

**NOAA  
FISHERIES**

West Coast  
Region

# How effective is NOAA Fisheries at monitoring and implementing recovery?

## Case Study: Sacramento River Winter-run Chinook Salmon

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Central Valley Office

Recovery Program Review

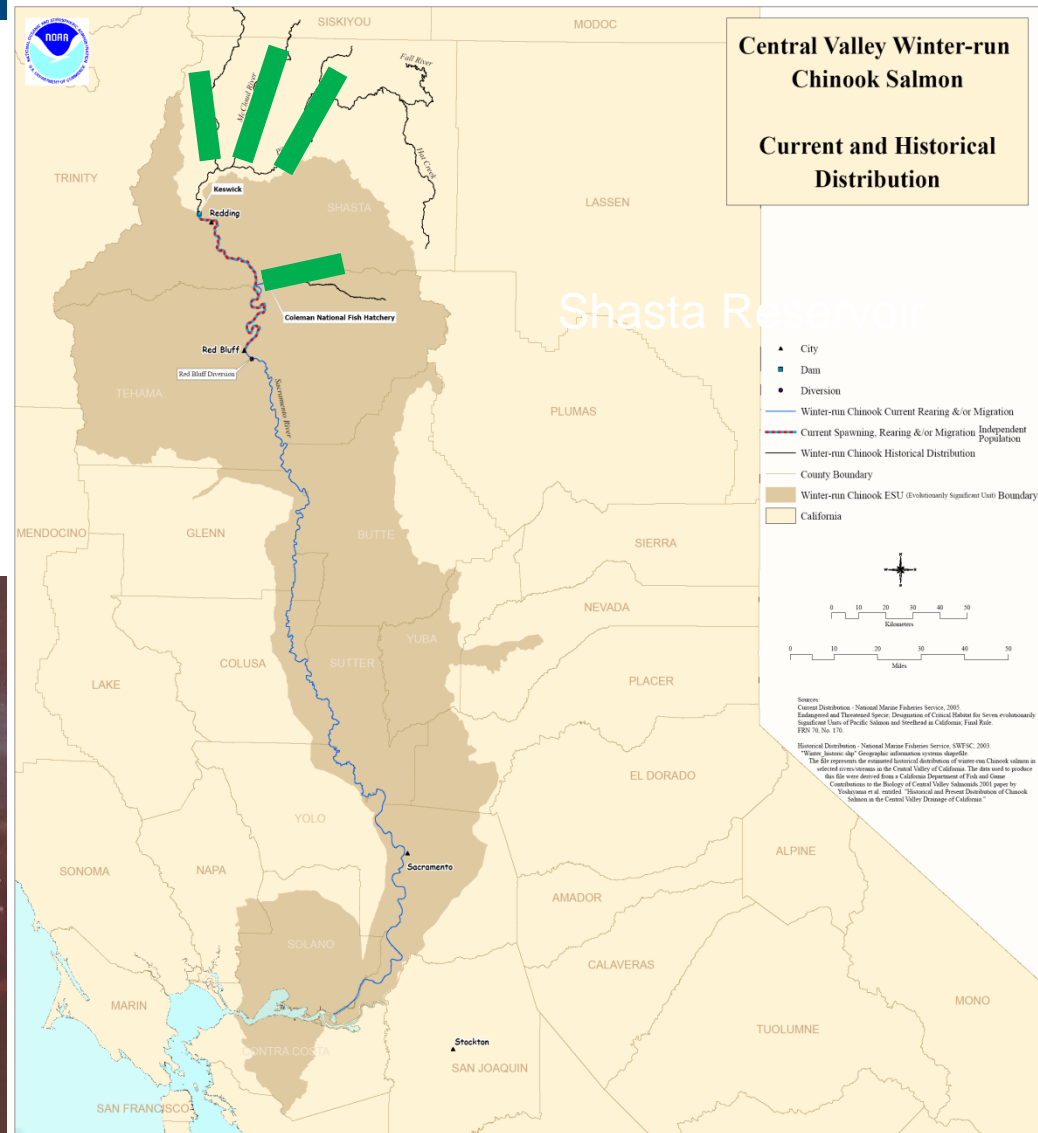
April 21, 2016

# Introduction

- Plan Name:
  - Central Valley Chinook Salmon and Steelhead Recovery Plan
    - Covers Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and California Central Valley steelhead
- Plan Status: Final plan released June 2014
- How Was the Plan Developed:
  - Two teams – Technical Recovery Team; Recovery Plan Team
- Winter-run Chinook Salmon Listing Status
  - ESA listed as threatened in 1989
  - Re-classified as endangered in 1994
  - 2015/2016 draft status review recommends retaining the endangered listing status
- Species in the Spotlight (initiated 2015)

# Winter-run Chinook salmon

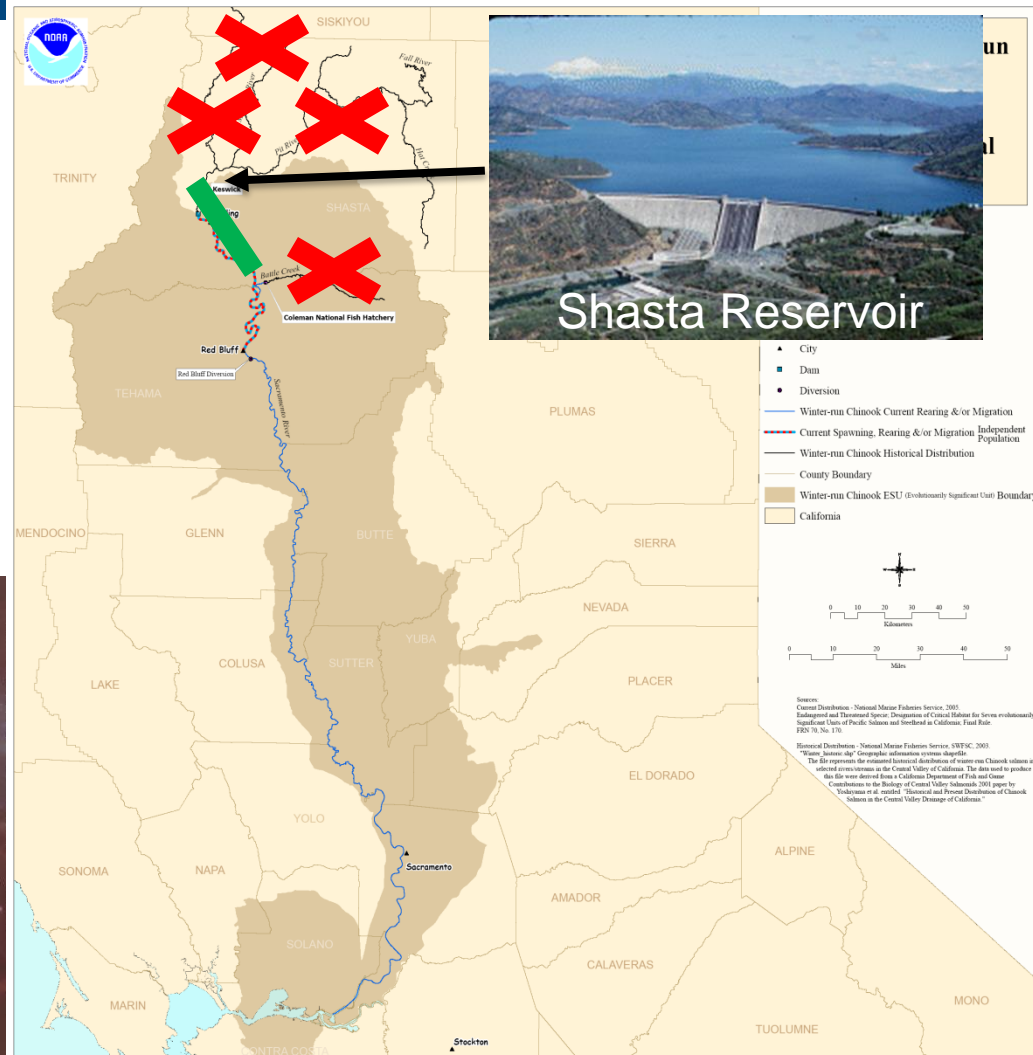
## Historical Distribution



- Historically: 4 populations
- Cold water spring fed rivers

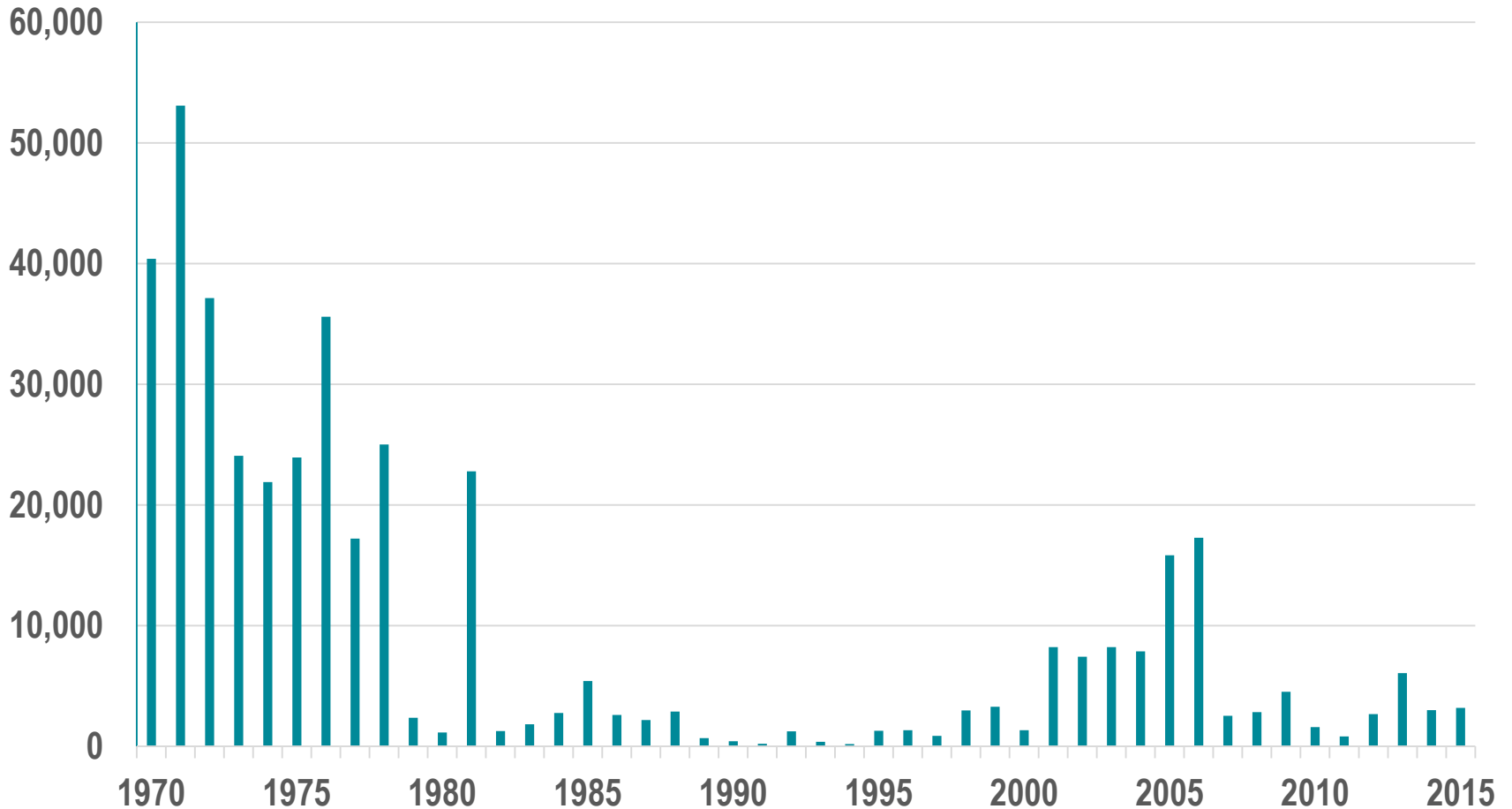
# Winter-run Chinook salmon

## Current Distribution



- Currently: 1 population that is supplemented with hatchery production
- Persists due to cold water releases from Shasta Reservoir

# Winter-run Chinook Salmon Adult Returns



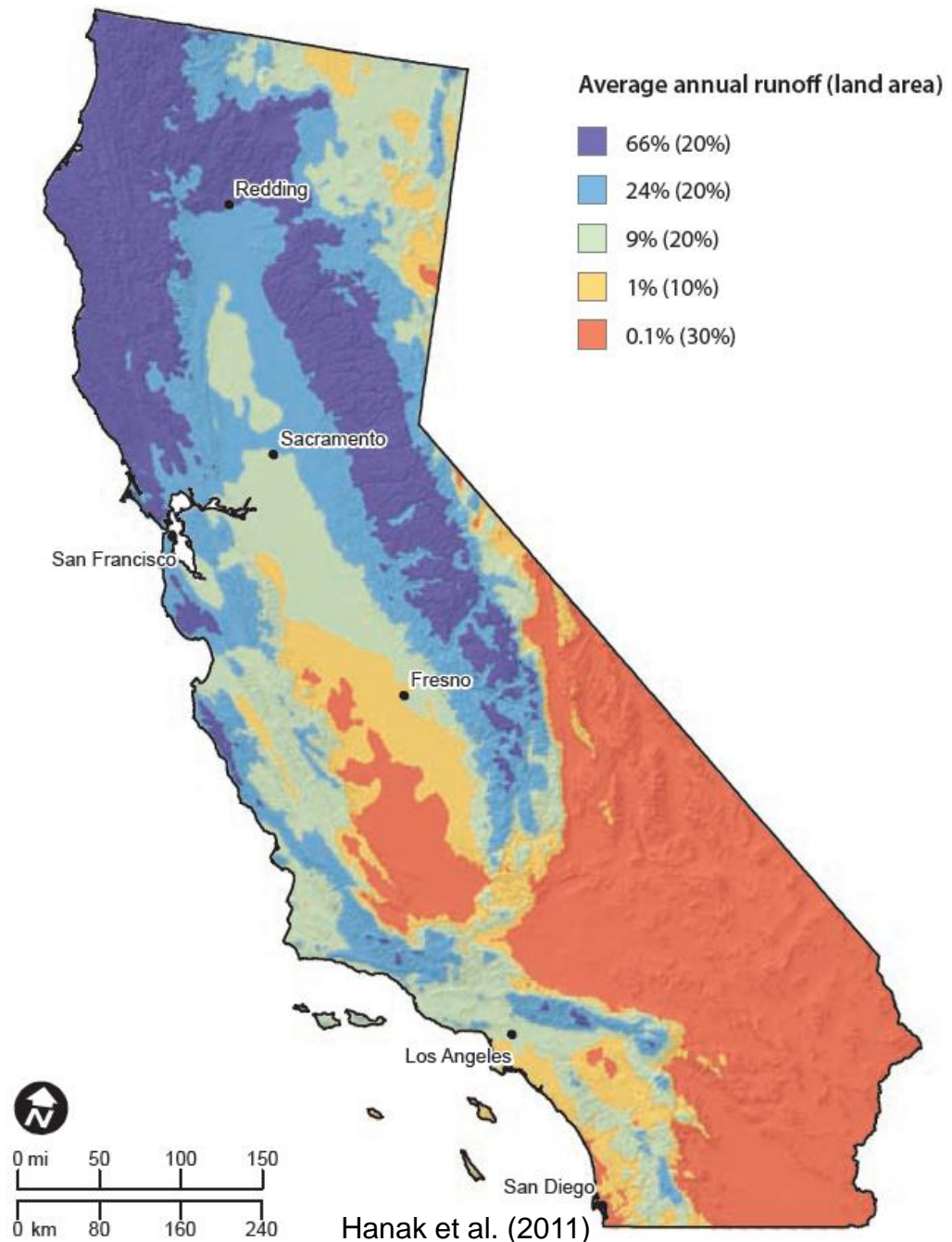
# Context for Winter-run Recovery Implementation

- Cannot understand CA salmon recovery without understanding CA water



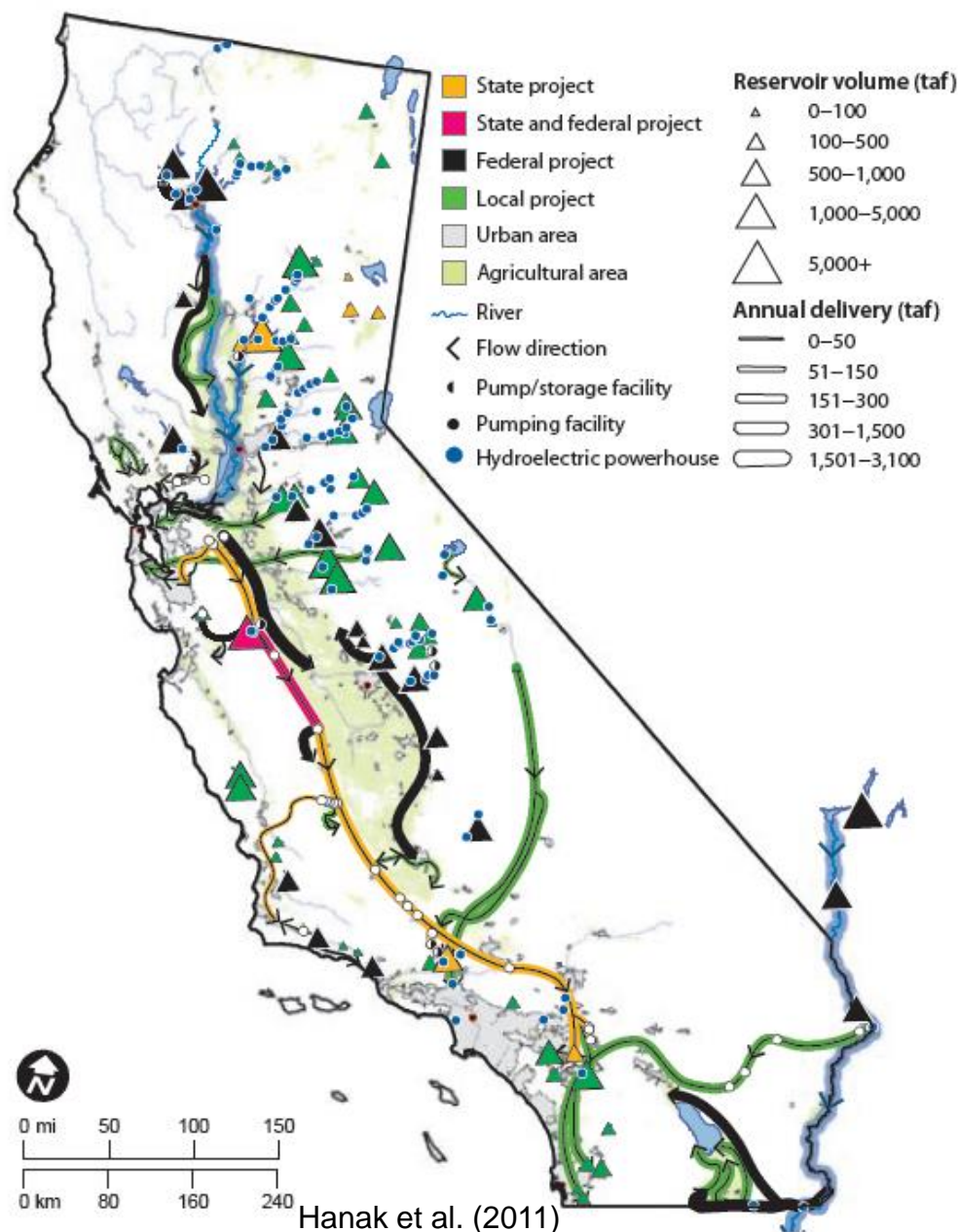
# California Water

- Precipitation is largely in the north
- Big agriculture and lots of people in the south



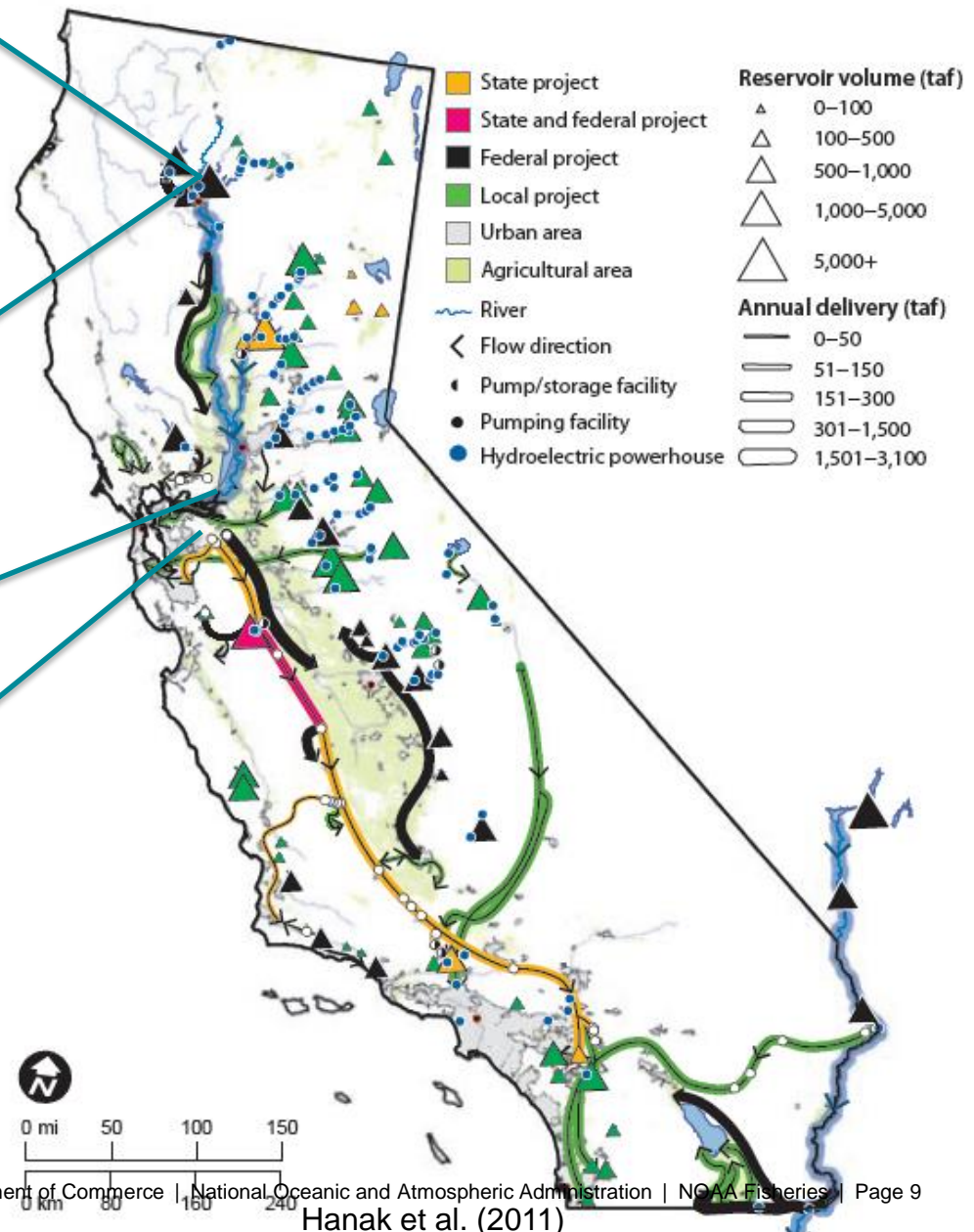
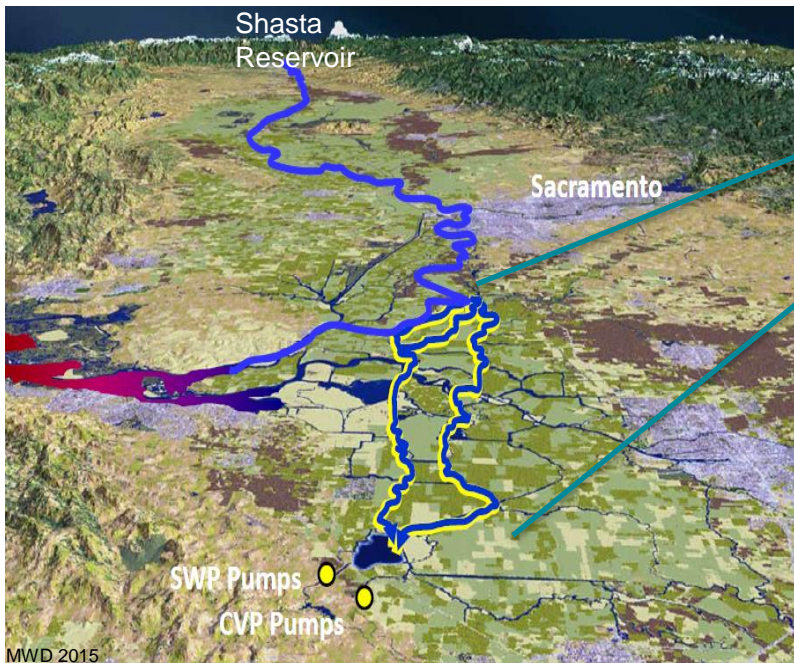
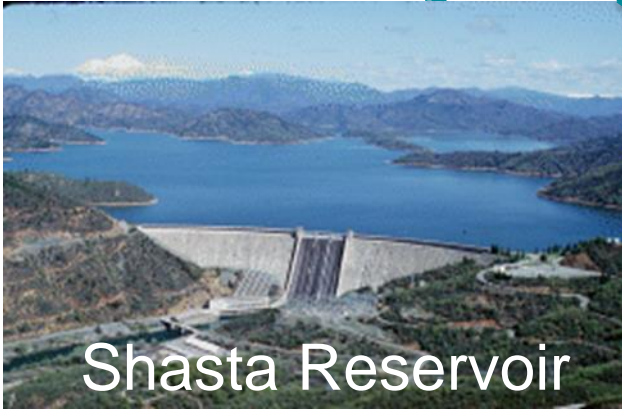
# Elaborate Water Conveyance System

- Central Valley Project/State Water Project (CVP/SWP) is main component
  - Shasta Reservoir largest CA reservoir
- CVP/SWP water supports:
  - \$40,000,000,000 agriculture (~13-45% of all US Ag)
  - 25,000,000 people
  - ~\$250,000,000 salmon economy



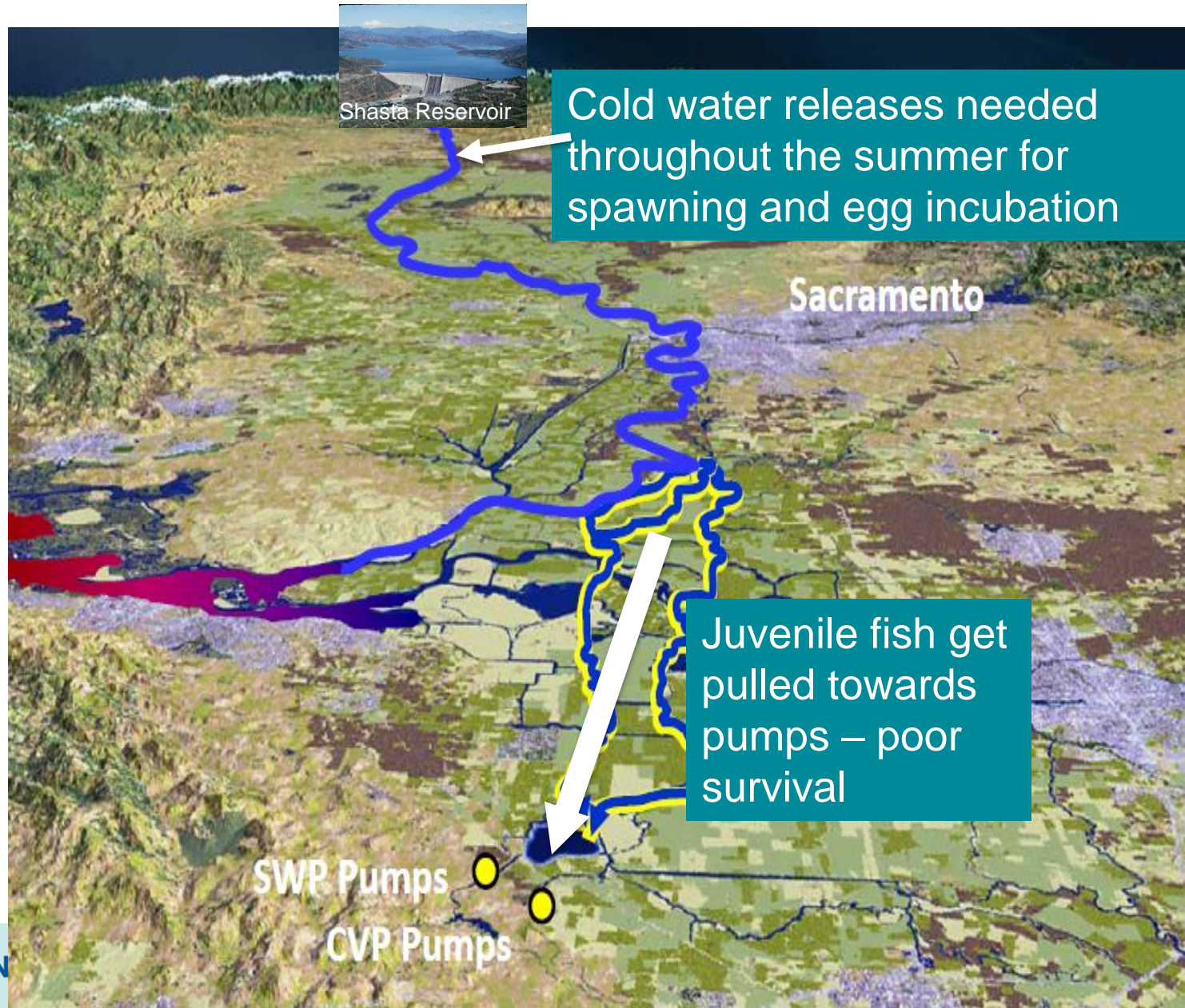


# Central Valley Project/State Water Project





# Water Management & Winter-run Chinook Salmon



# NMFS 2009 Biological Opinion on CVP/SWP

- Jeopardy conclusion for winter-run (and other species)
- BO required fundamental protections for reversing winter-run declines
  - Cold water for spawning
  - Restore Battle Creek
  - Reintroduction above Shasta Reservoir
  - Rearing habitat restoration
  - Managing Delta conditions to promote juvenile survival
    - Monitoring
  - Red Bluff Diversion Dam removal
- Final Recovery Plan (2014) incorporated these protections as the foundation for alleviating inland limiting factors

# Real-time Operations to Protect Winter-run

- Real-time operations for water management to ensure that winter-run habitat needs are met on a daily to weekly basis
  - CVP/SWP BO frames the overall protection plan for different locations (Upper Sacramento River; Delta) and life stages
- Example – Water Temperature management
  - Extremely careful management of Shasta Reservoir cold water pool
  - Coordination among the water and fish agencies occurs weekly if not daily
  - Reservoir and river water temperature modeling for “pre-season” planning and real-time operations during the water temperature management season
- Example - Delta
  - Monitoring in upper river helps determine the juvenile production into the Delta
  - Within Delta monitoring helps determine timing, location, magnitude in the Delta including at the pumps
    - Real-time acoustic tracking of hatchery winter-run
      - Spatial and temporal distributions
      - Survival
  - Pumping restrictions occur when winter-run “take” limits are exceeded

# Recovery Implementation Partners

- Agencies
  - NOAA Fisheries
  - United States Fish and Wildlife Service
  - CA Department of Fish and Wildlife
  - U.S. Bureau of Reclamation
  - CA Department of Water Resources
- Water Users
  - Northern California Water Association
  - Sacramento River Settlement Contractors
- Salmon Industry
  - Golden Gate Salmon Association
- Environmental and Watershed Groups
  - Central Valley Salmon Partnership



# Winter-run Recovery Implementation & Monitoring Overview

## Mechanisms

## Tools

## Partners

### Implementation

#### Regulatory

ESA section 7  
 -CVP/SWP BO  
 -CVPIA restoration programmatic BO  
 ESA section 10(j) experimental population  
 ESA section 4(d) take exemptions  
 ESA Habitat Conservation Plan

U.S. Bureau of Reclamation  
 CA Dept. Water Resources  
 U.S. Fish and Wildlife Service  
 CA Dept. Fish and Wildlife  
 Sacramento Water Contractors  
 Northern CA Water Association  
 Sierra Pacific Industries

#### Non Regulatory

CVPIA  
 Restoration Center  
 PCSRF - FRGP  
 CA Prop 1  
 Partnerships

U.S. Bureau of Reclamation  
 U.S. Fish and Wildlife Service  
 CA Dept. Fish and Wildlife  
 CV Salmon Partnership  
 Sacramento Water Contractors  
 Northern CA Water Association  
 Golden Gate Salmon Association

### Monitoring

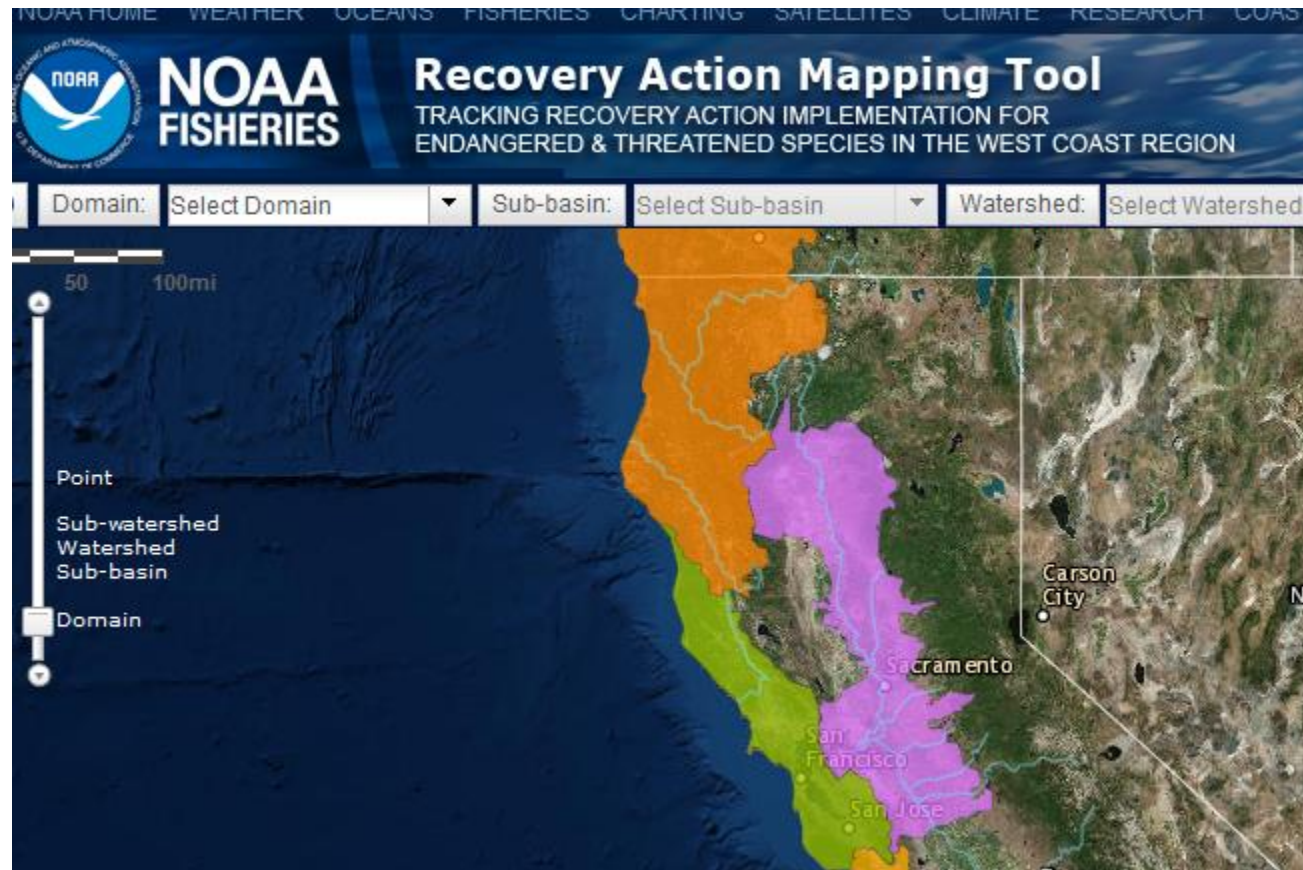
#### Status

Species  
 Threats  
 Actions

Carcass surveys  
 Redd surveys  
 Juvenile sampling  
 Tagging and sampling programs  
 Recovery Actions Mapping Tool

CA Dept. Fish and Wildlife  
 U.S. Fish and Wildlife Service  
 U.S. Bureau of Reclamation  
 NMFS Science Center  
 Winter-run Project Work Team  
 SAIL

# Monitoring Actions – Recovery Action Mapping Tool

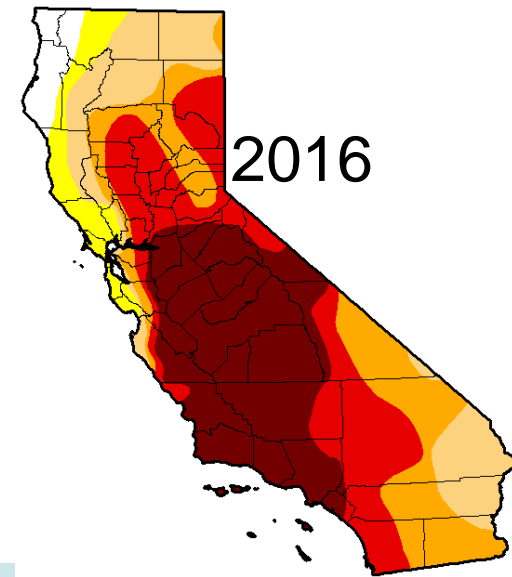
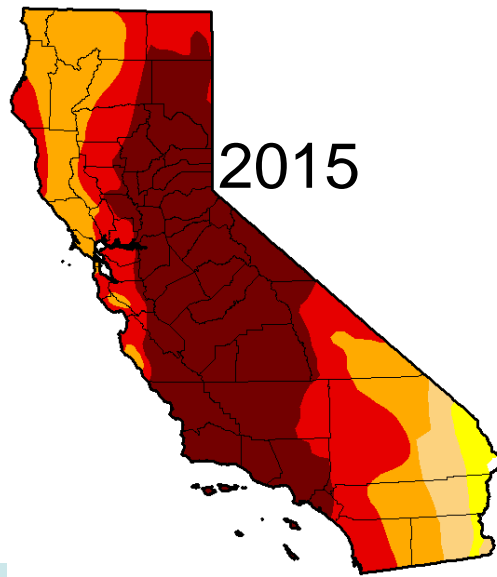
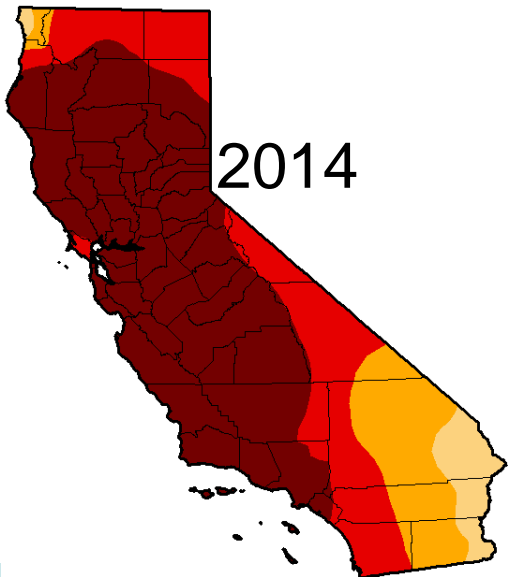
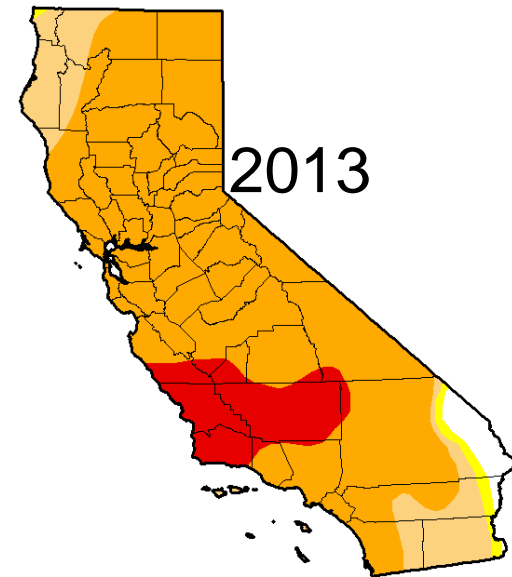
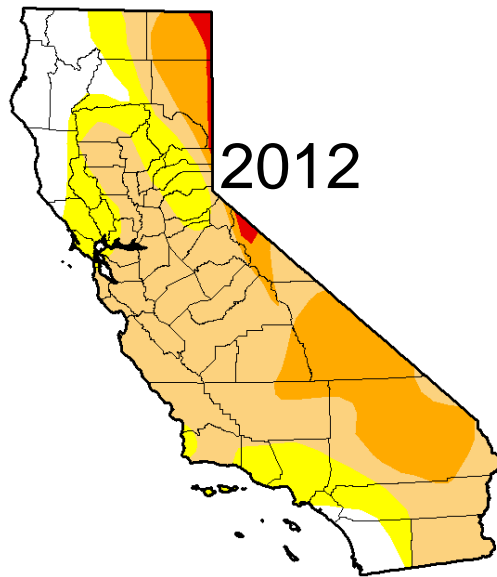
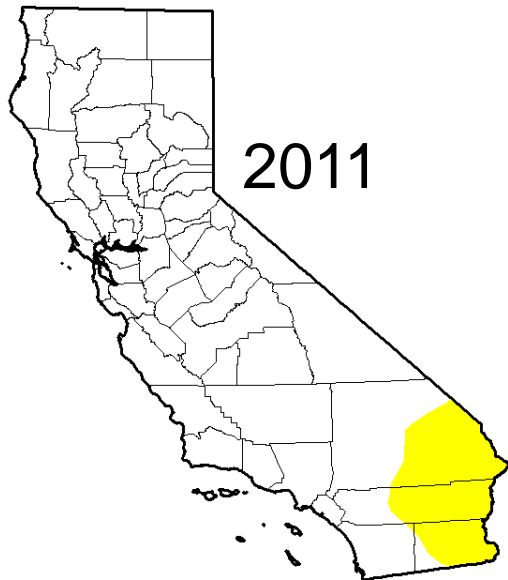


1. Maps actions in a web accessible, queriable Geographic Information System;
2. Tracks action implementation in a standardized format for the West Coast Region;
3. Fulfills reporting requirements, specifically related to the Government Performance and Results Act; and
4. Allows stakeholders to access real-time action data via an interactive web tool.

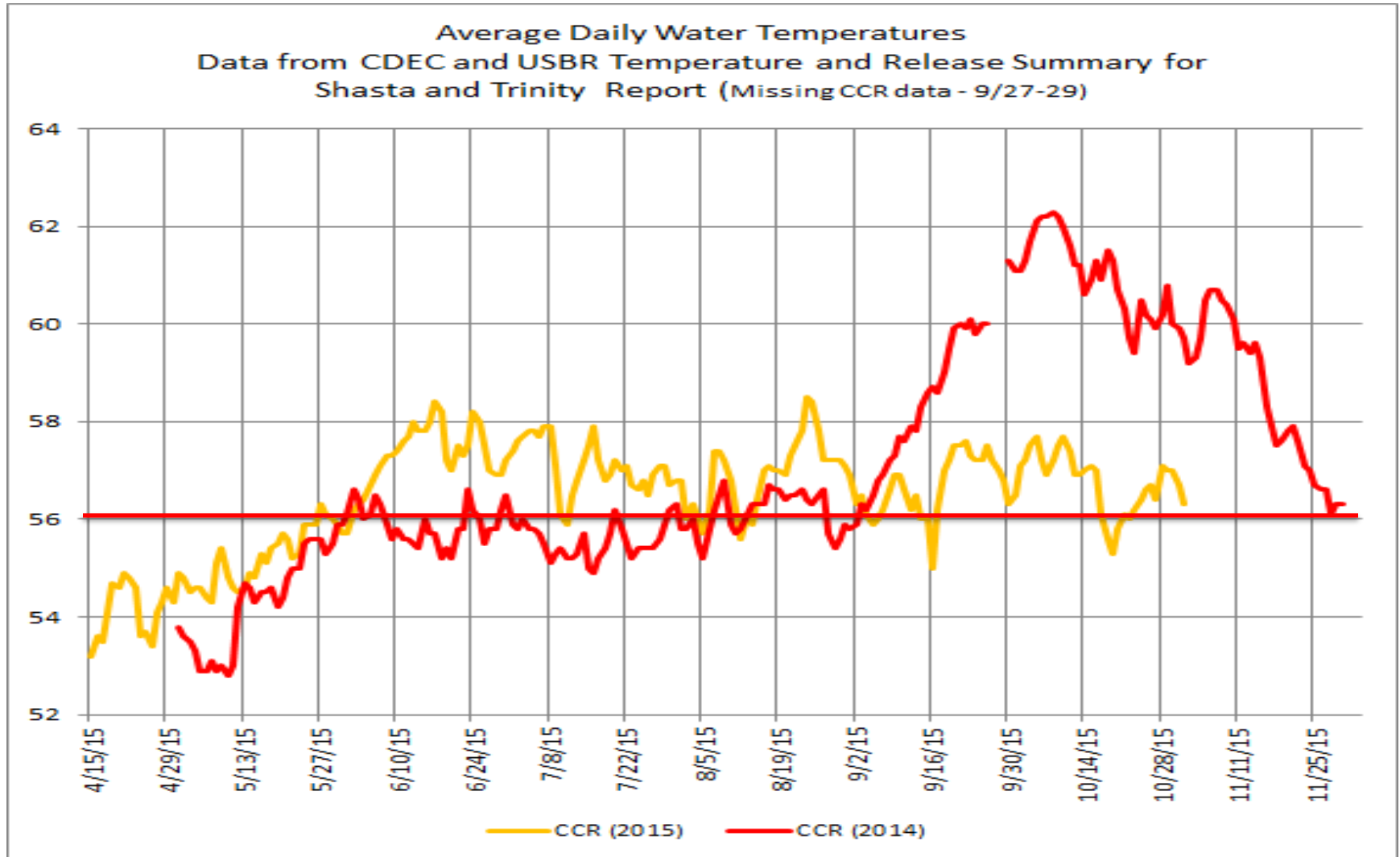
# Recovery Progress

- 69 priority “1” actions
  - 5 completed
  - 56 ongoing
  - 8 not initiated
- Status of recovery action completion not necessarily a good indicator of winter-run recovery progress
  - Many actions are open ended
- 5-year status review evaluates limiting factors and species viability
- Recent drought took a toll on winter-run

# Drought Monitor 2011 - 2016

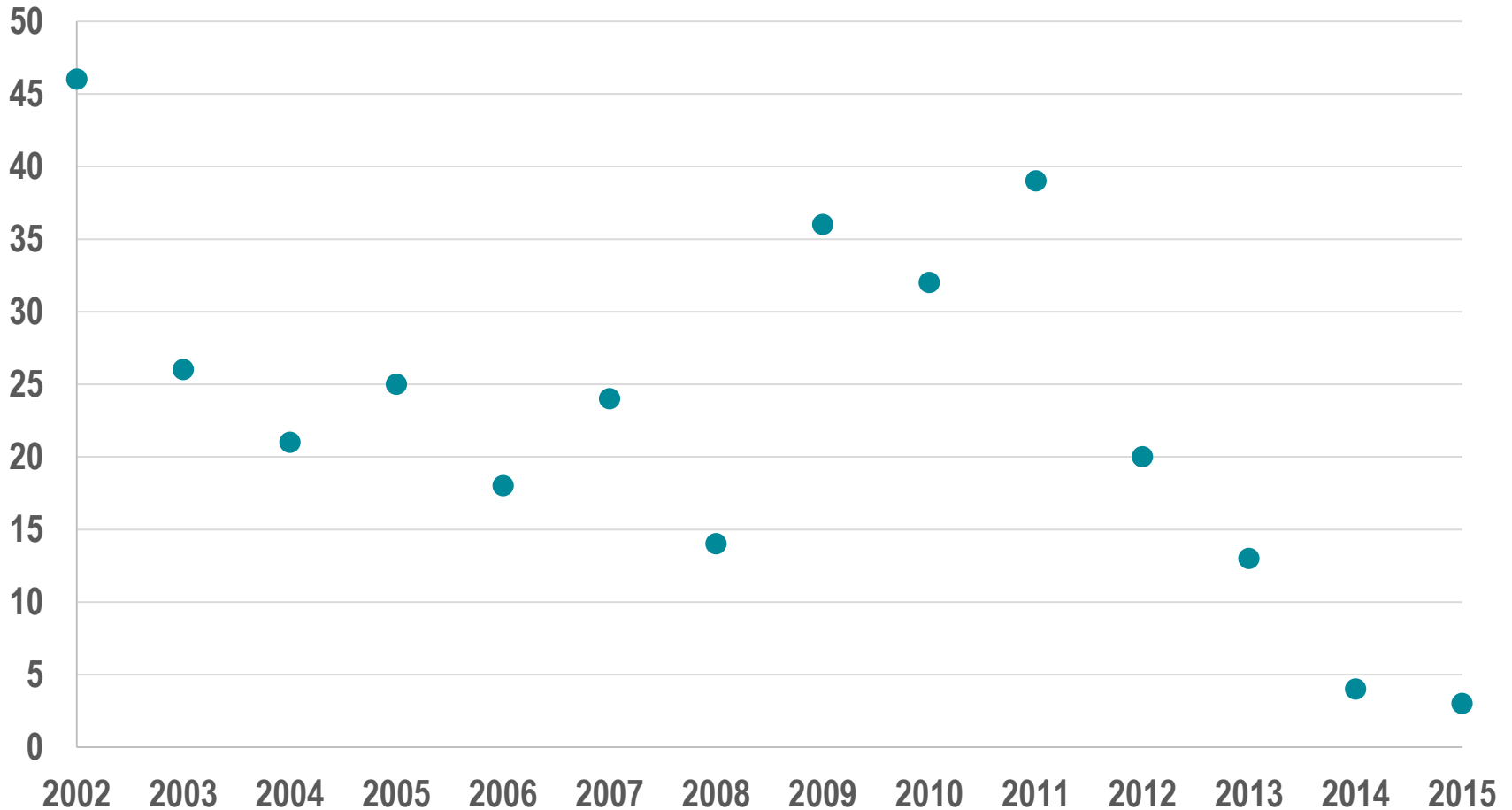


# Sacramento River Water Temperature





# Egg to Fry Survival (%)



# Summary

- CVP/SWP biological opinion drives many of our efforts to protect winter-run
- Close agency coordination, intensified during drought
- Decision making based on strong science and monitoring
  - Southwest Fisheries Science Center water temperature modeling and juvenile tracking
- Evolving and effective partnerships
  - Water groups helping to implement recovery actions
- Recovery Action Mapping Tool will be our database for tracking recovery action status
- Recovery progress hampered by the worst CA drought on record