

# Technical Memo

## Task 2. Mossdale Spring Trawl

### Introduction

**Background:** The Mossdale trawl is a long-term monitoring project in the San Joaquin River that monitors salmonid outmigration and juvenile fish populations. It is currently a collaborative effort between the California Department of Fish and Wildlife (CDFW) and United States Fish and Wildlife Service (USFWS). In its current design, each organization is responsible for sampling three months individually, and six months together. This design ensures resources and sampling efforts are shared equally between the two agencies and helps mitigate potential sample bias. To better coordinate, CDFW and USFWS hold monthly meetings to address changing river conditions, logistics, and resolve differences between the two agencies.

**Purpose:** This project also enumerates steelhead (*Oncorhynchus mykiss*) emigrating through the South Delta; and is helping develop methods for differentiating between juvenile fall and spring-run Chinook salmon. In addition, data collected during the survey is used by CDFW and USFWS to inform water management decisions in the San Joaquin River Basin. (IEP 2024). This project also provides data supporting water management in the San Joaquin River basin and the Delta; and is used for enumerating steelhead (*O. mykiss*) migrating through the San Joaquin River into the south Delta. Developing methods to differentiate fall and spring run juvenile Chinook salmon migrating in the San Joaquin River basin.

### Objectives

- Determine annual salmon smolt production in the San Joaquin Basin.
- Develop smolt production trend information.
- Determine the timing and magnitude of smolt out-migration into the Delta from the San Joaquin tributaries.
- Collect Steelhead smolt migration timing in the San Joaquin Basin.
- Develop Steelhead production and trend information.
- Evaluate the survival rate of hatchery fish at various points in the system.
- Document the occurrences of other species of interest including listed species.

### Methods

**Study Area:** The survey area is located in the State of California, San Joaquin County, section/township/range: 4/02S/06E and 33/01S/06E. The sample reach is located approximately 2 river miles downstream of Mossdale Crossing Regional Park on the San Joaquin River. See Appendix for a detailed map.

## Sampling Methods: Net & Live Box

The Mosssdale Trawl is conducted by towing a Kodiak trawl net between two vessels: a net boat and a chase/workup boat. The net used for the survey is approximately 20 meters long and composed of five panels, each with a decreasing mesh size the closer it gets to the live box at the cod end. The mesh size for each panel ranges from 5.1 cm stretch at the mouth to 0.3 cm stretch just before the live box. The fully extended mouth size of the net is 1.83 x 7.62 m rectangle.

The live box (34 cm wide x 34 cm tall x 51 cm long) is composed of 0.18 cm thick aluminum that is perforated with numerous 0.46 cm diameter holes. The live box contains several internal baffles to minimize fish mortality and stress due to flow pressure.

A float line and lead line enable the net to remain in the top few meters of the water column while sampling. In addition, at the front of each wing of the net is a 1.83 m spreader bar with floats at the top and weights at the bottom to keep depth constant while sampling. The net is connected to the boats using a 1.83 m rope bridle attached to a 15.24 m tow rope on each side of the net. As a result, the net is fished approximately 16 m from the boats. For additional details, please see the Mosssdale Trawl Standard Operating Procedures.

CDFW conducts up to 18 20-minute tows, 3-to-5 days per week during April, May and June. In the months of January, February, March, July, August and September, CDFW, in conjunction with USFWS, conducts 10 20-minute tows. During the months of coordination, we meet with USFWS once per month to coordinate and discuss logistics, vehicles or boats usage, staff conflicts and resolve any monitoring differences.

**Data Collection:** Data is recorded on paper datasheet in the field. All data are entered into a relational database for processing and are shared through [SacPAS](https://www.cbr.washington.edu/sacramento/data/juv_monitoring.html).

[[https://www.cbr.washington.edu/sacramento/data/juv\\_monitoring.html](https://www.cbr.washington.edu/sacramento/data/juv_monitoring.html)]

**Data Analysis:** Juvenile salmon production is estimated using three different methods:

1. Smolt production index calculation,
2. Vulnerability expansion estimate (single Year),
3. Vulnerability expansion estimate (multi-years).

For detail about data analysis, please see the Mosssdale Trawl Standard Operating Procedures.

## Results

Between July 1, 2024, and September 30, 2024, CDFW collaborated with USFWS to perform the survey. CDFW assisted USFWS by providing two staff members for the three-day sampling week. From September 30, 2024, to December 31, 2024, USFWS took over sampling full-time. During this time, CDFW prepared their sampling gear for the next sampling period. This included repairing nets, maintaining and calibrating scientific sampling equipment, purchasing necessary equipment, and working with fleet repair vendors to maintain vessels, trailers, and vehicles.

Beginning January 1, 2025, CDFW resumed its collaborative survey efforts with USFWS. Unexpected federal job cuts early in the year presented a problem to continue collaborative efforts. USFWS and CDFW created a plan to continue the survey without USFWS staffing. CDFW was able to fully take over and continue surveying three days a week using their survey equipment and a crew of four

employees beginning on February 18, 2025. Starting on April 1, 2025, the survey was conducted five days a week with a crew of four employees. In June, CDFW coordinated again with USFWS to discuss sampling conditions and facilitate the switch to using their vessels and sampling equipment on July 1, 2025.

During the spring of 2025, we captured 913 juvenile Chinook salmon between February 18 and the end of June. Using the Fisher’s Length at Date table, 517 juvenile salmon were identified as fall run (Figure 1), 105 were identified as spring run (Figure 1) and one was identified as winter run (Figure 2). CDFW collected 290 hatchery-origin juvenile salmon. Coded-wired tags were extracted and read. All hatchery origin fish were found to originate from the San Joaquin River Conservation Hatchery’s 2024 brood year and released at Freemont Ford Bridge (Highway 140) or Reach 1 of the restoration area. CDFW also captured two *O. mykiss* (Figure 3). Both were wild (adipose fin intact) with no identifying markings or tags.

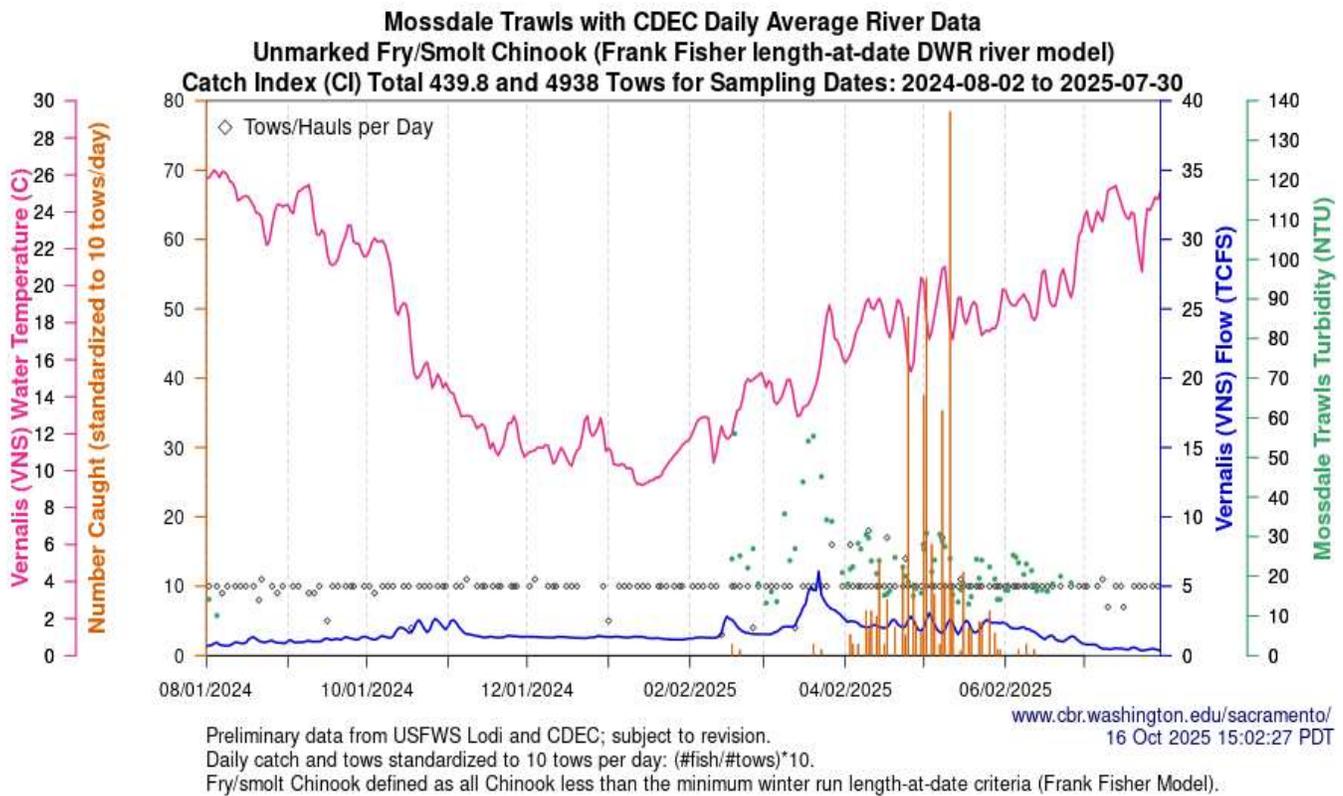


Figure 1: Fall and spring run juvenile salmon caught at Mosssdale Trawl during water year 2024

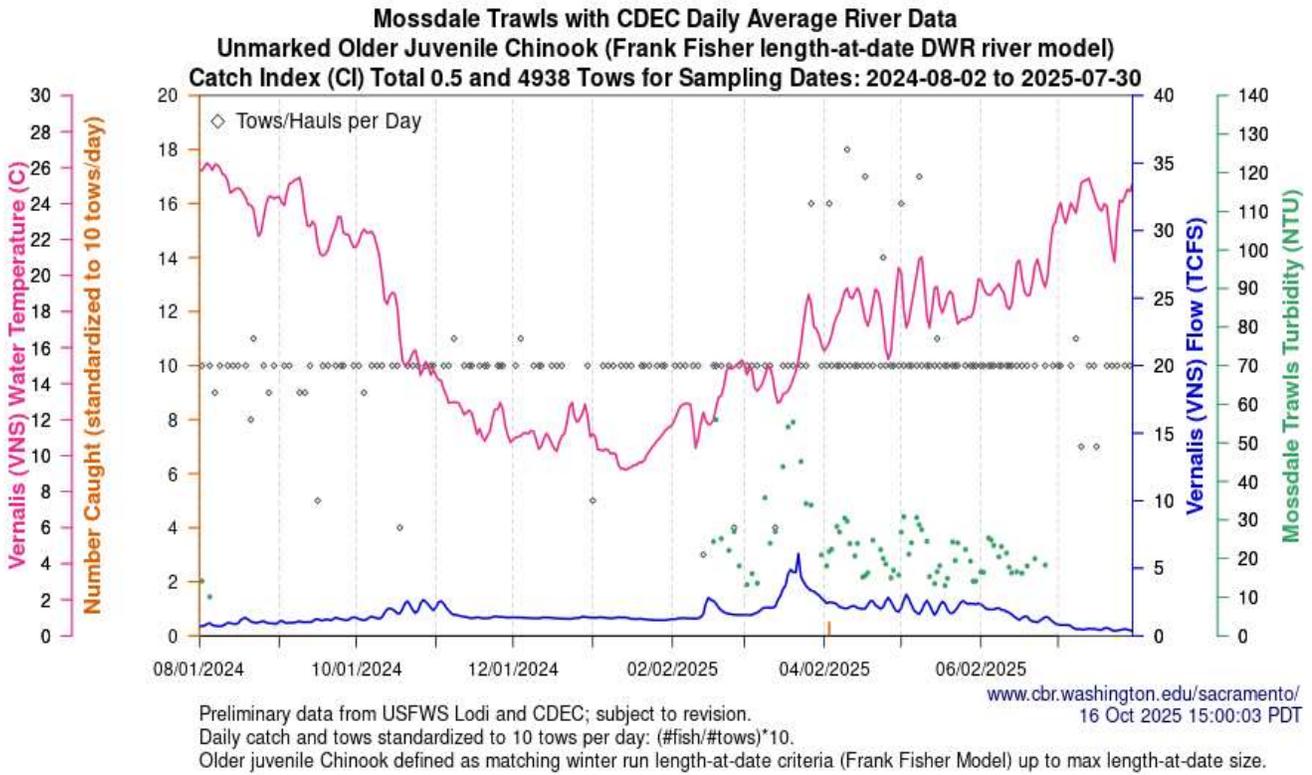


Figure 2: Winter run juvenile salmon caught at Mossdale Trawl during water year 2024

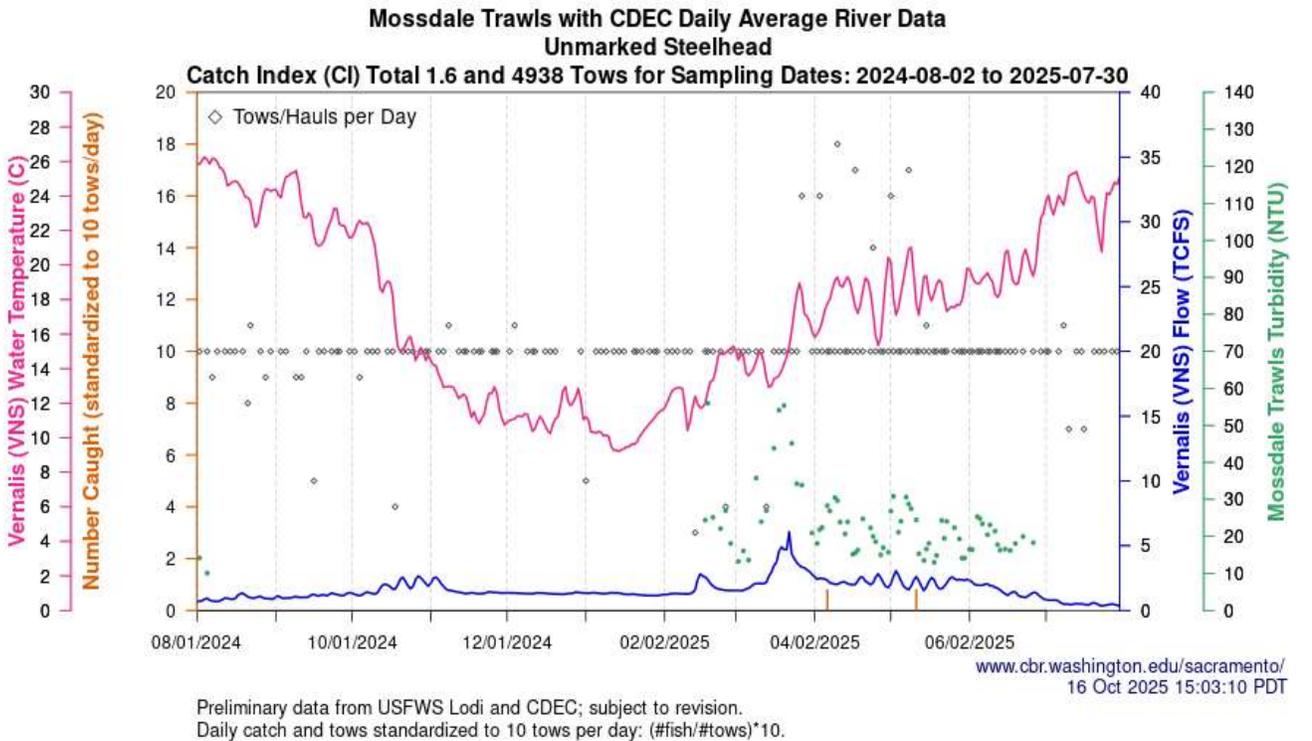


Figure 3: steelhead smolt caught at Mossdale Trawl during water year 2024

## Discussion

CDFW's sampling effort was focused on capturing fall-run juvenile Chinook salmon's out-migration population size and timing. Based on a preliminary review of the data, juvenile salmon capture decreased significantly from 2,169 juveniles in 2024 to 913 in 2025. Table 1. shows historical raw salmon catch from 2007 to 2024.

*Table 1: Raw juvenile salmon catch.*

Year	Total CHN handled
2007	3392
2008	1696
2009	647
2010	296
2011	3265
2012	3236
2013	5388
2014	1343
2015	72
2016	202
2017	2752
2018	1547
2019	712
2020	*
2021	95*
2022	62
2023	249**
2024	2169
2025	913

\* indicates no sampling or sampling impacted by COVID 19 safety protocol.

\*\* indicates sampling impacted by flood condition.

The biggest challenge when conducting the Mossdale Trawl was again staffing. Although CDFW had sufficient staffing, unexpected staff cuts to USFWS staff resulted in CDFW providing additional staff and all required sampling equipment earlier than expected. Communication between USFWS and CDFW allowed the quick unexpected transition to go as smoothly as possible.

We were able to achieve most of the deliverables for Task 2, Mossdale Spring Trawl. We provide more details for each deliverable below.

We had compared our trawl protocol with USFWS's and align our sampling differences.

During April, May and June the Mossdale Trawl daily catch data are posted onto CalFish website weekly. These data is processed by University of Washington Columbia Basin Research staff

before posting onto [SacPAS: Cenral Valley Prediction & Assessment of Salmon](https://www.cbr.washington.edu/sacramento/) website. [https://www.cbr.washington.edu/sacramento/]

Figure 1 to 3 shown above have provided Fall/Spring/Winter run juvenile passage and steelhead smolt passage at Mossdale Trawl for water year 2024. Current funding and staffing were originally designed to carry out the new enhanced Mossdale Trawl which is co-operating with USFWS year-round. After the contract execution, CDFW had concluded that the existing funding and staffing level was enough to continue the enhanced survey (which focused on fall-run population estimates and year-round fishery monitoring with reduced monitoring effort). However, to produce the spring-run and steelhead population estimate, more resources including both funding and staff are required.

All Mossdale monitoring data were transferred to USFWS weekly between February 18<sup>th</sup> and the end of June. USFWS retains all datasheets outside of these dates. All Mossdale surveying data are posted on to the [EDI Data Portal](#). [Data Portal - Data Package Summary | Environmental Data Initiative (EDI) (edirepository.org)].

We collected 617 samples of genetic material from juvenile salmon. All fin clip samples are dried and cataloged.

No special request or special study were made by GOTR in water year 2024.

## Conclusion

The Mossdale Trawl is a long-term monitoring effort on Delta juvenile fish with partial emphasis on the San Joaquin River basin salmonid migration size and timing. CDFW was able to perform the planned field sampling effort with staff working overtime, despite the staffing shortage. The USFWS and staffing cuts have since been resolved but their staffing situation remains uncertain and may require further assistance in the future to ensure surveying is completed.

## References

- [Figure 1:](#)  
[https://www.cbr.washington.edu/sacramento/tmp/juvmonitor\\_1761243108\\_159\\_SJ054\\_R.png](https://www.cbr.washington.edu/sacramento/tmp/juvmonitor_1761243108_159_SJ054_R.png)
- [Figure 2:](#)  
[https://www.cbr.washington.edu/sacramento/tmp/juvmonitor\\_1761243031\\_799\\_SJ054\\_R.png](https://www.cbr.washington.edu/sacramento/tmp/juvmonitor_1761243031_799_SJ054_R.png)
- [Figure 3:](#)  
[https://www.cbr.washington.edu/sacramento/tmp/juvmonitor\\_1761243161\\_828\\_SJ054\\_R.png](https://www.cbr.washington.edu/sacramento/tmp/juvmonitor_1761243161_828_SJ054_R.png)
- [IEP 2024 Delta Juvenile Fish Monitoring Program](#), [https://iep.ca.gov/Science-Synthesis-Service/Monitoring-Programs/Delta-Juvenile-Fish]
- Kok, Ryan and S. Tsao, Mossdale Trawl Standard Operating Procedures. 2020.