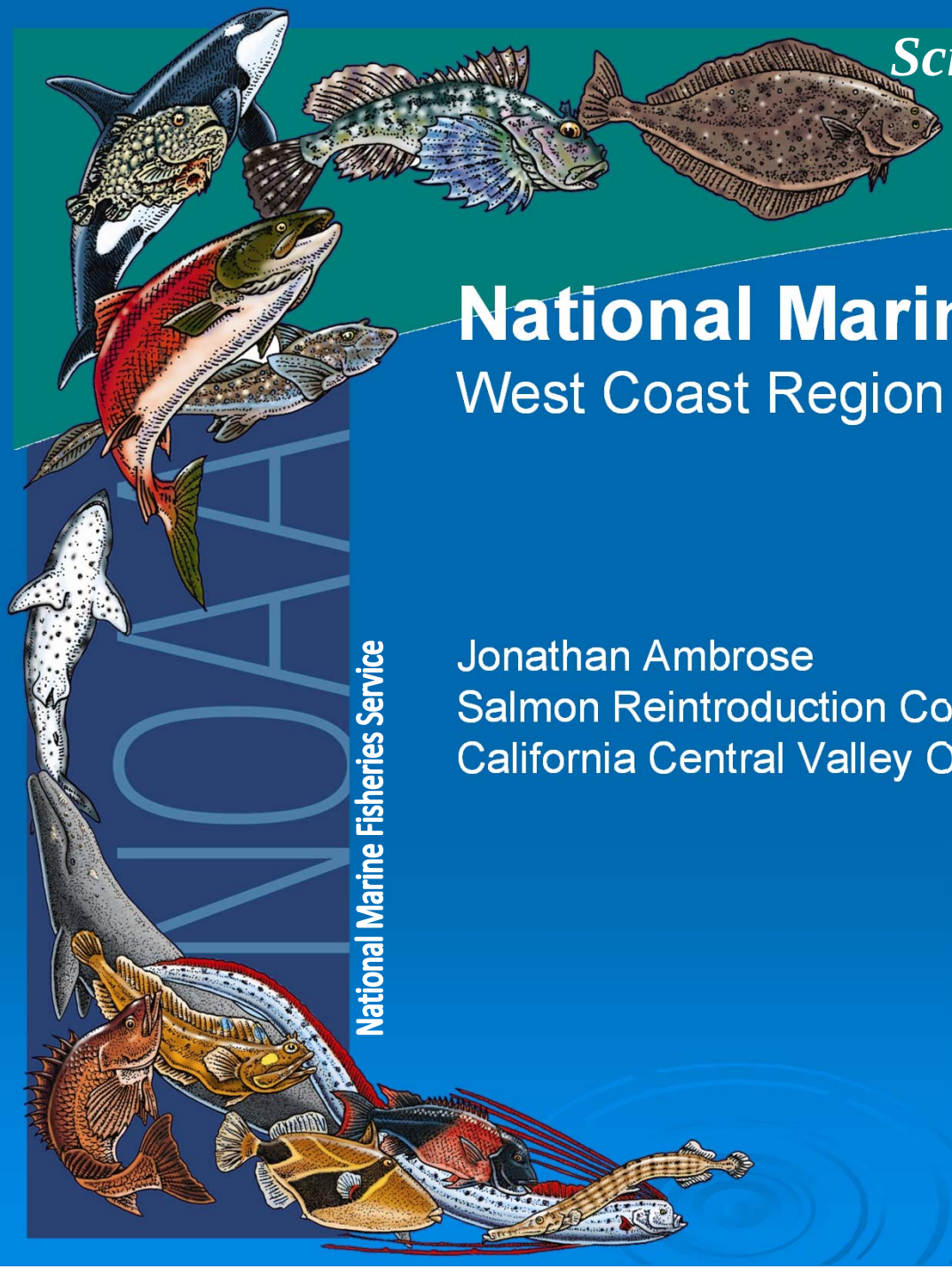
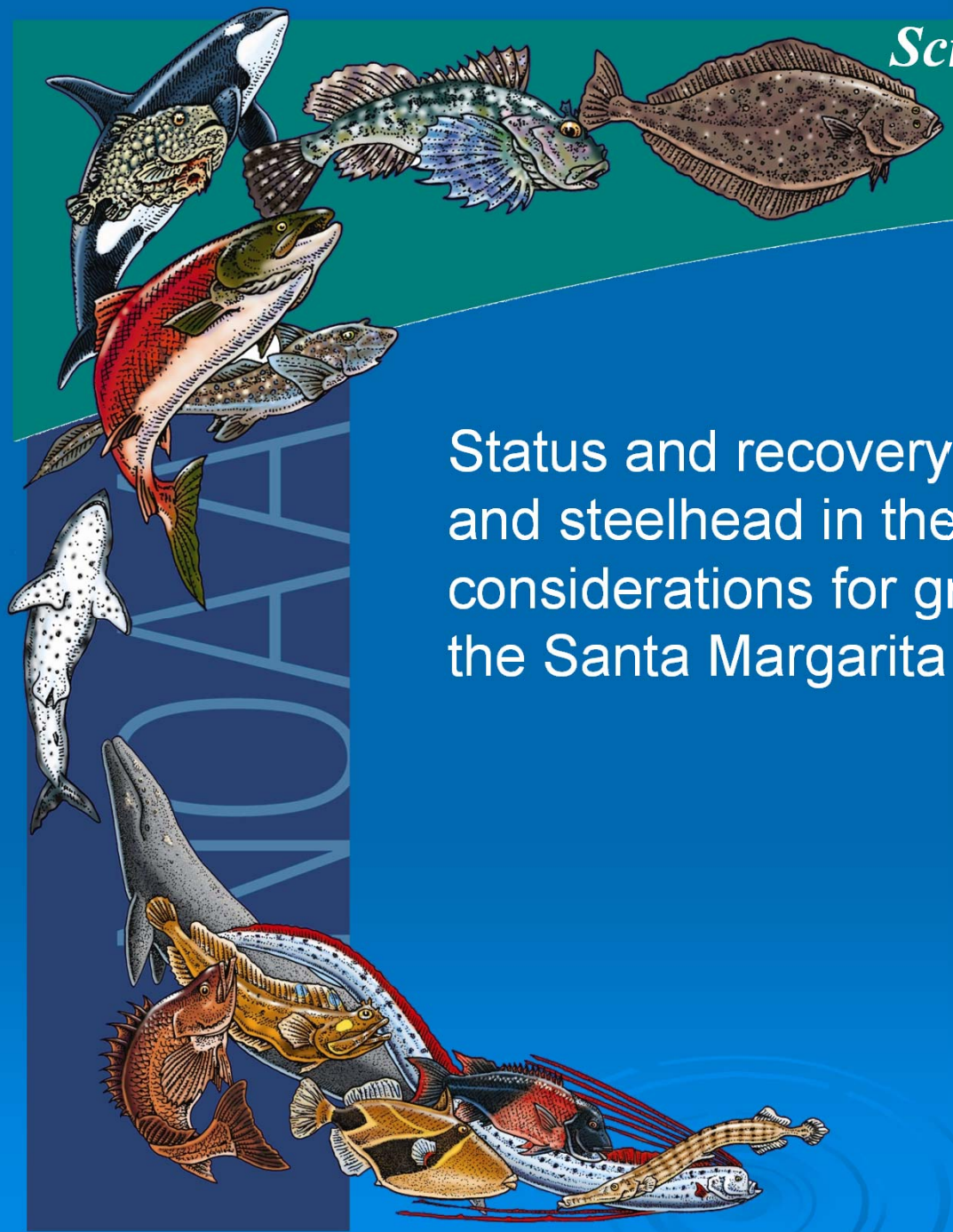


Science, Service, Stewardship

National Marine Fisheries Service

West Coast Region

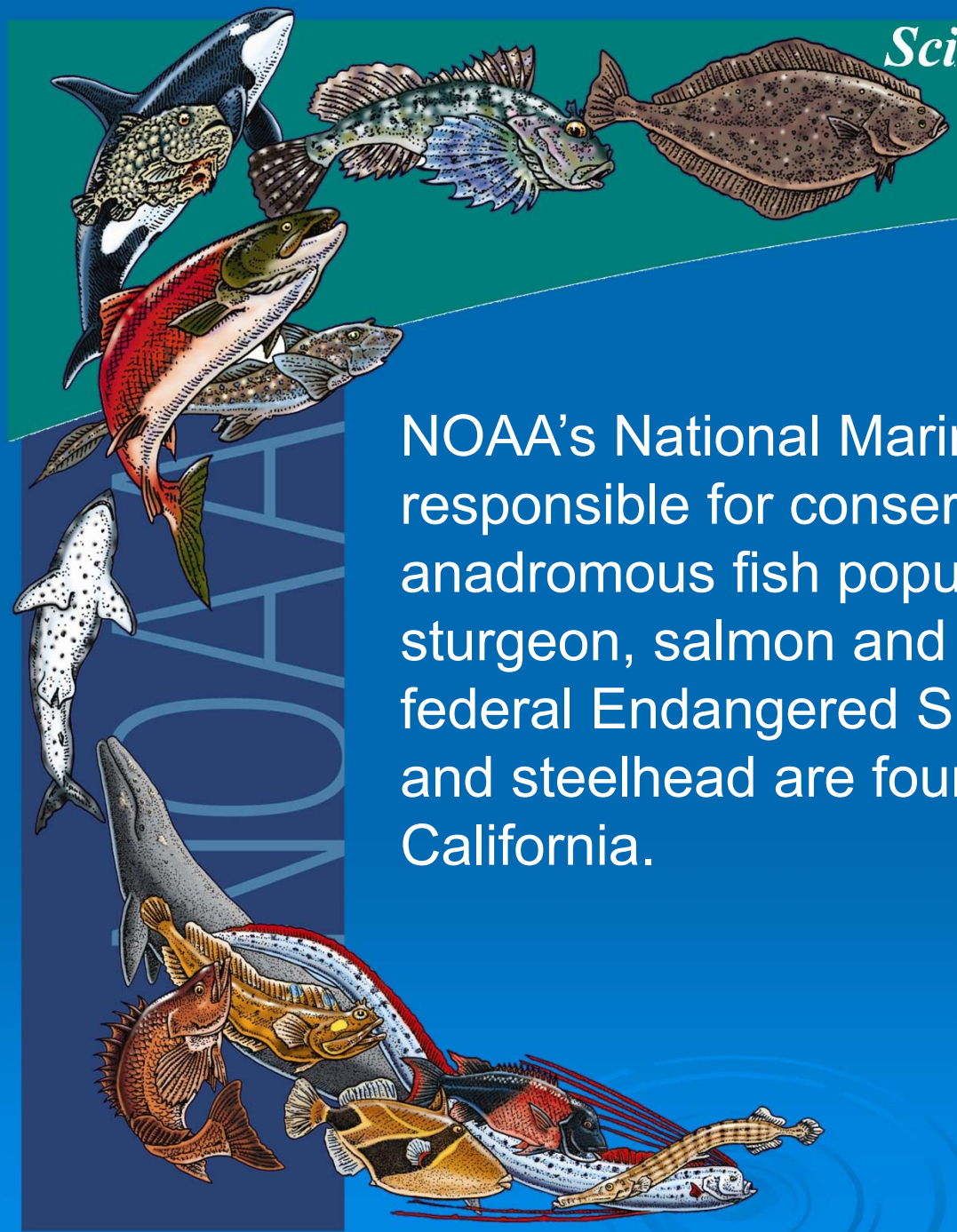
Jonathan Ambrose
Salmon Reintroduction Coordinator
California Central Valley Office



Science, Service, Stewardship

Status and recovery plan overview for salmon and steelhead in the Santa Cruz Mountains and considerations for groundwater sustainability in the Santa Margarita aquifer

Science, Service, Stewardship



NOAA's National Marine Fisheries Service is responsible for conserving and recovering anadromous fish populations, including green sturgeon, salmon and steelhead, listed under the federal Endangered Species Act. Coho salmon and steelhead are found in Santa Cruz County, California.

Salmonid Life-cycle

CCC Steelhead
Listed as Threatened (1997)
Recovery Plan: (2016)

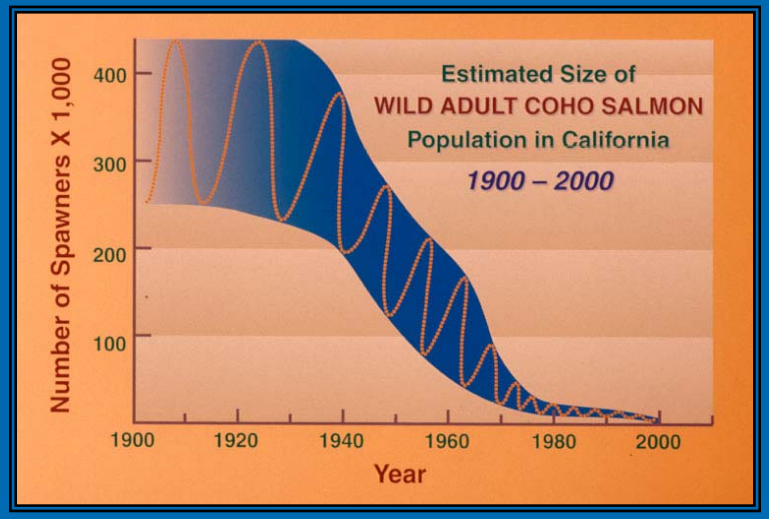
Juvenile steelhead in Scott Creek. Morgan Bond, SWFSC

Adult Russian R steelhead. Josh Fuller, NMFS

Smolt steelhead from San Gregorio Cr. Lagoon. Joel Casagrande, NMFS


NOAA FISHERIES
Central California Coast Steelhead
Distinct Population Segment
Diversity Strata
Essential and Supporting Populations
City
River
CCC Steelhead DPS
Diversity Strata
Interior
North Coastal
Coastal San Francisco Bay
Interior San Francisco Bay
Santa Cruz Mountains
Text Essential Population
Text Supporting Population
Ukiah
Upper Russian River
Gualala
Crocker C.
Gill C.
Miller C.
Sausal C.
Dry Creek
Maacama Creek
Austin Creek
Porter C.
Hulbert C.
Sheephouse C.
Jenner
Dutch Bill C.
Freezeout C.
Willow C.
Salmon Creek
Estero Americano
Stemple Creek
Walker Creek
Green Valley Creek
Mark West Creek
Santa Rosa
Napa River
Sonoma Creek
Napa
Petaluma River
Green Valley Creek/Suisun
Novato C.
Lagunitas Creek
Miller
Drakes Bay
San Rafael
Pinole C.
San Pablo C.
Wildcat C.
Walnut Creek
Corte Madera C.
Arr. G.M. del Presido
Pine Gulch
Redwood Creek
Codornices C.
Pacific
Ocean
San Francisco
San Leandro C.
San Lorenzo C.
Hayward
San Pedro Creek
San Mateo C.
Alameda Creek
Half Moon Bay
Pilarcitos Creek
San Francisquito C.
Tunitas Creek
Stevens C.
San Jose
San Gregorio Creek
Pescadero Creek
Coyote Creek
Guadalupe River
Gazos Creek
Waddell Creek
Scott Creek
San Vicente Creek
Laguna Creek
Santa Cruz
San Lorenzo River
Soquel Creek
Aptos Creek
Area of Detail
California
0
20
Miles

CCC Coho Salmon
Listed as Threatened (1996)
Re-Listed as Endangered (2005)
Recovery Plan: (2012)
Species in Spotlight (2015)

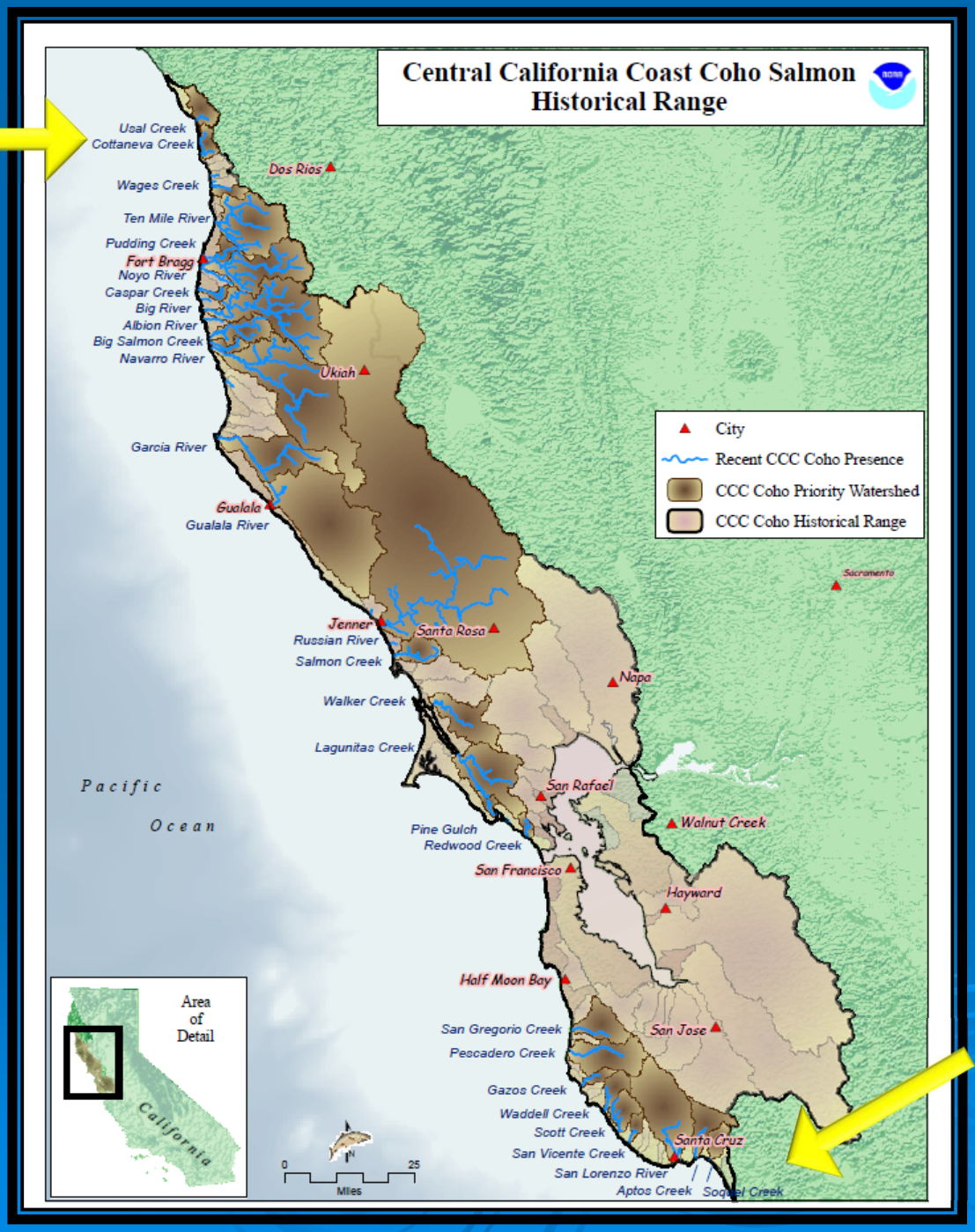


CCC Coho Salmon Estimates

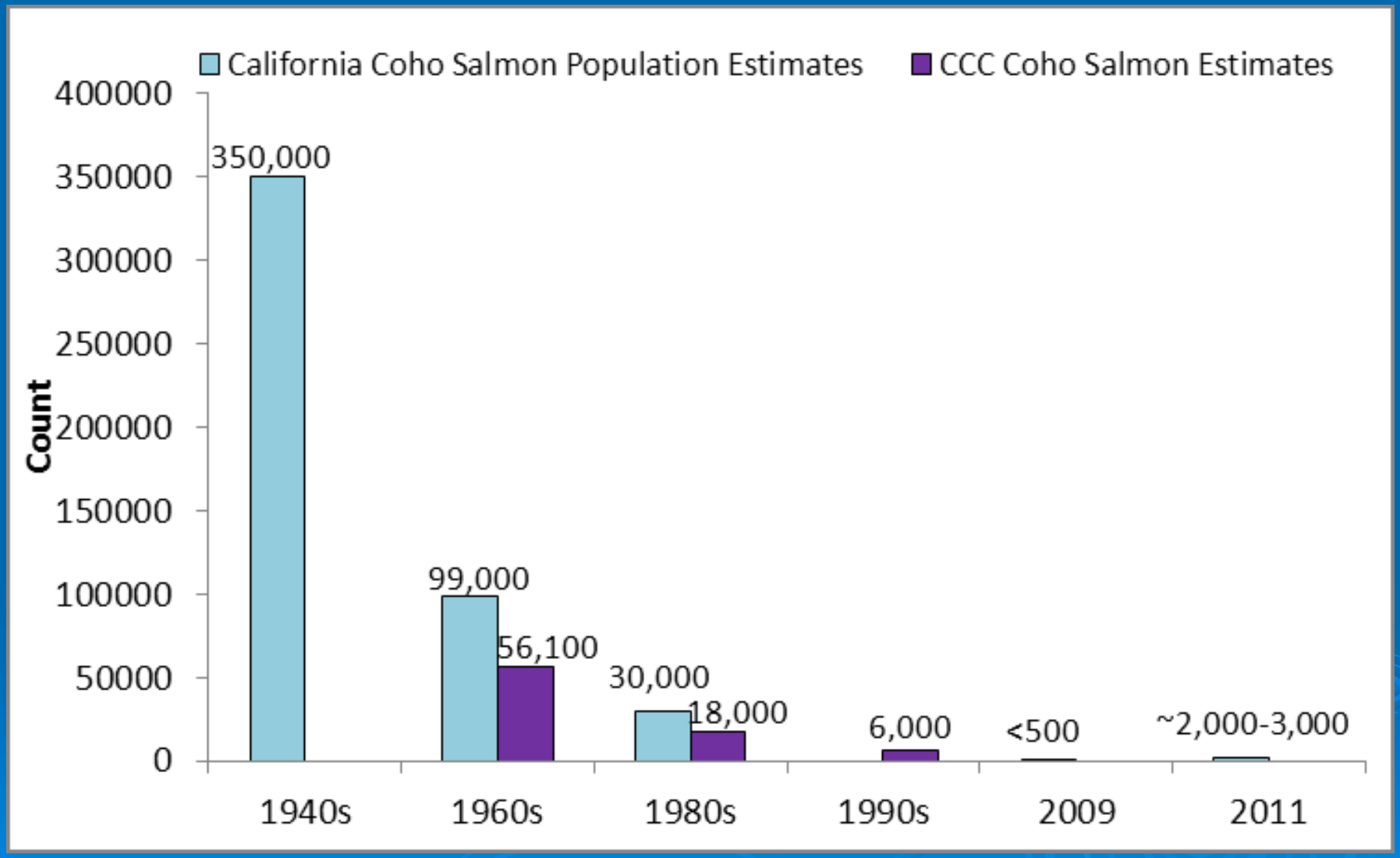
99% reduction in total population

Science January 29, 2010 Issue: CCC coho salmon appear to be the most endangered salmon on the west coast.

Usal Creek
Mendocino County



Aptos Creek
Santa Cruz County


California Coho Salmon Population Estimates
CCC Coho Salmon Estimates
Count
400000
350000
300000
250000
200000
150000
100000
50000
0
350,000
99,000
56,100
30,000
18,000
6,000
<500
~2,000-3,000
1940s
1960s
1980s
1990s
2009
2011

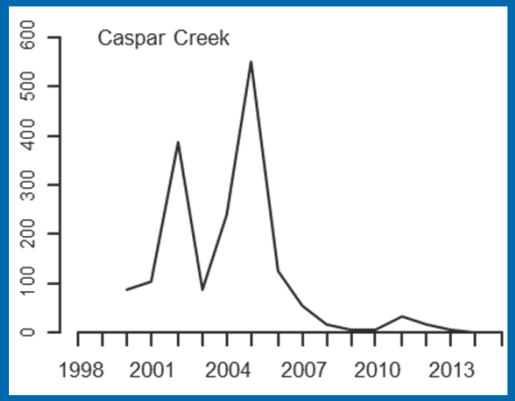
From Original Petition to List Coho Salmon. Dec. 16, 1993. Santa Cruz County Fish and Game Advisory Commission

- "If not corrected these conditions* could lead to a total loss of coho in the next 10 to 20 years."

- * "predation, competition, instream conditions, lack of summer water, dewatering, lagoon degradation, habitat degradation, over exploitation, and poaching"

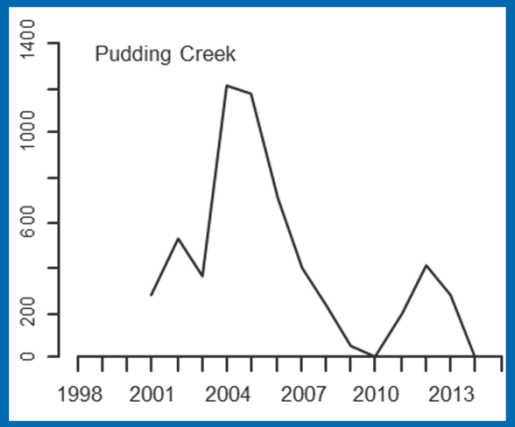
Monterey Bay Salmon and Trout Project and SWFSC

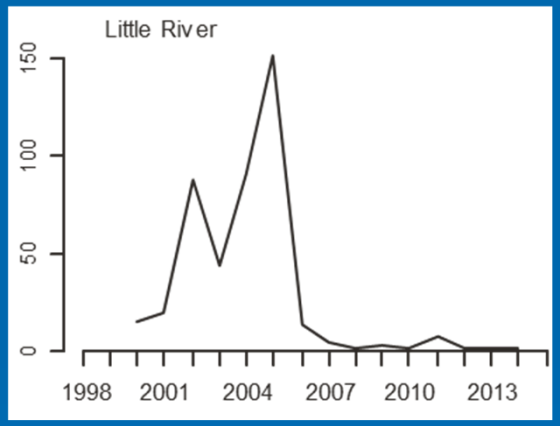
5 – year Status Review Update: CCC Coho Salmon ESU

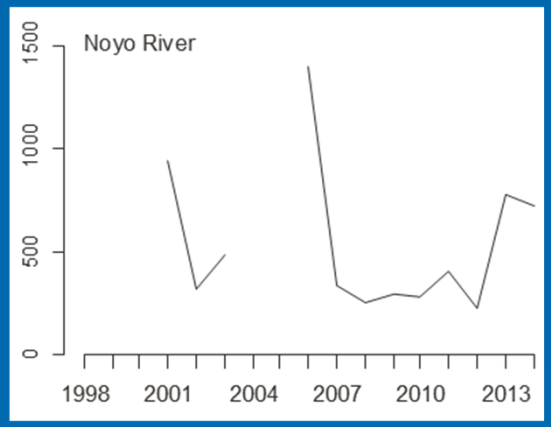


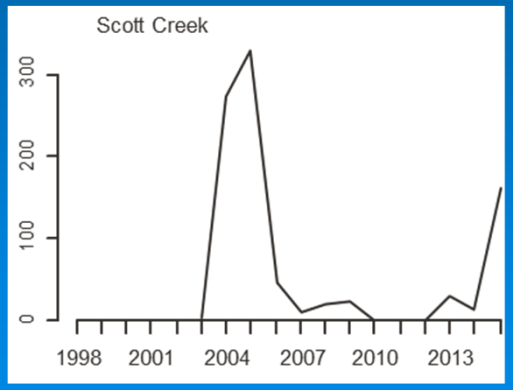
Rogers et al. 2016

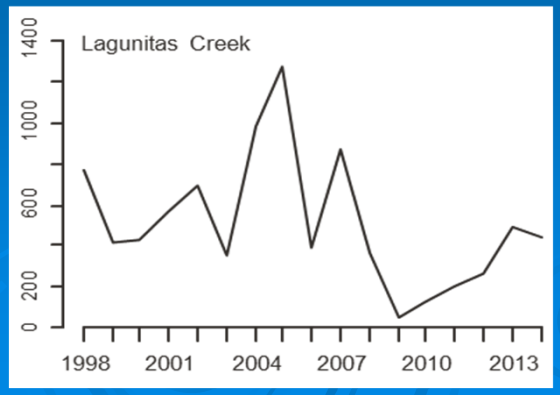
"A bright spot appears to be the recent improvement in abundance and spatial distribution noted within the strata's dependent populations; Scott Creek experienced the largest coho salmon run in a decade during 2014/15, and researchers recently detected juvenile coho salmon within four dependent watersheds where they were previously thought to be extirpated (San Vincente, Waddell, Soquel and Laguna creeks)."

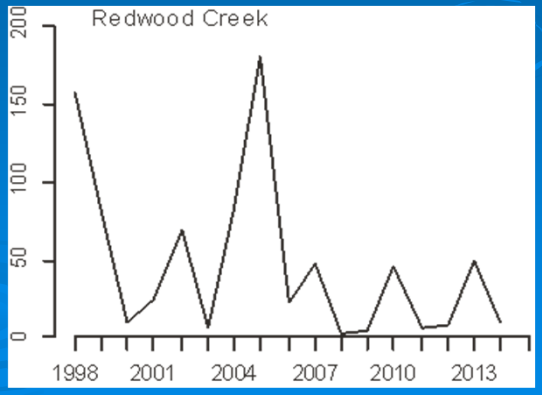




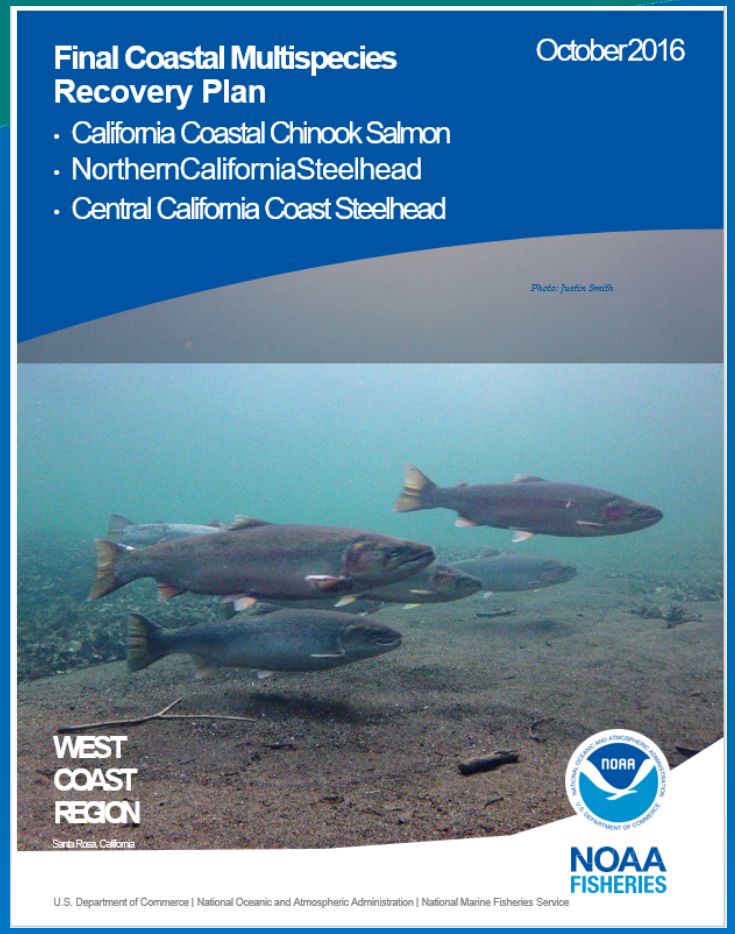


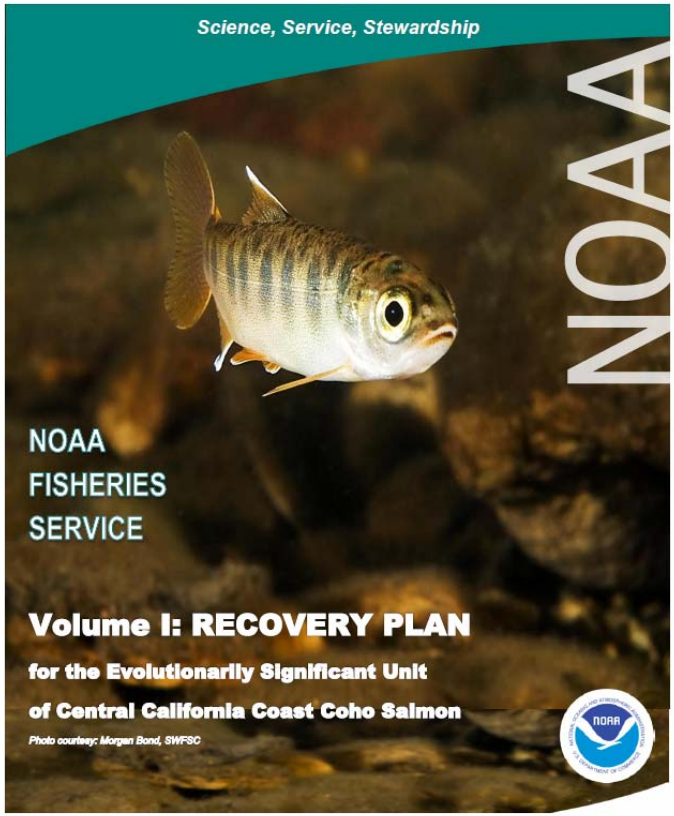


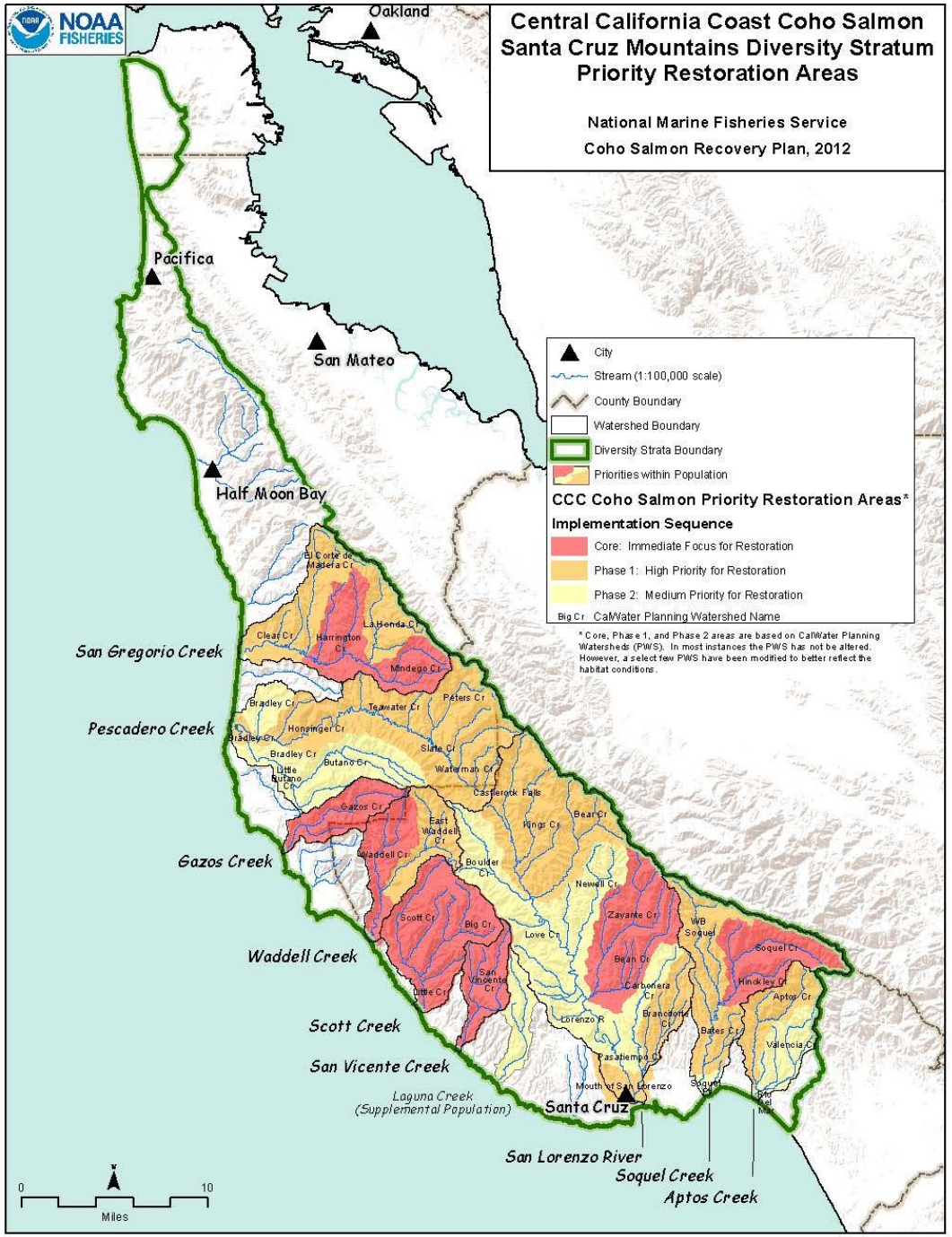


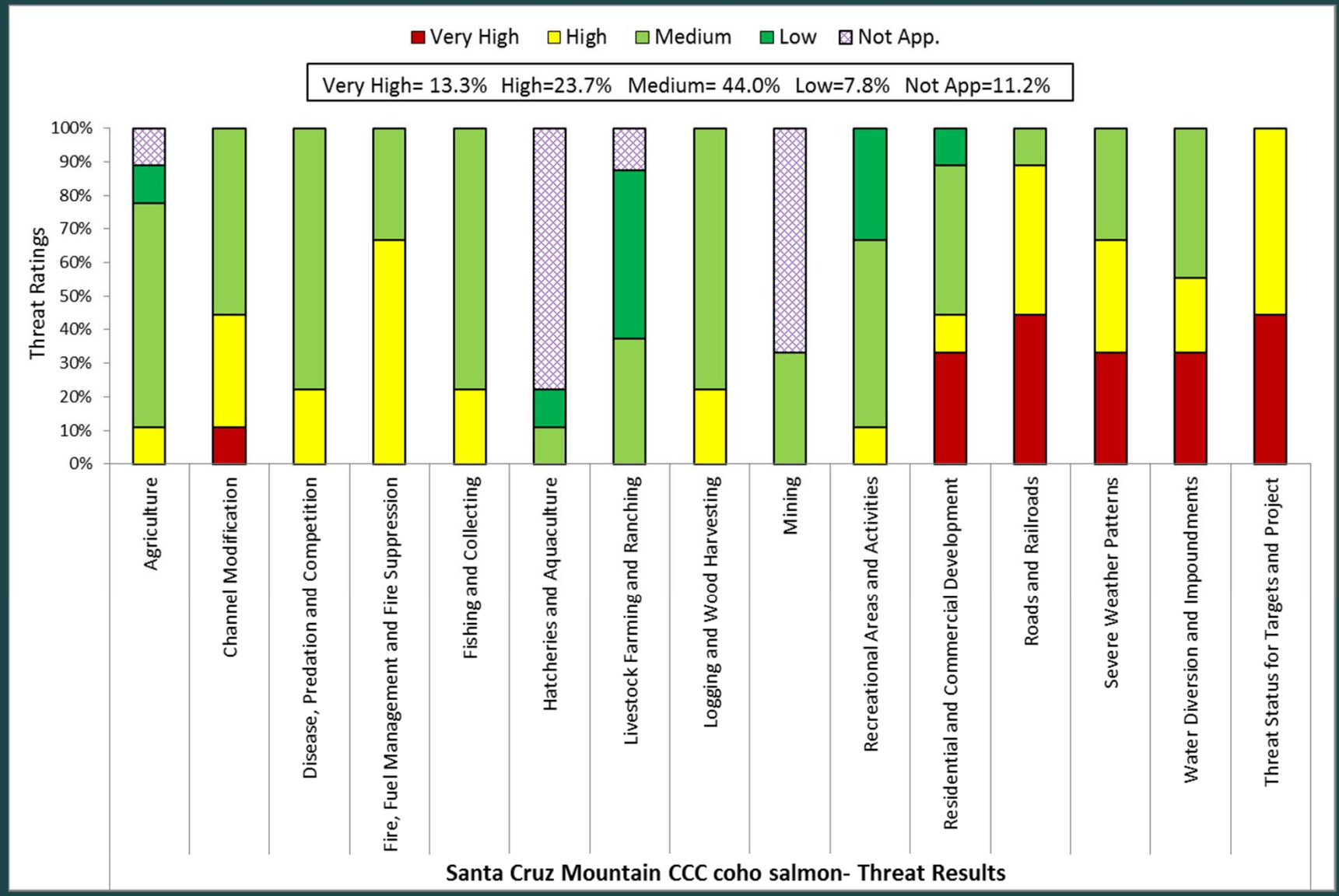


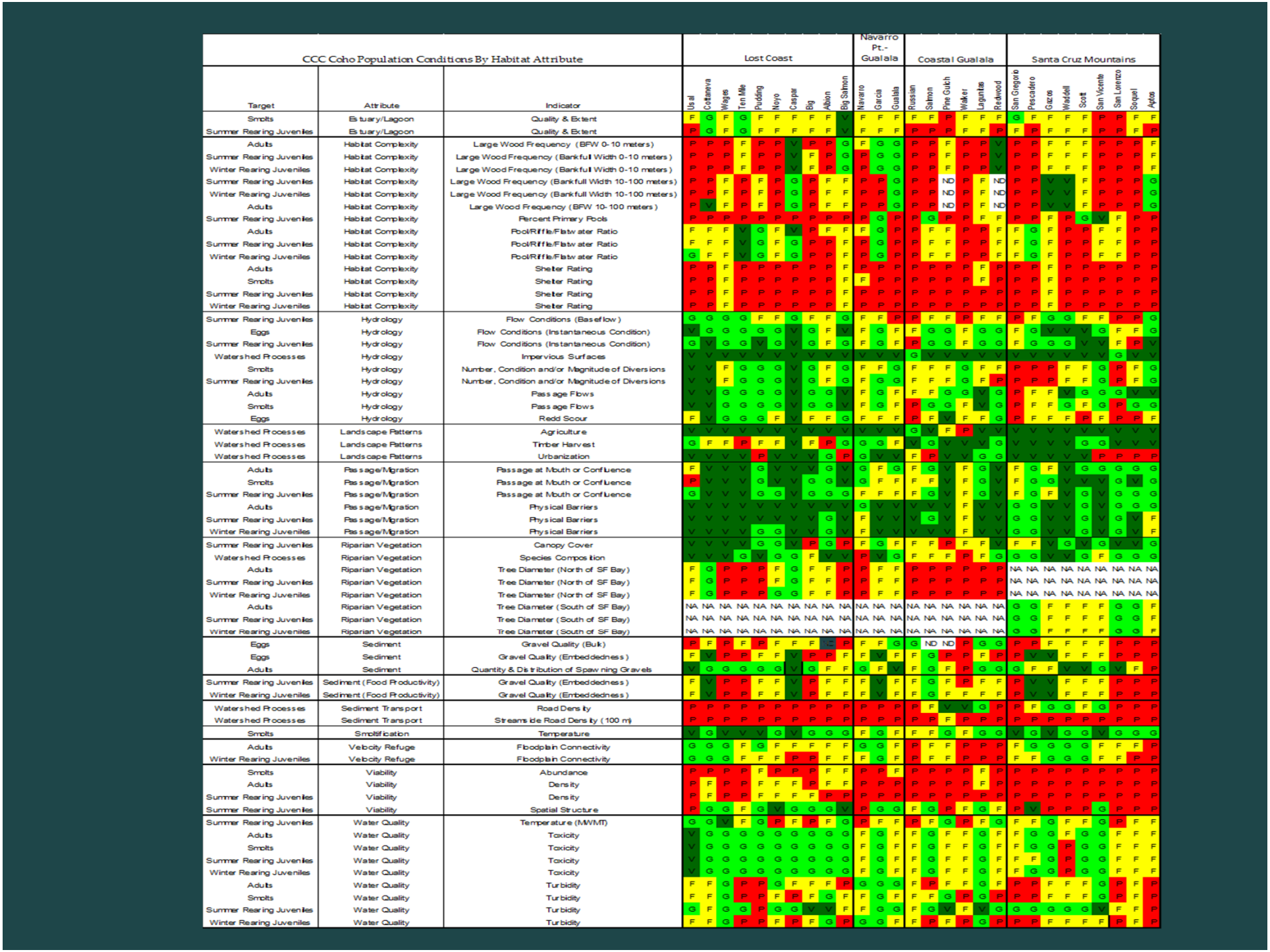
Federal Recovery Plans



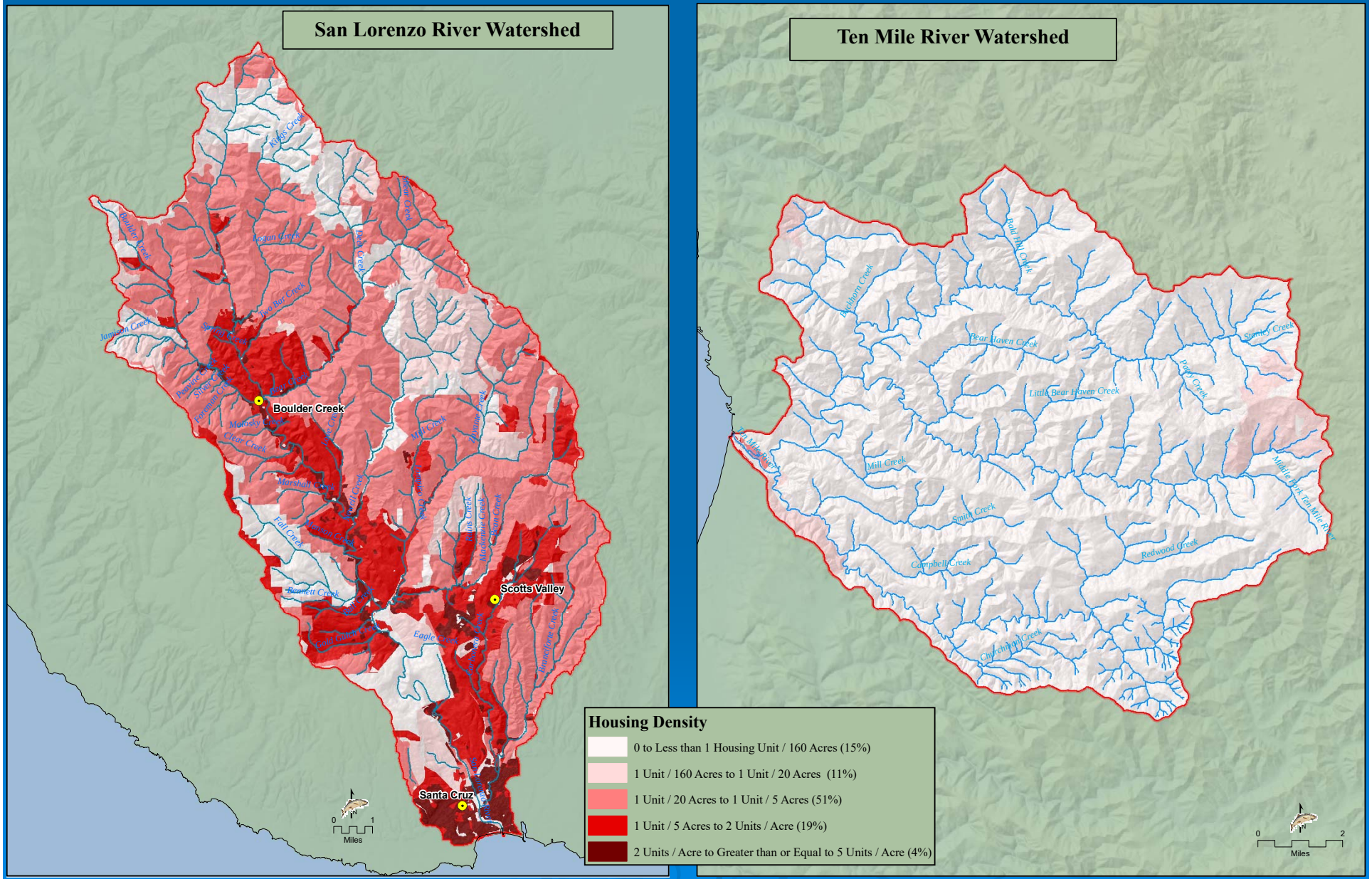



NOAA FISHERIES
Central California Coast Coho Salmon
Santa Cruz Mountains Diversity Stratum
Priority Restoration Areas
National Marine Fisheries Service
Coho Salmon Recovery Plan, 2012
Oakland
Pacifica
San Mateo
Half Moon Bay
City
Stream (1:100,000 scale)
County Boundary
Watershed Boundary
Diversity Strata Boundary
Priorities within Population
CCC Coho Salmon Priority Restoration Areas*
Implementation Sequence
Core: Immediate Focus for Restoration
Phase 1: High Priority for Restoration
Phase 2: Medium Priority for Restoration
Big Cr CalWater Planning Watershed Name
* Core, Phase 1, and Phase 2 areas are based on CalWater Planning Watersheds (PWS). In most instances the PWS has not be altered. However, a select few PWS have been modified to better reflect the habitat conditions.
San Gregorio Creek
Pescadero Creek
Gazos Creek
Waddell Creek
Scott Creek
San Vicente Creek
Laguna Creek
(Supplemental Population)
Santa Cruz
San Lorenzo River
Soquel Creek
Aptos Creek
0
10
Miles


Very High
High
Medium
Low
Not App.
Very High= 13.3% High=23.7% Medium= 44.0% Low=7.8% Not App=11.2%
Threat Ratings
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Agriculture
Channel Modification
Disease, Predation and Competition
Fire, Fuel Management and Fire Suppression
Fishing and Collecting
Hatcheries and Aquaculture
Livestock Farming and Ranching
Logging and Wood Harvesting
Mining
Recreational Areas and Activities
Residential and Commercial Development
Roads and Railroads
Severe Weather Patterns
Water Diversion and Impoundments
Threat Status for Targets and Project
Santa Cruz Mountain CCC coho salmon- Threat Results


CCC Coho Population Conditions By Habitat Attribute
Lost Coast
Navarro Pt.-Gualala
Coastal Gualala
Santa Cruz Mountains
Target
Attribute
Indicator
Usal
Cottaneva
Wages
Ten Mile
Pudding
Noyo
Caspar
Big
Albion
Big Salmon
Navarro
Garcia
Gualala
Russian
Salmon
Pine Gulch
Walker
Lagunitas
Redwood
San Gregorio
Pescadero
Gazos
Waddell
Scott
San Vicente
San Lorenzo
Soquel
Aptos
Smolts
Estuary/Lagoon
Quality & Extent
Summer Rearing Juveniles
Estuary/Lagoon
Quality & Extent
Adults
Habitat Complexity
Large Wood Frequency (BFW 0-10 meters)
Summer Rearing Juveniles
Habitat Complexity
Large Wood Frequency (Bankfull Width 0-10 meters)
Winter Rearing Juveniles
Habitat Complexity
Large Wood Frequency (Bankfull Width 0-10 meters)
Summer Rearing Juveniles
Habitat Complexity
Large Wood Frequency (Bankfull Width 10-100 meters)
Winter Rearing Juveniles
Habitat Complexity
Large Wood Frequency (Bankfull Width 10-100 meters)
Adults
Habitat Complexity
Large Wood Frequency (BFW 10-100 meters)
Summer Rearing Juveniles
Habitat Complexity
Percent Primary Pools
Adults
Habitat Complexity
Pool/Riffle/Flatwater Ratio
Summer Rearing Juveniles
Habitat Complexity
Pool/Riffle/Flatwater Ratio
Winter Rearing Juveniles
Habitat Complexity
Pool/Riffle/Flatwater Ratio
Adults
Habitat Complexity
Shelter Rating
Smolts
Habitat Complexity
Shelter Rating
Summer Rearing Juveniles
Habitat Complexity
Shelter Rating
Winter Rearing Juveniles
Habitat Complexity
Shelter Rating
Summer Rearing Juveniles
Hydrology
Flow Conditions (Baseflow)
Eggs
Hydrology
Flow Conditions (Instantaneous Condition)
Summer Rearing Juveniles
Hydrology
Flow Conditions (Instantaneous Condition)
Watershed Processes
Hydrology
Impervious Surfaces
Smolts
Hydrology
Number, Condition and/or Magnitude of Diversions
Summer Rearing Juveniles
Hydrology
Number, Condition and/or Magnitude of Diversions
Adults
Hydrology
Passage Flows
Smolts
Hydrology
Passage Flows
Eggs
Hydrology
Redd Scour
Watershed Processes
Landscape Patterns
Agriculture
Watershed Processes
Landscape Patterns
Timber Harvest
Watershed Processes
Landscape Patterns
Urbanization
Adults
Passage/Migration
Passage at Mouth or Confluence
Smolts
Passage/Migration
Passage at Mouth or Confluence
Summer Rearing Juveniles
Passage/Migration
Passage at Mouth or Confluence
Adults
Passage/Migration
Physical Barriers
Summer Rearing Juveniles
Passage/Migration
Physical Barriers
Winter Rearing Juveniles
Passage/Migration
Physical Barriers
Summer Rearing Juveniles
Riparian Vegetation
Canopy Cover
Watershed Processes
Riparian Vegetation
Species Composition
Adults
Riparian Vegetation
Tree Diameter (North of SF Bay)
Summer Rearing Juveniles
Riparian Vegetation
Tree Diameter (North of SF Bay)
Winter Rearing Juveniles
Riparian Vegetation
Tree Diameter (North of SF Bay)
Adults
Riparian Vegetation
Tree Diameter (South of SF Bay)
Summer Rearing Juveniles
Riparian Vegetation
Tree Diameter (South of SF Bay)
Winter Rearing Juveniles
Riparian Vegetation
Tree Diameter (South of SF Bay)
Eggs
Sediment
Gravel Quality (Bulk)
Eggs
Sediment
Gravel Quality (Embeddedness)
Adults
Sediment
Quantity & Distribution of Spawning Gravels
Summer Rearing Juveniles
Sediment (Food Productivity)
Gravel Quality (Embeddedness)
Winter Rearing Juveniles
Sediment (Food Productivity)
Gravel Quality (Embeddedness)
Watershed Processes
Sediment Transport
Road Density
Watershed Processes
Sediment Transport
Streamside Road Density (100 m)
Smolts
Smoltification
Temperature
Adults
Velocity Refuge
Floodplain Connectivity
Winter Rearing Juveniles
Velocity Refuge
Floodplain Connectivity
Smolts
Viability
Abundance
Adults
Viability
Density
Summer Rearing Juveniles
Viability
Density
Summer Rearing Juveniles
Viability
Spatial Structure
Summer Rearing Juveniles
Water Quality
Temperature (MWMT)
Adults
Water Quality
Toxicity
Smolts
Water Quality
Toxicity
Summer Rearing Juveniles
Water Quality
Toxicity
Winter Rearing Juveniles
Water Quality
Toxicity
Adults
Water Quality
Turbidity
Smolts
Water Quality
Turbidity
Summer Rearing Juveniles
Water Quality
Turbidity
Winter Rearing Juveniles
Water Quality
Turbidity

A Tale of Two Similarly Sized Watersheds



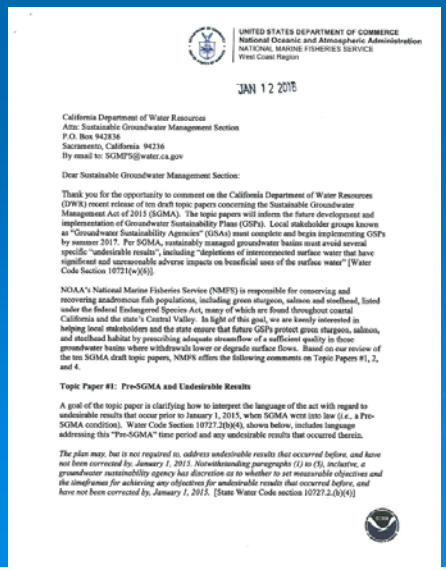
Sustainable Groundwater Management Act of 2014 (SGMA) – Opportunities for Conservation and Recovery

- Defines sustainable groundwater management as management and use of groundwater in a manner that can be maintained during the planning and implementation horizon (50 yr) without causing undesirable results :
  - Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply
  - Significant and unreasonable reduction of groundwater storage, seawater intrusion, water quality degradation, and land subsidence
  - Surface water depletions that have significant and unreasonable adverse impacts on beneficial uses of surface water

Source: DWR presentation to CA Water Commission, April 2016

In a letter dated January 12, 2016, to DWR NMFS provided the following comments on SGMA draft topic papers that may pertain to conditions in the streams affected by the Santa Margarita aquifer.

- "The impacts of surface water depletion on anadromous salmonid streams likely reached historical levels during this past summer as a result of the state's ongoing four-year drought."
- "…undesirable results that have not been corrected by Jan 1, 2015, … (should) be corrected and avoided."
- "… SGMA should give rise to actions that ensure streams and rivers impacted by groundwater extraction contain adequate flow for fish and other aquatic species."



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region

JAN 12 2016

California Department of Water Resources
Attn: Sustainable Groundwater Management Section
P.O. Box 942836
Sacramento, California 94236
By email to: SGMPS@water.ca.gov

Dear Sustainable Groundwater Management Section:

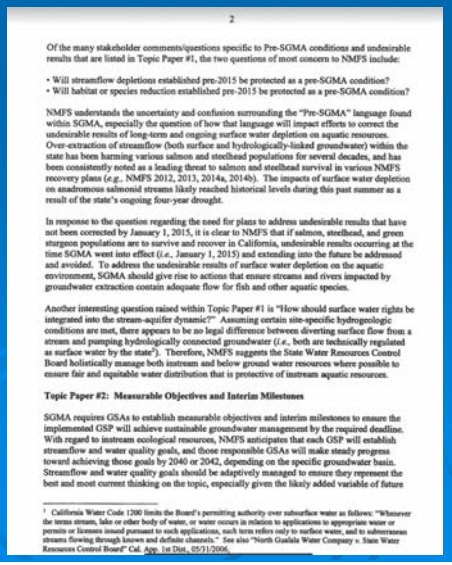
Thank you for the opportunity to comment on the California Department of Water Resources (DWR) recent release of ten draft topic papers concerning the Sustainable Groundwater Management Act of 2015 (SGMA). The topic papers will inform the future development and implementation of Groundwater Sustainability Plans (GSPs). Local stakeholder groups known as "Groundwater Sustainability Agencies" (GSAs) must complete and begin implementing GSPs by summer 2017. Per SGMA, sustainably managed groundwater basins must avoid several specific "undesirable results", including "depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water" [Water Code Section 10721(w)(6)].

NOAA's National Marine Fisheries Service (NMFS) is responsible for conserving and recovering anadromous fish populations, including green sturgeon, salmon and steelhead, listed under the federal Endangered Species Act, many of which are found throughout coastal California and the state's Central Valley. In light of this goal, we are keenly interested in helping local stakeholders and the state ensure that future GSPs protect green sturgeon, salmon, and steelhead habitat by prescribing adequate streamflow of a sufficient quality in those groundwater basins where withdrawals lower or degrade surface flows. Based on our review of the ten SGMA draft topic papers, NMFS offers the following comments on Topic Papers #1, 2, and 4.

Topic Paper #1: Pre-SGMA and Undesirable Results

A goal of the topic paper is clarifying how to interpret the language of the act with regard to undesirable results that occur prior to January 1, 2015, when SGMA went into law (i.e., a Pre-SGMA condition). Water Code Section 10727.2(b)(4), shown below, includes language addressing this "Pre-SGMA" time period and any undesirable results that occurred therein.

The plan may, but is not required to, address undesirable results that occurred before, and have not been corrected by, January 1, 2015. Notwithstanding paragraphs (1) to (3), inclusive, a groundwater sustainability agency has discretion as to whether to set measurable objectives and the timeframes for achieving any objectives for undesirable results that occurred before, and have not been corrected by, January 1, 2015. [State Water Code section 10727.2.(b)(4)]



2

Of the many stakeholder comments/questions specific to Pre-SGMA conditions and undesirable results that are listed in Topic Paper #1, the two questions of most concern to NMFS include:

- Will streamflow depletions established pre-2015 be protected as a pre-SGMA condition?
- Will habitat or species reduction established pre-2015 be protected as a pre-SGMA condition?

NMFS understands the uncertainty and confusion surrounding the "Pre-SGMA" language found within SGMA, especially the question of how that language will impact efforts to correct the undesirable results of long-term and ongoing surface water depletion on aquatic resources. Over-extraction of streamflow (both surface and hydrologically-linked groundwater) within the state has been harming various salmon and steelhead populations for several decades, and has been consistently noted as a leading threat to salmon and steelhead survival in various NMFS recovery plans (*e.g.*, NMFS 2012, 2013, 2014a, 2014b). The impacts of surface water depletion on anadromous salmonid streams likely reached historical levels during this past summer as a result of the state's ongoing four-year drought.

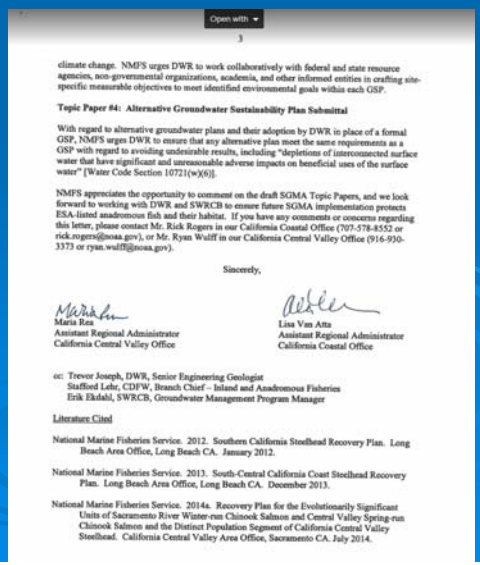
In response to the question regarding the need for plans to address undesirable results that have not been corrected by January 1, 2015, it is clear to NMFS that if salmon, steelhead, and green sturgeon populations are to survive and recover in California, undesirable results occurring at the time SGMA went into effect (*i.e.*, January 1, 2015) and extending into the future be addressed and avoided. To address the undesirable results of surface water depletion on the aquatic environment, SGMA should give rise to actions that ensure streams and rivers impacted by groundwater extraction contain adequate flow for fish and other aquatic species.

Another interesting question raised within Topic Paper #1 is "How should surface water rights be integrated into the stream-aquifer dynamic?" Assuming certain site-specific hydrogeologic conditions are met, there appears to be no legal difference between diverting surface flow from a stream and pumping hydrologically connected groundwater (*i.e.*, both are technically regulated as surface water by the state[1]). Therefore, NMFS suggests the State Water Resources Control Board holistically manage both instream and below ground water resources where possible to ensure fair and equitable water distribution that is protective of instream aquatic resources.

Topic Paper #2: Measurable Objectives and Interim Milestones

SGMA requires GSAs to establish measurable objectives and interim milestones to ensure the implemented GSP will achieve sustainable groundwater management by the required deadline. With regard to instream ecological resources, NMFS anticipates that each GSP will establish streamflow and water quality goals, and those responsible GSAs will make steady progress toward achieving those goals by 2040 or 2042, depending on the specific groundwater basin. Streamflow and water quality goals should be adaptively managed to ensure they represent the best and most current thinking on the topic, especially given the likely added variable of future

[1] California Water Code 1200 limits the Board's permitting authority over subsurface water as follows: "Whenever the terms stream, lake or other body of water, or water occurs in relation to applications to appropriate water or permits or licenses issued pursuant to such applications, such term refers only to surface water, and to subterranean streams flowing through known and definite channels." See also "North Gualala Water Company v. State Water Resources Control Board" Cal. App. 1st Dist. 05/31/2006.



Open with

3

climate change. NMFS urges DWR to work collaboratively with federal and state resource agencies, non-governmental organizations, academia, and other informed entities in crafting site-specific measurable objectives to meet identified environmental goals within each GSP.

Topic Paper #4: Alternative Groundwater Sustainability Plan Submittal

With regard to alternative groundwater plans and their adoption by DWR in place of a formal GSP, NMFS urges DWR to ensure that any alternative plan meet the same requirements as a GSP with regard to avoiding undesirable results, including "depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water" [Water Code Section 10721(w)(6)].

NMFS appreciates the opportunity to comment on the draft SGMA Topic Papers, and we look forward to working with DWR and SWRCB to ensure future SGMA implementation protects ESA-listed anadromous fish and their habitat. If you have any comments or concerns regarding this letter, please contact Mr. Rick Rogers in our California Coastal Office (707-578-8552 or rick.rogers@noaa.gov), or Mr. Ryan Wulff in our California Central Valley Office (916-930-3373 or ryan.wulff@noaa.gov).

Sincerely,

Maria Rea
Assistant Regional Administrator
California Central Valley Office

Lisa Van Atta
Assistant Regional Administrator
California Coastal Office

cc: Trevor Joseph, DWR, Senior Engineering Geologist
Staffod Lehr, CDFW, Branch Chief – Inland and Anadromous Fisheries
Erik Ekdahl, SWRCB, Groundwater Management Program Manager

Literature Cited

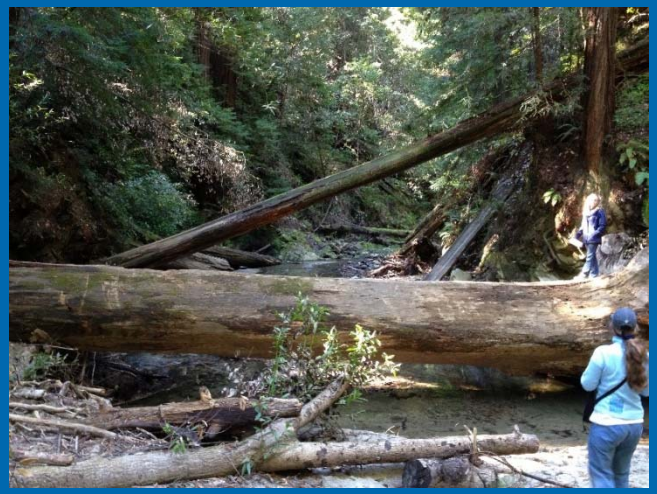
National Marine Fisheries Service. 2012. Southern California Steelhead Recovery Plan. Long Beach Area Office, Long Beach CA. January 2012.

National Marine Fisheries Service. 2013. South-Central California Coast Steelhead Recovery Plan. Long Beach Area Office, Long Beach CA. December 2013.

National Marine Fisheries Service. 2014a. Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead. California Central Valley Area Office, Sacramento CA. July 2014.

Appropriate Thresholds

www.cartoonstock.com/cartoonview.asp?



Bean Cr. 2013. J Ambrose, NMFS

Carbonera Cr. 2009. C. Berry, SCWD

Lake Oroville during drought. Earthjustice

Bean Cr. K. Kittleson, SCC

Dead steelhead. Bean Cr. K. Kittleson, SCC

Some Conclusions

- Coho salmon and steelhead populations have experienced a significant reduction in the streams of the Santa Cruz Mountains
- Water diversions (including groundwater pumping) are major threats to coho salmon and steelhead viability in the San Lorenzo watershed.
- The Santa Margarita aquifer is heavily overdrafted which has resulted in reductions in surface flow in the Zayante, Bean, and Carbonera Creeks as well as the mainstem San Lorenzo River (and Branciforte?).
- NMFS is concerned that the SGMA January 1, 2015, compliance date for achievement of baseline conditions are insufficient to ensure adequate conditions necessary for salmon and steelhead rearing, particularly during the summer months.
- To avoid significant and unreasonable adverse impacts on beneficial uses of surface water, flows need to meet a conservation and recovery standard.


Questions?