

SWP Planning and Operations WY 2024 to date



California Water
Commission
May 15, 2024

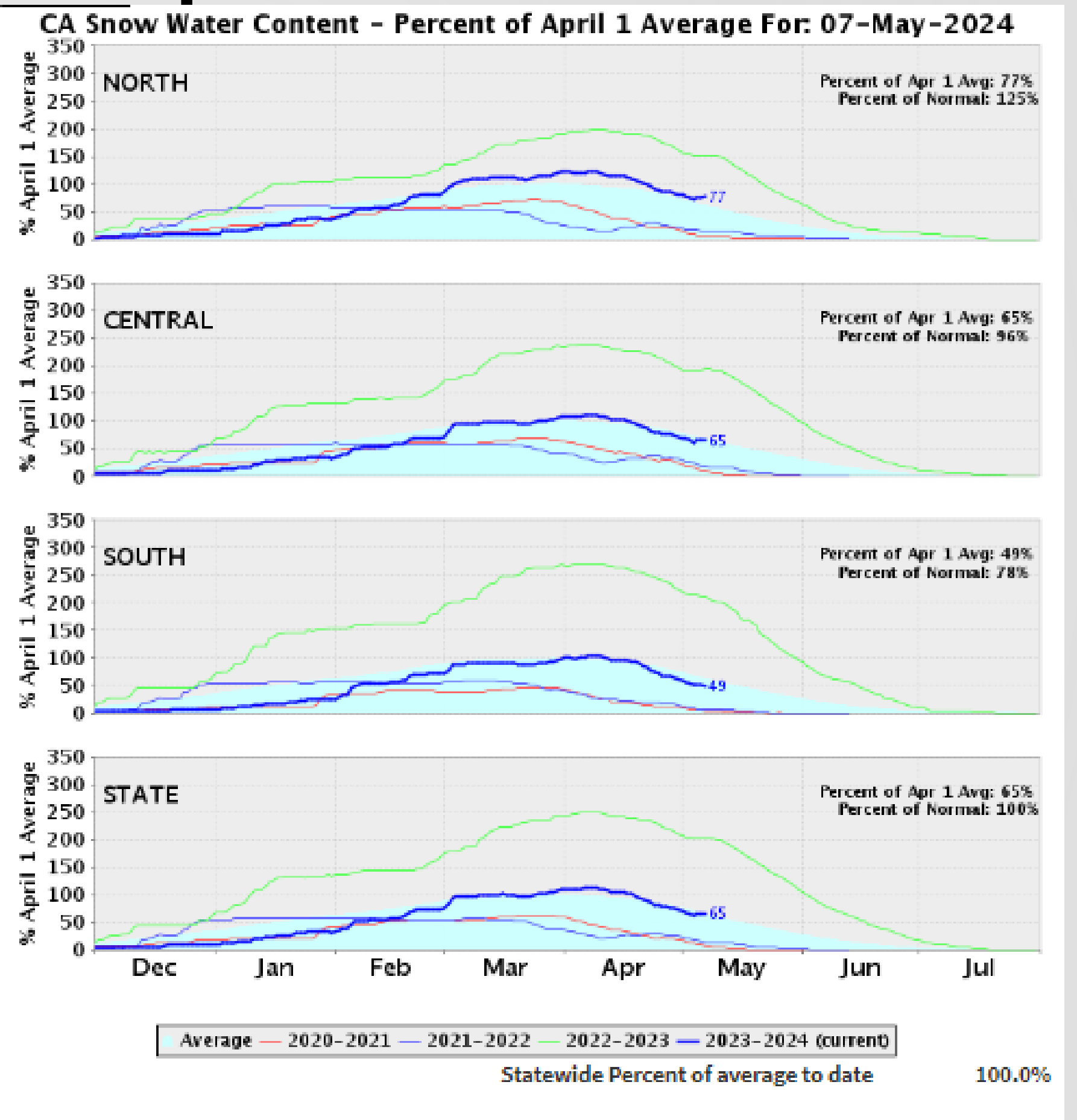
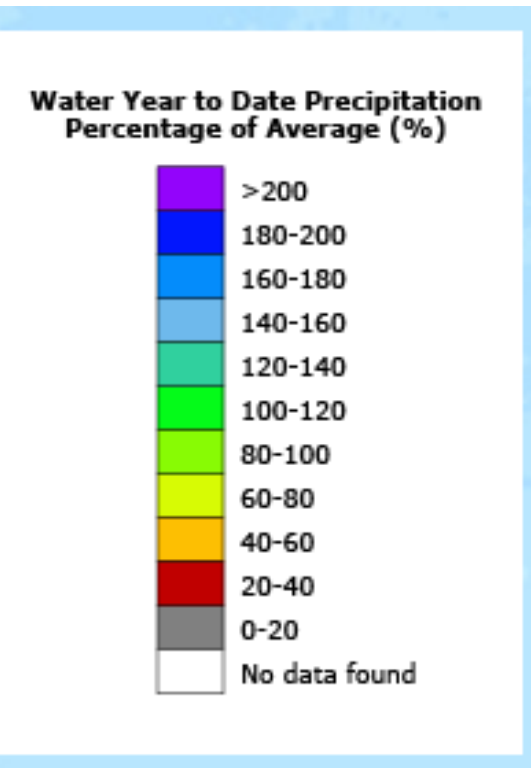


Molly White, PE
SWP Water Management



Lenny Grimaldo, PhD
SWP Environmental Director

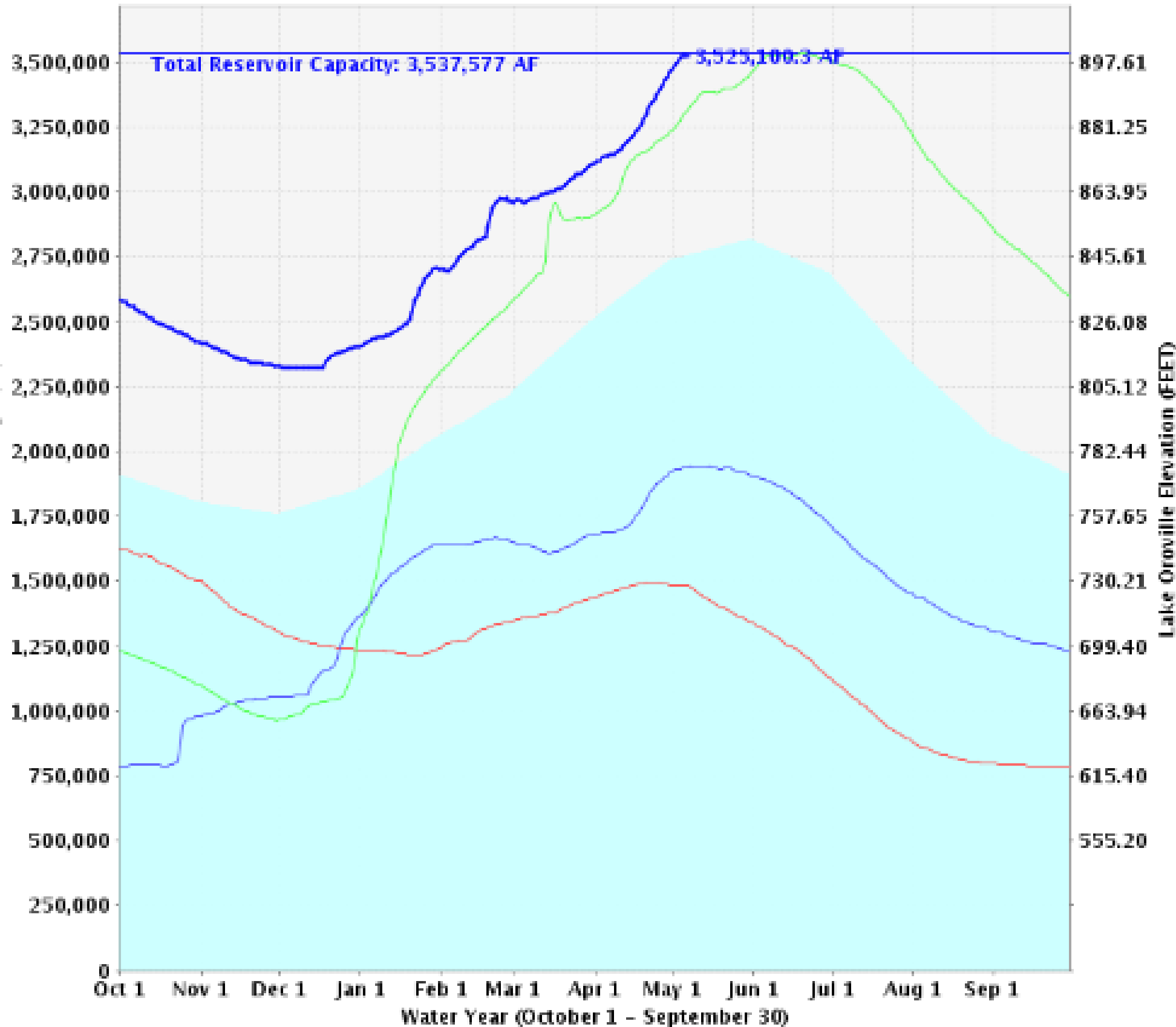
Precipitation and Snowpack Conditions



Lake Oroville WY 2024

(ctrl+click for multiple selections)

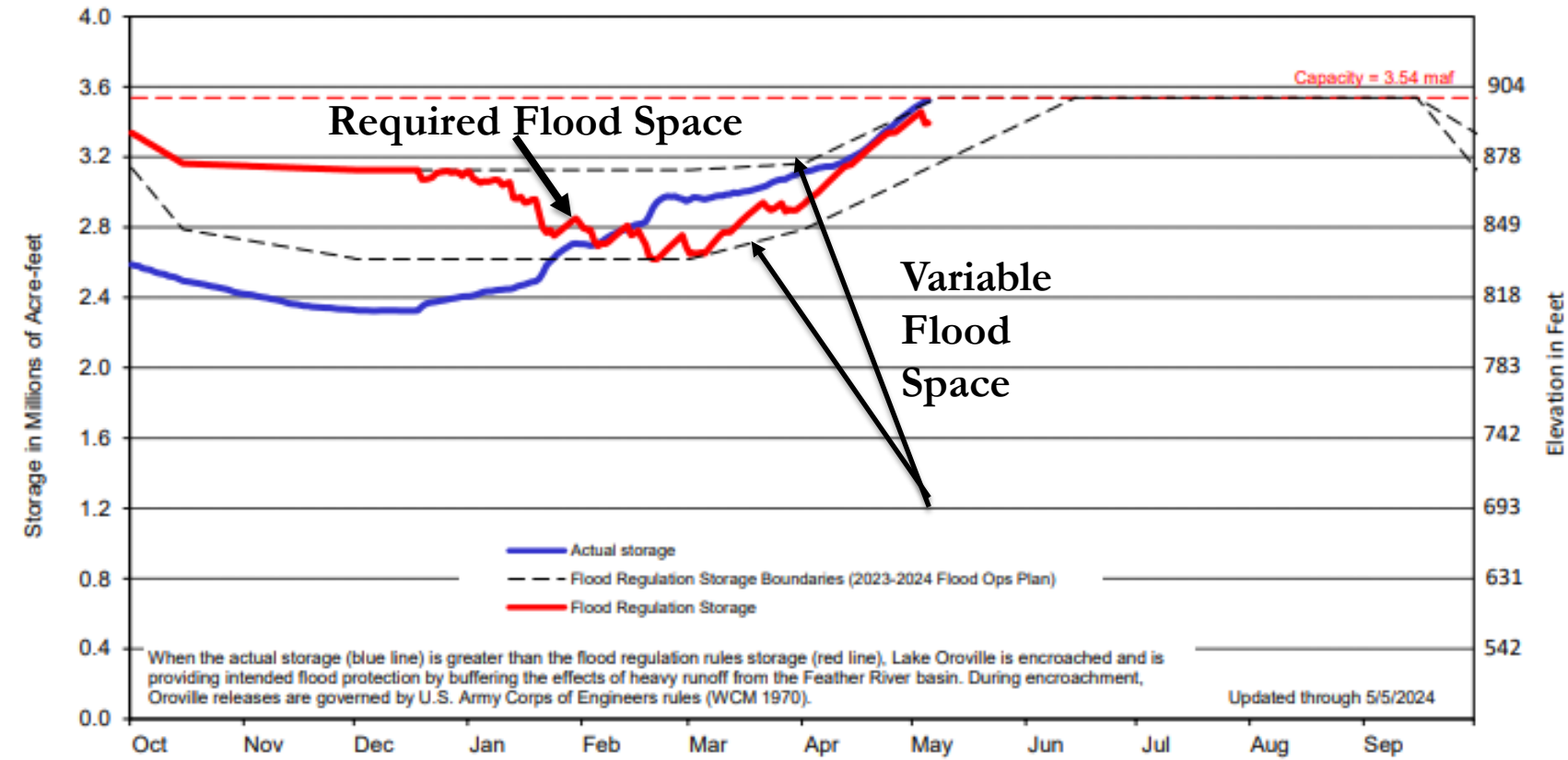
Lake Oroville Storage Levels



Historical Average — Total Reservoir Capacity — 2020-2021 — 2021-2022 — 2022-2023 — 2023-2024 (current)

Lake Oroville Storage

October 1, 2023 to September 30, 2024

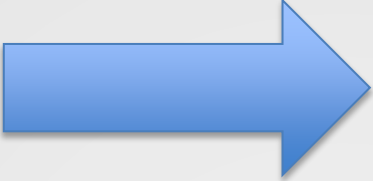


2024 SWP Winter/Spring -- Planning and Operations

SWP Actions to Date

Water Supply Forecasts and SWP Allocations:

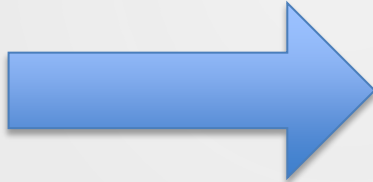
- May 1 Bulletin 120 (DWR-Div Flood Mgmt)
 - Sacramento Valley: Above Normal
 - San Joaquin Valley: Above Normal
- Monthly evaluations
final allocation typically issued in May



- ❖ Allocations:
 - December 2023: 10% initial allocation
 - February 2024: increased to 15%
 - March 2024: increased to 30%
 - April 2024: increased to 40%
- ❖ State Water Contractor coordination ongoing

Typical Reservoir Operations:

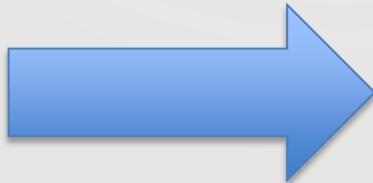
- Releases for instream flow and Delta reqt's
- Minimum releases for storage conservation
- **Flood control operations**



- ❖ February 2024: Flood control releases began
- ❖ May 2024: Fill/storage management

Export Operations:

- Capture storm flows to move to San Luis Reservoir storage for later in the year
- Adjust for Delta requirements and ESA/CESA fisheries protections



- ❖ January 1, 2024: ESA/CESA fisheries protections in place
 - Significant reduction of exports since mid-January
- ❖ Close coordination with Reclamation, CDFW, NMFS and USFWS on Delta operations

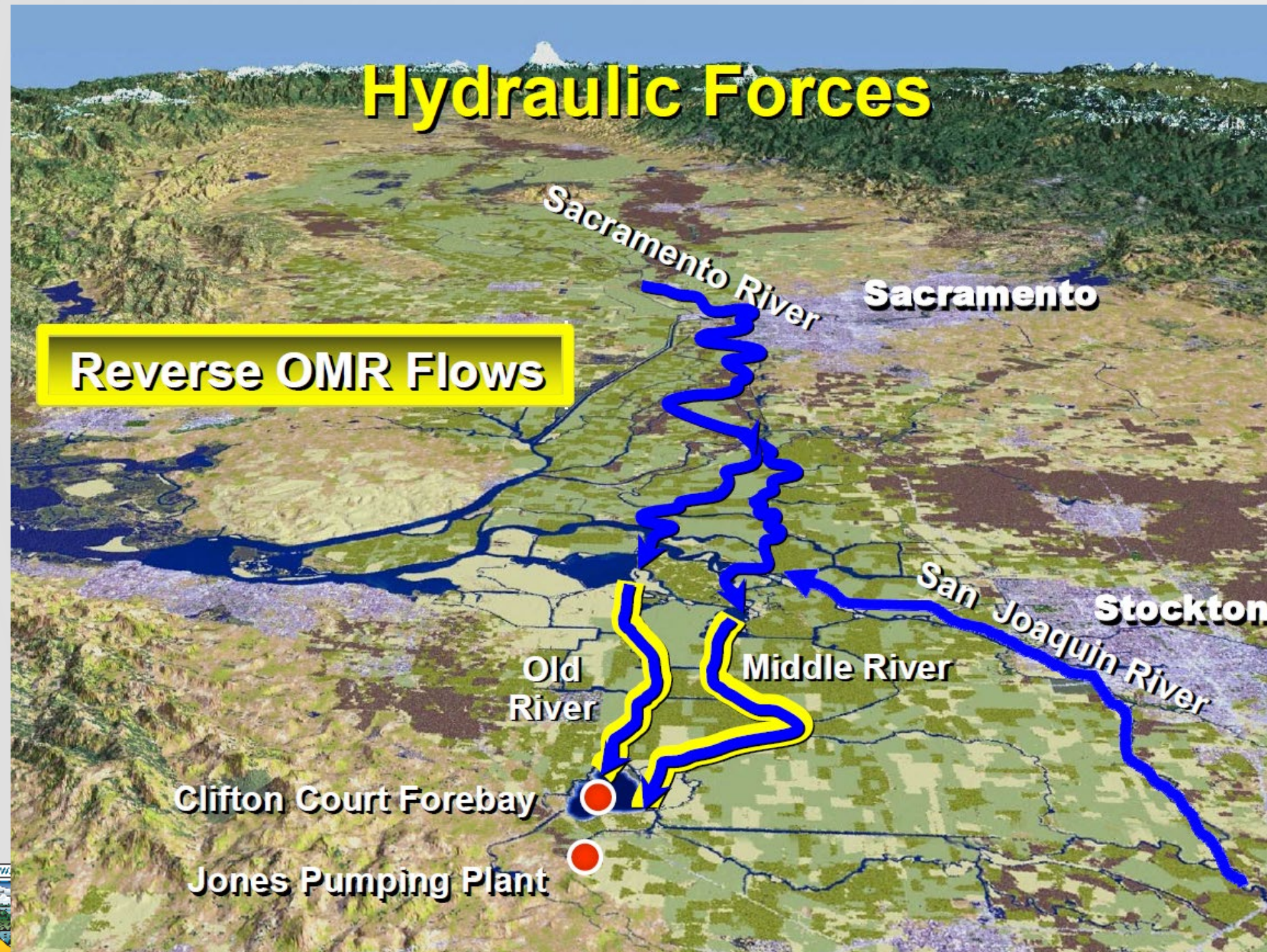


Looking Ahead --->2024 SWP Summer/Fall Operations

- ❖ July through September: Increased Feather River releases of stored water from Lake Oroville:
 - Meet Delta outflow and water quality requirements
 - Maximize south Delta exports
- ❖ Summer/Fall ESA/CESA SWP Actions – Delta smelt habitat improvement requirements (above normal water year type):
 - Summer/early fall: Suisun Marsh Salinity Control gate operations
 - September/October: Fall X2 operation (maintain water quality 80k from the Golden Gate Bridge)
- ❖ Late Fall/Winter: Oroville storage conservation and 2025 planning begins



SWP and CVP operations during WY 2024 impacted over salvage concerns for winter-run salmon and steelhead

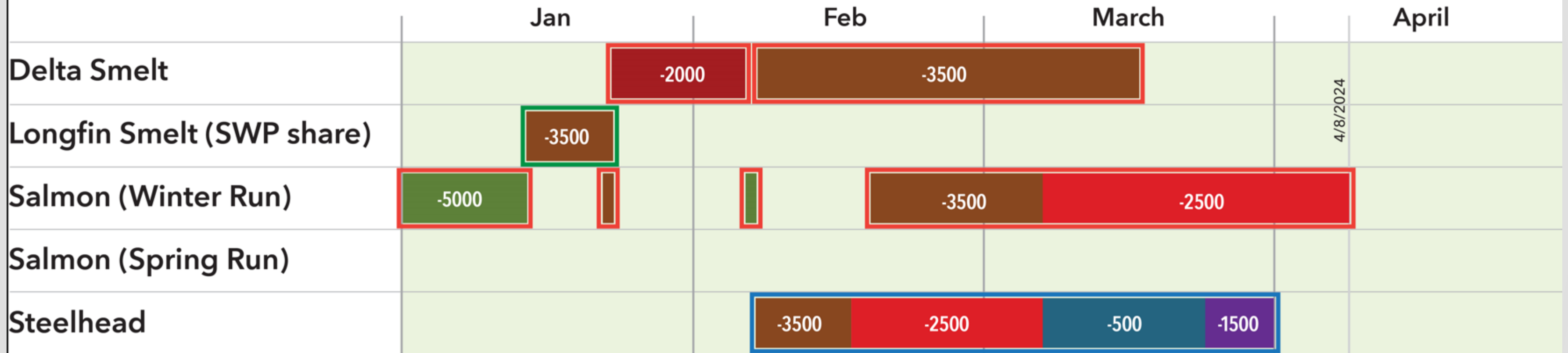


- Per state and federal ESA permits, salvage and entrainment risk is managed through a suite of Old and Middle River (OMR) flow actions
- SWP and CVP exports reduce the "footprint" of project effects
- In late March, the SWP and CVP reached 100% threshold for both winter-run salmon and exceeded Sacramento-Basin steelhead incidental take limit



PERMIT ACTIONS

Old and Middle River (OMR) Actions in 2024



4/8/2024

Legend

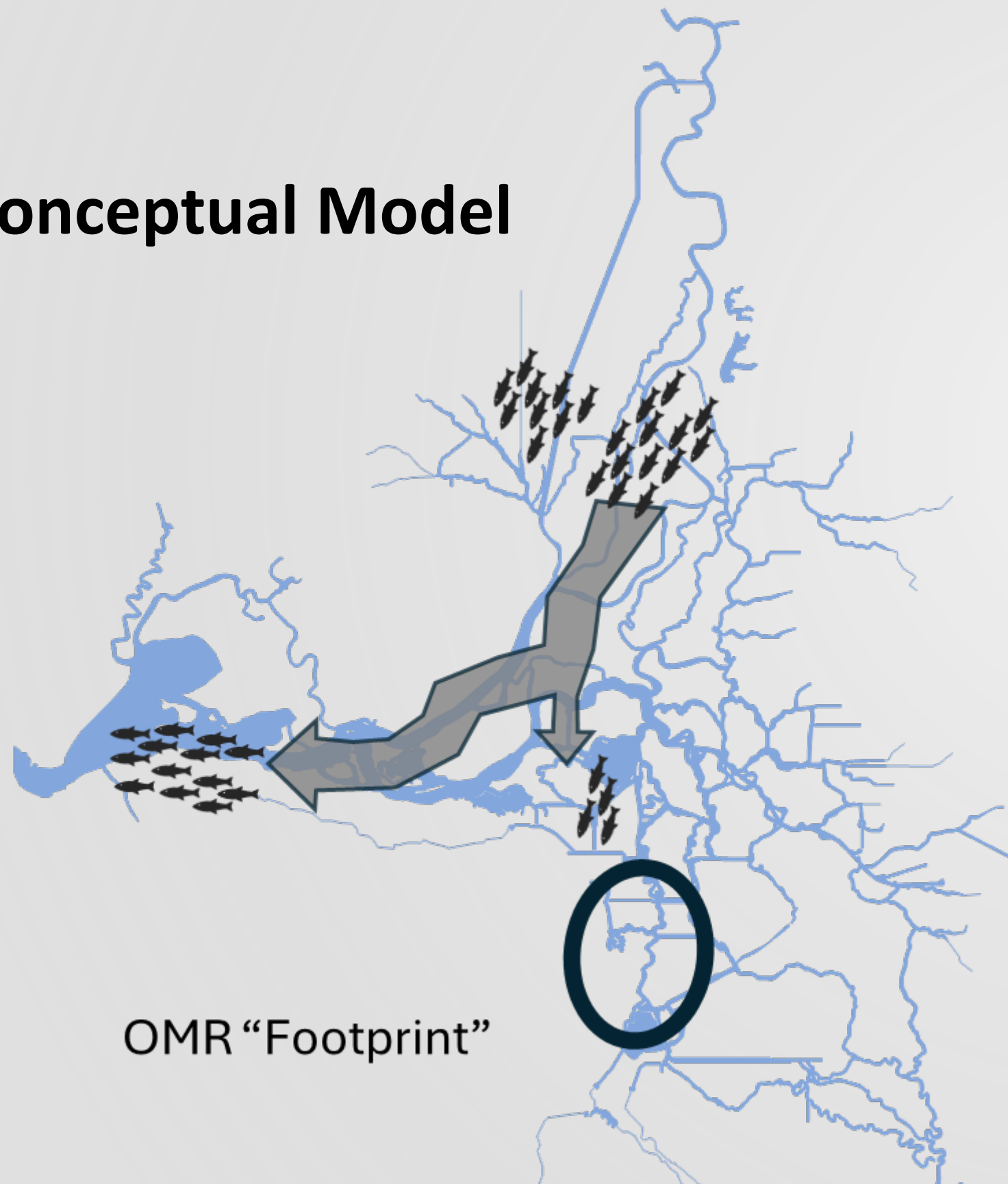
- ITP & BiOps
- IEWPP
- OMRI of -2,500 cfs
- ITP only
- OMRI of -500 cfs
- OMRI of -3,500 cfs
- BiOps only
- OMRI of -1,500 cfs
- OMRI of -5,000 cfs

Definitions:

- **BiOps:** Biological Opinions issued in 2019 by U.S. Fish and Wildlife Service/National Marine Fisheries Service
- **ITP:** Incidental Take Permit issued in 2020 by California Department of Fish and Wildlife
- **OMRI:** Old and Middle River Index
- **IEWPP:** Integrated Early Winter Pulse Protection - "First Flush"

Retrospective Look at Fish Protections During Winter and Spring: Why were salvage thresholds exceeded for winter-run salmon and Sacramento basin steelhead?

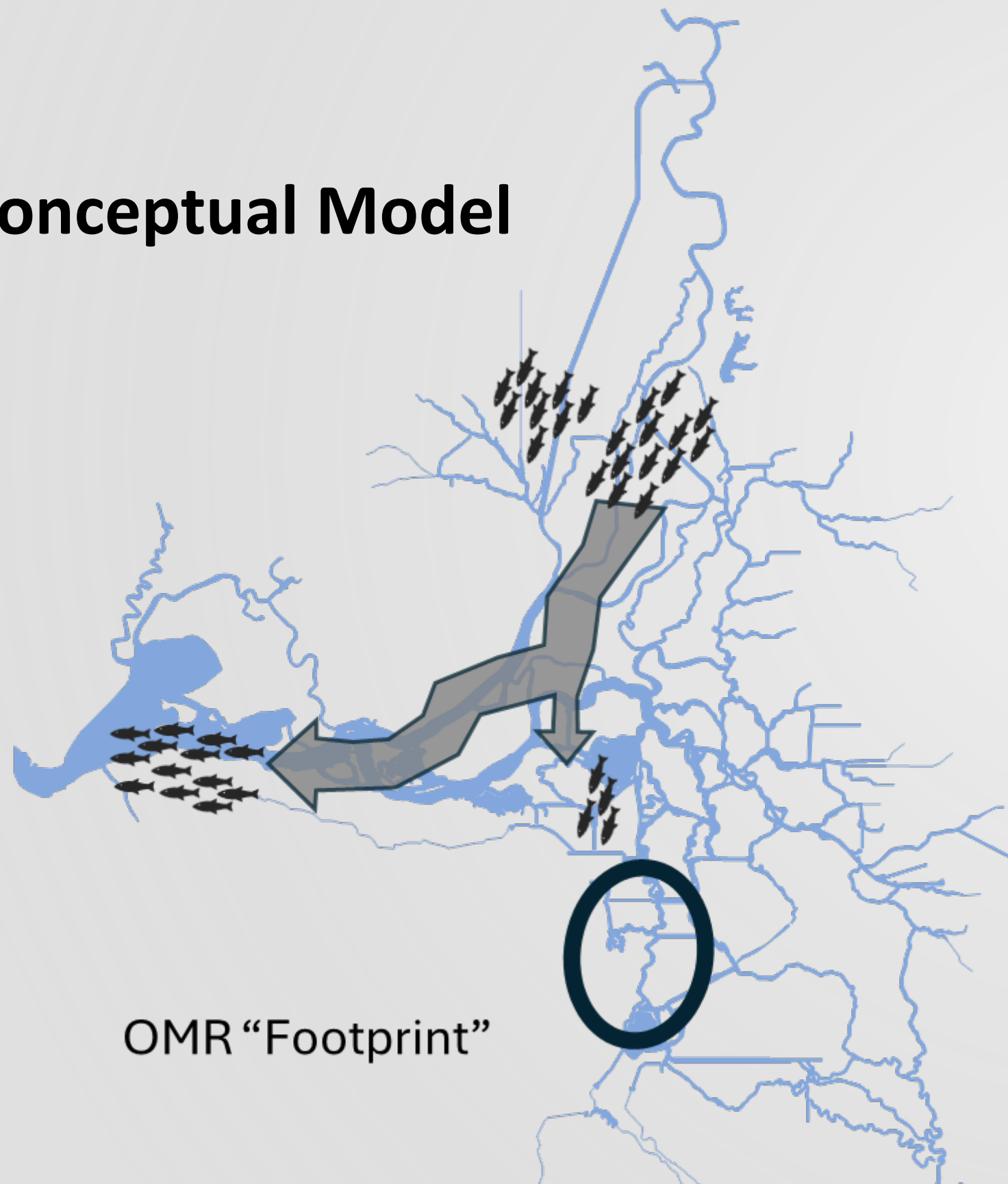
Conceptual Model



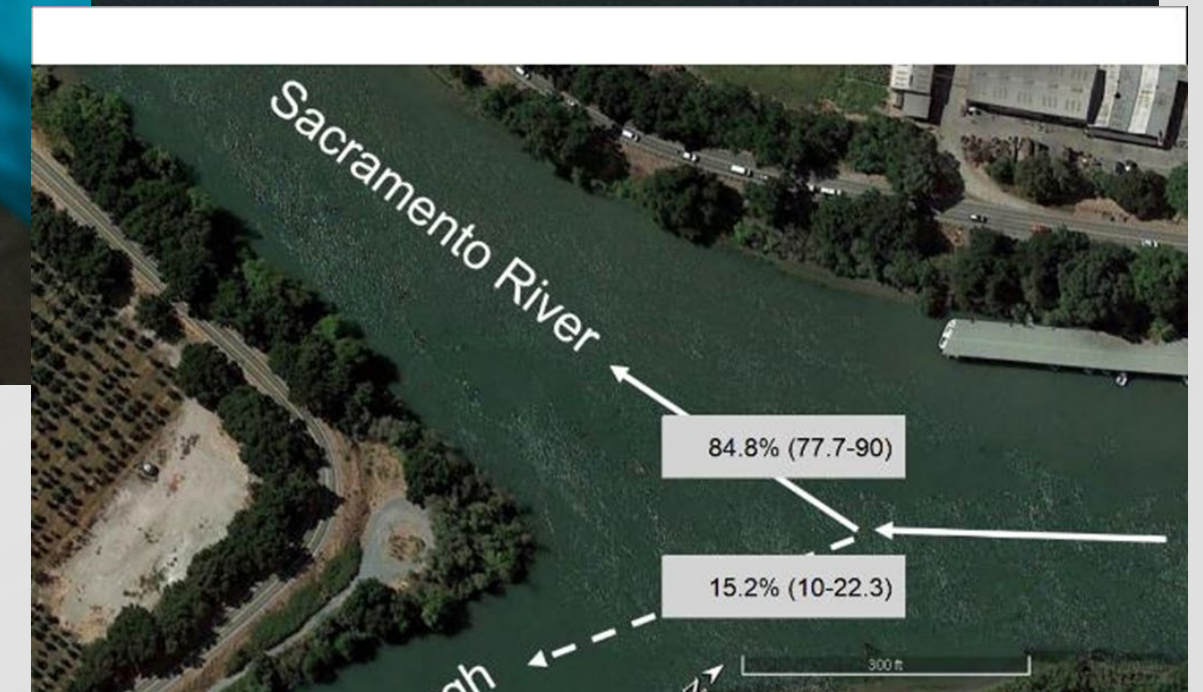
OMR "Footprint"

Retrospective Look at Fish Protections During Winter and Spring: Why were salvage thresholds exceeded for winter-run salmon and Sacramento basin steelhead?

Conceptual Model



Georgiana Slough Non-physical Barrier



Winter-run Salmon: DNA and hatchery releases support DWR's hypothesis that "true" winter-run salmon experienced low salvage and *low entrainment risk overall*



BACKGROUND

Chinook salmon entering State Water Project (SWP) and Central Valley Project (CVP) fish collection facilities in the Delta are assigned to run type for incidental take reporting and loss threshold triggers. Initially, run type is assigned using the Delta model length-at-date (LAD) criteria but may be corrected if genetics indicates a different run. Daily loss thresholds require rapid detection of natural winter-run individuals. A high number of winter-run LAD individuals have been collected in water year (WY) 2024, but subsequent genetic analysis confirmed only a small number as winter-run. Most of these winter-run LAD individuals have assigned as fall or late fall-run. However, genetic analysis assigned a number of these older juvenile salmon as spring-run. This has prompted management concern regarding the potential impacts that water operations are having on vulnerable spring-run yearling populations during this WY.

GENETIC IDENTIFICATION APPROACHES

- > GT-seq with Cramer Fish Sciences (CFS) panel: This approach uses a panel of genetic markers published in Clemento et al. (2014) for salvage-related run identification and eight loci from chromosome 28 (Ots28) to classify adult return time. The Clemento panel was developed for CA and OR coastal Chinook fisheries. Regulatory-related decisions are based on these results.
- > SHERLOCK: A pilot study is assessing SHERLOCK for run type identification (Baerwald et al. 2023), which relies heavily on a region of Ots28 strongly associated with adult return timing (Thompson et al. 2020). SHERLOCK assays were developed for their ability to rapidly assign CV salmon run type.
- > Similarities & Differences: Both GT-seq and SHERLOCK obtain results for Ots28, a region on the salmon genome that allows very reliable predictions of whether a juvenile salmon will be an early migrating adult (i.e. winter-run or spring-run) or a late migrating adult (i.e. fall-run or late fall-run). SHERLOCK uses the Ots28 marker and other markers on Ots16 for assigning run. The GT-seq approach uses a genome-wide suite of neutral markers for run assignment and reports early/late Ots28 results separately.
- > Other common genetic approaches, not typically used for salvage purposes, include: 1) GT-seq with a "transition" panel used by both NOAA SWFSC and CDFW; 2) Fluidigm with an "AIM" panel used by Meek lab. Both of these panels were created specifically for Central Valley Chinook salmon genetic stock identification.

Winter-run LAD salvaged as of 03/08/2024, N = 315

Genetic Assignment	# of Individuals
Winter	17
Fall/Late Fall	223
Spring	75

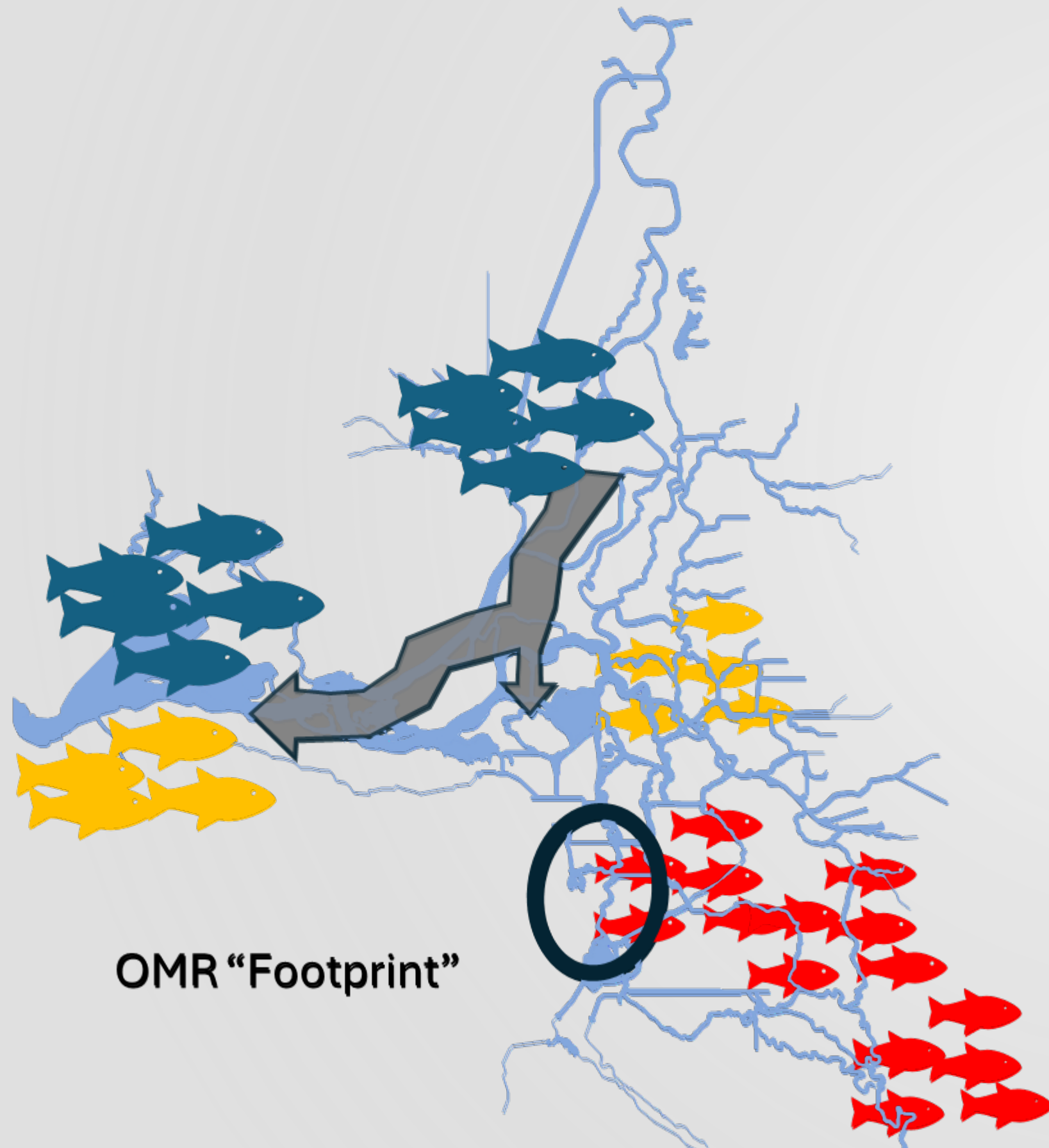
Genetic Definitions



Different markers = Different genomic regions are examined. Neutral markers are presumed to not be associated with fitness.

Different baselines: Genotyping platforms (e.g., GT-seq and Fluidigm) generate genotype data that can be analyzed to make population assignments by comparing genetic results at each marker between the unknown individual and a large sample of reference adults assigned to a specific run and population based on their demonstrated run timing and location observed in streams.

- 23 genetic confirmed winter-run have been salvaged to date, representing ~5% (4.64%) of the annual loss compared to >100% of the annual loss threshold using length-at-date
- 877,052 hatchery winter-run salmon inserted with coded-wire tags (CWT) released in the Upper Sacramento between December 28th and February 16th. So far, only one fish from these release groups (<<1% of total) have been detected at salvage
- 581 hatchery winter-run inserted with acoustic tags in the upper Sacramento River. Zero of these fish were salvaged. These tagged salmon experienced high survival from the Upper Sacramento to the Delta (2.50x higher than observed during last 5 years)
- DWR estimates > 50% of these hatchery winter-run salmon entered San Francisco Bay

Sacramento-Basin Steelhead: Unlikely contributed to salvage between January and April in any meaningful percentage



- 10 acoustic tagged steelhead approached the Georgianna Slough Barrier Junction. All 10 remained in the Sacramento River 
- DWR conducted a special study of acoustic tagged steelhead in Lower Mokelumne River in March, zero were salvaged 
- Forensic work continues
 - A sub-sample of steelhead collected at the facilities were retained for otolith analysis
 - Tissue samples collected for genetic analysis for tributary origin

The seal of the California Department of Water Resources is a circular emblem. It features a central landscape with a winding river, green hills, and a yellow field. The text "DEPARTMENT OF WATER RESOURCES" is written in a circle around the top, and "STATE OF CALIFORNIA" is written around the bottom. The seal is rendered in a light blue and green color scheme.

Thank You

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