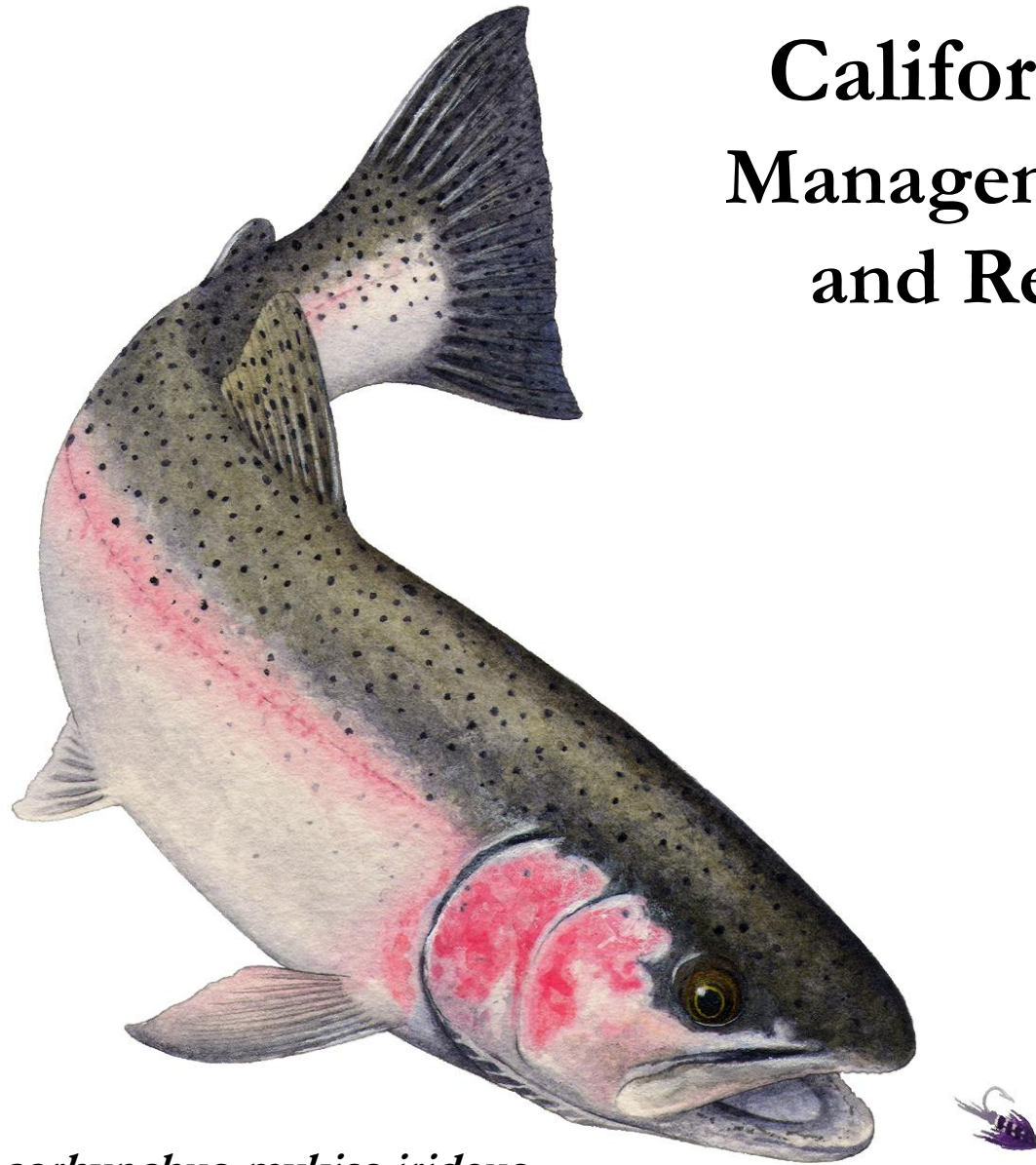


California Steelhead: Management, Monitoring and Recovery Efforts

Jonathan Nelson

Steelhead Management,
Research and Restoration
Program



Oncorhynchus mykiss irideus

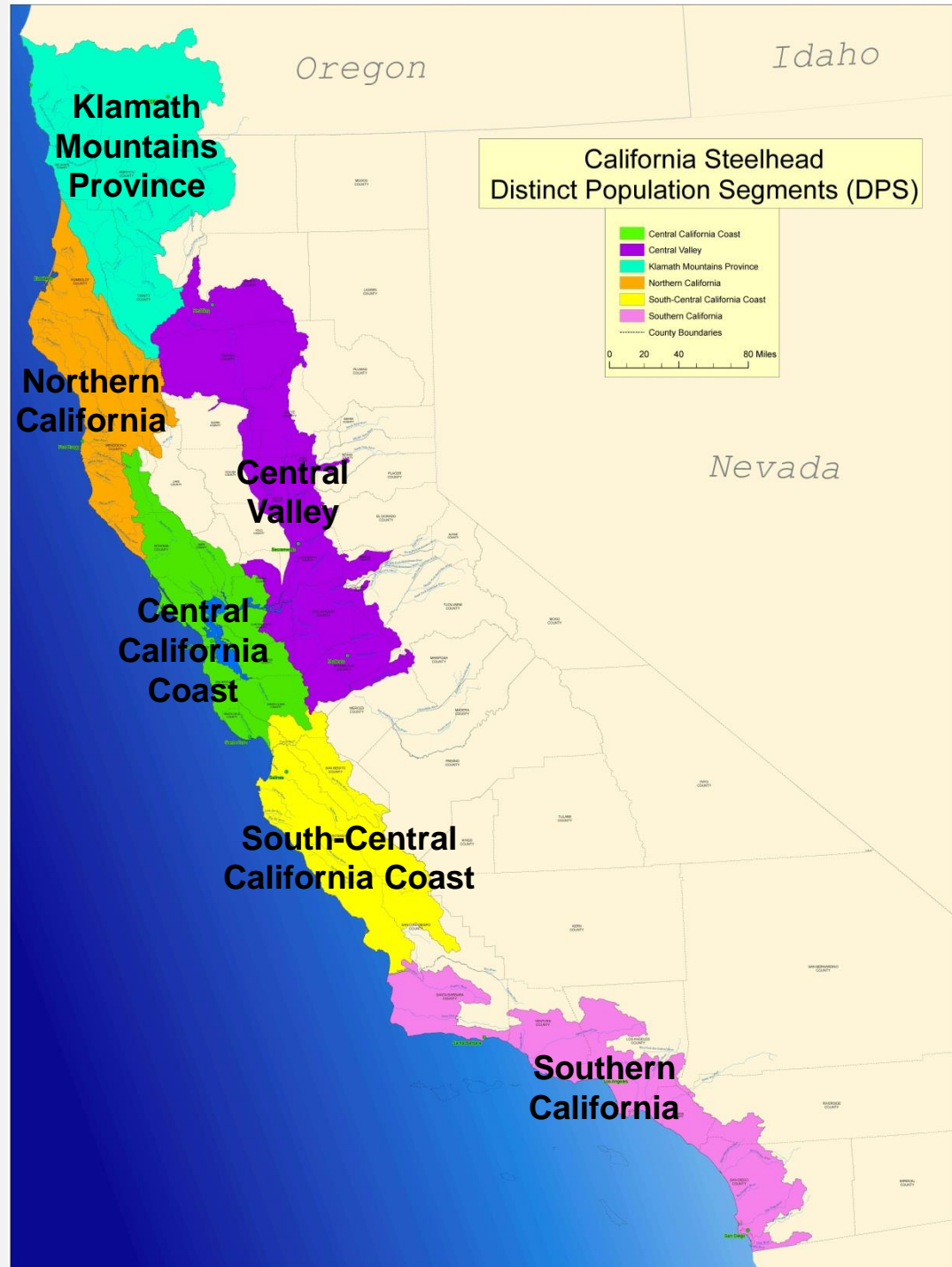


California Steelhead – Current Topics

- **Federal status reviews completed in 2016**
- **Expand California Monitoring Plan**
- **Lingering effects of drought**
- **Localized effects of natural disasters**
- **Implementation of recovery actions**
- **Implement CA HSRG and develop of HGMPs**

California Steelhead Distinct Population Segments (DPS)

- **Klamath Mountains Province**
Status: Not warranted (2001)
Species of Special Concern
- **Northern California**
Status: Threatened (2000)
- **Central California Coast**
Status: Threatened (1997)
- **Central Valley**
Status: Threatened (1998)
- **South-Central California Coast**
Status: Threatened (1997)
- **Southern California**
Status: **Endangered** (1997)



Steelhead Ecotypes in California Waters

- **Winter Steelhead** (ocean maturing)
 - Present in all California DPS
 - Predominant run observed throughout California
 - Enter freshwater in fall/winter and spawn within weeks to months upon entry
 - Status highly variable throughout the State
 - Most difficult run to monitor population due to seasonal water conditions
- **Fall Steelhead** (stream maturing)
 - Observed in Trinity & Klamath watersheds in the Klamath Mountain Province DPS
 - Enter freshwater in summer/fall and spawn late fall/winter
 - Stock appears to be stable
 - Run timing coincides with Trinity River Hatchery Steelhead
- **Summer Steelhead** (steam maturing)
 - 23 streams in the Klamath Mountains Province and Northern California DPS
 - Enter freshwater in spring and early summer, move to headwaters and hold over in deep pools and spawn late fall/winter
 - Overall stock status is uncertain, but several individual populations appear stable
 - This life history is prone to threats and should be evaluated for additional protection measures
- **“Half-Pounder” runs**
 - Observed in the Klamath Mountains Province and Northern California DPS
 - Defined as sub-adults that have spent 2-4 months in estuary or nearshore before returning to the river to overwinter

NOAA Fisheries Steelhead DPS Status Reviews

April 2016

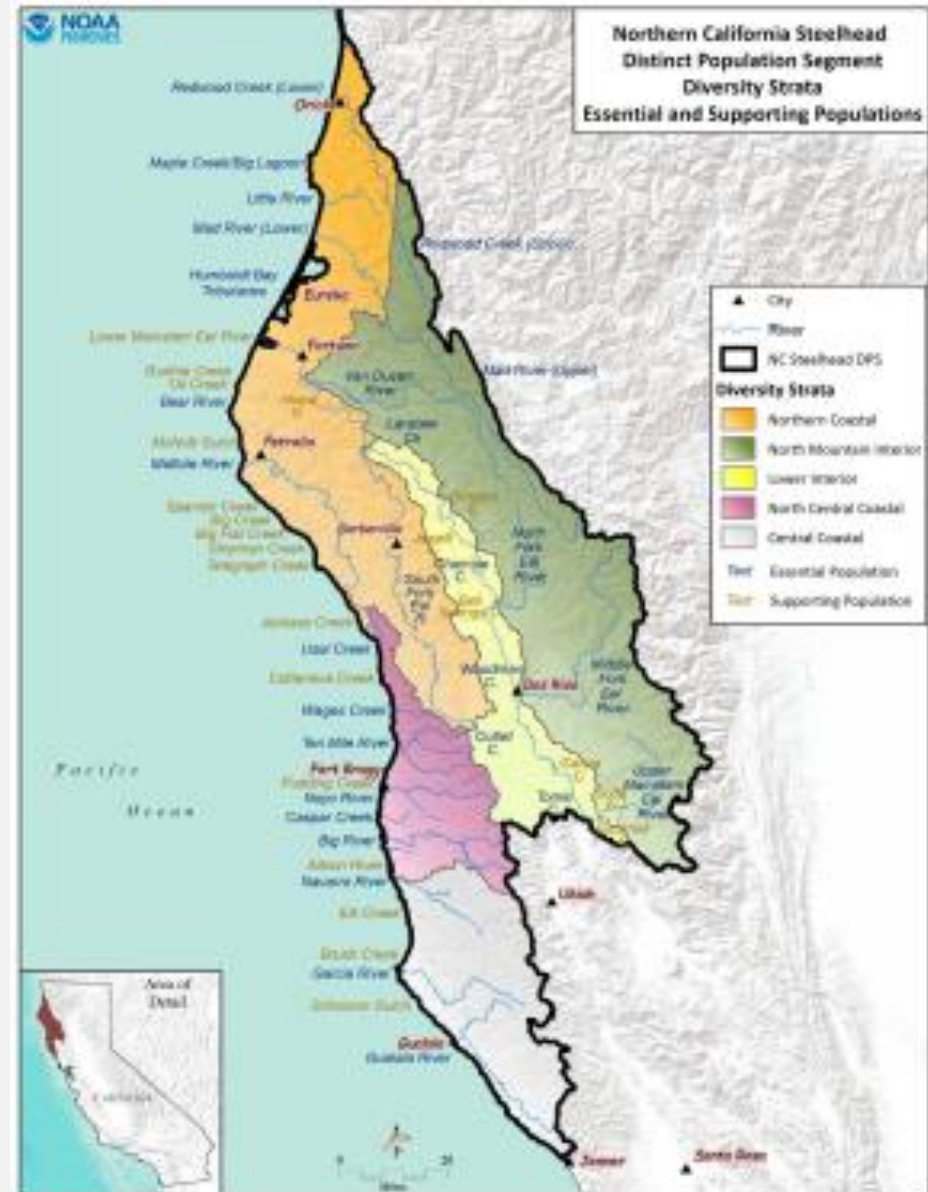
Northern California

Winter Steelhead

- 5 YR trend/viability: Mixed
- Present in all diversity strata
- All extant populations remain
- No viable populations (N = 42)

Summer Steelhead

- Present in known diversity strata
- Half of extant pops remain
- No viable populations (N = 10)



NOAA Fisheries Steelhead DPS Status Reviews

April 2016

Central California Coast Winter Steelhead

- 5 YR trend/viability: Uncertain
- Present in all diversity strata
- Some populations may be extirpated – SF Bay Strata
- Observed increase in abundance for Santa Cruz Mtn stratum
- Russian River higher proportion of hatchery to natural origin
- Scott Ck (most studied) showing downward trend
- No viable populations (N = 37)



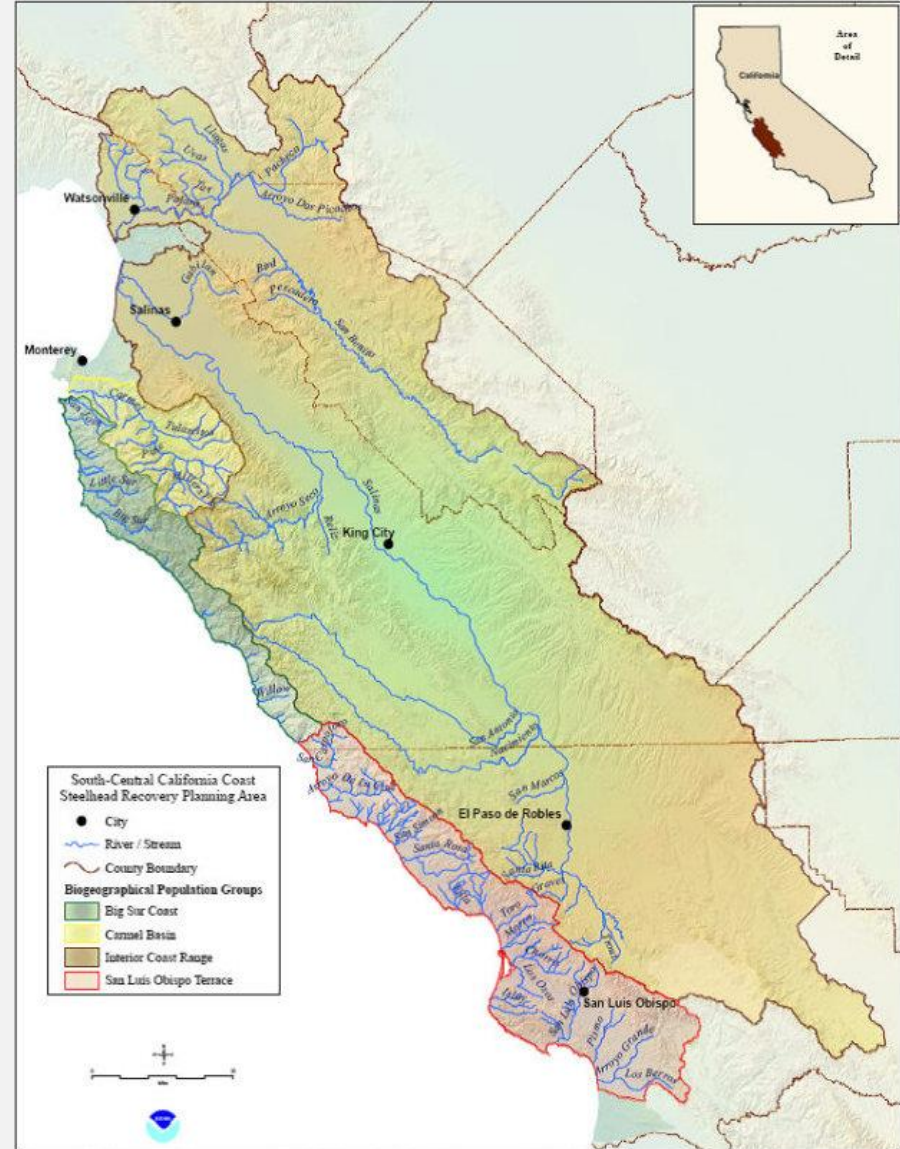
NOAA Fisheries Steelhead DPS Status Reviews

March 2016

South-Central California Coast

Winter Steelhead

- 5 YR trend/viability: Negative
- Present in all diversity strata
- Lingering effects of drought
- Continuing decline on Carmel River
 - Decline in survival of in-river smolts
 - Reliance on rescued smolts at intermediate rearing facility
 - Removal of San Clemente Dam and river restoration in 2015
- No viable populations (N = 13)



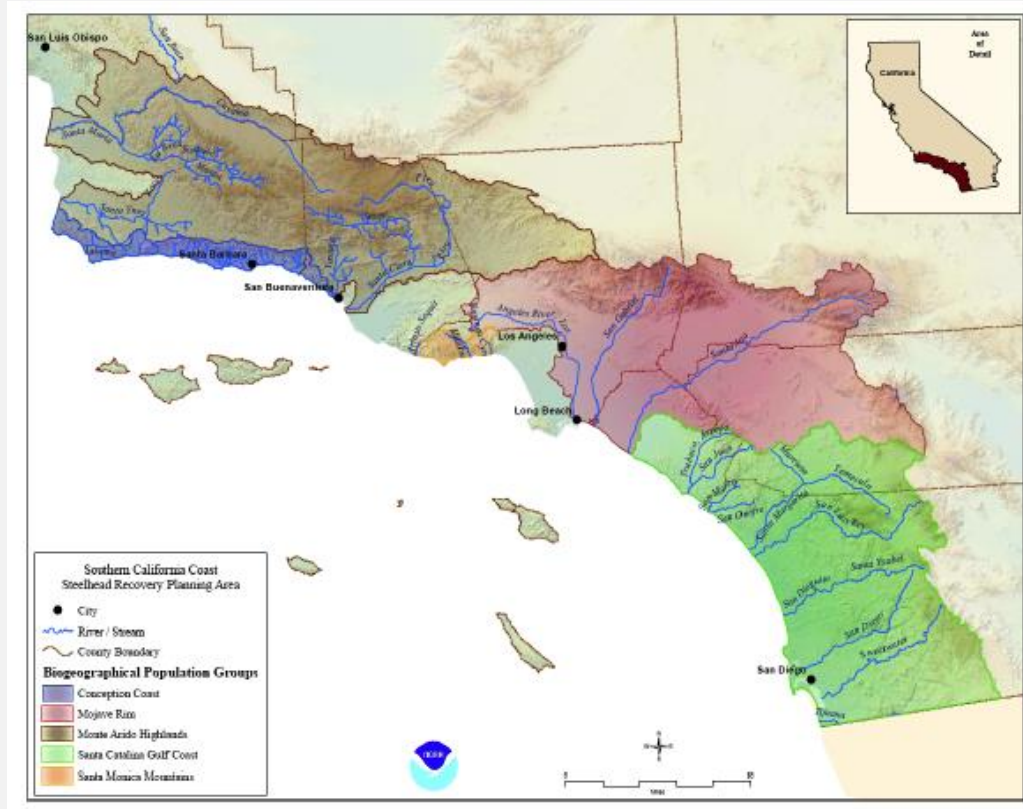
NOAA Fisheries Steelhead DPS Status Reviews

March 2016

Southern California

Winter Steelhead

- 5 YR trend/viability: Uncertain
- Present in all diversity strata
- Extirpation of native stocks
- Substantial introgression of hatchery rainbow trout in two BPGs
 - Mojave Rim
 - Catalina Gulf Coast
- Lingering effects of drought
- No viable populations (N = 18)



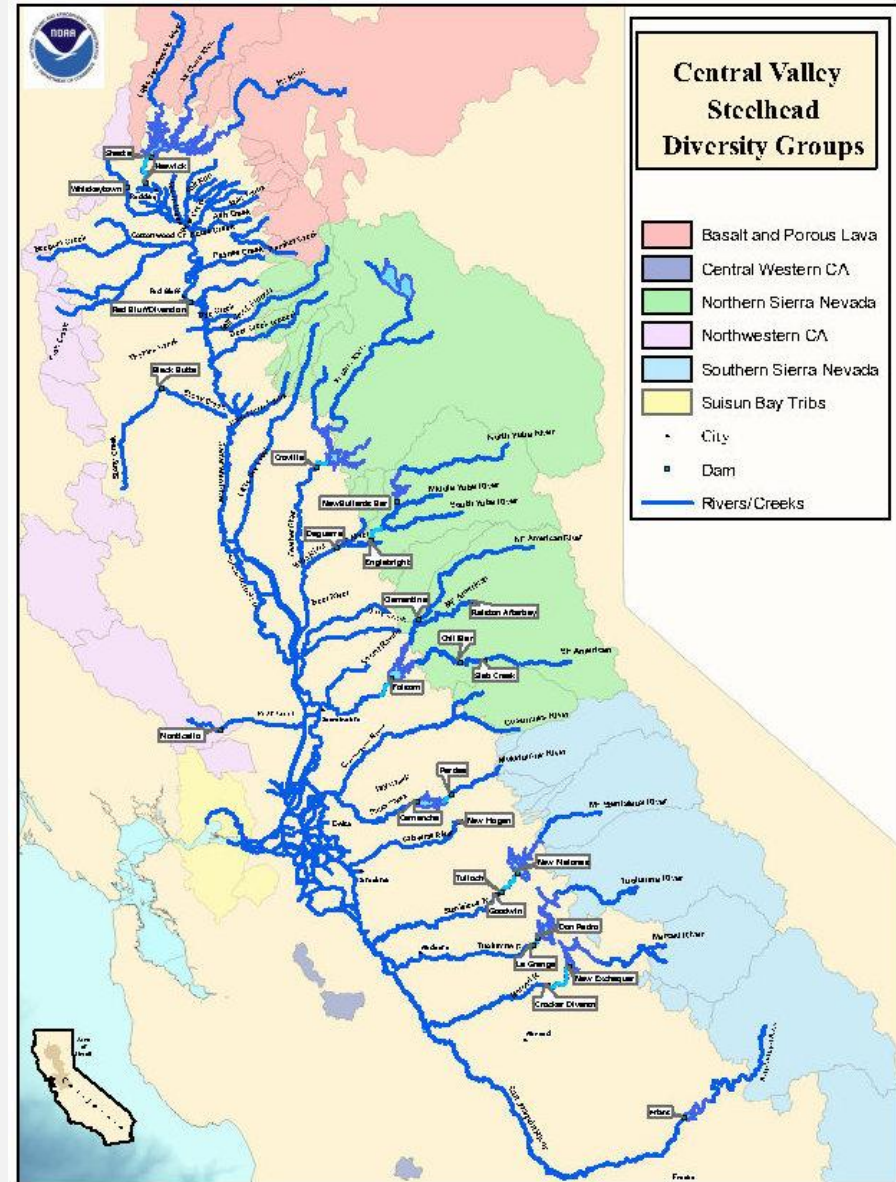
NOAA Fisheries Steelhead DPS Status Reviews

May 2016

California Central Valley

Winter Steelhead

- 5 YR trend/viability: Uncertain
- Widely distributed throughout the valley
- Positive trend for Clear Creek
- Dominated by hatchery origin fish
- Mokelumne River Hatchery fish included in DPS
- No viable populations (N = 81)



CA Steelhead Recovery and Management Plans

- **Northern California DPS – NMFS October 2016**

http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/northern_california_coast/coastal_multispecies_recovery_plan.html

- **Central California Coast DPS – NMFS October 2016**

http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/northern_california_coast/coastal_multispecies_recovery_plan.html

- **California Central Valley DPS – NMFS July 2014**

http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/california_central_valley/california_central_valley_recovery_plan_documents.html

- **South-Central California Coast DPS – NMFS December 2013**

http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/south_central_southern_california_coast/south_central_southern_california_coast_recovery_plan_documents.html

- **Southern California DPS – NMFS January 2012**

http://www.westcoast.fisheries.noaa.gov/protected_species/salmon_steelhead/recovery_planning_and_implementation/south_central_southern_california_coast/south_central_southern_california_coast_recovery_plan_documents.html

- **Steelhead Restoration and Management Plan for California - CDFW Feb 1996**

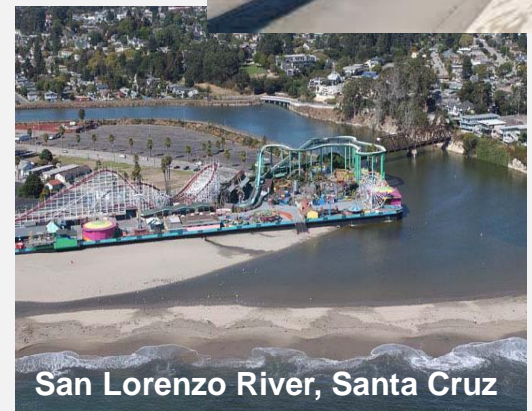
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=3490&inline>

- **Fish Species of Special Concern in California - CDFW July 2016**

<https://www.wildlife.ca.gov/Conservation/SSC/Fishes>

Coastal Steelhead Populations Threats

- Poor forest and land use practices
- Habitat blockages and degradation
- Passage barriers – Dams and diversions
- Elevated water temperatures
- Dewatering from irrigation
- Lagoon breaching
- Invasive plant species
- Urbanization and channelization
- Fish predation
- Non-native fish competition
- Drought



Thomas Fire and Montecito Mudslide

Southern California



Before

**Matilija Creek
Tributary to Ventura River
Ventura County**



Before

**Gabernador Creek
Tributary to Carpinteria Creek
Santa Barbara County**



After

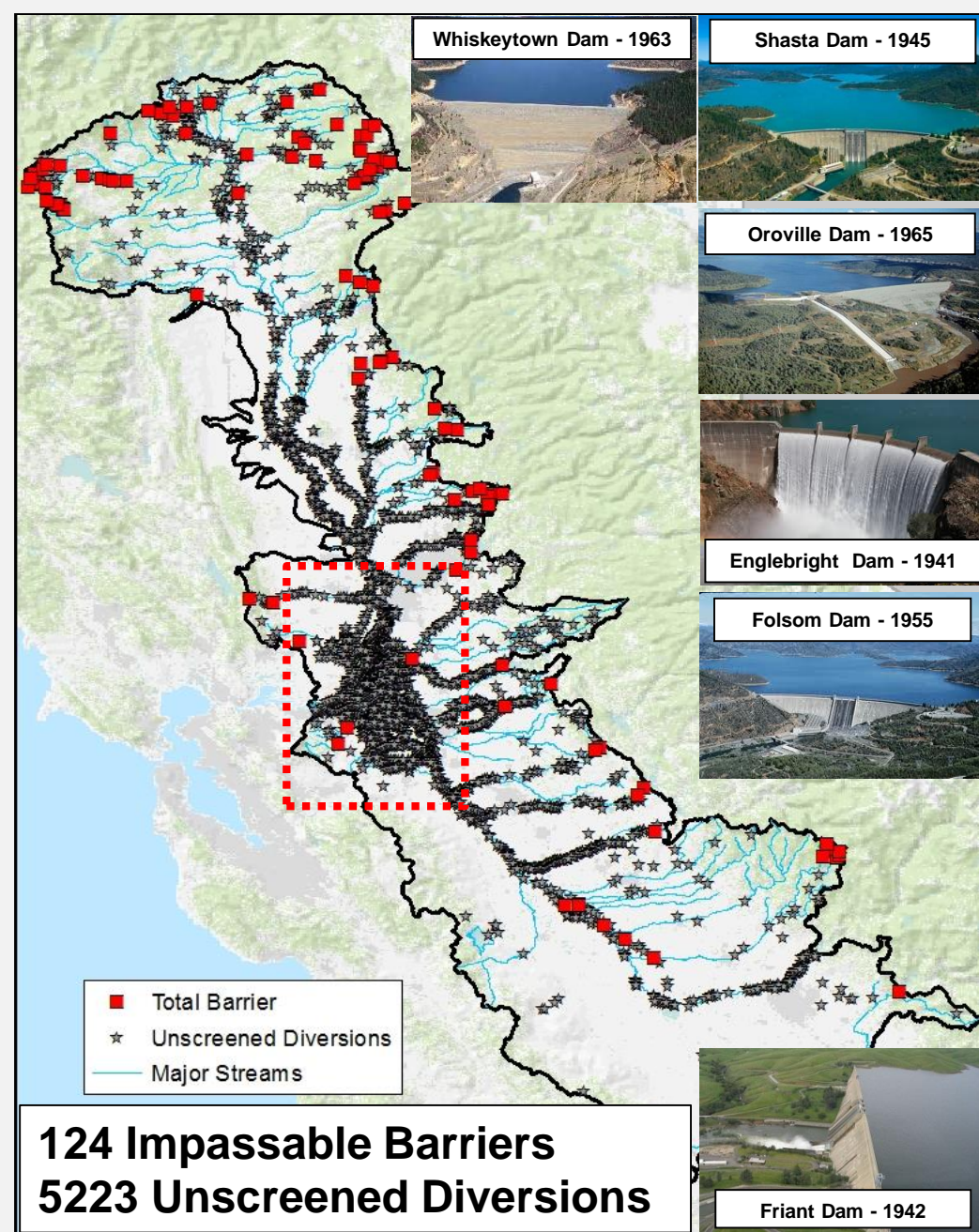


After

FEB/ 1/2018

Central Valley Steelhead Population Threats

- **Dams (13 major reservoirs)**
 - Habitat blockages and loss
 - Habitat degradation
- **Water Management**
 - Diversions and dewatering
 - Poor water quality
- **Predation**
- **Migration paths in Delta**
- **Drought**



~ 80% of historical habitat unavailable

Oroville Dam Spillway Failure – Feather River



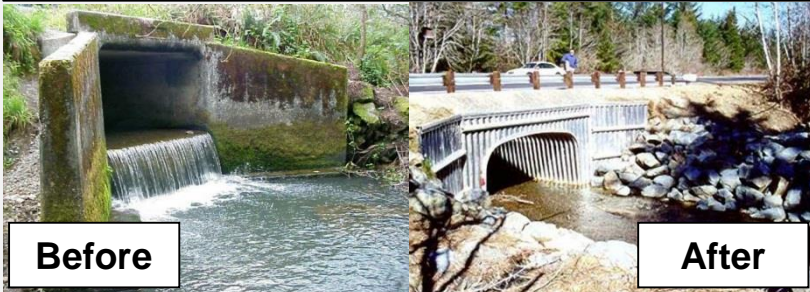
- **Occurred in February 2017**
- **Extended high discharge 100K (~ 2 weeks)**
 - **Scour of newly constructed redds**
 - **High amounts of debris and siltation**
- **Dramatic reduction in flow 50K cfs to 600 cfs**
 - **Stranding of yearling and adult steelhead**
 - **51 rescued and 36 dead**

Restoration Efforts for Steelhead in California

- **Restoration actions include:**

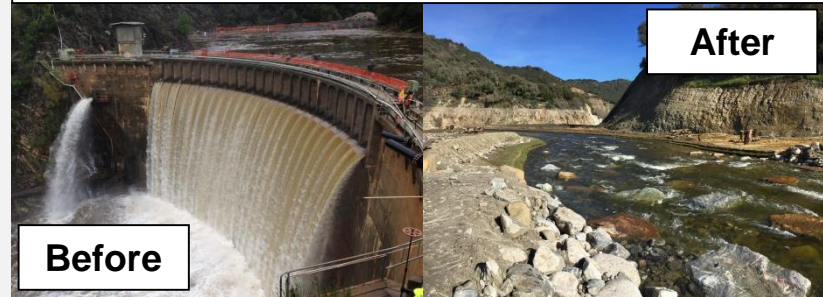
- Estuary enhancements
- Invasive plant removal
- Predator removal
- Riparian enhancement
- Barrier removals
- Gravel augmentation
- Stream channel enhancement
- Water user agreements
- Land acquisitions

Barrier Removal Project



Jordan Creek - Del Norte County

Dam Removal Project



San Clemente Dam – Carmel River

Bank Stabilization Project



Santa Rosa Creek – San Luis Obispo County

- **Primary funding source:**
 - CDFW Fisheries Restoration Grant Program

California Steelhead Report and Restoration Card Program

Program established in 1993 with the following objectives:

1. **Gather angler data to provide catch data**
 - Effort, origin, harvest and location
 - Tool for fisheries management decisions
2. **Generate revenue for steelhead projects**
 - Funds are prioritized for projects that can provide angler benefit through restoration, monitoring and education.
 - ~ 3.55 M dedicated to 169 projects to date

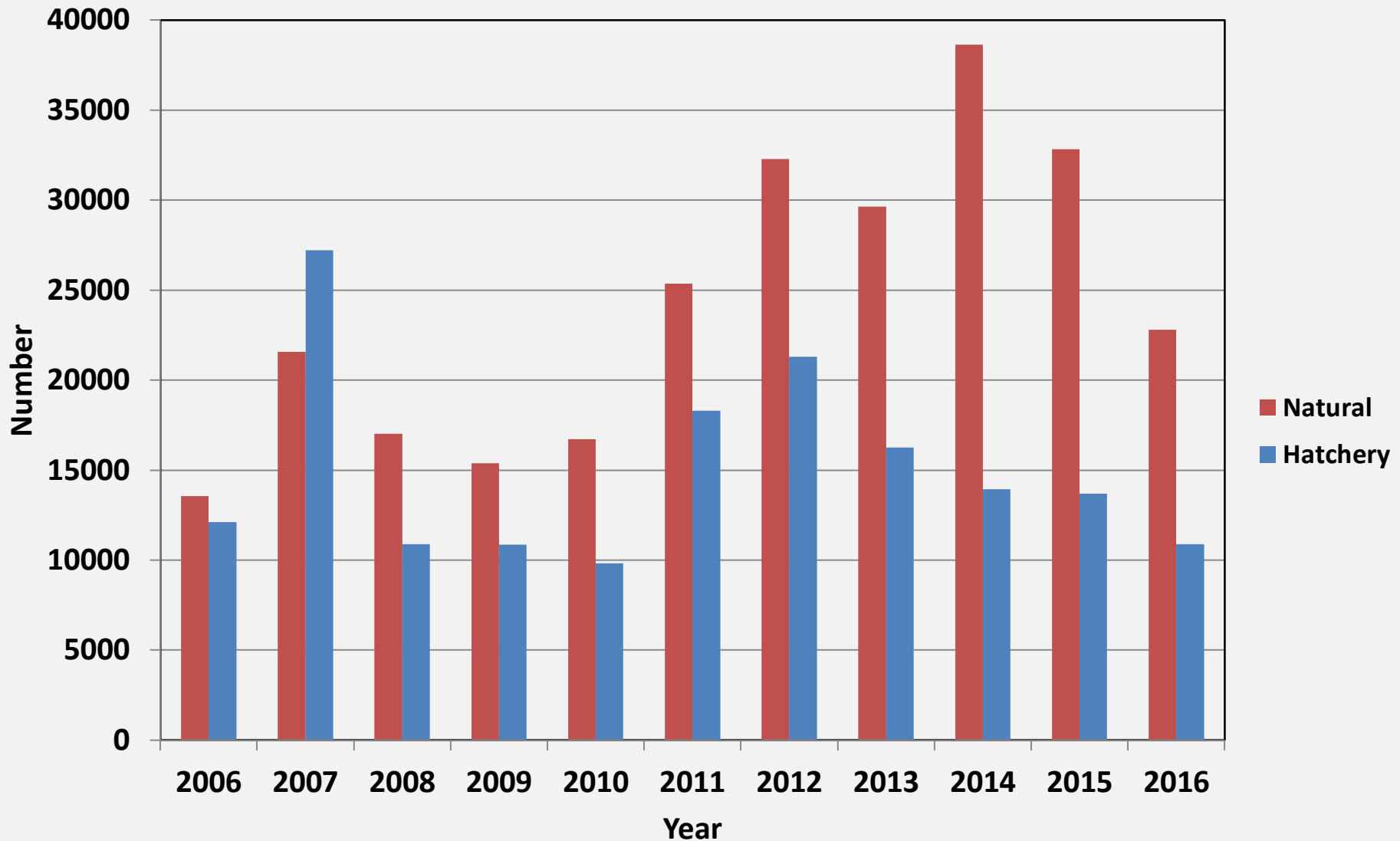
Data Reporting

- **Mandatory reporting in 2003**
- **~ 55,000 Cards purchased annually**
 - ~ 25% annual return rate
- **Online reporting available in 2011**
 - Observed shift from mail to online reporting, but not an increase in return rate
- **Data are not used to make population estimates**
- **Detailed information and program reports available:**

<https://www.wildlife.ca.gov/Conservation/Inland-Fisheries/Steelhead-Report-Card>

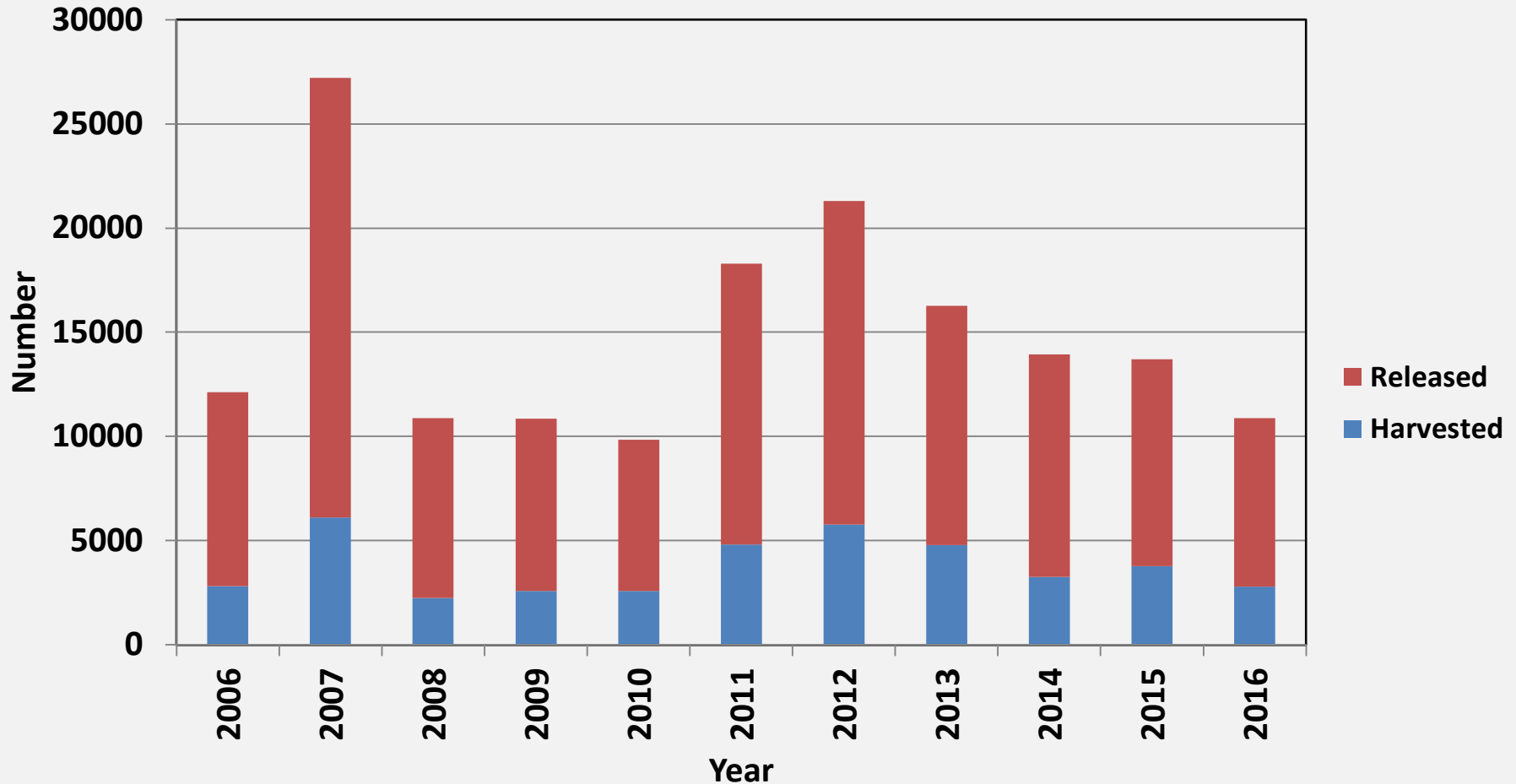
California Steelhead Report Card Data

Statewide Angler Reported Catch of *O. mykiss* (> 16") 2006-2016



California Steelhead Report Card Data

Reported Harvest of Hatchery-origin *O. mykiss* (> 16") 2006-2016



- **Statewide daily bag and possession limits are 2 and 4**
- **~25% reported harvest of hatchery fish annually**

California Steelhead

Monitoring Plans:

California Coast:

- **California Coastal Salmonid population Monitoring: Strategy, Design, and Methods.**
 - (CDFG Fish Bulletin 180, 2011)

California Central Valley:

- **A Comprehensive Monitoring Plan for Steelhead in the California Central Valley**
 - (CDFG 2010)
- **Implementation Plan for the Central Valley Steelhead Monitoring Plan**
 - (CDFW 2014)

Monitoring Techniques:

- **Life Cycle Monitoring Stations**
- **VAKI and Video Stations**
- **DIDSON Stations**
- **Weirs and Fish Traps**
- **REDD Surveys**
- **Snorkel Surveys**
- **Acoustic Telemetry**

California Steelhead Monitoring Programs



CV Steelhead Monitoring Program



Lower Sacramento River

- Large Wire Fyke Traps
- Resistance Board Weirs with video/sonar monitoring
- VAKI units in ladders
- PIT antenna arrays



Cottonwood Creek



Bear Creek

California Hatchery Program Reviews

Eight facilities statewide

- Central Valley (4)
- Coastal (4)

Issues include:

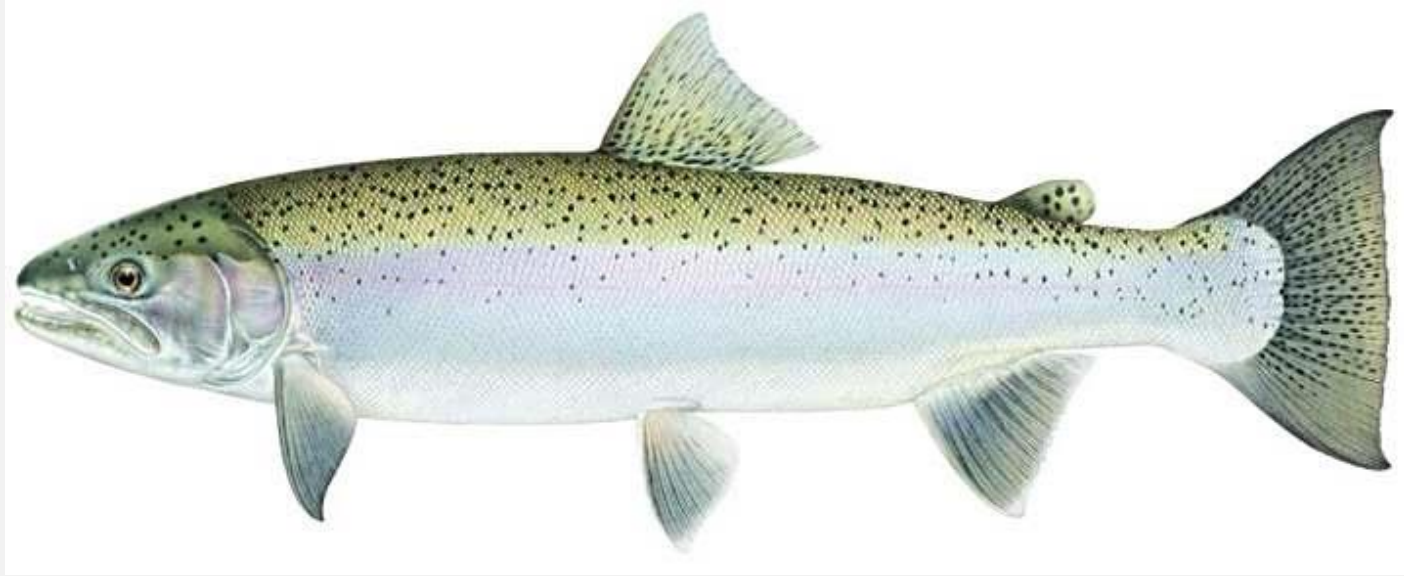
- Reducing inbreeding
- Increasing natural origin broodstock
- Evaluating Kelt reconditioning
- Re-establishing proper stock on American River
- Iron Gate program collapse



For detailed information: <http://cahatcheryreview.com>

CALIFORNIA STEELHEAD SUMMARY

- **Steelhead stocks in California appear to be stable to declining**
- **Need consistent water supply and unimpeded passage**
- **Need to implement identified recovery actions**
- **Need implementation of monitoring programs & data collection**
- **Need to continue to address & alleviate threats**
- **Need baseline funding for population assessment and restoration**



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