

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE REPORT
ON SALMON METHODOLOGY REVIEW FINAL TOPIC SELECTION

As described in the Situation Summary for this agenda item, Council Operating Procedure 15 specifies procedures for the review and Council approval of methodologies for salmon abundance and harvest projection and conservation objectives. The annual methodology review process is intended to help clarify the technical basis for the Council's management actions, provides an opportunity for peer review of the technical estimation and modeling procedures to ensure the best and most objective technical analyses possible, and can be used to resolve disputes over methodology.

COP 15 also provides that management entities are expected to provide “early notification and documentation of anticipated changes in procedures for methodologies not under full review in a particular year.”

California Department of Fish and Wildlife (CDFW) wishes to notify the Council and advisory bodies that it has identified a need for future methodology review items that likely will require consideration and review in 2024 or beyond, noting that materials and analyses are not ready for review in 2023, and will require considerable effort to prepare. See the appended CDFW news release from August 23 2023 below, describing initial CDFW efforts at Parentage-Based Tagging (PBT) that have been implemented in 2023, toward the goal of increasing production of Sacramento River Fall Chinook (SRFC) in 2023 over 2022 production levels.

Per the COP, during the March and April meetings or at other appropriate times, Council advisory bodies are tasked with identifying methodology issues which need documentation and/or merit a full review. Examples of issues that could merit a full review include new model algorithms, methods for incorporating base data into models, forecasting methods for major PFMC stocks, experimental design of proposed experimental fisheries, and technical changes to stock complexes or conservation objectives. In light of these examples, the implementation of PBT will require review of a number of methods, which may include but would not be limited to the following:

1. Monitoring the survival, maturation, and exploitation rates of PBT releases.
2. Estimating natural-origin escapement in the presence of PBT hatchery release groups.
3. Incorporation of PBT hatchery releases into an age-structured assessment for SRFC.
4. Possible revision of the SRFC harvest control rule to account for PBT-marked fish while also considering the Pacific Coast Salmon Fishery Management Plan’s goal that artificial production programs that are designed to perpetuate and/or rebuild depressed natural populations should be

short-term in duration, boost the abundance of targeted natural populations over a few generations, and terminate when the population is able to sustain itself naturally.

5. Impacts of PBT hatchery releases on the Sacramento Index (SI) and Sacramento Harvest Model (SHM) used to forecast ocean abundance, spawner escapement, and estimate exploitation rates which are critical to the annual fishery planning process.

6. Ocean and Inland sampling design needed to evaluate fishery performance in relation to the conservation objectives and harvest control rules outlined in the Pacific Coast Salmon Fishery Management Plan.

CDFW Completes Release Of 23 Million Fall-Run Chinook Salmon

August 23, 2023



The California Department of Fish and Wildlife (CDFW) has completed the release of approximately 23 million fall-run Chinook salmon raised at its four Central Valley anadromous fish hatcheries, the Feather River Fish Hatchery, the Nimbus Fish Hatchery, the Mokelumne River Fish Hatchery and the Merced River Hatchery.

The 23 million salmon raised and released by CDFW in 2023 represents a 15 percent increase over the roughly 20 million fall-run Chinook salmon raised and released in 2022. This year's production goals were increased as a coordinated effort among state and federal partnering agencies to help fall-run Chinook salmon overcome impacts from an extended drought that increased water temperatures and decreased water flow throughout the Central Valley during critical salmon spawning and rearing periods. Drought conditions coupled with Thiamine Deficiency Complex, a vitamin deficiency that impacts reproduction, have reduced in-river spawning success the past several years.



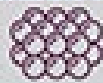
2023 FALL-RUN CHINOOK SALMON PRODUCTION & RELEASE

BY THE NUMBERS

PRODUCTION

23 MILLION TOTAL

BREAKDOWN OF PRODUCTION BY CDFW HATCHERY



Feather River Fish Hatchery - 10.4 million
 Nimbus Fish Hatchery - 5.6 million
 Mokelumne River Hatchery - 7.0 million

2.26 M

FEATHER RIVER

- 1 million released as smolts
- 1 million released as pre-smolts just after tagging
- 266,000 released as unmarked/untagged fry

RELEASES

9.1 M

SAN PABLO BAY

- Direct releases at night
- Concord - 5.33 million
- Marin Blvd and Gun (Point San Quentin) - 795,000
- Net pen releases
- Marin Island - 3 million

1.85 M

AMERICAN RIVER

- 1 million releases as unmarked/untagged fry
- 856,000 released as smolts

3.1 M

MOKELUMNE RIVER

- 3.1 million releases into the San Joaquin River at Sherman Island

5.56 M

SAN FRANCISCO BAY

- Estuary and Ocean Science Centre (Fiberson) - 3.36 million
- Brickyard Cove (Richmond) - 200,000
- Fort Baker - 2 million

1.07 M

OCEAN RELEASES

- Monterey Harbor - 362,000
- Santa Cruz Harbor - 360,000
- Pillar Point Harbor - 752,000

To learn more about chinook salmon in California, visit: wildlife.ca.gov/Conservation/Fishes/Chinook-Salmon or scan the QR code.



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Beyond the hatchery production increase, CDFW carried out several new, innovative and experimental release strategies to take advantage of some of the best in-river flows and water conditions in years and to increase overall survival. In 2023:

- For the first time since 2020, CDFW conducted in-river salmon releases within the Feather River and the American River to take advantage of the increased water flows associated with winter storms that lingered into the spring. These flows increased available rearing habitat and provided for increased survival while migrating toward the ocean. Salmon smolts outfitted with acoustic tags were released with larger groups in their natal rivers to allow CDFW to monitor and track their downstream migration to the ocean. Preliminary results suggest high survival for groups of hatchery-raised fish released into the river systems in 2023. [Watch the May 16, 2023, release of fall-run Chinook salmon smolts into the American River \(Video\)](#)(opens in new tab).
- The more than one million salmon fry released into the American River in February represented CDFW's initial effort with "Parentage Based Tagging" or PBT. These juvenile salmon don't carry physical markings or tags, but their genetic signatures have been recorded and stored for future analysis to evaluate the overall success of the fry release.
- The Feather River Fish Hatchery released smaller juvenile fall-run Chinook salmon earlier in the spring than the typical smolt releases to diversify hatchery release strategies as well as the timing and size of hatchery-raised fish entering into the bay and marine environments.
- CDFW added to the release sites and strategies used within San Francisco and San Pablo bays. These included new release locations at: the Estuary and Ocean Science Center in partnership with San Francisco State University; Point San Quentin, in partnership with the Marin Rod and Gun Club; and Brickyard Cove in Richmond in partnership with the City of Richmond and the Golden Gate Salmon Association. At these locations, smolts were released at night on strong outgoing tides to reduce bird predation and encourage seaward migration.
- With the exception of PBT release groups in the American River, 25 percent of all fall-run Chinook salmon raised and released by CDFW's Central Valley anadromous fish hatcheries carry coded-wire tags (CWT) with information on their origin and have a clipped adipose fin to indicate their hatchery origin.

Both CWT and PBT tagged fish will provide important scientific data that will inform future management decisions and hatchery operations. Fall-run Chinook salmon support the bulk of California's commercial and recreational salmon fishing seasons. Although ocean and in-river salmon fishing seasons have been closed for 2023, fishing seasons will be reevaluated in 2024.

CDFW photo of salmon smolt release into San Francisco Bay.

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