

Watching the rivers flow and the numbers grow

*Monitoring Coho Salmon on the
Mendocino Coast*



Presented by:

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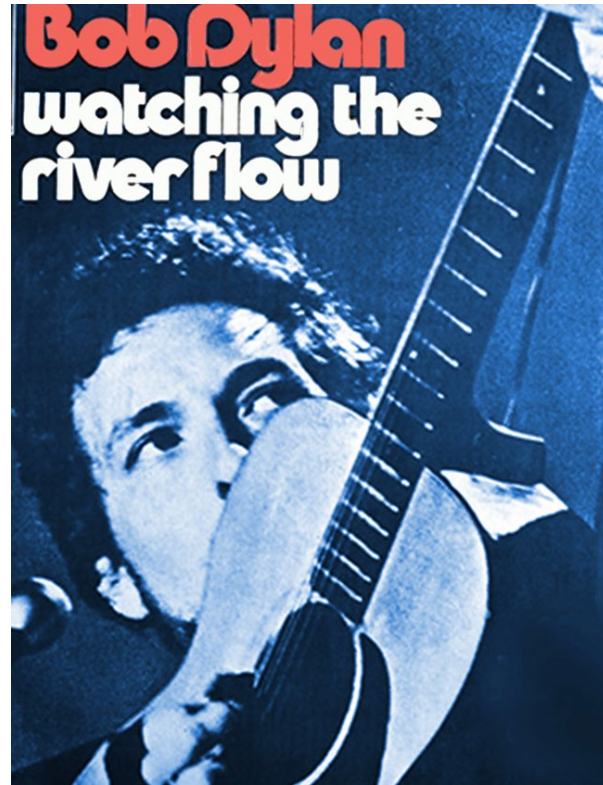
California Department of Fish and Wildlife

Fort Bragg, CA



Overview

- Region
- Monitoring
- Findings



Our Mission

To manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and their use and enjoyment by the public.





In Mendocino, river restoration pays off for salmon

Coho love the newly 'messy' streams.

Tanvi Dutta Gupta November 13, 2025

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NEWS

Record 30,000 Endangered Central California Coast Coho Salmon Return to Mendocino Coast Rivers

March 26, 2026

Back-to-back record spawning seasons suggest that reconnecting tributaries and restoring salmon habitat is supporting Central California Coast Coho population growth. NOAA has funded more than 100 restoration projects on the Mendocino Coast.

ing the Albion River in Mendocino County, the California Conservation Corps moves logs and branches into the river.
ristie Hemm Klok/High Country News

Endangered California Coho Salmon Experience Record-Breaking Spawning Season on Mendocino Coast

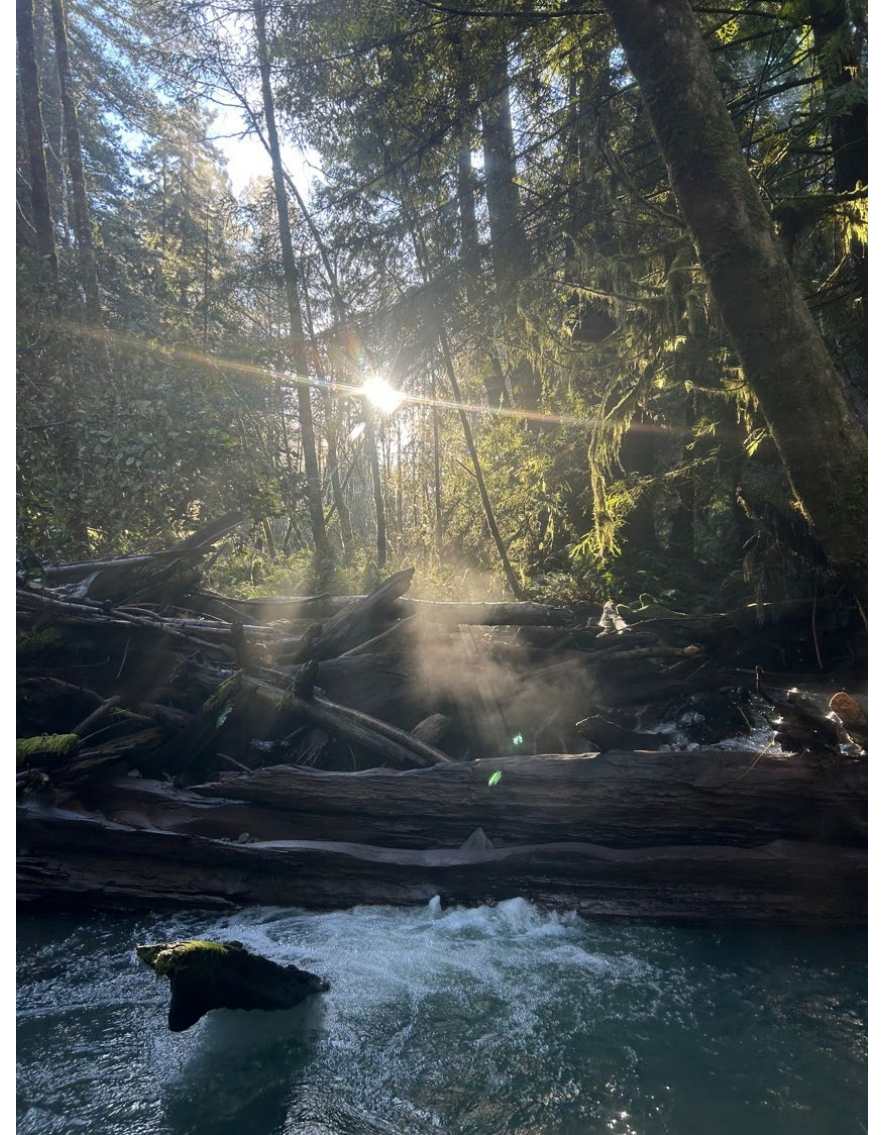
March 04, 2025

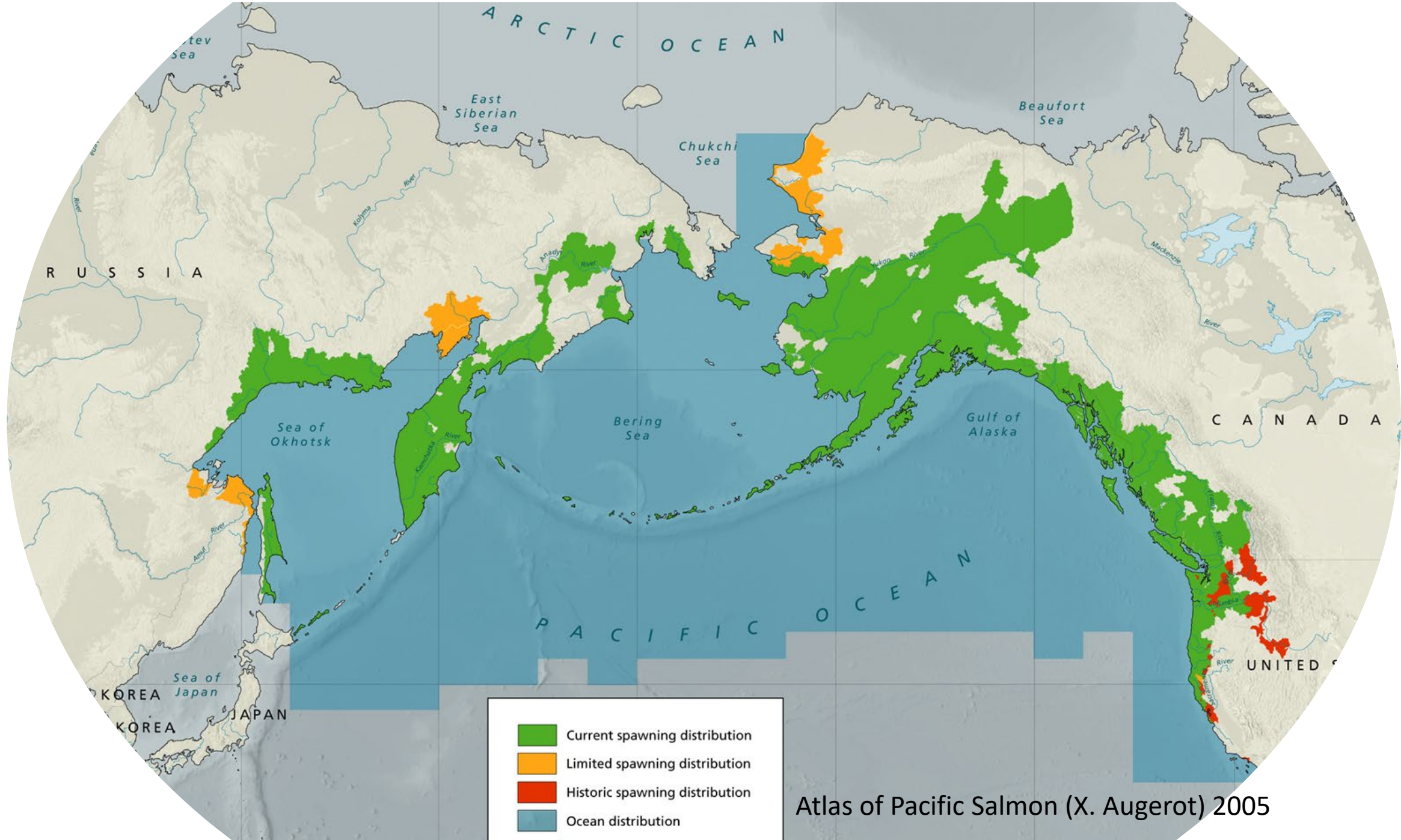
Last winter, Central California Coast coho salmon returned to Mendocino Coast rivers in the highest numbers since monitoring began. The overall numbers remain low compared to the species' past abundance, but NOAA scientists are excited by the results.

Feature Story | West Coast

Mendocino Coast Region

- Coniferous redwood forest
- Watershed size 10-800 sq km
- Unregulated flows, direct into ocean
- Mix of open and bar-built estuaries
- Timber, agriculture, rural residential



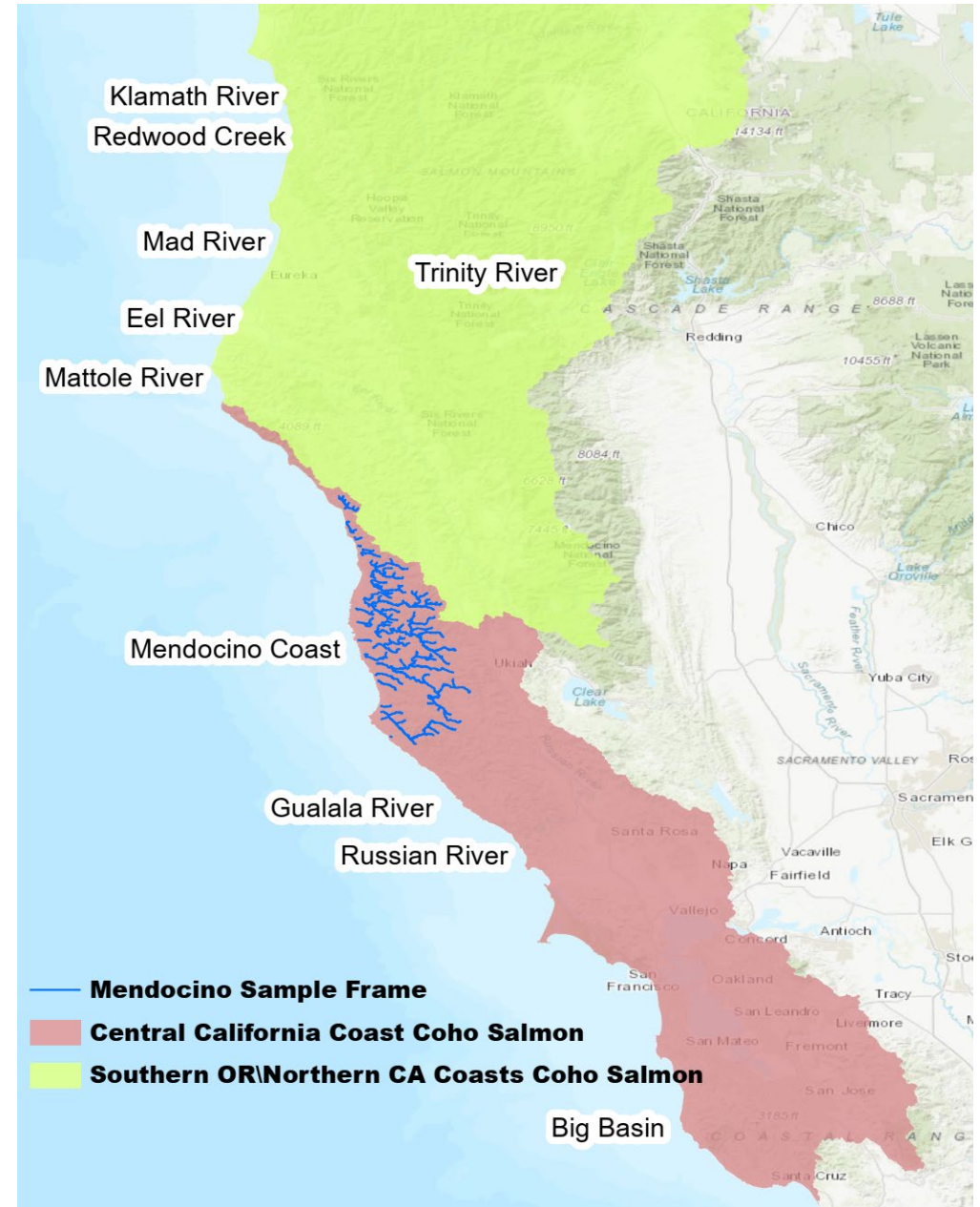


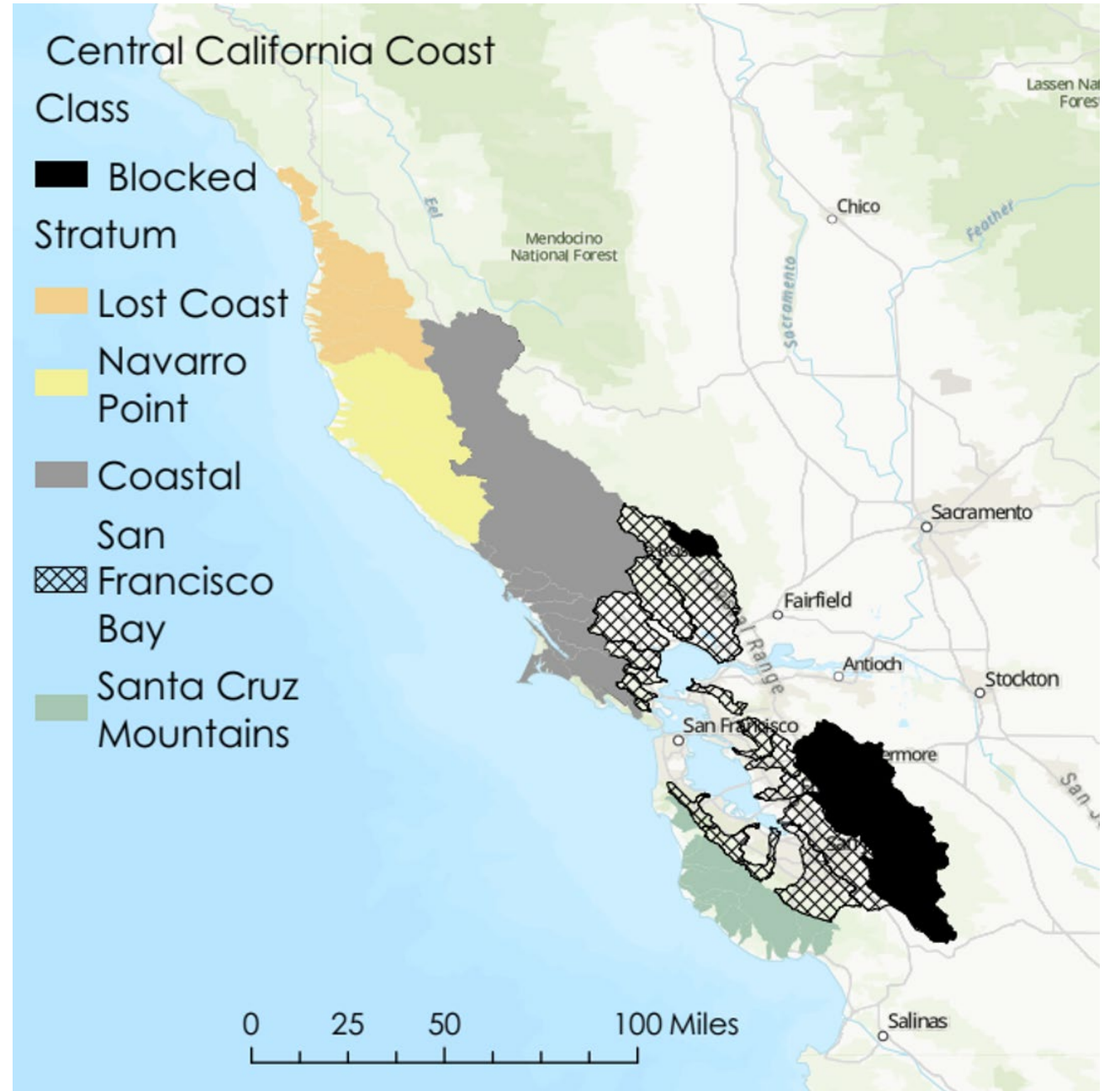
Atlas of Pacific Salmon (X. Augerot) 2005

Mendocino Coast Region



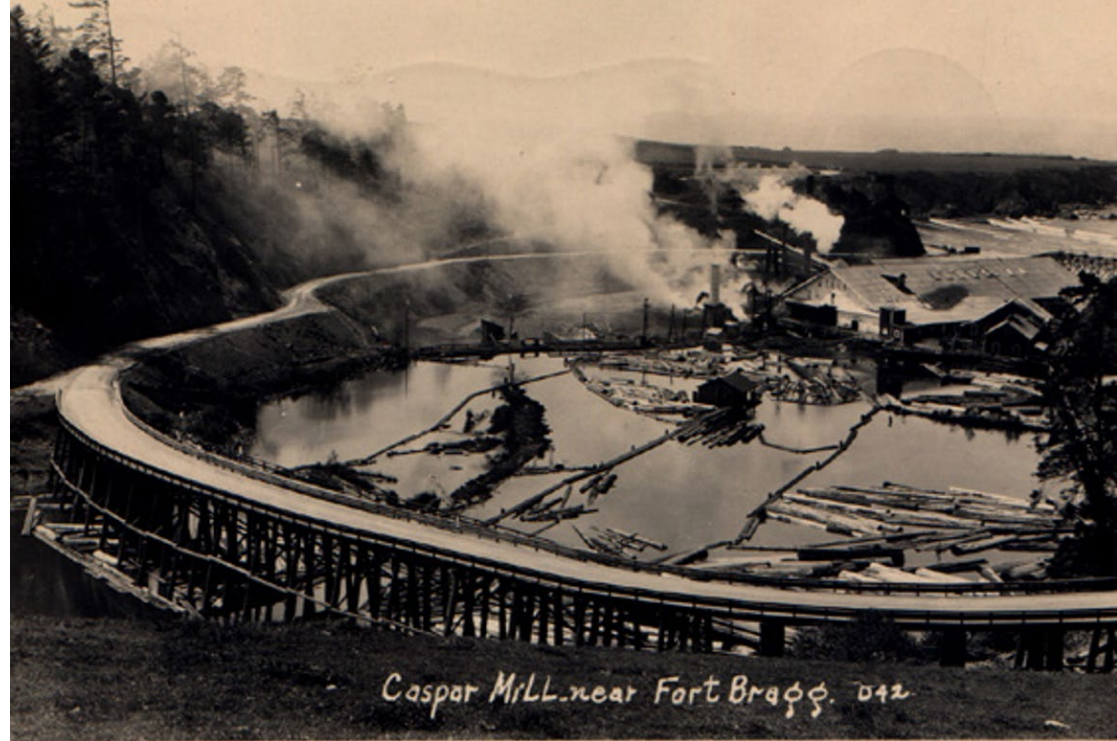
- Northern range of endangered Central Ca Coast Coho
- Two ESU diversity strata
- NC steelhead, CC Chinook
- Wild populations





Land Use History

- Logging mid-late 1800s
- Post WWII rapid timber extraction with agriculture and society development
- Overfishing



Habitat impacts

- Loss of riparian trees
- Erosion and siltation
- Channels became simplified and entrenched
- Loss of floodplain connectivity



Fish crisis in the 1950s

- Small scale hatchery efforts 1960-1990s
- Environmental laws 1970s
- Remove blocked streams of logging debris through 1980s
- Sediment and road improvements
- ESA Listing
- Shift in restoration strategy



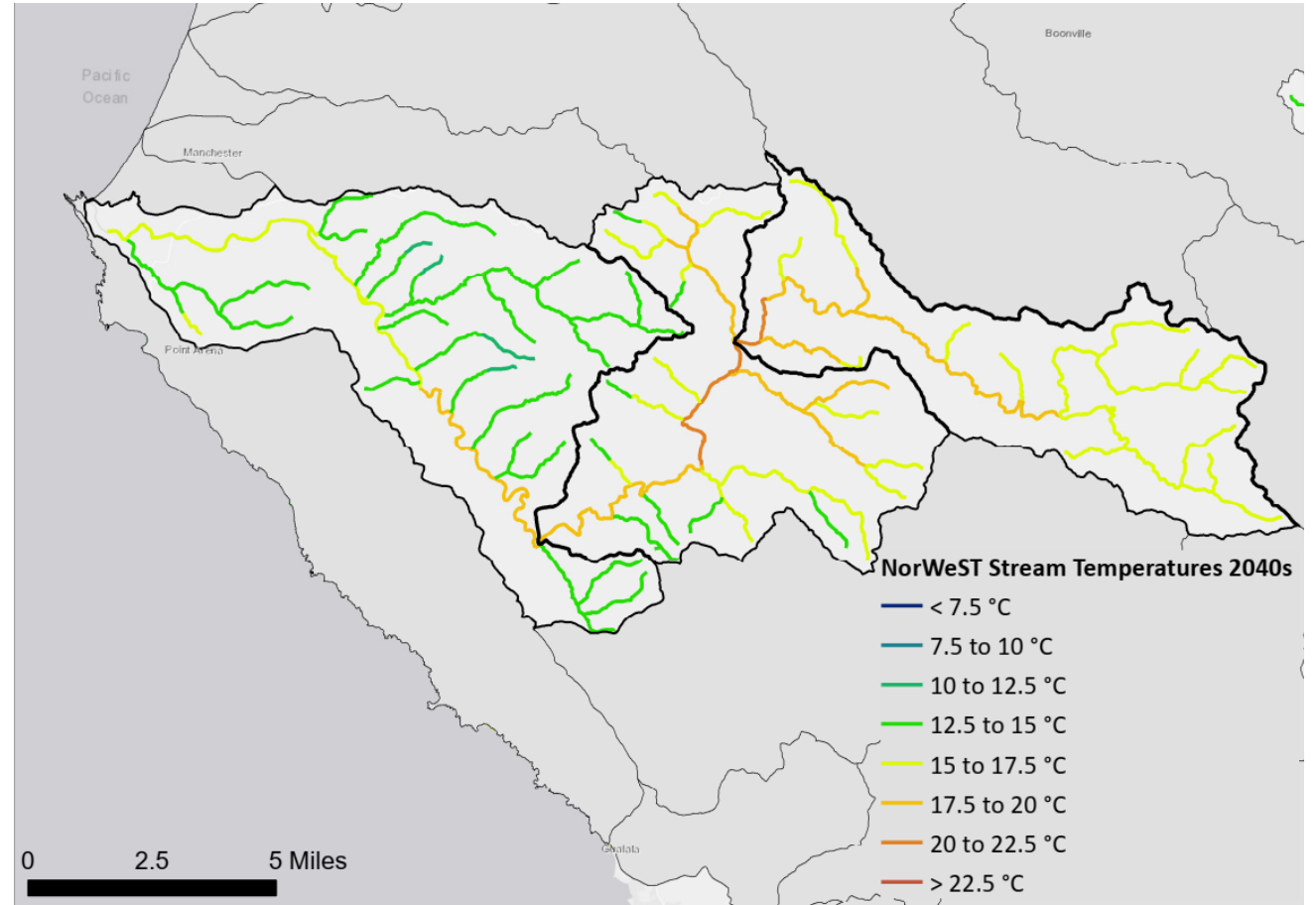
Ongoing threats

- Degraded freshwater and estuarine habitat from legacy practices
- Depressed salmon populations
- Diversions
- Groundwater pumping



Ongoing threats

- Climate change
 - intensified and shift in water regime
 - marine ecosystem shifts
 - increased water temperatures
 - fog decline



Recovery strategies

- Land protection and stewardship
- Watershed rehabilitation
- Regulations, permitting, enforcement
- Streamflow enhancement
- Conservation hatcheries
- Monitoring



Habitat restoration

Goal: increase in the amount and quality of spawning and rearing habitat improve juvenile life stage survival and increase adult fish returns.

- Increase lower velocity areas and provide cover to increase winter survival and growth
- Provide a variety of physical and thermal conditions deal with climate variability



SHaRP

- 16 subwatersheds strongholds
- Lack of instream structural complexity and off-channel habitat at the juvenile life stage
- 650 km of large wood and off channel habitat
- 100 km of road assessment
- 30 fish passage projects
- 12 streamflow enhancement (Navarro)
- [SHaRP Project Tracker](#)

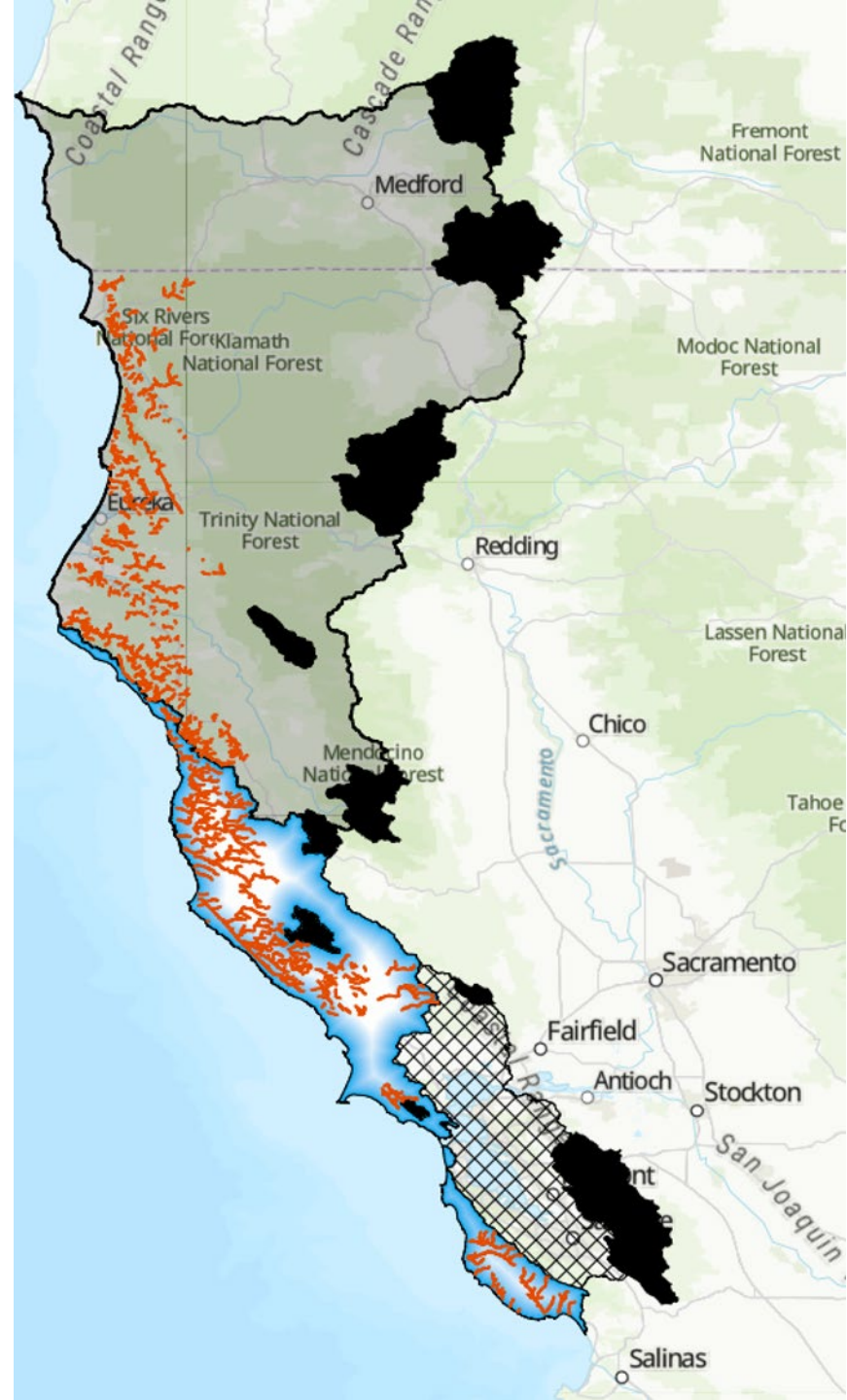


California Coastal Monitoring Plan (CMP)

“Comprehensive population monitoring program to collect essential data on the current status of coastal salmon and steelhead salmon populations”

- Monitor parameters that assess the long-term viability of salmon and steelhead
- Trend detection of abundance, productivity, and survival.
- Piloted in coastal Mendocino; first implemented in 2008





California Coastal Salmonid Monitoring Plan (CMP)

- Pacific States Marine Fisheries Commission (PSMFC), Mendocino Redwood Company (MRC) and Redwood Timber Company
- Funded by Pacific Coastal Salmon Recovery Fund (PCSRF)
- Support of many landowners



Monitoring area

- 339 spawning survey reaches (500 miles)
- Annually sample 15%
- Life cycle monitoring to calibrate redd surveys and evaluate trends in survival.
- Produce Coho population estimates for the region, diversity strata and independent population watersheds.



Sample Strategy - Two Stage

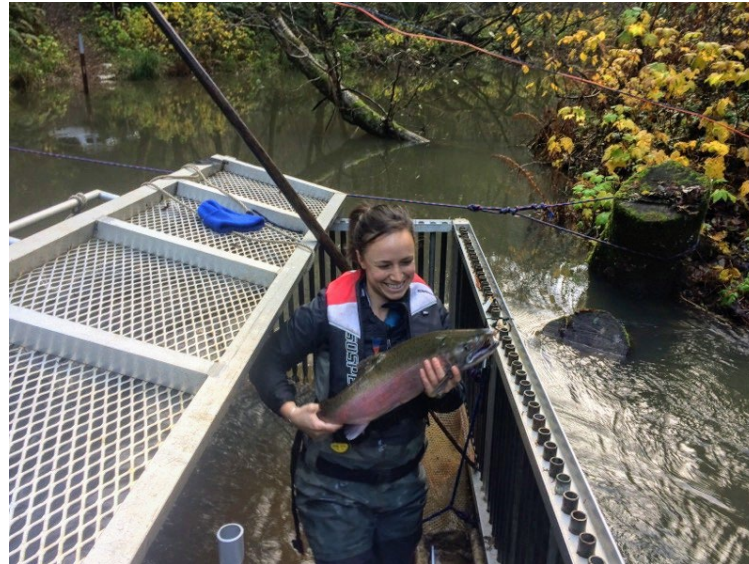
Spawning surveys

- Spatially balanced frame
- Redd counts
- Adult and redd estimates



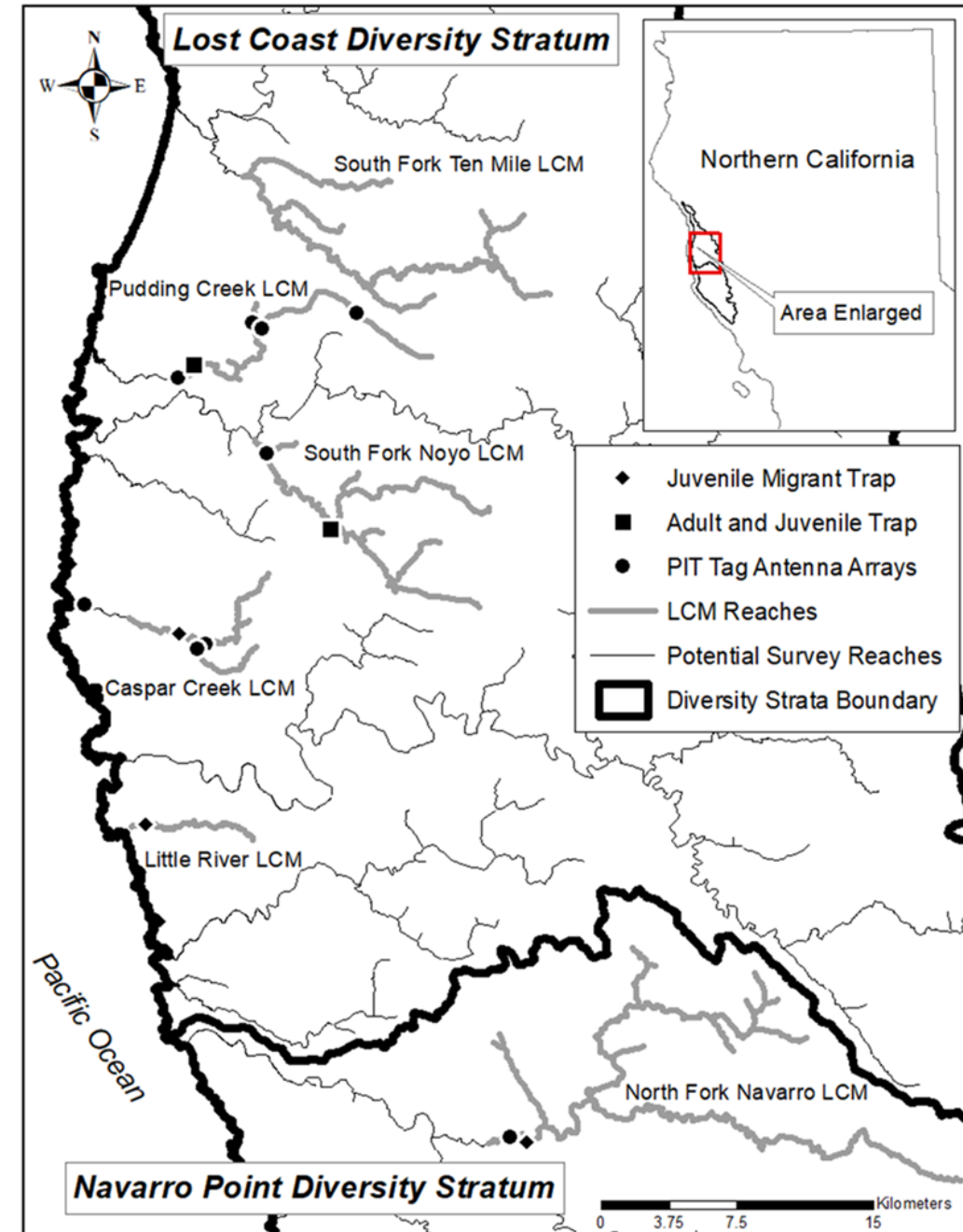
Life Cycle Monitoring

- Redd census, adult mark recapture, and smolt estimates
- Calibrate regional redd estimates to reduce uncertainty and bias
- Fish metrics to evaluate trends



Life Cycle Monitoring Stations

If we are seeing increase or decreases in populations, understanding metrics of fish response such as growth, movement, survival, and production are essential to understanding WHY.



Additional project

- BACI experiments: Pudding Creek and Ten Mile River evaluate fish response to restoration.
- Spatial structure juvenile snorkel surveys and wet dry mapping drought impacts
- Evaluation of pilot captive rear and release project to bolster Navarro and Garcia



Viabale Salmonid Population (VSP) parameter

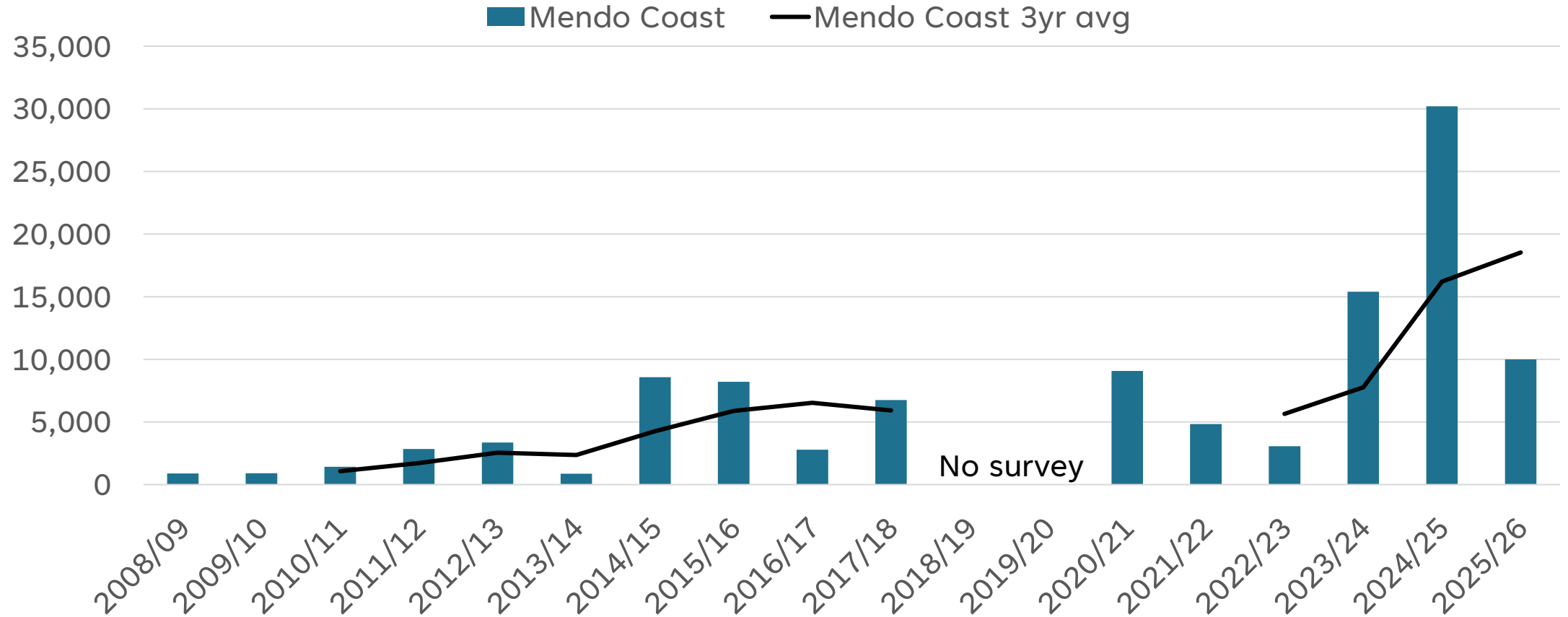
1. **Abundance.** Individuals in a population=High to buffer population
2. **Productivity.** Trend in abundance over time =High for replacement
3. **Spatial structure.** Geographical and ecological distribution connectivity on the landscape =Wide to reduce extinction
4. **Diversity.** Life histories that are diverse and complex for resilience

Results

- Last three years adult returns highest since monitoring began



Mendocino Coast

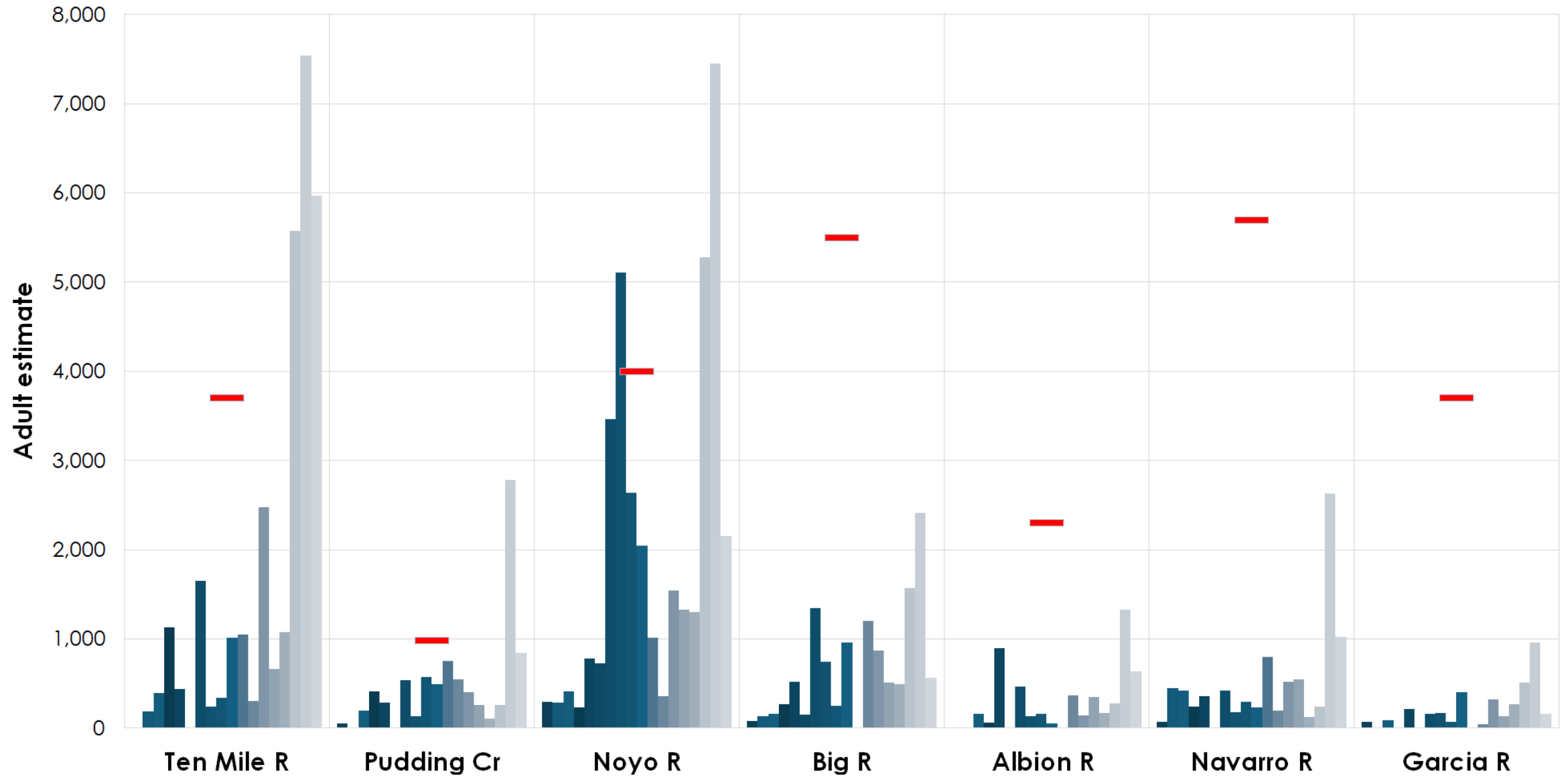


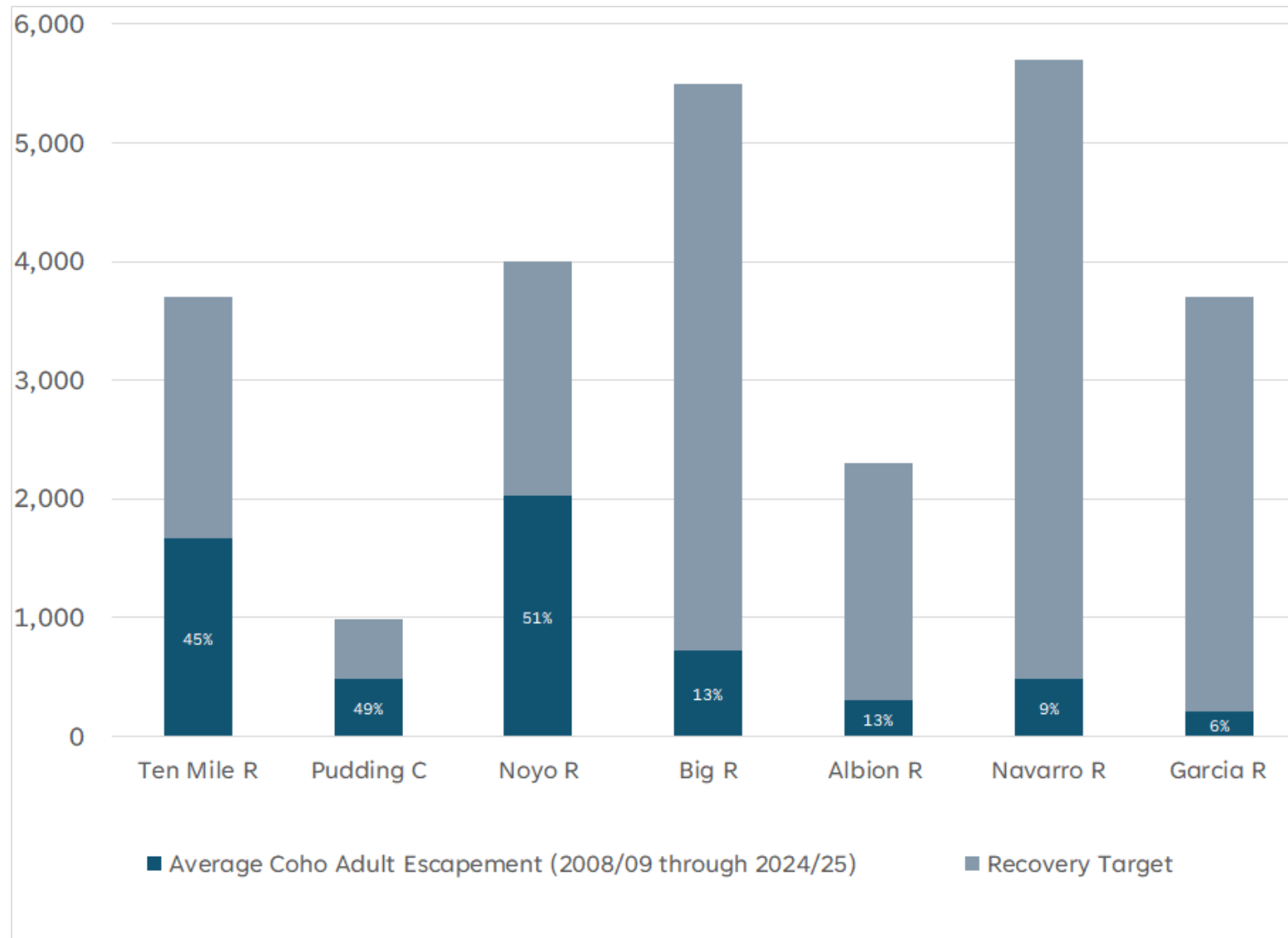
Results

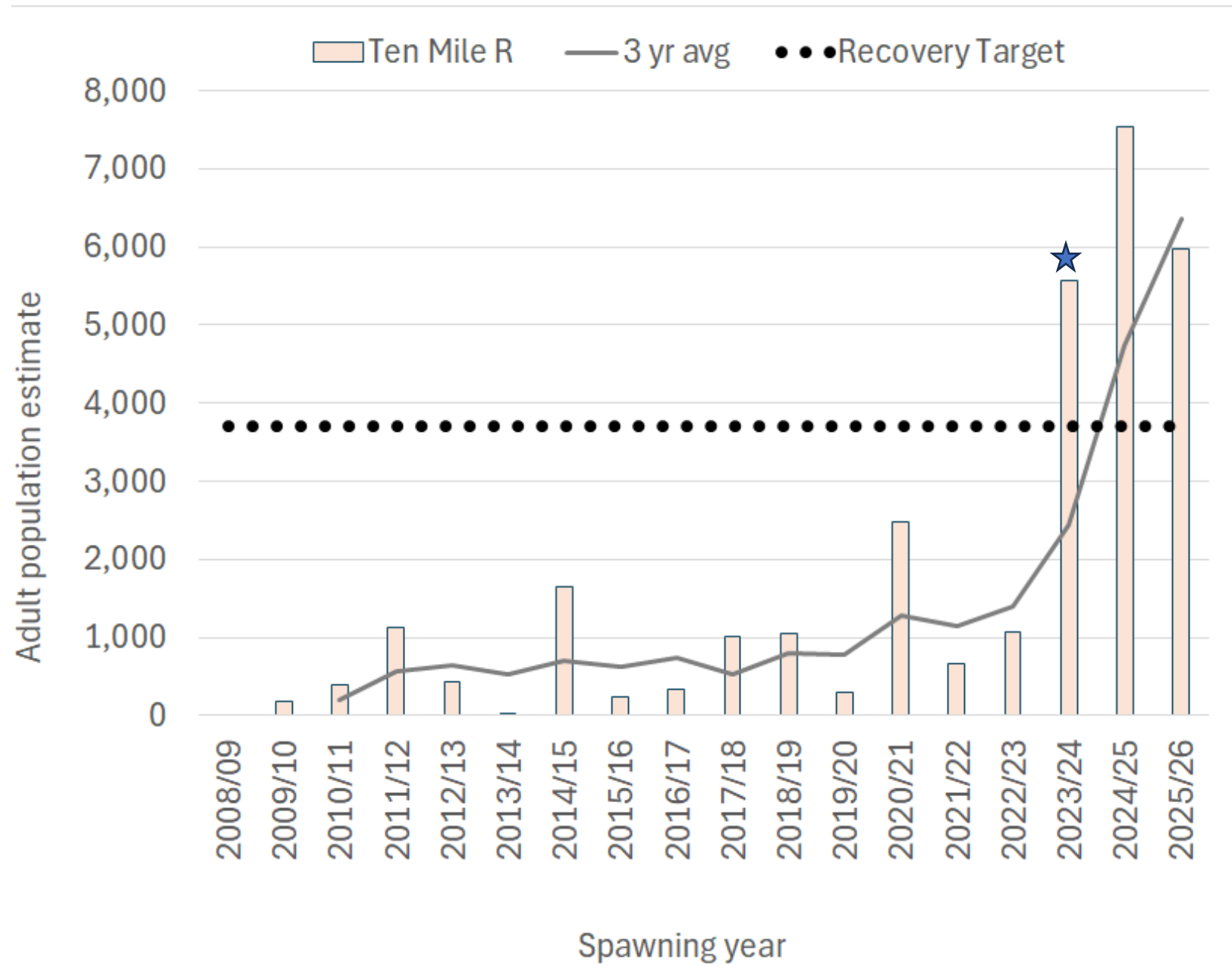
- Last three years adult returns highest since monitoring began
- Recovery targets met in some spaces
- NP DS much lower than LC DS



Mendocino Coast







Results

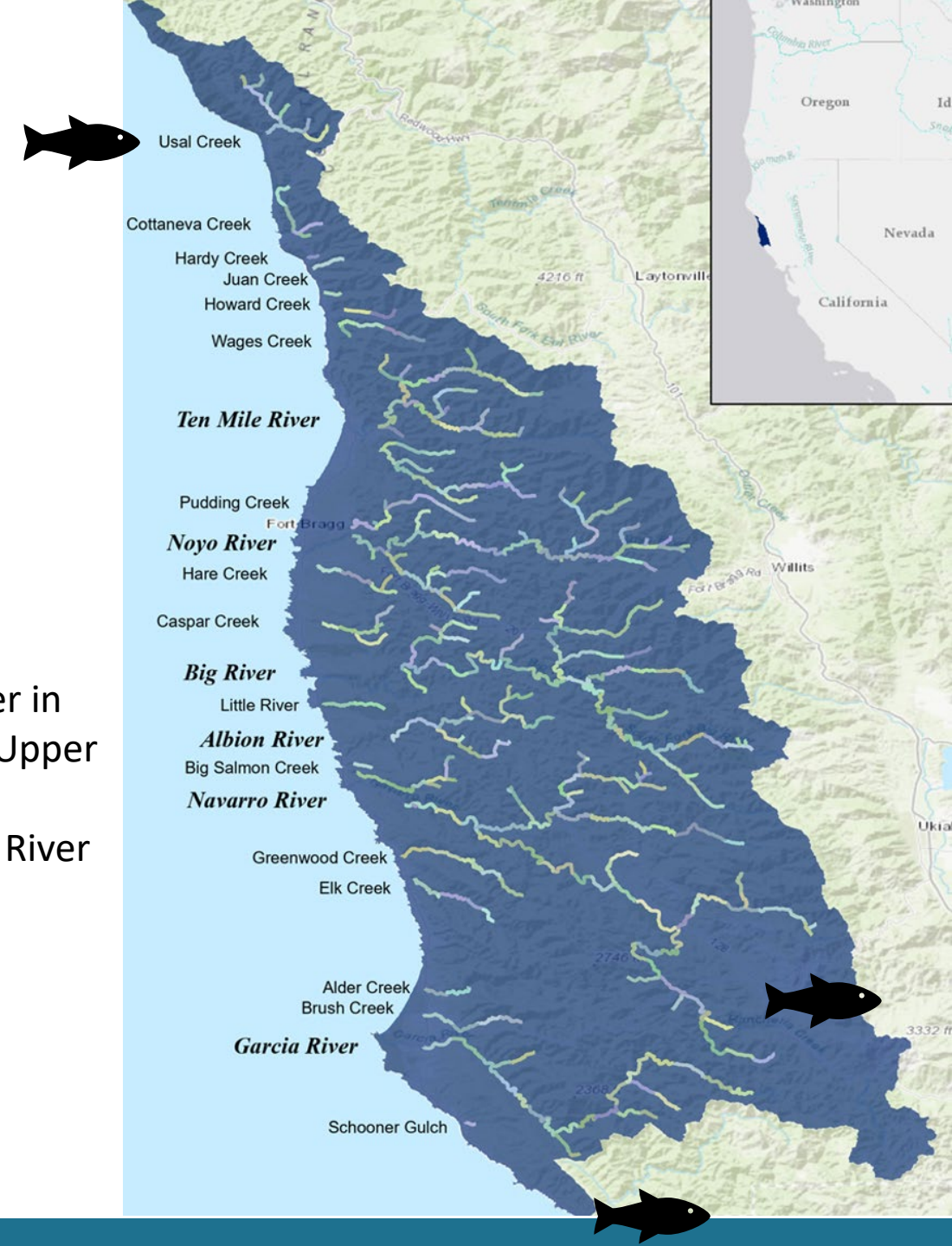
- Last three years adult returns highest since monitoring began
- Recovery targets met in some spaces
- NP DS much lower than LC DS
- Distribution in historic locations



Juvenile and adults observed



- Usal Creek
- DeHaven Creek
- Virgin Creek
- Jug Handle
- Doyle Creek
- Russian Gulch
- Upper Navarro River in Anderson Creek & Upper Rancheria
- North Fork Gualala River

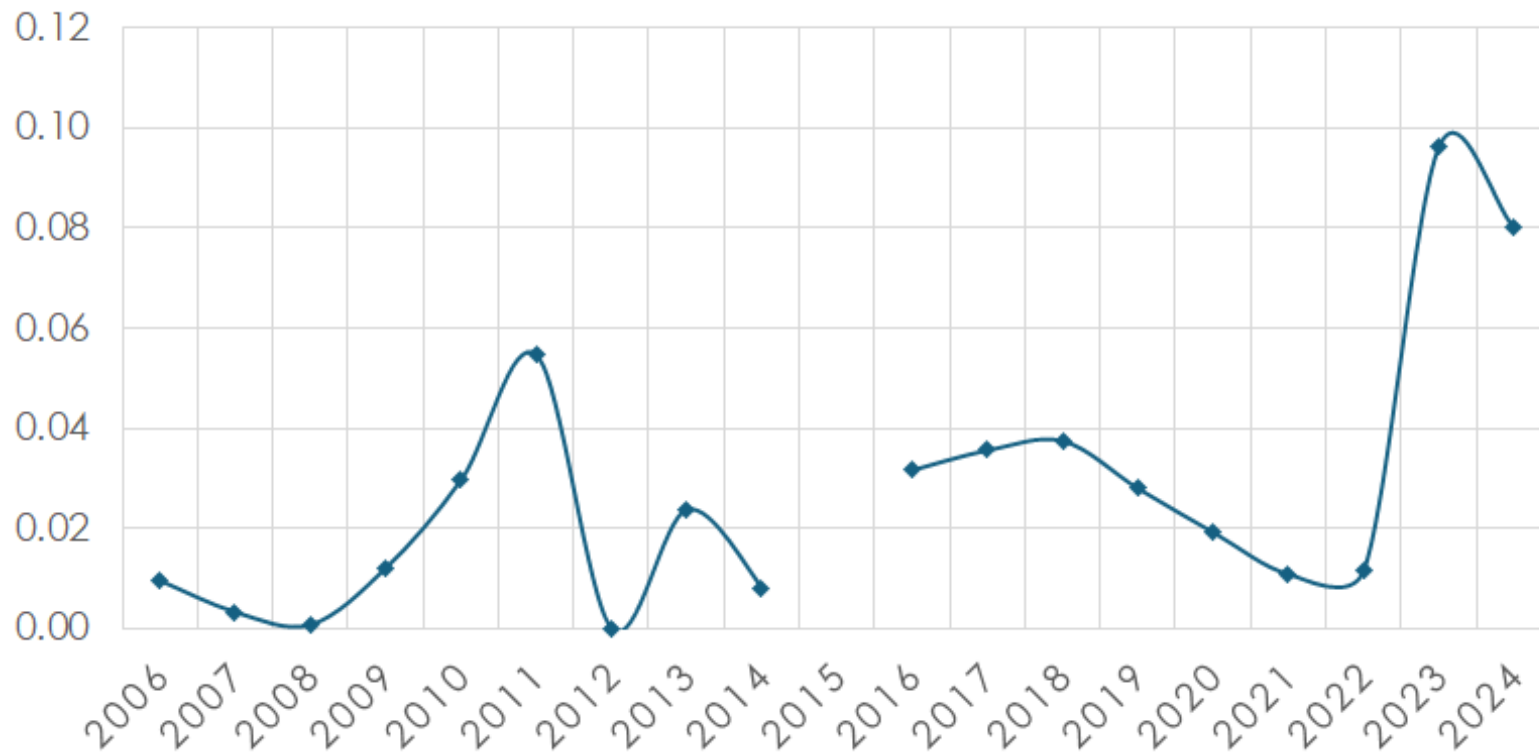


Why increases?

- Look to LCM data

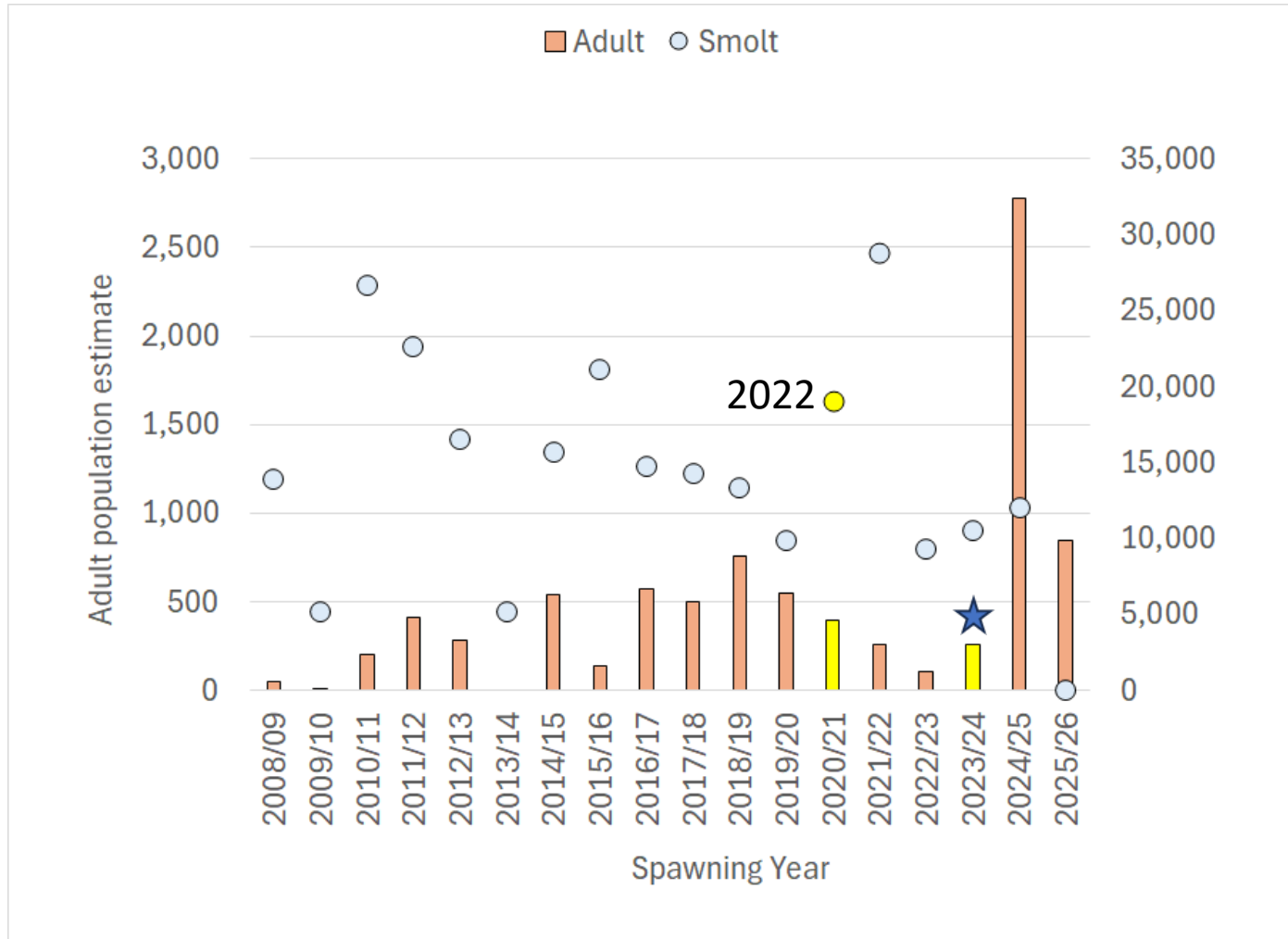


SAR



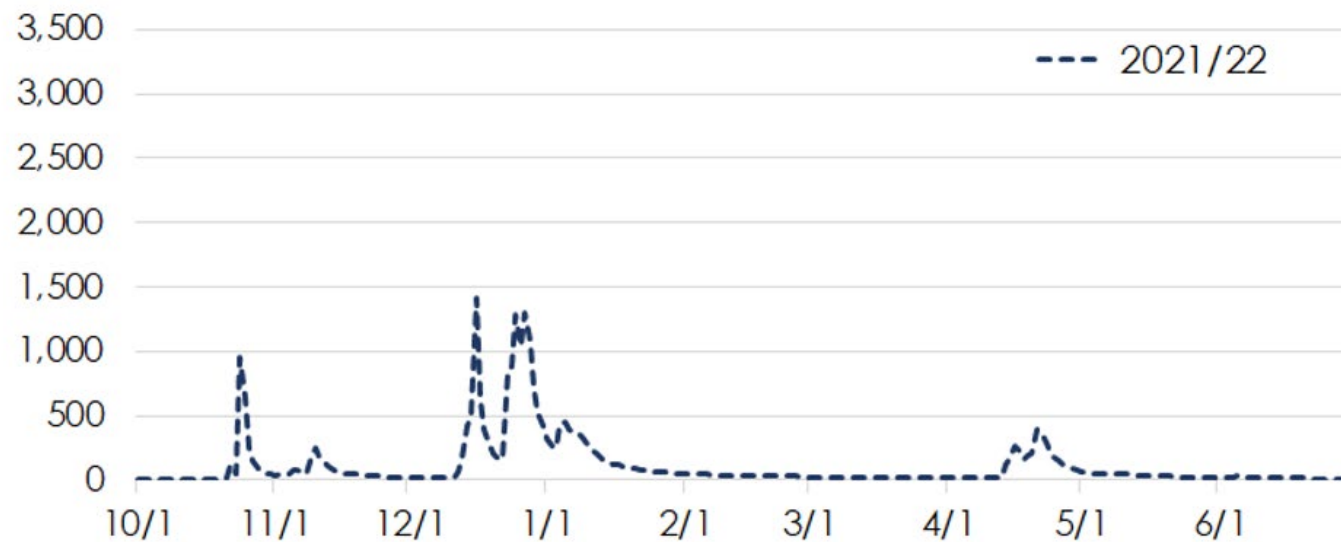
- Smolt to adult return rate high for 24/25 and 25/26
- Similar coast-wide
- Conditions for spawning and rearing, outmigration

Pudding LCM 2024/25 (15K)



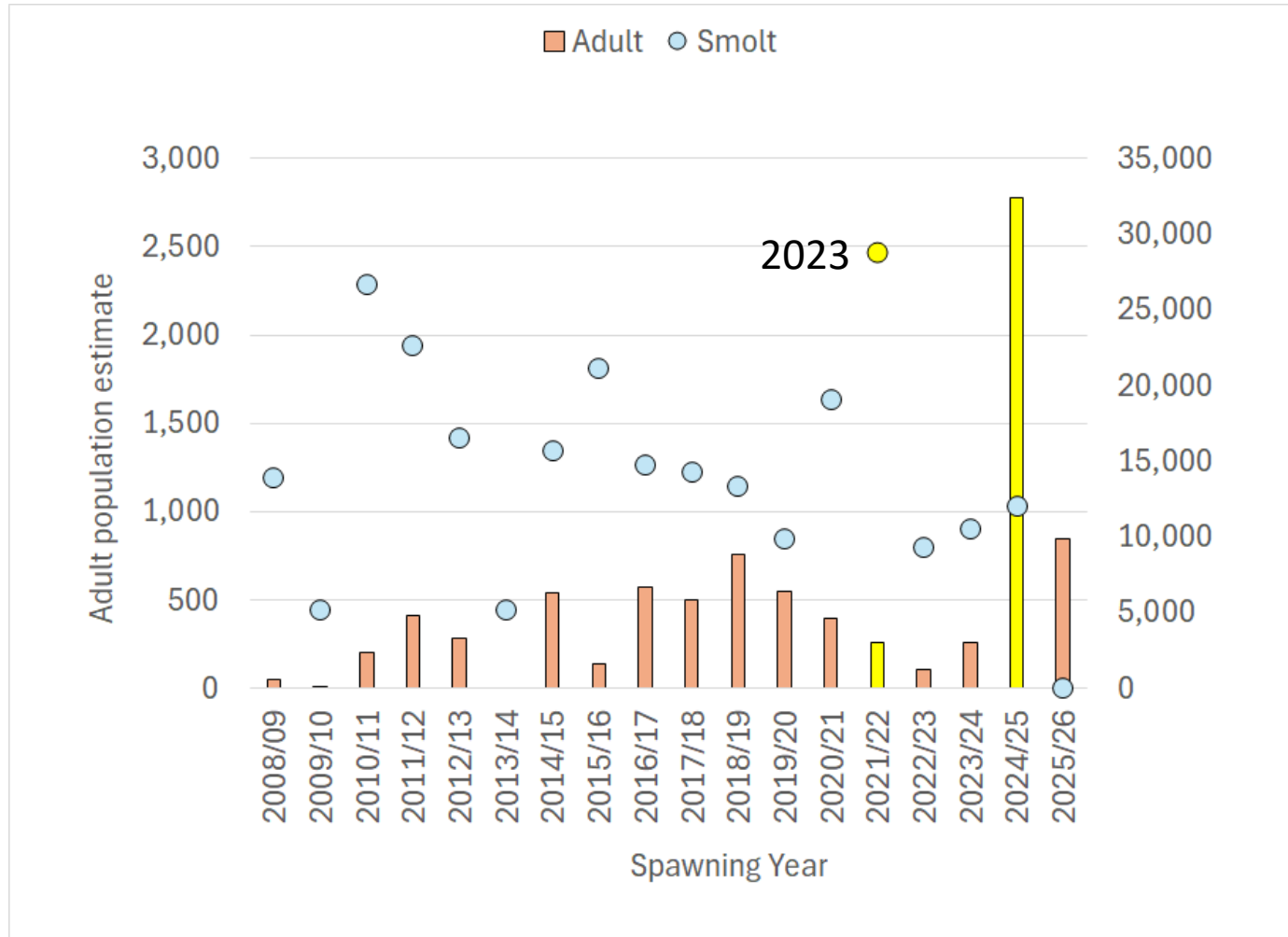
- Lower pop in Pudding and Navarro
- 2020/21 Spawning conditions dry
- Good smolt production 2022
- Poor rearing/outmigration flows WY 22

River conditions



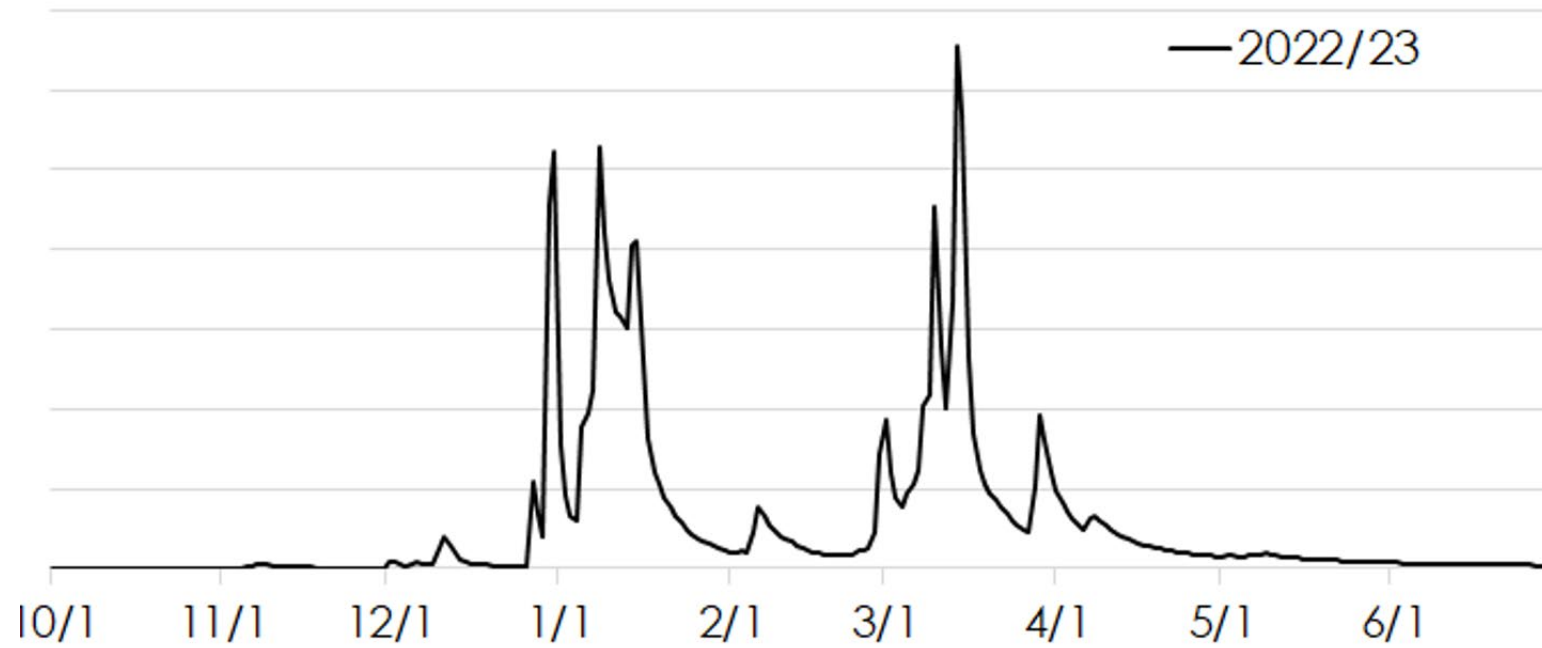
- Estuary bar closure
- Navarro and Pudding lower return
- Possibly smolts stayed 2nd yr and returned with next cohort

Pudding LCM 2025 (30 K)



- 2021/22 Spawning conditions dry
- High smolt production 2023 (some 2 year)
- Good rearing/outmigration flows Wy 23

River conditions

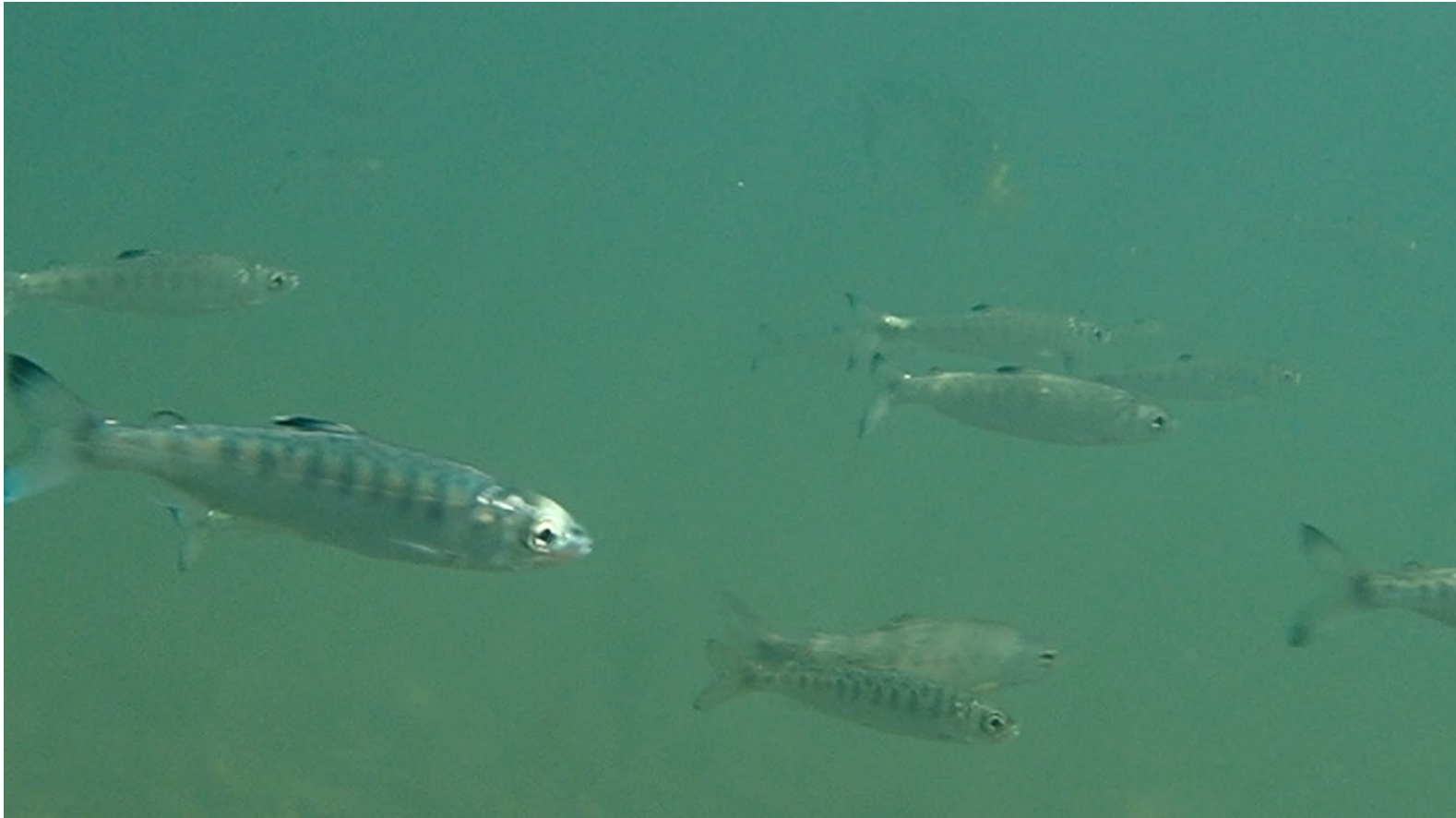


Highlights CMP Monitoring- 18 years

- Informing recovery parameters status reviews
- Status and trend across populations in the region
- Recovery targets met some significant trends up; not seeing downward trends
- Distribution expanding with population sizes
- Smolt and adult timing
- Plasticity in life history discovered (Juv and adults)
- Estuary use
- Evaluation of restoration
- Strong relationships/partners built



Estuary



Gaps/challenges



- Egg to fry life stage
- Winter habitat changes
- Spatial structure
- Gualala
- Funding

In gratitude

