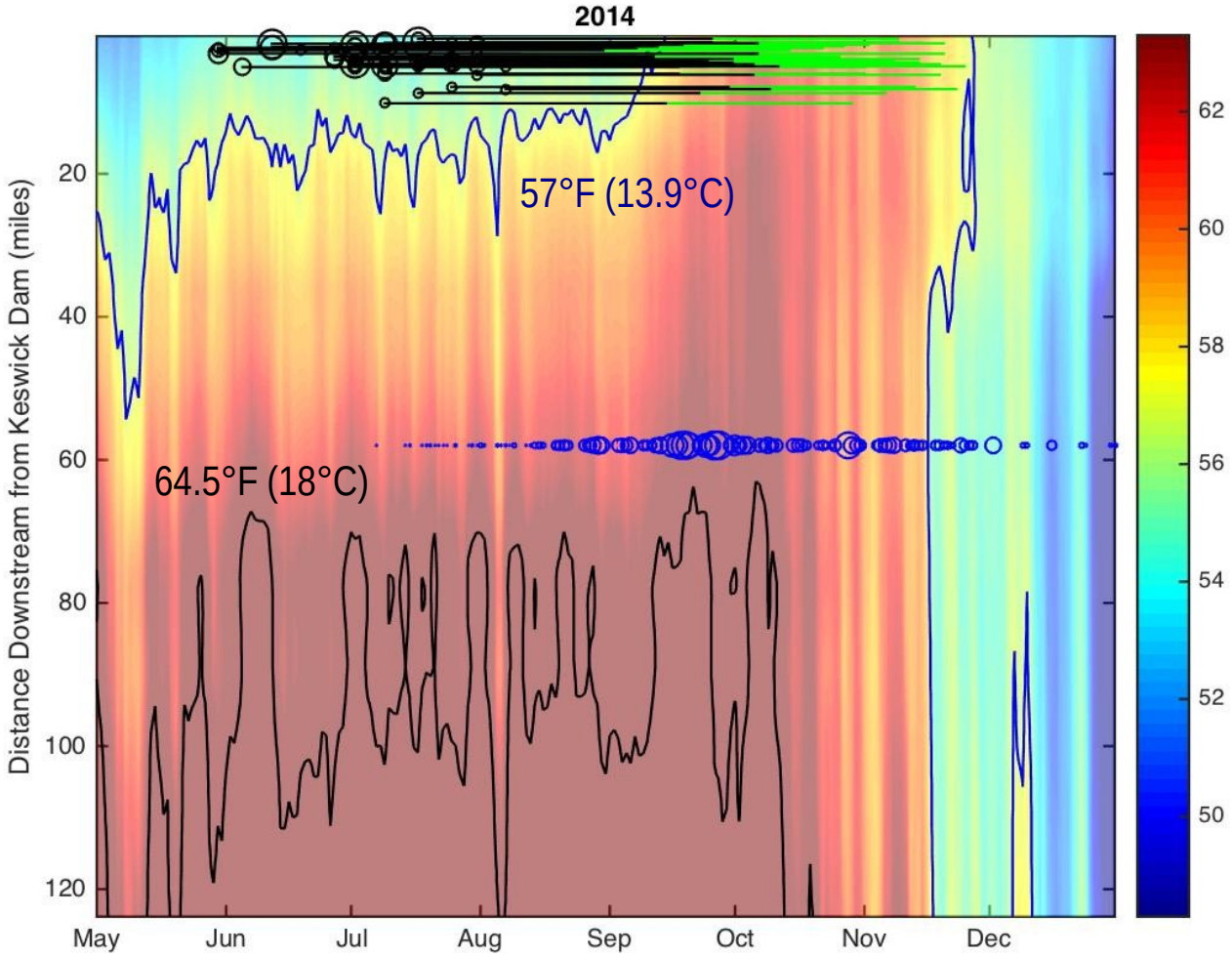
- Requires Keswick release schedule and Drought Contingency Plan

# 2014 Water Operations

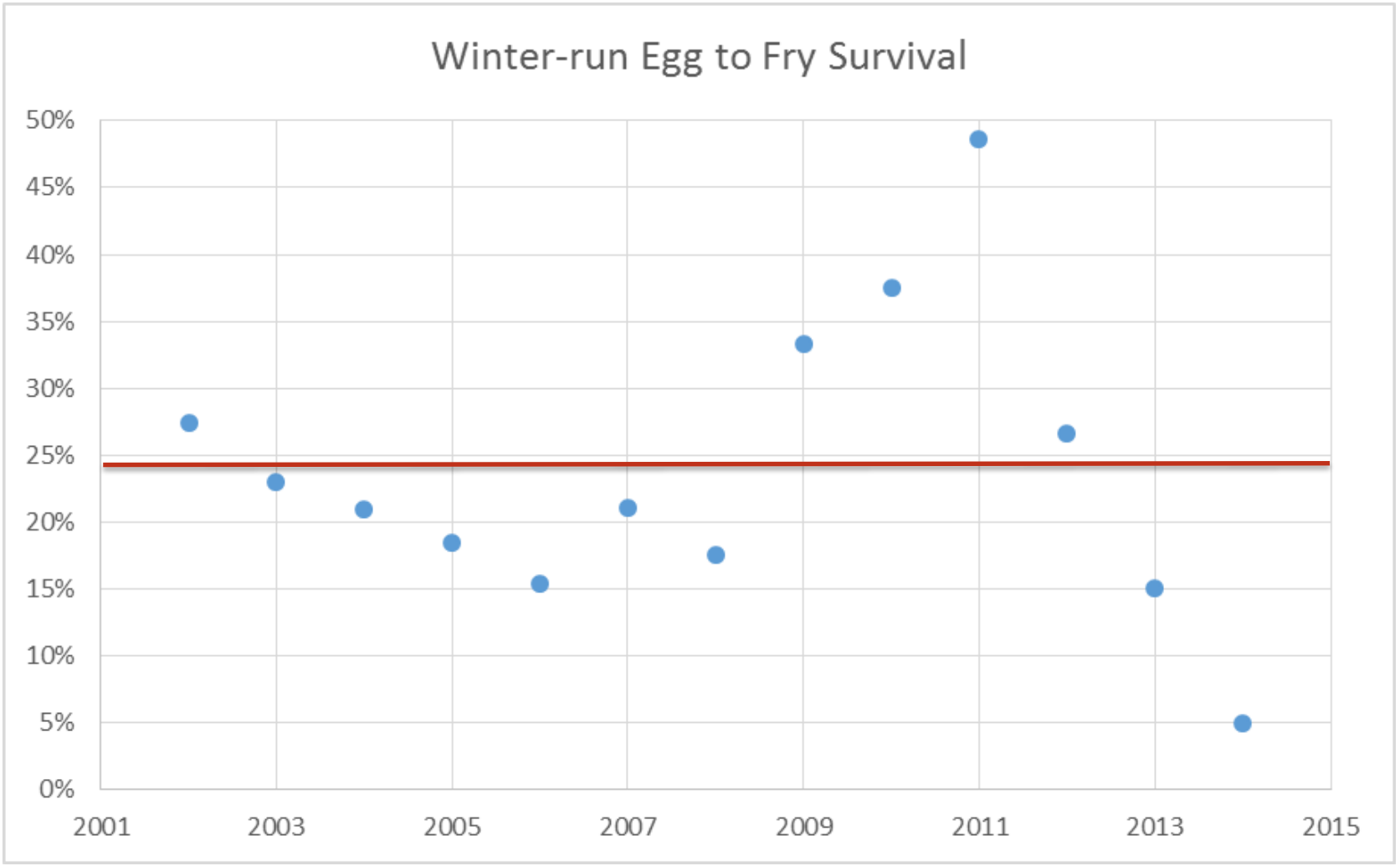
## Water temperatures had adverse effects on winter-run eggs and fry



# 2014 Temperature Landscape



# 2014 Winter-run Egg to Fry Survival



# 2014 Lessons Learned and 2015 Improvements

## 2014 Hindcast - Lessons Learned

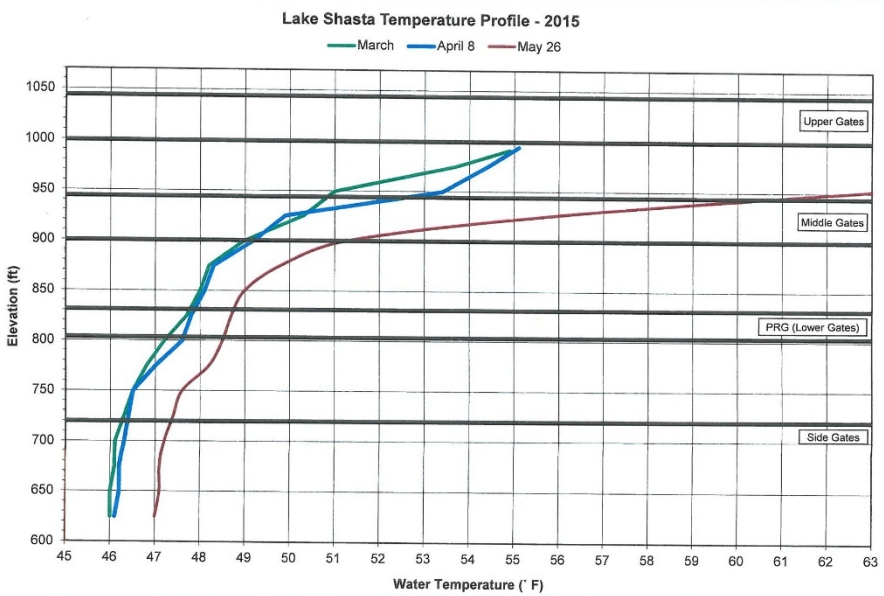
- Difficulty predicting temperatures with low storage
- Temperatures in late summer/fall were approximately 4$^{o}$ F higher than modeled
- Loss of water temperature control when full side gates were accessed

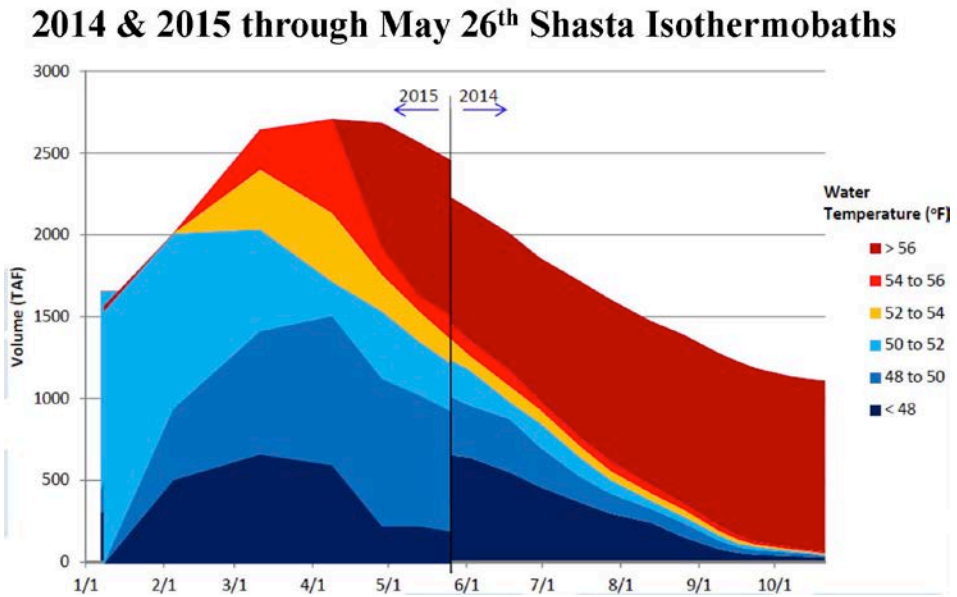
## 2015 Temperature Management Plan - Adaptations to Improve Shasta Cold Water Pool

- Relaxed minimum navigational flow requirements
- Relaxed Delta water quality requirements
- Delayed Sacramento River Settlement Contractor depletions
- Higher early temperature target (58$^{o}$ F)
- Warm water bypass

# 2015 Update

## Updated May 2015 Shasta Lake profile showed water temperatures could not be met

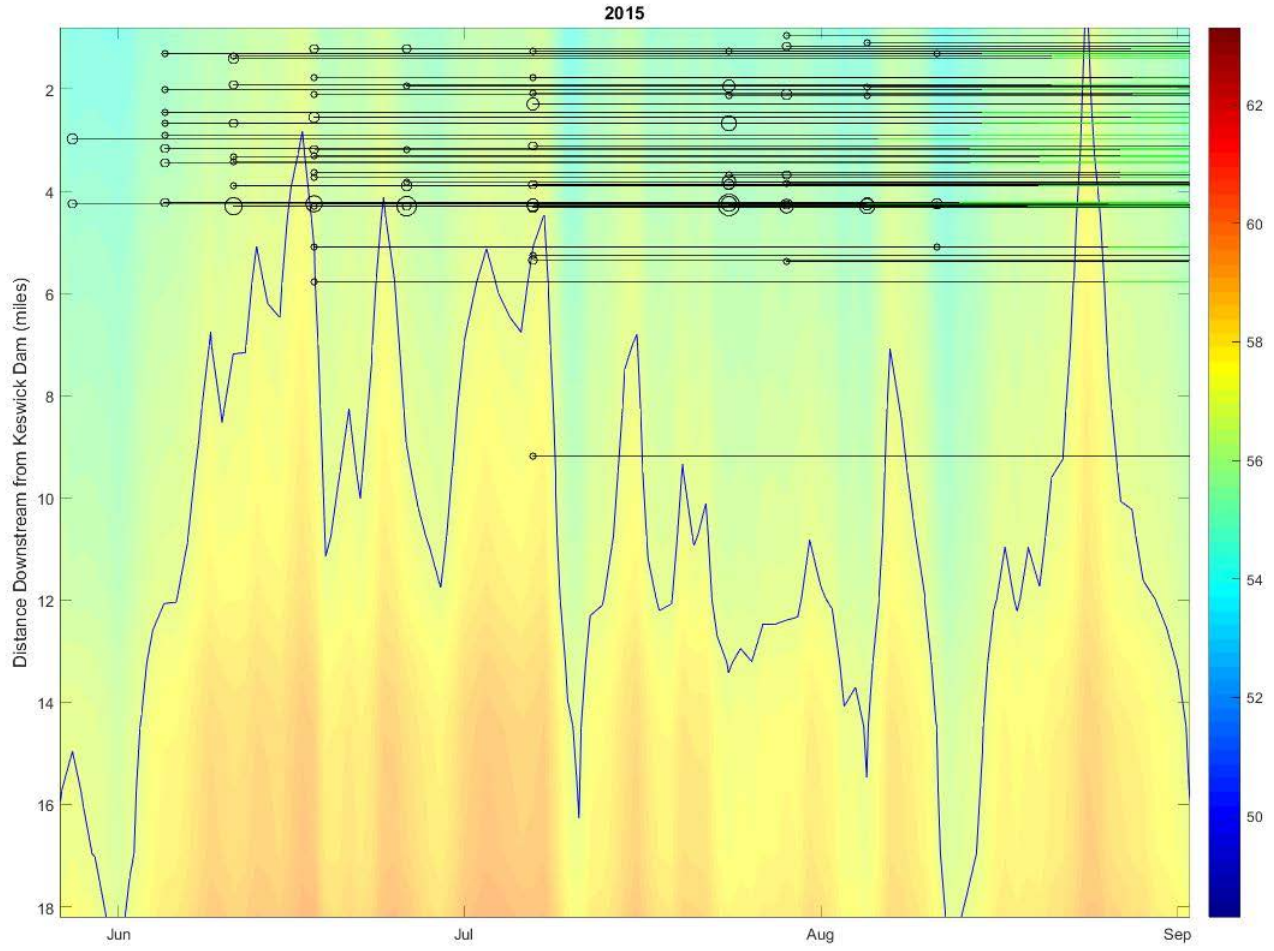


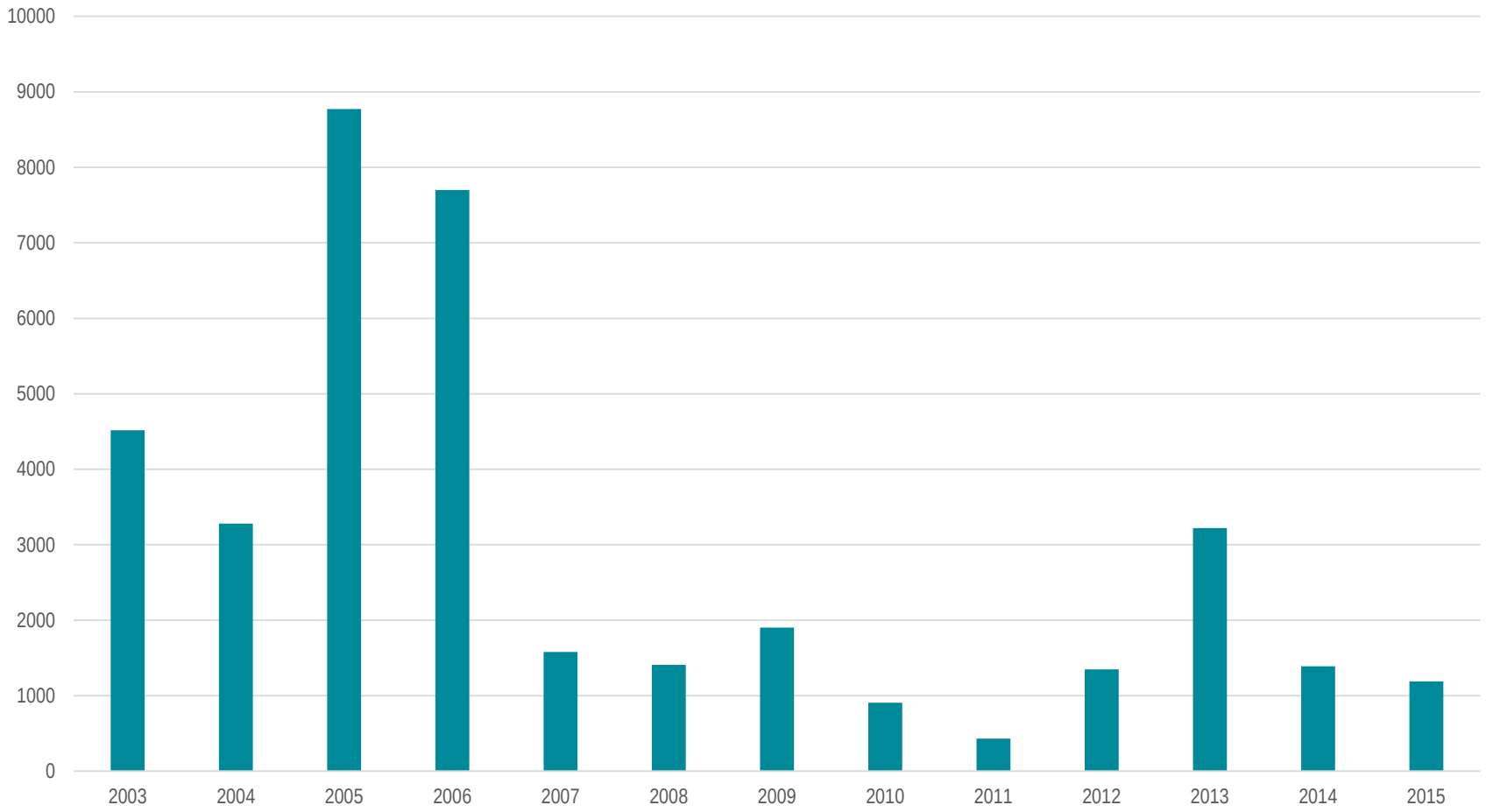
# 2015 Revised Sac River Temp Mgmt Plan

- Target 57$^{o}$ F at Clear Creek, not to exceed 58$^{o}$ F
- Maintain Keswick releases of 7,250 cfs
  - ✓ ~258 taf difference from original plan
- Delay full side gate operation as long as possible
- Optimize temperature using real-time monitoring and decision making
  - ✓ Establish real-time Shasta/Keswick reservoir temperature profiles
  - ✓ Install new upstream temperature gage location
  - ✓ Deploy additional temperature sensors in river
- Increase redd monitoring
- Increase production and capacity at LSNF Hatchery
- Review temperature model for refinements

# 2015 Temperature Landscape

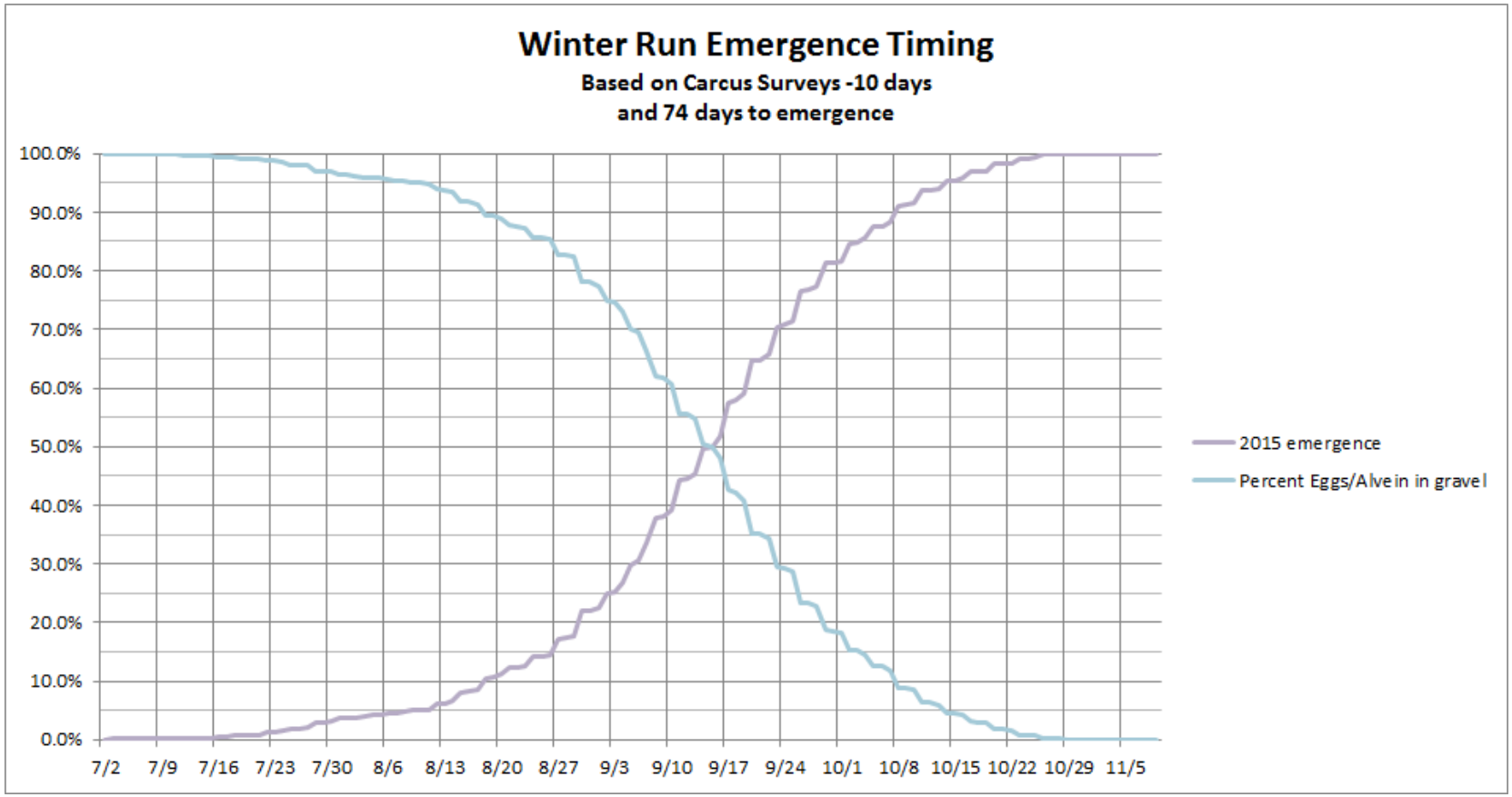


# 2015 Winter-run Carcass Counts



# 2015 Juvenile Abundance

## Still too early to tell



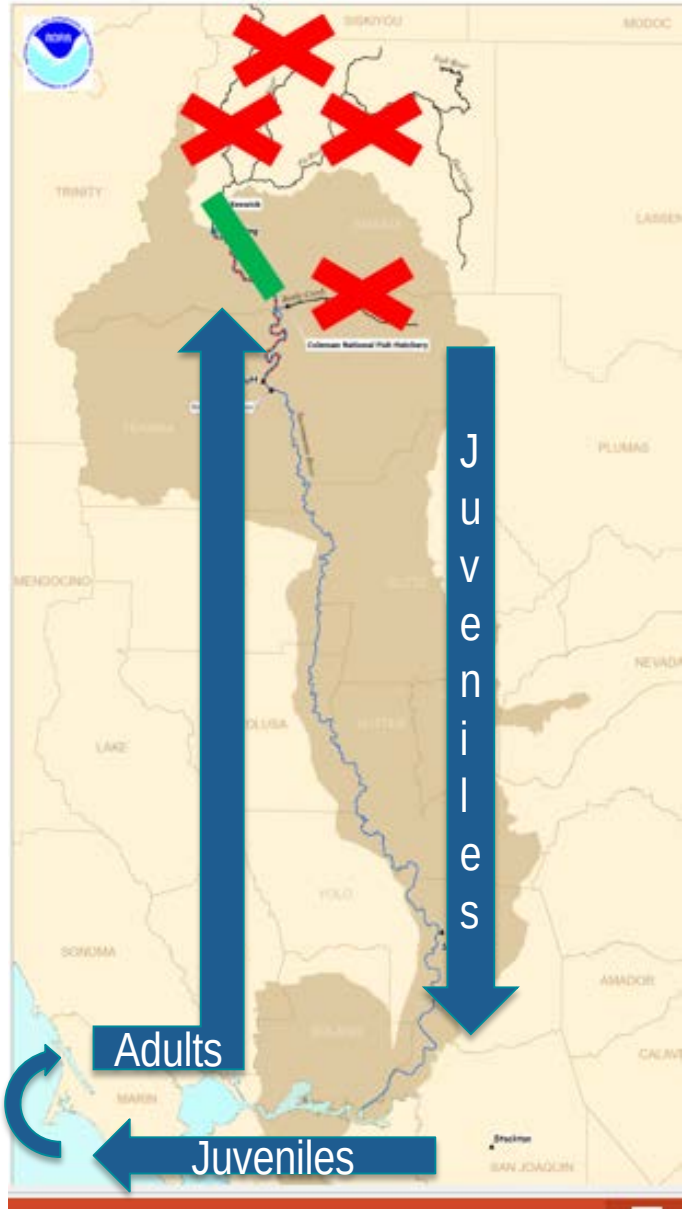
# 2015 Hatchery Production

- Avg Year: 200,000 fry
- 2014: 600,000 fry
- 2015: 400,000 fry
- Why the Decrease?
  1. Limited broodstock
  2. Disease
  3. Reduced capacity at hatchery

# NMFS Species in the Spotlight

## Winter-run Chinook

- 1 of 8 national priority endangered species to stabilize and recover
- Highlights key actions needed at each life stage



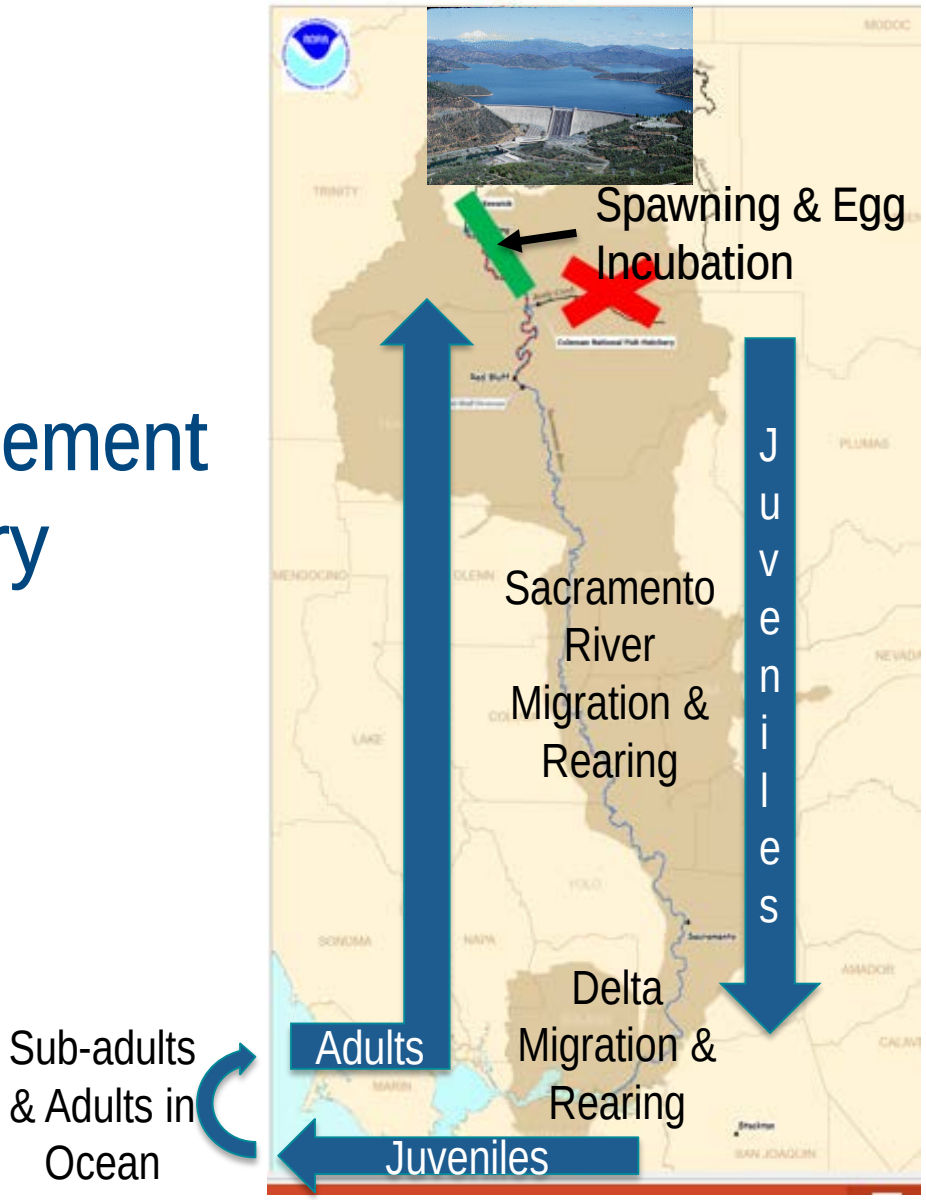

Sub-adults & Adults in Ocean

# Winter-run Chinook Salmon Action Plan

## Action 1:

## Water temperature management for spawners, eggs, and fry

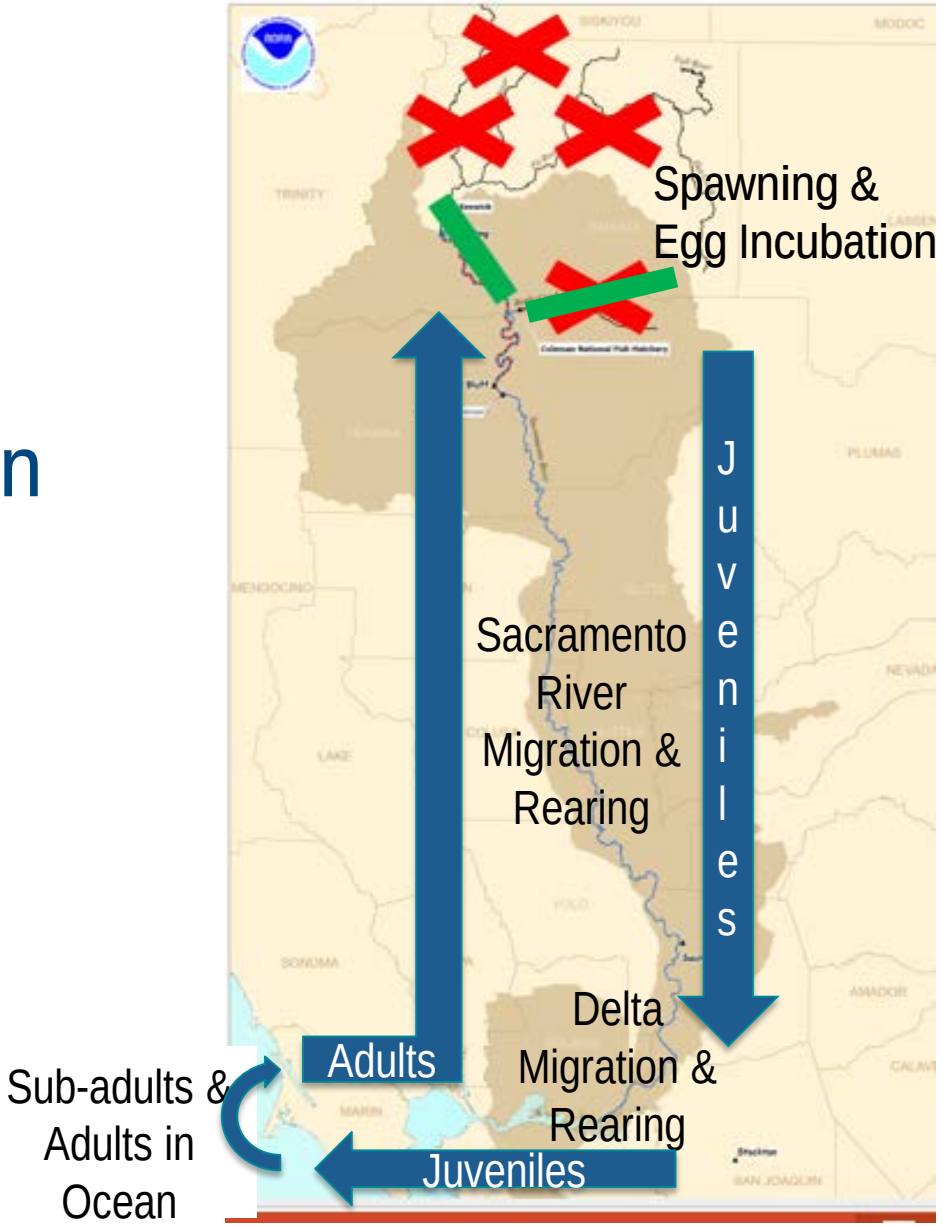
- Model Advances (RAFT)
- Partnership with irrigators
- Physical modifications



# Winter-run Chinook Salmon Action Plan

## Action 2:

## Battle Creek Restoration & Reintroduction



# Winter-run Chinook Salmon Action Plan

## Action 3:

## McCloud River Reintroduction


Sub-adults & Adults in Ocean

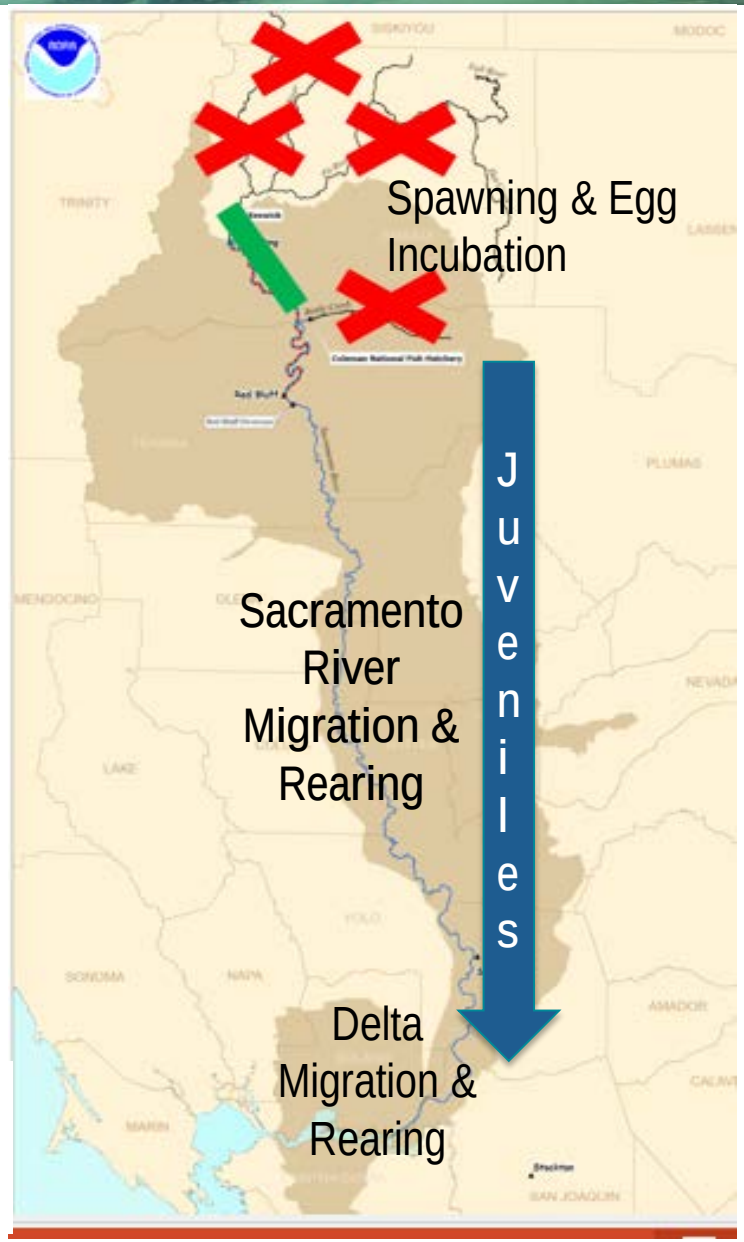
# Winter-run Chinook Salmon Action Plan

## Action 4:

## Floodplain Habitat Restoration

- Yolo Bypass
- CV Flood Protection Plan


Sub-adults & Adults in Ocean



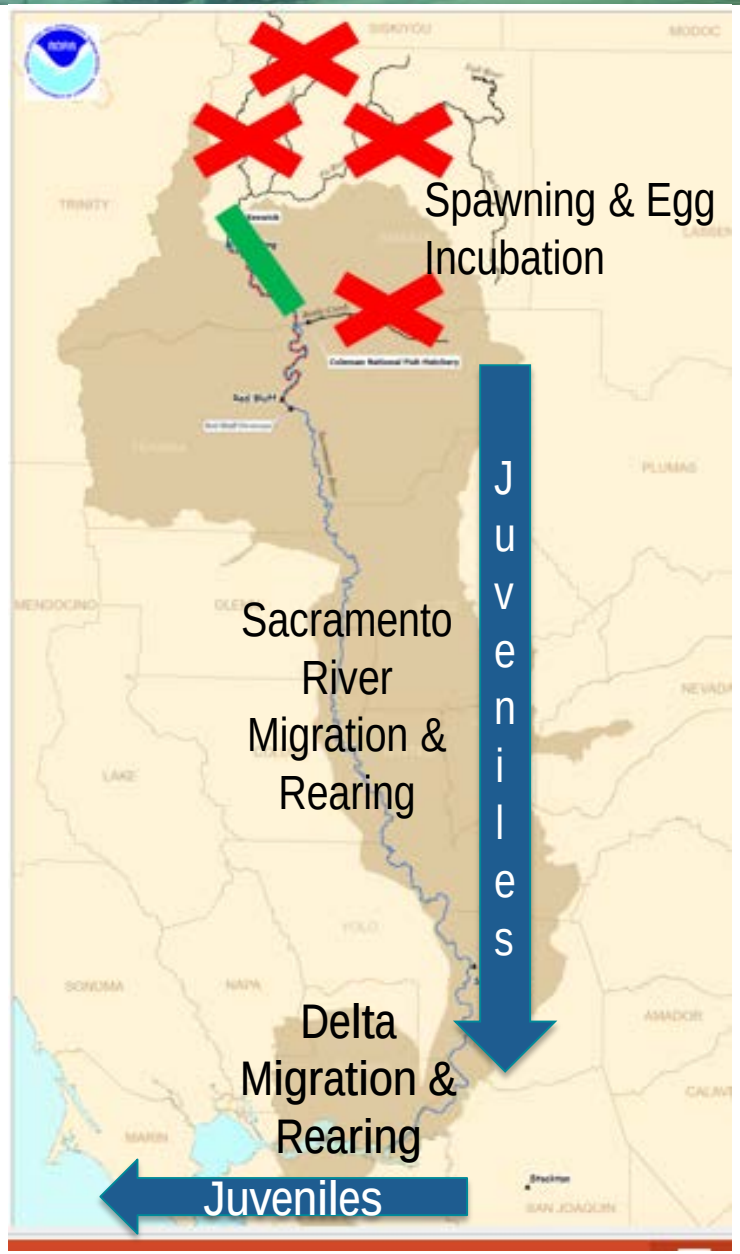
# Winter-run Chinook Salmon Action Plan

## Action 5:

## Managing Delta Conditions

- Minimize reverse flows
- Improve monitoring
- Real-time acoustic telemetry
- Particle tracking model
- Non-physical barrier

Sub-adults & Adults in Ocean



# Questions?