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RECLAMATION

Fish Salvage and Operations at the Tracy Fish Collection Facility for Water Year 2023

Tracy Fish Collection Facility

**South-Central California Area Office | Tracy Office
Interior Region 10 - California-Great Basin**



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The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Cover photo – Daily fish salvage process at the Tracy Fish Collection Facility (Reclamation/Reyes).

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**South-Central California Area Office | Tracy Office
Interior Region 10 - California-Great Basin**

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**Tracy Fish Collection Facility
California-Great Basin, Region 10**

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Peer Review Certification

This section has been reviewed and is believed to be in accordance with the service agreement and standards of the profession.

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Acronyms and Abbreviations

| | |
|-------------|---|
| AF | acre feet |
| BO | Biological Opinion |
| CDFW | California Department of Fish and Wildlife |
| CWT | Coded Wire Tag |
| CVP | Central Valley Project |
| D-1641 | State Water Board Revised Decision 1641 |
| Delta | Sacramento-San Joaquin Delta |
| FL | fork length |
| ft | feet |
| JPP | C.W. “Bill” Jones Pumping Plant |
| mm | millimeters |
| NOAA | National Oceanic and Atmospheric Administration |
| O&M | Operation and Maintenance |
| Reclamation | Bureau of Reclamation |
| SWRCB | State Water Resources Control Board |
| TFCF | Tracy Fish Collection Facility |
| WY | water year |

Symbols

| | |
|--------|--------------------------|
| \geq | greater than or equal to |
| $<$ | less than |

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1. Introduction

The Tracy Fish Collection Facility (TFCF) diverts and salvages fish from water being exported from the Sacramento-San Joaquin Delta (Delta) by the C.W. “Bill” Jones Pumping Plant (JPP) into the Delta Mendota Canal. Both the TFCF and JPP are integral parts of the Bureau of Reclamation’s (Reclamation) Central Valley Project (CVP) which provides water for agriculture and municipalities on the western side of the San Joaquin Valley. Salvaged fish are loaded into tanker trucks and released into the western Delta away from the immediate influence of the JPP water exports.

This report summarizes the 2023 water year (10/01/2022 to 09/30/2023) operational and biological information gathered from the TFCF. Species given individual consideration are: Chinook Salmon (*Oncorhynchus tshawytscha*), Steelhead (*O. mykiss*), Striped Bass (*Morone saxatilis*), Largemouth Bass (*Micropterus salmoides*), Delta Smelt (*Hypomesus transpacificus*), Longfin Smelt (*Spirinchus thaleichthys*), Sacramento Splittail (*Pogonichthys macrolepidotus*), Threadfin Shad (*Dorosoma petenense*), Green Sturgeon (*Acipenser medirostris*), and White Sturgeon (*Acipenser transmontanus*).

2. Methods

Daily volumes of water exported were reported from meter readings at the JPP in Byron, California. Monthly water exports were plotted and examined for temporal trends. Water year (WY) exports for the CVP from 1981 through 2023 were noted. Salvage data from WY 1981 to 2023 were examined for long and short-term trends. Diverted fish are subsampled and enumerated at the TFCF. The subsamples are expanded and reported as “estimated salvage” to quantify the fish abundance at the facility. It should be noted that some fish species, including Delta Smelt, may have a low survival rate through the salvage process. The TFCF is only required to enumerate fish greater than or equal to (\geq) 20 millimeters (mm) fork length (FL) because salvage efficiency degrades rapidly for fish smaller than this size. Salvage estimates were obtained by multiplying routine sample counts by an expansion factor calculated as salvage minutes divided by minutes of the sample count in Equation 1:

$$\text{SALVAGE}_{\text{SAMPLE}} = \text{COUNT}_{\text{SAMPLE}} \times (\text{SALVAGE MINUTES} / \text{MINUTES}_{\text{SAMPLE}}) \quad (\text{Eq. 1})$$

Predator removals were not expanded since they are removed with no salvage minutes:

$$\text{SALVAGE}_{\text{PREDATOR REMOVAL}} = \text{COUNT}_{\text{PREDATOR REMOVAL}} \quad (\text{Eq. 2})$$

Salvage estimates were calculated by the summation of both equations by month and water year. Intra annual abundances were examined by plotting the monthly salvage totals for selected fish species and for all fish taxa combined for WY 2023.

Annual and monthly salvage estimates for Chinook Salmon and Steelhead were calculated for wild and hatchery fish. Salmonid origin was determined by the presence (assumed to be wild) or

absence (assumed to be hatchery) of an adipose fin. Race of Chinook Salmon was initially determined by the Delta criteria based on length-at-date of salvage (California Department of Fish and Wildlife [CDFW] 2014). If Coded Wire Tag (CWT) information was available, the race of hatchery Chinook Salmon was updated. If DNA race information was available, the race of wild Chinook Salmon was updated.

Chinook Salmon loss estimates are presented because they are used to measure the fishery impact of the water export operation. Loss is the estimated number of fish encountered by the facility minus the number of fish that survived salvage operations (CDFW 2013). Loss was subcategorized by origin and race. Daily loss estimates are used as a regulatory trigger to protect listed salmonid species by reducing CVP and SWP water exports. The Biological Opinion (BO) established the use of daily loss densities to trigger mandatory consultation with the National Oceanic and Atmospheric Administration (NOAA) Fisheries and water export reductions.

Larval fish sampling was conducted between March 1 and June 6, 2023, to detect the presence of Delta Smelt and Longfin Smelt larvae and post-larval juveniles (< 20 mm FL). During the 04:00, 10:00, 16:00, and 22:00 hour fish counts, the fish screen used at the fish count station was replaced with a 0.5-mm fish screen to retain smaller fish. No changes were made to the screens in the holding tanks during larval sampling. Larval fish were identified to species by TFCF personnel and reported the next working day. On the final day, no larval sampling occurred during the 16:00 and 22:00 fish counts.

3. Results and Discussion

3.1. Water Exports

During WY 2023, the CVP exported 2,219,806-acre feet (AF) of water which is an increase from the previous two years (1,406,786 AF in WY 2022; 916,360 AF in WY 2021; Figure 1). Average annual water export since WY 1981 has been 2,209,709 AF. However, coinciding with dry and drought years, average annual water exports in the last ten years has been 1,661,265 AF.

The lowest monthly water exports of WY 2023 occurred between October and December 2022 (Figure 2). During these periods, a total of 230,394 AF was exported, accounting for 10.38 percent of total exports. Monthly exports ranged from 63,333 AF in October 2022 to 254,815 AF in August 2023.

Fish Salvage and Operations at the Tracy Fish Collection Facility for Water Year 2023

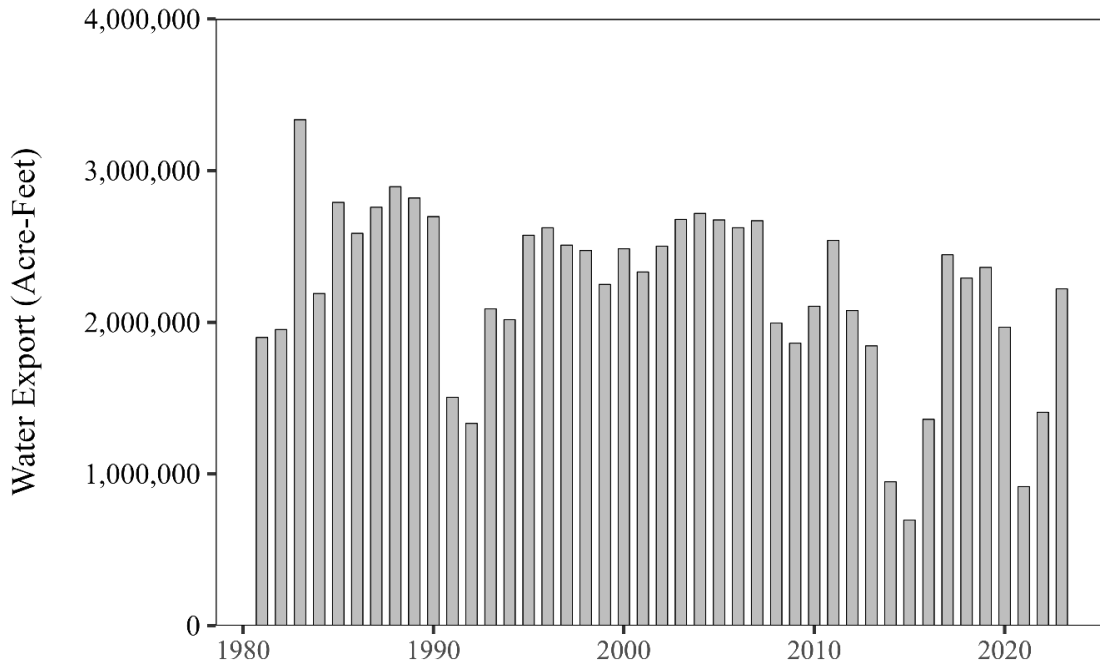


Figure 1.—Annual water exports in millions of acre-feet for the Central Valley Project for WYs 1981-2023.

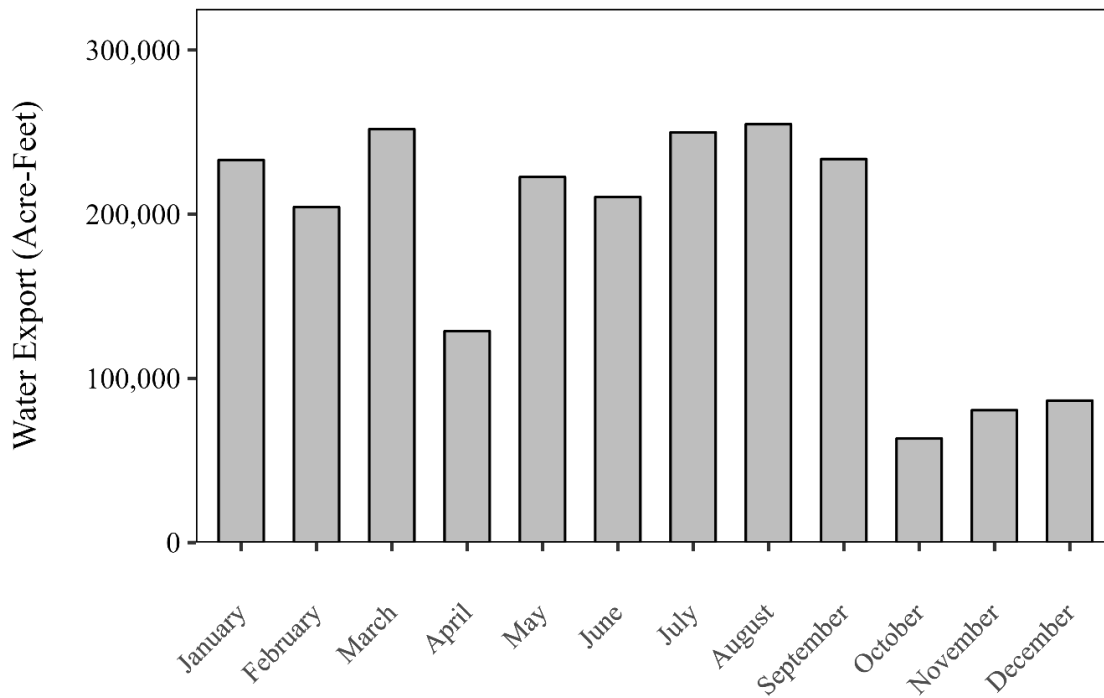


Figure 2.—Monthly water exports (in acre-feet) for the Central Valley Project, WY 2023.

3.2. Total Salvage and Prevalent Species

Total fish salvage (all fish combined) at the TFCF during WY 2023 was 13,442,038 (Figure 3), which was greater than eight times the total in WY 2022 (1,633,236) and less than the record high salvage of 37,659,835 fish in WY 2006, when most of the salvaged fish were Common Carp (*Cyprinus carpio*).

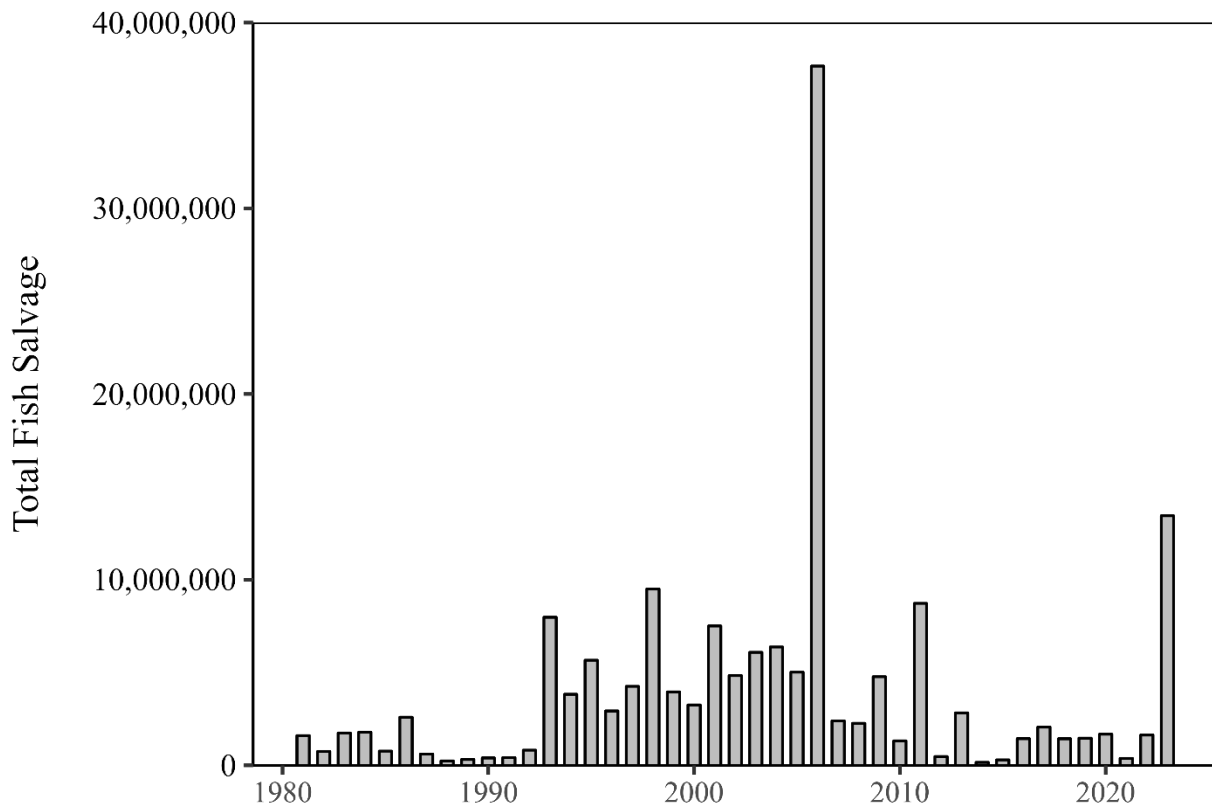


Figure 3.—Annual salvage (by water year) of all fish taxa combined at the Tracy Fish Collection Facility, WYs 1981-2023.

Threadfin Shad accounted for 40.52 percent of the total salvage in WY 2023 (Figure 4 and Appendix 1). Threadfin Shad make up the bulk of salvage most years, aside from WY 2006, when Common Carp accounted for 81.8 percent (30,495,481) of salvage. The second to sixth most salvaged species in WY 2023 were: Common Carp (32.42 percent), Splittail (*Pogonichthys macrolepidotus*, 15.40 percent), Largemouth Bass, (2.63 percent), Bluegill (*Lepomis macrochirus*, 2.02 percent), White Catfish (*Ameiurus catus*, 1.97 percent), and Striped Bass (*Morone saxatilis*, 1.10 percent), respectively. Native species comprised 16.01 percent of total fish salvage. Listed species (including Chinook Salmon, Steelhead, Longfin Smelt, and Delta Smelt) accounted for 0.17 percent of salvage.

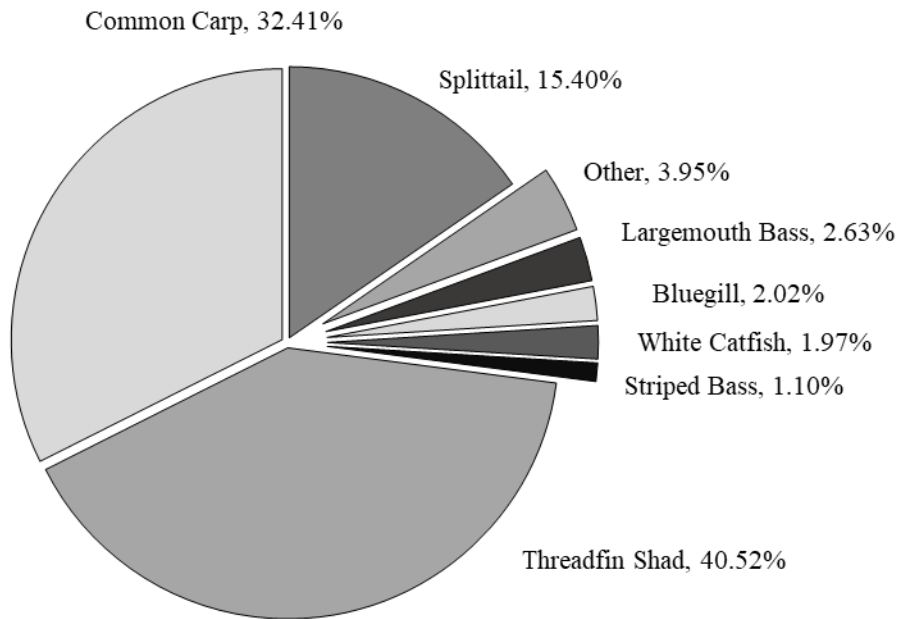


Figure 4.—Percentages of the annual salvage for the most prevalent ($\geq 1.0\%$) species at the Tracy Fish Collection Facility for WY 2023.

3.3. Chinook Salmon

The total annual salvage during WY 2023 of juvenile (< 300 mm FL) Chinook Salmon was 21,057 for all races and origins combined (Figure 5; Appendix 1). This is the fifteenth highest salvage year since WY 1981. Average annual salvage for the last 10 years was 7,6136 fish (WYs 2014 to 2023), which is 21 percent of the average salvage of Chinook Salmon for WYs 1981 to 2013 (31,696 fish).

Fish Salvage and Operations at the Tracy Fish Collection Facility for Water Year 2023

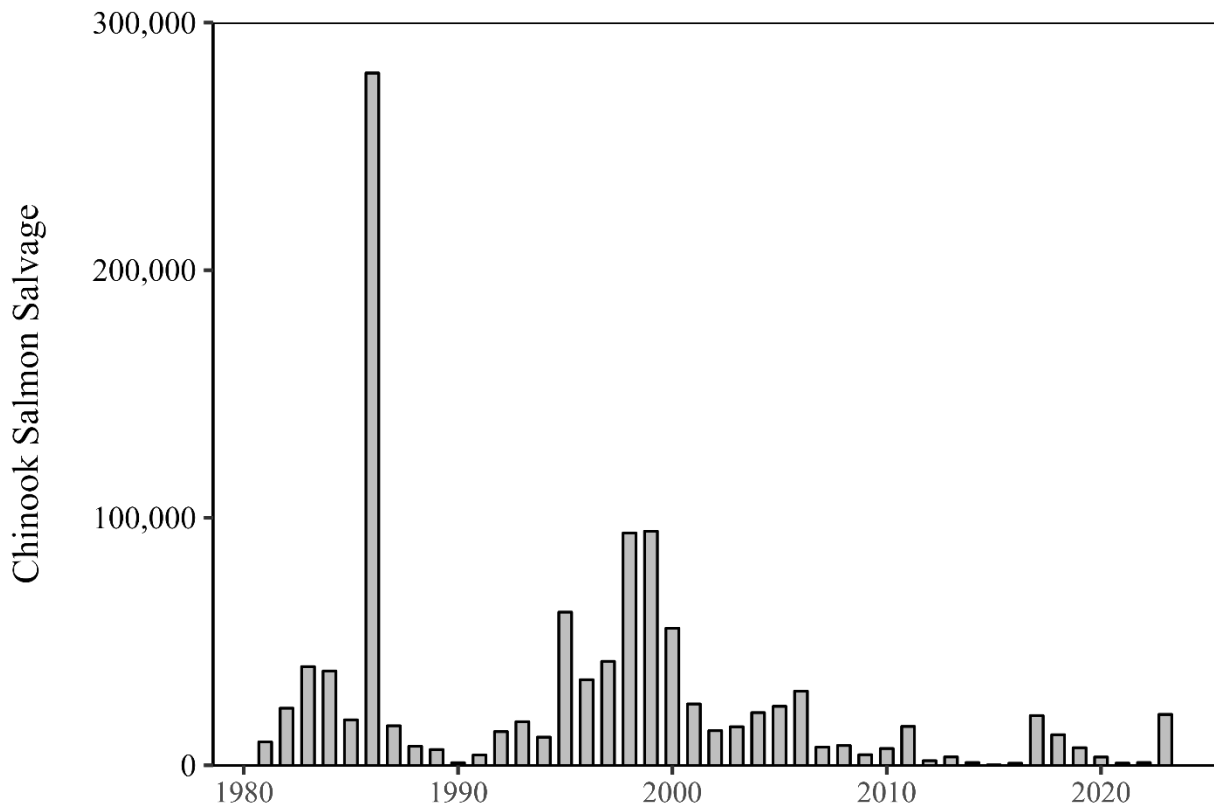


Figure 5.—Annual salvage (by Water Year) of Chinook Salmon (all races and origins combined) at the Tracy Fish Collection Facility, WYs 1981-2023.

Wild Chinook Salmon were sampled from December-September with the majority (88.66 percent) being sampled from May through June (Figure 6). One Chinook Salmon was determined by genetic analysis to be wild Winter Run (out of 4,173 genetic samples). Of genetic samples submitted, 50.83 percent were female (2,121 fish). As determined by length-at-date, Spring Run wild Chinook Salmon were sampled in January through July, with most being salvaged in May (74.88 percent of Spring Run). The majority (59.50 percent) of wild Fall Run Chinook Salmon were sampled in June. By length-at-date, samples consisted of 59.19 percent Fall Run, 40.99 percent Spring Run and 0/07 percent unassigned or Late-Fall Run. Group loss estimated by length-at-date is reported in Table 1.

Fish Salvage and Operations at the Tracy Fish Collection Facility for Water Year 2023

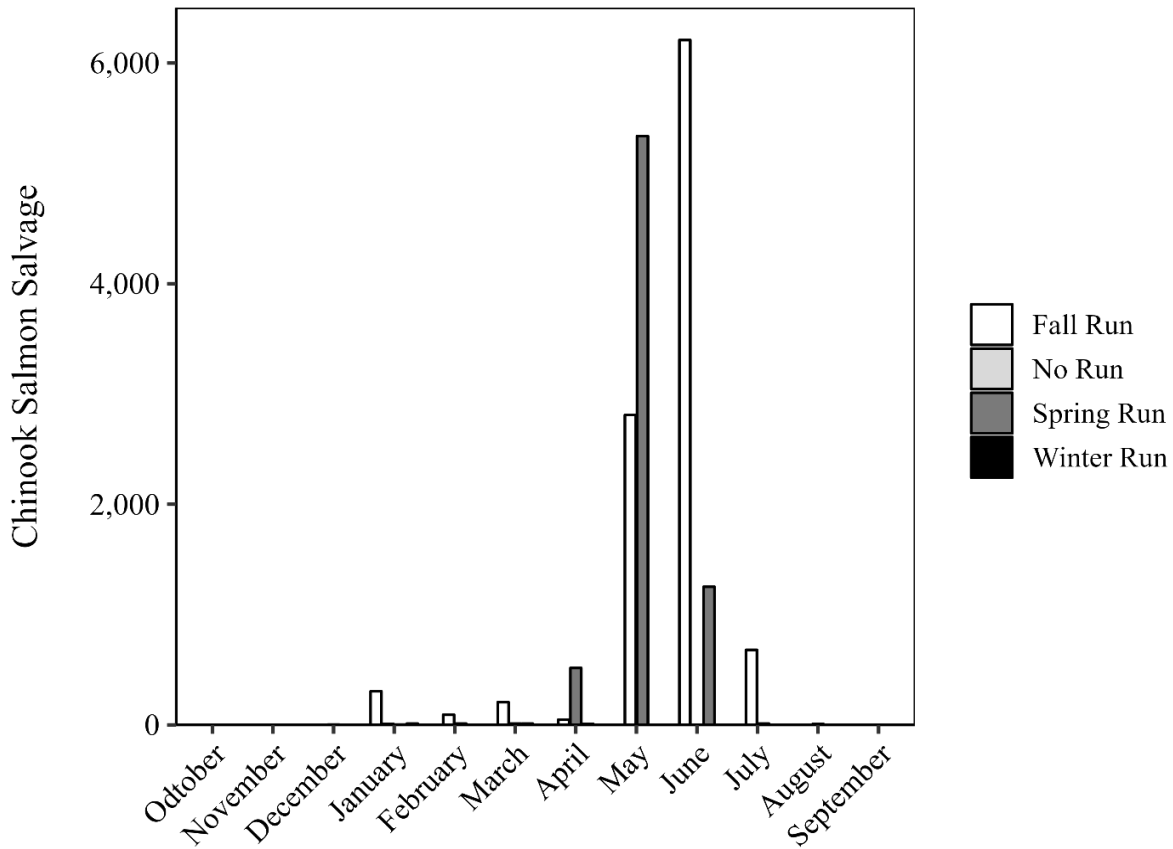


Figure 6.—Monthly salvage of Wild Chinook Salmon for three different runs (Spring, Winter, Fall) at the Tracy Fish Collection Facility, WY 2023.

Table 1.—Chinook Salmon Annual Salvage, Percentages of Annual Salvage, and Losses for WY 2023

| Origin | Race* | Salvage | Percentage | Loss |
|-----------------------|-----------|---------------|---------------|---------------|
| Wild | Fall | 10,522 | 49.97% | 6,784 |
| | Late-Fall | 12 | 0.06% | 8 |
| | Spring | 7,198 | 34.18% | 4,979 |
| | Winter | 44 | 0.21% | 31 |
| Total Wild | | 17,776 | 84.42% | 11,802 |
| Hatchery | Fall | 336 | 1.60% | 268 |
| | Late-Fall | 300 | 1.42% | 223 |
| | Spring | 2,457 | 11.67% | 1,953 |
| | Winter | 188 | 0.89% | 140 |
| Total Hatchery | | 3,281 | 15.60% | 2,584 |
| Grand Total | | 21,057 | | 14,386 |

*Race determined by Salmon Length at Date Criteria

3.4. Steelhead

The annual salvage of wild and hatchery Steelhead was 788 during WY 2023 (Figure 7), the highest since WY 2010 (3,088 fish). Average annual salvage in the last ten years (447 fish per year; WYs 2014 to 2023) is lower than the average previous ten years (2,041 fish per year; WYs 2004 to 2013).

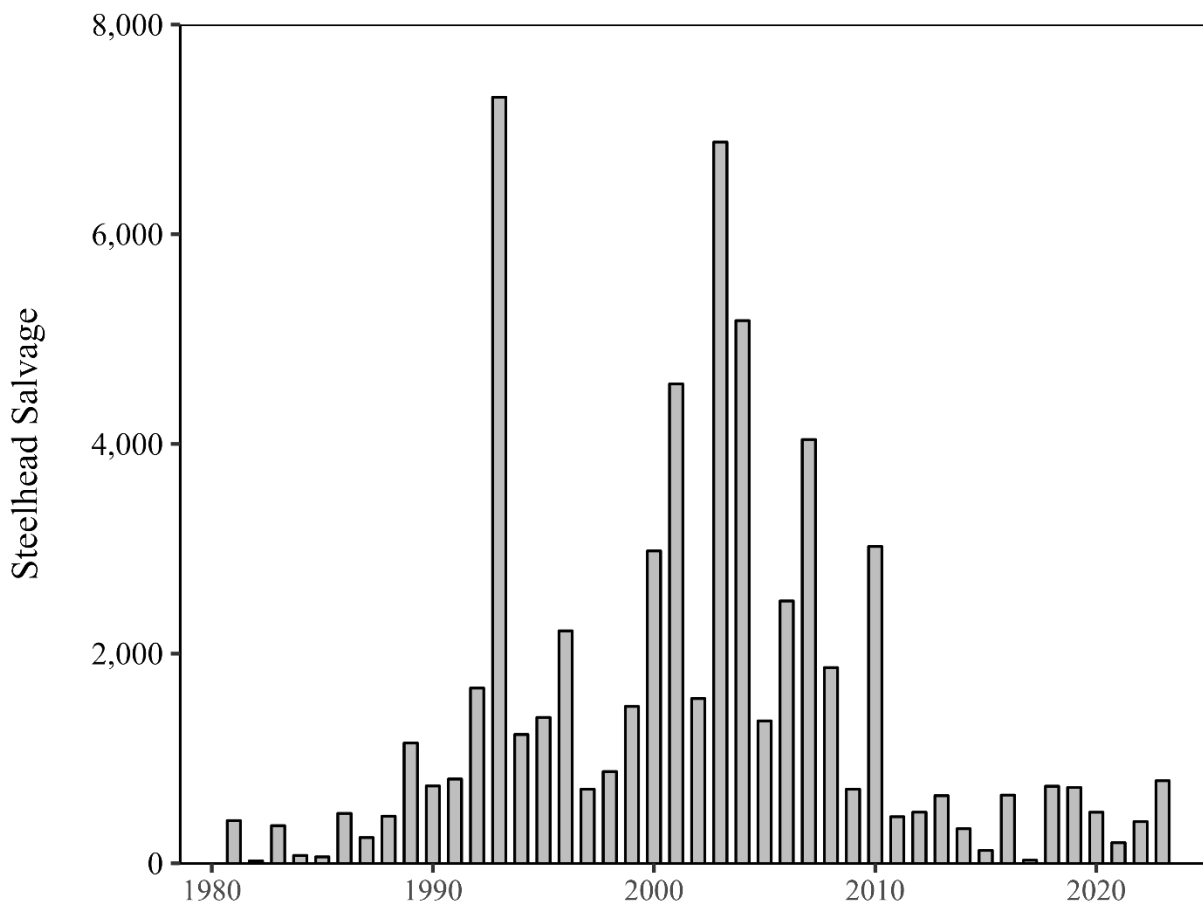


Figure 7.—Annual salvage (by Water Year) of Steelhead (all origins combined) at the Tracy Fish Collection Facility, WYs 1981-2023.

Salvaged juvenile Steelhead were primarily of hatchery origin (612 fish; 77.66 percent; Figure 8). Wild Steelhead were salvaged from January through June (except April). Salvage of both hatchery and wild Steelhead was highest during February and March (Figure 8).

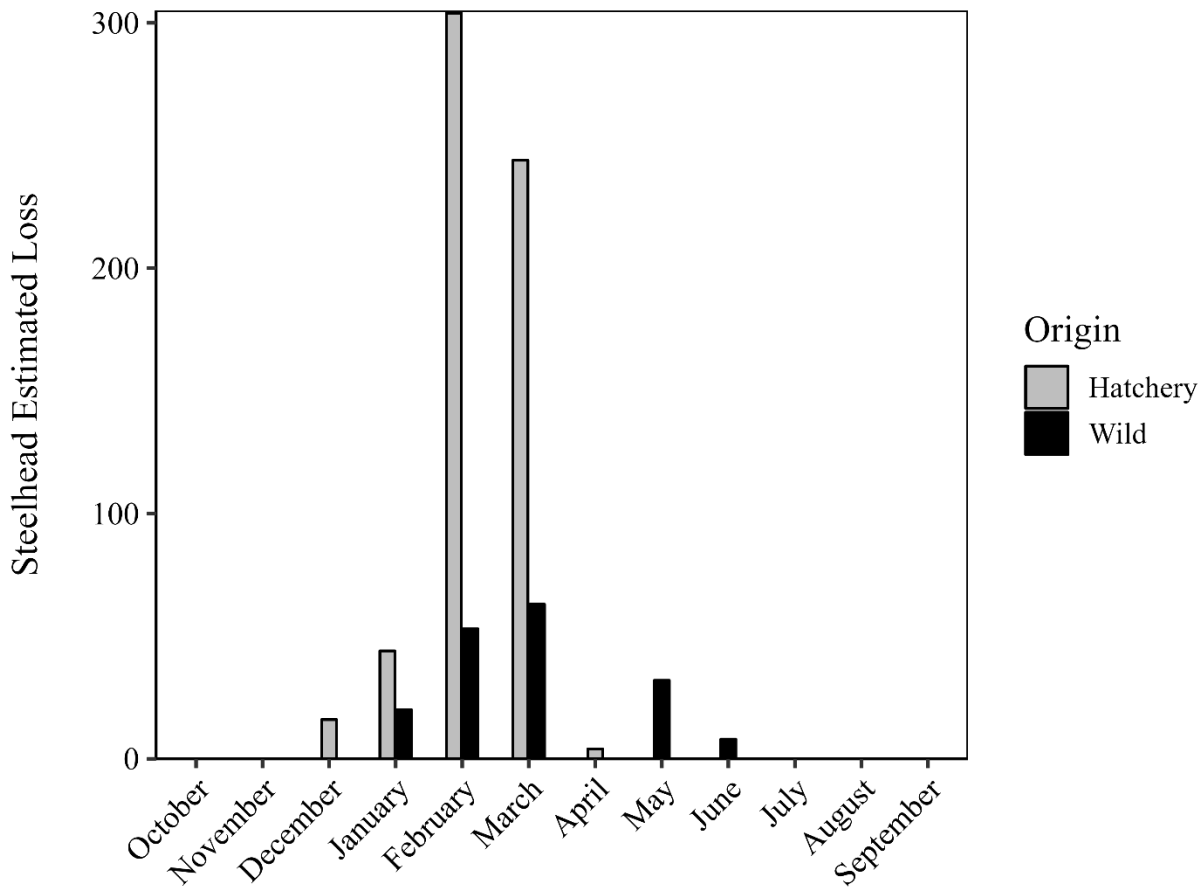


Figure 8.—Monthly salvage of hatchery and wild Steelhead at the Tracy Fish Collection Facility, Water Year 2023.

3.5. Striped Bass

The annual salvage of Striped Bass was 148,305 during WY 2023 (Figure 9), which is almost five times greater than the previous year (29,753 fish; WY 2022) and greater than the ten-year average (53,792 fish; WYs 2014 to 2023). However, since WY 1994, a generally reduced salvage trend was observed for this species, and annual Striped Bass salvage has not been above 1,000,000 except for WY 2001 (Figure 9).

Most Striped Bass were salvaged in June (33,797 fish) and July (81,713 fish; Figure 10), with salvage of Striped Bass during these months accounting for 77.90% of total Striped Bass salvage. Striped Bass were salvaged in every month of the year, although the lowest salvage occurred in May (9 fish; Figure 10).

Fish Salvage and Operations at the
Tracy Fish Collection Facility for Water Year 2023

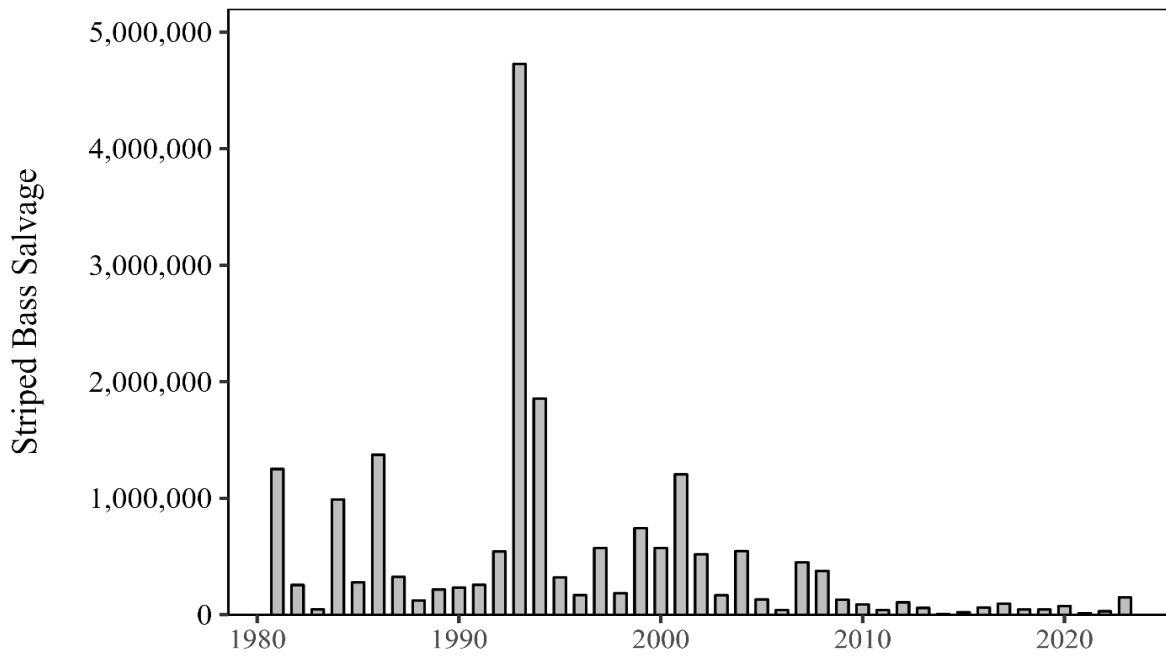


Figure 9.—Annual salvage (by Water Year) of Striped Bass at the Tracy Fish Collection Facility, WY 1981-2023.

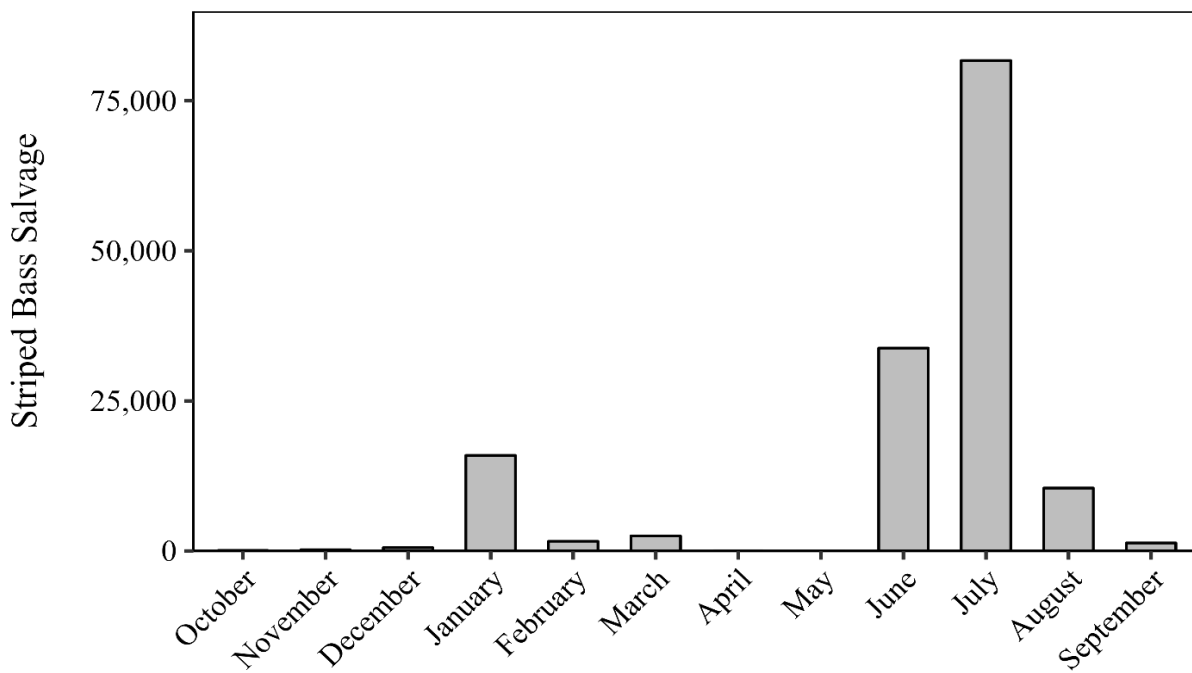


Figure 10.—Monthly salvage of Striped Bass at the Tracy Fish Collection Facility, Water Year 2023.

3.6. Largemouth Bass

The annual salvage of Largemouth Bass was 353,775 in WY 2023 (Figure 11). This was the largest annual salvage of Largemouth Bass in the dataset (WYs 1981 to 2023) and seven times greater than the annual salvage in WY 2022 (52,527 fish). Prior to 1993, annual salvage of Largemouth Bass did not exceed 1,000 fish. During the last ten years (WYs 2014 to 2023), average annual salvage of Largemouth Bass (78,179 fish per year) has been greater than Striped Bass (53,801 fish per year). Prior to this, average annual salvage of Striped Bass (572,210 fish per year) had been much greater than that of Largemouth Bass (24,290 fish per year; WYs 1981 to 2013).

Largemouth Bass were salvaged during all months of WY 2023, but 75.42 percent of the annual salvage occurred during June (103,740 fish) and July (163,068 fish; Figure 12).

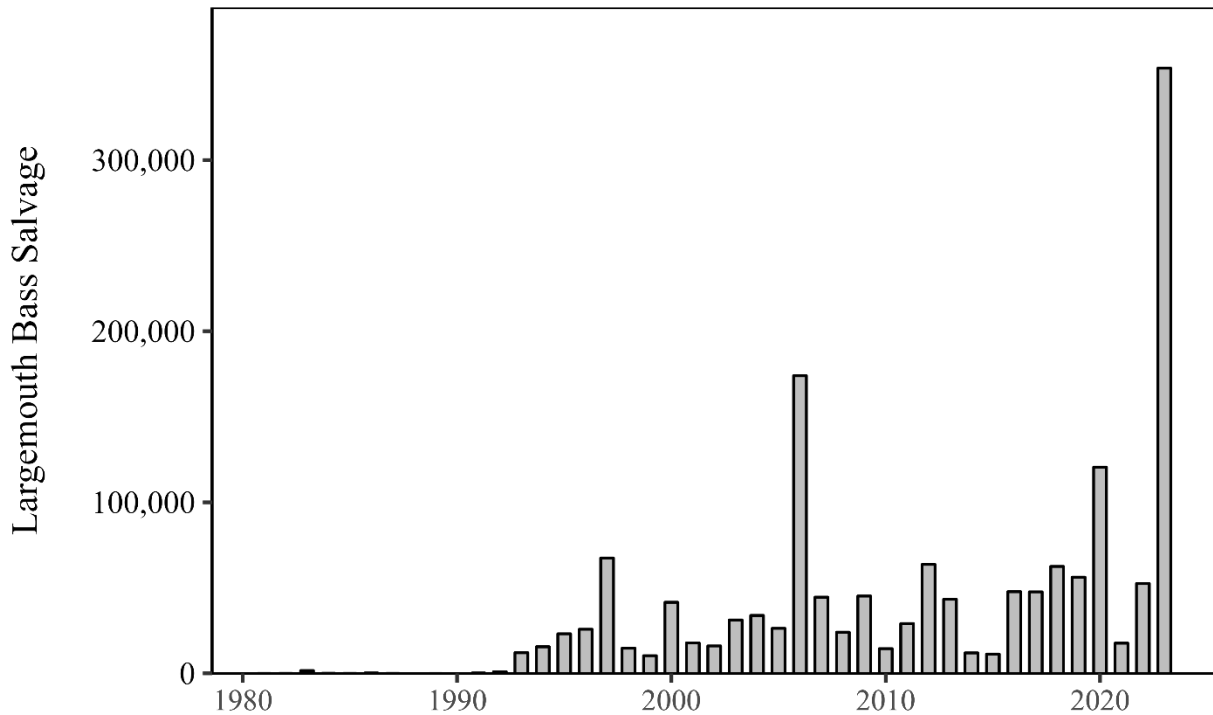


Figure 11.—Annual salvage (by Water Year) of Largemouth Bass at the Tracy Fish Collection Facility, WY 1981-2023.

Fish Salvage and Operations at the Tracy Fish Collection Facility for Water Year 2023

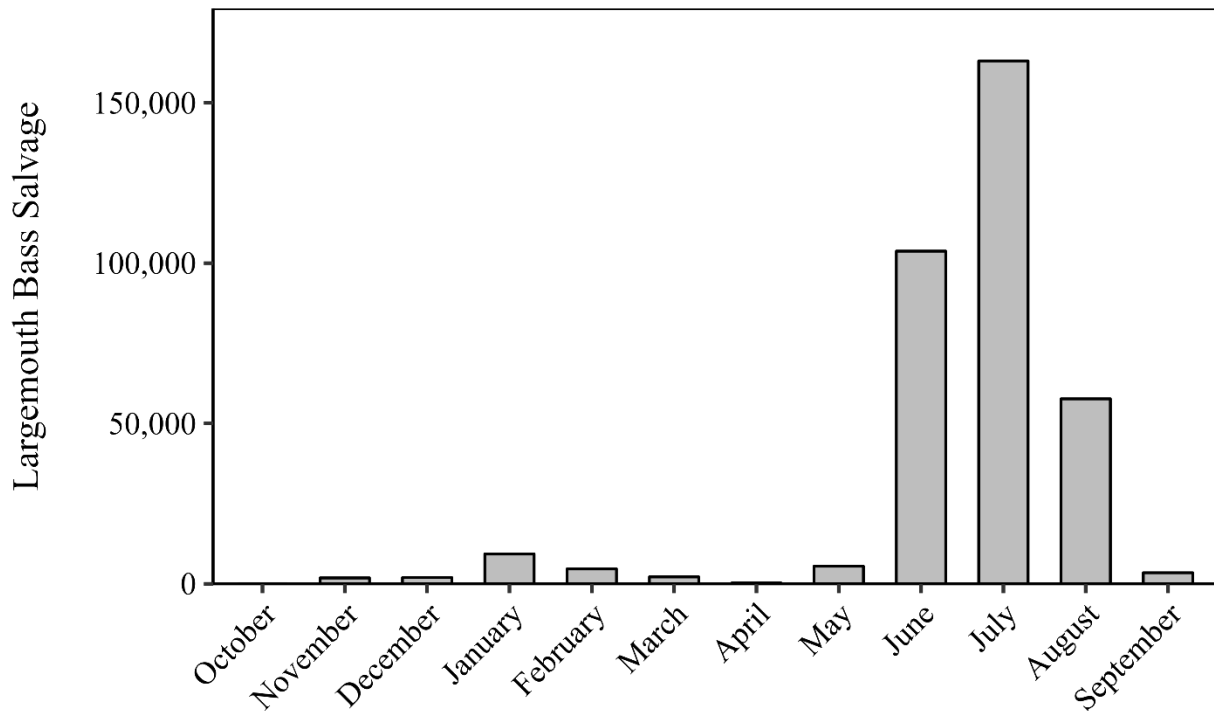


Figure 12.—Monthly salvage of Largemouth Bass at the Tracy Fish Collection Facility, Water Year 2023.

3.7. Delta Smelt

In WY 2023, the annual salvage of Delta Smelt was 36, including the salvage of 8 hatchery individuals (Table 2). Delta Smelt salvage has steadily declined since 2005 (Figure 13) and has generally followed the same declining annual population trend for this species. WYs 2005 to 2023 represented the lowest 19-year period of annual salvage for Delta Smelt on record (range = 0 to 1,009; Figure 13). No Delta Smelt were detected during larval sampling in WY 2023 and no Delta Smelt were salvaged in WYs 2020 and 2021.

Delta smelt were only salvaged between January and March, with most salvage occurring in February (28 fish, 77.78 percent).

Table 2.—VIE Tagged Delta Smelt Salvaged at TFCF WY 2023

| Date | VIE Tag Color - Location | Fork Length (mm) |
|------------|-----------------------------------|------------------|
| 01/07/2023 | Red – Left – Anterior Dorsal | 74 |
| 02/12/2023 | Orange – Right – Posterior Dorsal | 63 |
| 02/13/2023 | Orange – Right – Posterior Dorsal | 69 |
| 02/13/2023 | Orange – Right – Posterior Dorsal | 59 |
| 02/14/2023 | Orange – Right – Posterior Dorsal | 63 |
| 02/17/2023 | Orange – Right – Posterior Dorsal | 70 |
| 02/22/2023 | Orange – Right – Posterior Dorsal | 65 |
| 03/02/2023 | Orange – Left – Anterior Dorsal | 67 |

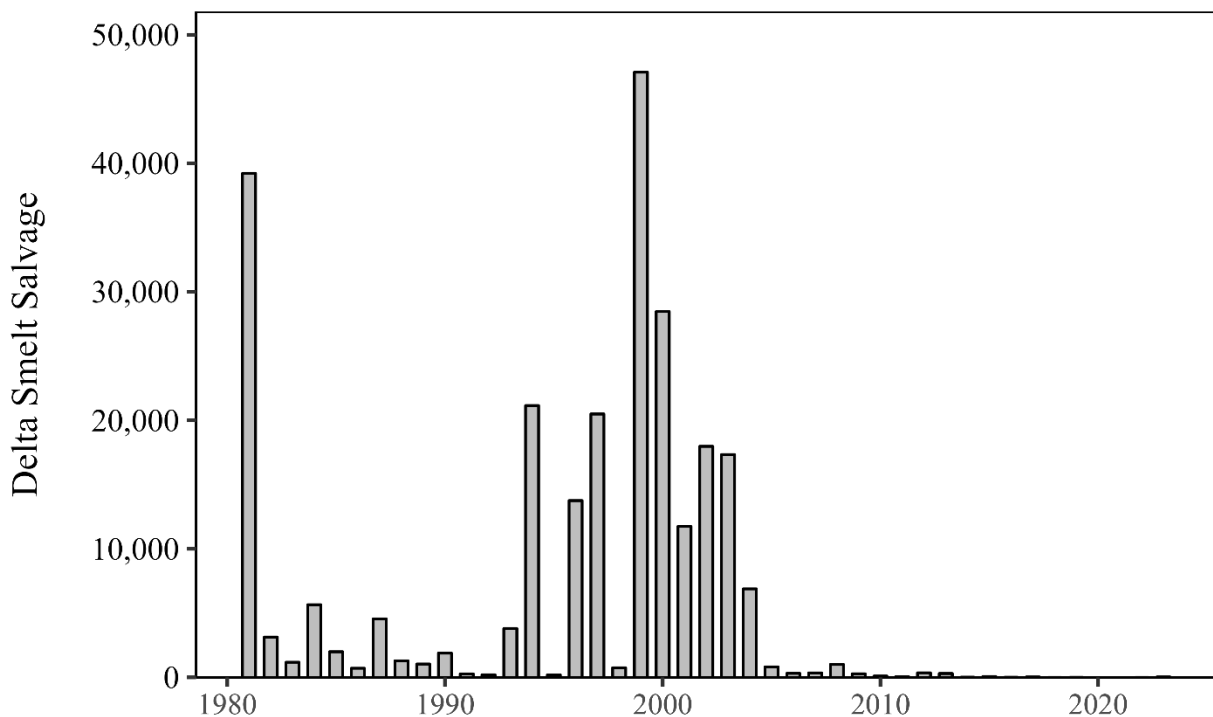


Figure 13.—Annual salvage (by Water Year) of Delta Smelt at the Tracy Fish Collection Facility, WY 1981-2023.

3.8. Longfin Smelt

The annual salvage of Longfin Smelt was 20 during WY 2023, far fewer than salvaged in WY 2022 (2,982 fish; Figure 14). Annual salvage of Longfin Smelt has fluctuated since WY 1981, with a range of 0 (multiple WYs) to 43,056 fish salvaged in a year (WY 2002).

Fish Salvage and Operations at the
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In WY 2023, Longfin Smelt were only salvaged in January and February, while in WY 2022 Longfin Smelt were only salvaged between March and May. No Longfin Smelt < 20 mm FL were detected in WY 2023 during larval sampling.

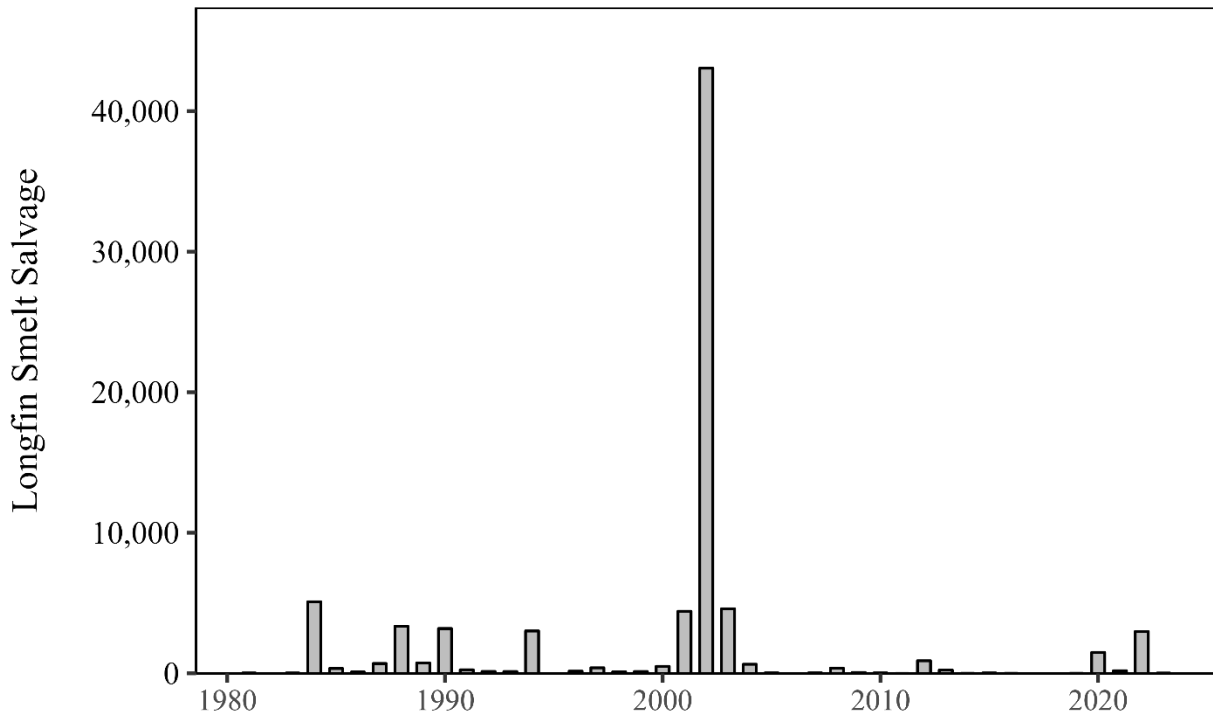


Figure 14.—Annual salvage (by Water Year) of Longfin Smelt at the Tracy Fish Collection Facility, WY 1981-2023.

3.9. Sacramento Splittail

The annual salvage of juvenile and adult Sacramento Splittail was 2,070,863 in WY 2023 (Figure 15). Annual salvage of Sacramento Splittail has fluctuated annually, with annual salvage less than 5,000 during 19 of 43 sampling years (44.18 percent) and surpassing 2 million during five sampling years (11.62 percent). Historically, salvage of Sacramento Splittail was greatest during May and June months, with a maximum of 5,487,606 fish (May WY 2011). A similar trend was observed in WY 2023 with 633,164 salvaged in May and 1,227,249 were salvaged in June (Figure 16).

Fish Salvage and Operations at the Tracy Fish Collection Facility for Water Year 2023

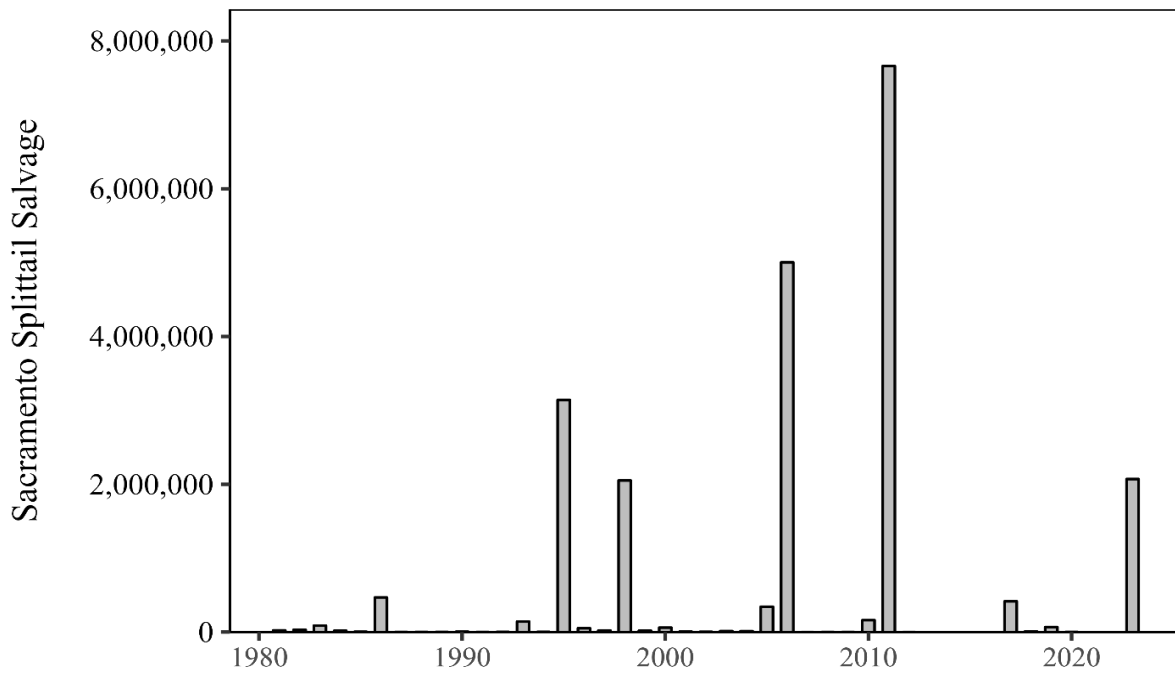


Figure 15.—Annual salvage (by Water Year) of Sacramento Splittail at the Tracy Fish Collection Facility, WY 1981-2023. Note: Splittail were salvaged all sampling years (43), but annual salvage was less than 5,000 fish during 19 water years.

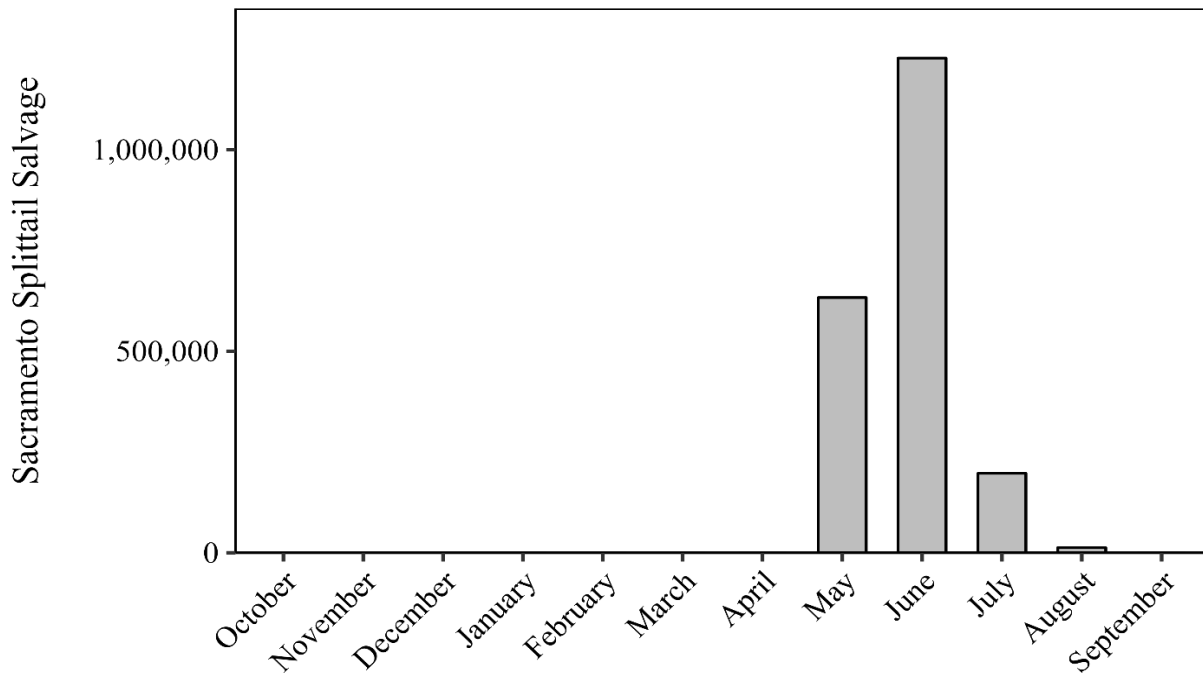


Figure 16.—Monthly salvage of Sacramento Splittail at the Tracy Fish Collection Facility, WY 2023.

3.10. Threadfin Shad

The annual salvage of juvenile and adult Threadfin Shad was 5,447,311 during WY 2023, a three-fold increase from WY 2022 (1,358,971; Figure 17). WY 2023 was the third sampling year that salvage of Threadfin Shad surpassed five million. Annual salvage of Threadfin Shad has varied greatly throughout time but is rarely less than 50,000 fish per year.

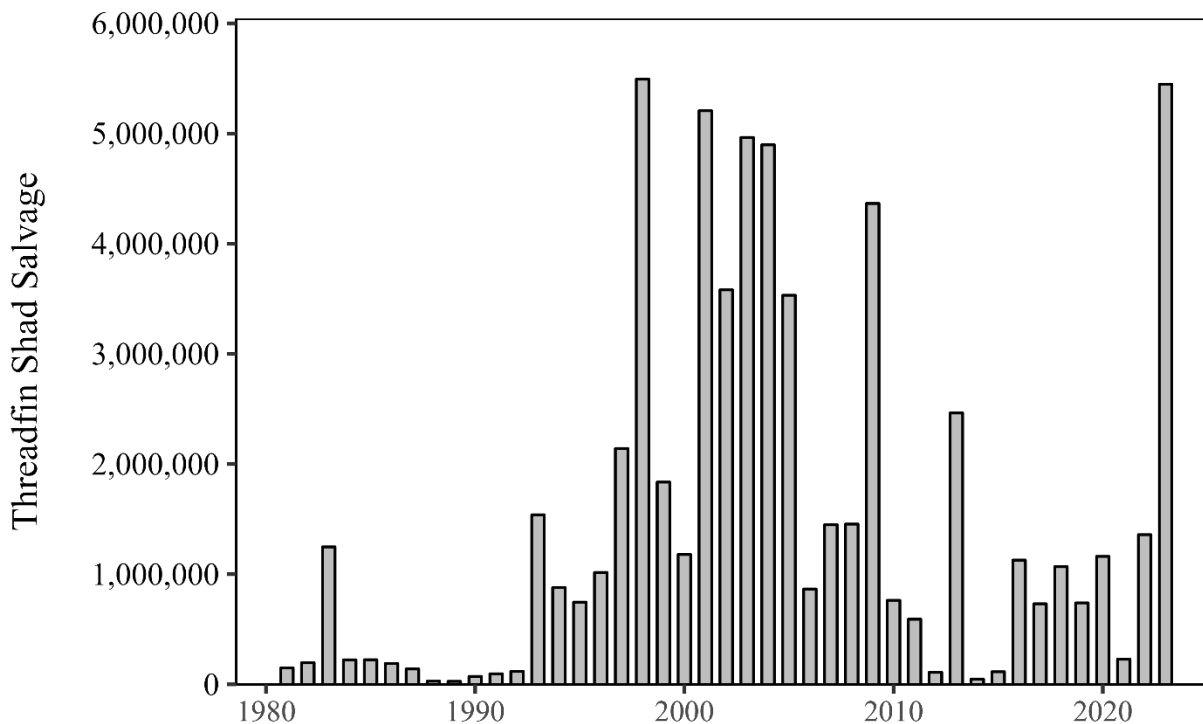


Figure 17.—Annual salvage (by Water Year) of Threadfin Shad at the Tracy Fish Collection Facility, WY 1981-2023.

The monthly salvage of Threadfin Shad during WY 2023 followed a similar seasonal trend to previous years. Threadfin Shad were salvaged every month, with notably higher densities in July (2,361,552 fish) and August (2,654,536 fish; Figure 18).

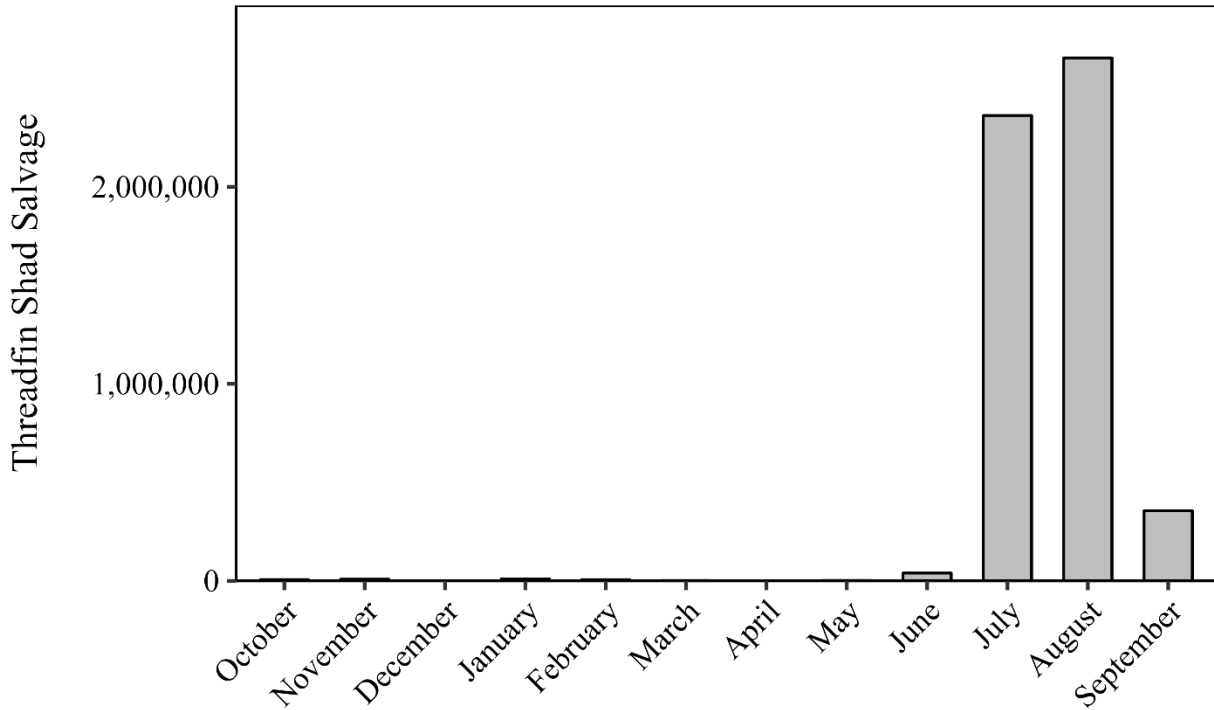


Figure 18.—Monthly salvage of Threadfin Shad at the Tracy Fish Collection Facility, WY 2023.

3.11. Green Sturgeon

No Green Sturgeon were salvaged during WYs 2023 or 2022, and this species has only been detected in half the WYs on record (21 of 43, Figure 19). Green Sturgeon were last detected in WY 2021 when annual salvage was 4, the lowest on record (tied with WY 2017). Annual salvage last surpassed 150 fish in WY 2007 (168). The greatest annual salvage of Green Sturgeon was in WY 1983 (216 fish).

Fish Salvage and Operations at the Tracy Fish Collection Facility for Water Year 2023

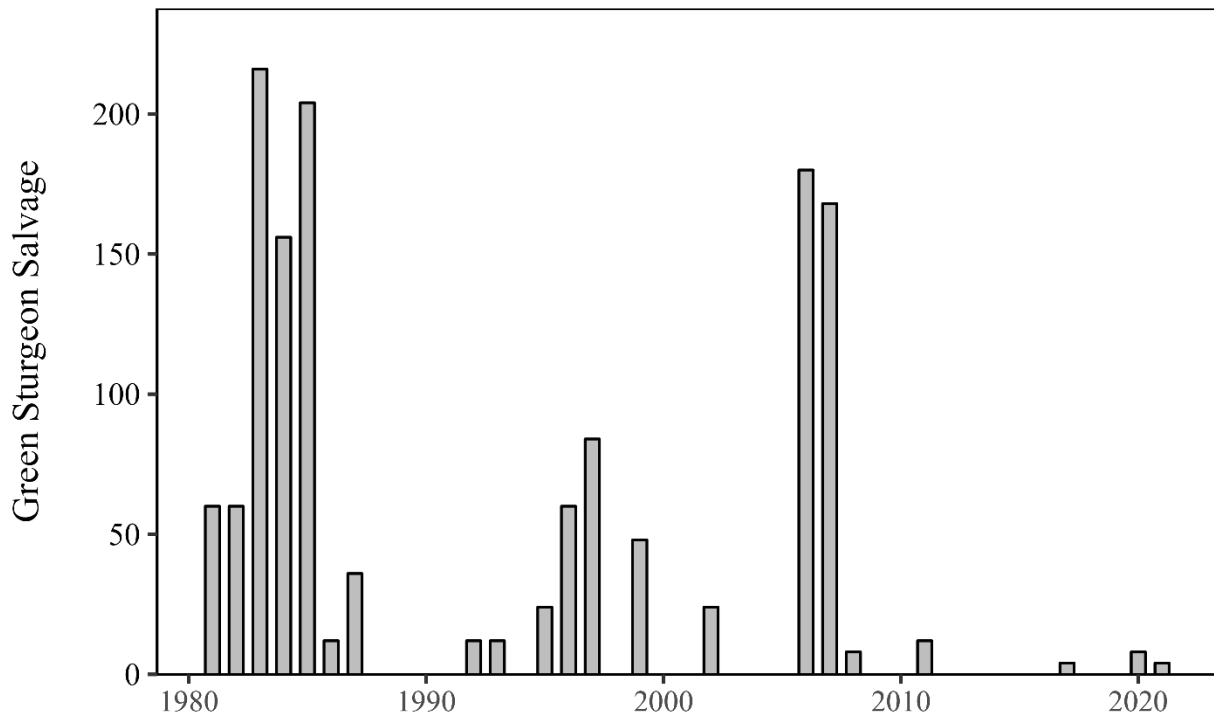


Figure 19.—Annual salvage (by Water Year) of Green Sturgeon at the Tracy Fish Collection Facility, WY 1981-2023.

3.12. White Sturgeon

Annual salvage of White Sturgeon was 941 fish in WY 2023, which is the highest salvage amount recorded (WYs 1981 to 2023; Figure 20). Since WY 1981, White Sturgeon have only been salvaged in 28 years (65.11 percent). No White Sturgeon were salvaged between WYs 2020 and 2022.

Most White Sturgeon were salvaged between July (526 fish) and August (273 fish) during WY 2023 (84.89 percent of annual total; Figure 21).

Fish Salvage and Operations at the Tracy Fish Collection Facility for Water Year 2023

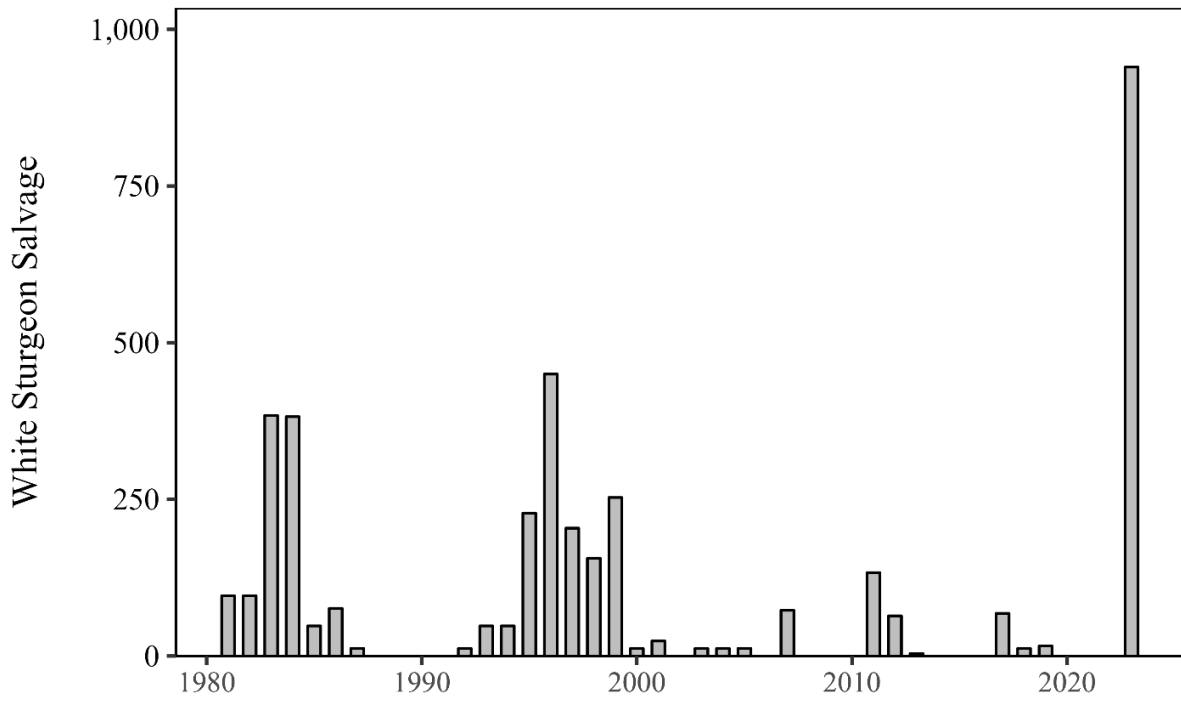


Figure 20.—Annual salvage (by Water Year) of White Sturgeon at the Tracy Fish Collection Facility, WY 1981-2023.

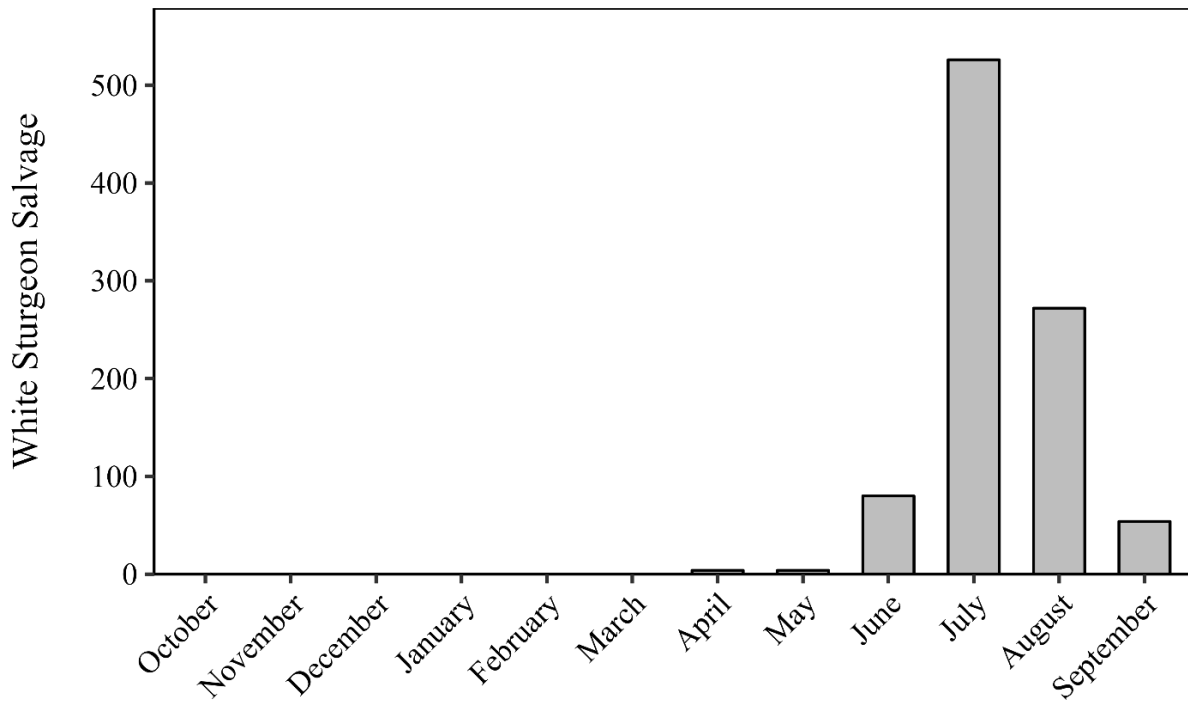


Figure 21.—Monthly salvage of White Sturgeon at the Tracy Fish Collection Facility, WY 2023.

4. Operations Summary

The TFCF was in operation all 365 days of WY 2023, and 99.00 percent of fish counts were conducted (4,336/4,380 fish counts). Duration of sample counting, pumping and salvage were of standard length (30, 120, and 120 minutes, respectively) in 96.57 percent of fish counts (4,230/4,380). Thirteen fish counts had reduced pumping, include accommodating Daylight Savings Time on March 12. The duration of sampling was reduced from 30 to 10 minutes for 13 days (82 fish counts) due to large amounts of debris and salvaged fish. In addition, weight estimations were used on 175 fish counts.

A fish facility outage is defined as the inability to (1) properly screen the entire flow (e.g., due to mechanical breakdown, low water conditions, or excessive debris conditions) or (2) conduct fish salvage operations according to mandated operational criteria. When a fish facility outage occurs, water exports at JPP may continue and fish counts may be missed. If salvage ceases and it is certain that fish counts will be missed or if salvage inefficiency occurs due to operational issues, the Equipment Operator Supervisor or others designated by the Operation and Maintenance (O&M) Division Chief must follow the outage notification decision tree (Appendix 2) or the notification protocol explained in the CDFW memorandum (Appendix 3). There were 8 planned outages and 14 unplanned outages at the TFCF during WY 2023 (Table 3).

Additionally, although not obligatory, salvage interruptions or periods of no salvage due to shutdown of the JPP and/or Decision 1641 (D-1641) requirements are also being reported here. D-1641 provides regulatory rules and orders regarding water quality and water right requirements for the Bay-Delta Estuary (State Water Resources Control Board [SWRCB] 2000). These decisions can lead to disruptions to the TFCF salvage. There were six planned outages and one unplanned outage due to shutdown of the JPP and D-1641 requirements in WY 2023 (Table 4).

Fish Salvage and Operations at the
Tracy Fish Collection Facility for Water Year 2023

Table 3.—Operation Notes for Tracy Fish Collection Facility Outages

Tracy Fish Collection Facility Outages

| Type | Start | End | Time | Duration (day) | Duration (hour) | Salvage Interrupted (Y/N) | Export Interrupted (Y/N) | # of Missed Counts |
|-------------|--------------|------------|---------------|-----------------------|------------------------|----------------------------------|---------------------------------|---------------------------|
| Planned | 10/26/2022 | 10/26/2022 | 08:00 - 13:05 | 0 | 5.1 | Y | N | 2 |
| Unplanned | 11/10/2022 | 11/10/2022 | 07:00 - 11:30 | 0 | 4.5 | Y | N | 1 |
| Unplanned | 1/21/2023 | 1/21/2023 | 02:00 - 04:00 | 0 | 2.0 | N | N | 1 |
| Unplanned | 1/23/2023 | 1/23/2023 | 02:00 - 06:00 | 0 | 4.0 | N | N | 0 |
| Unplanned | 1/24/2023 | 1/24/2023 | 04:00 - 06:00 | 0 | 2.0 | N | N | 0 |
| Unplanned | 1/25/2023 | 1/25/2023 | 06:00 - 08:00 | 0 | 2.0 | N | N | 0 |
| Unplanned | 2/8/2023 | 2/8/2023 | 14:00 - 18:00 | 0 | 4.0 | N | N | 2 |
| Unplanned | 2/12/2023 | 2/12/2023 | 06:00 - 14:00 | 0 | 8.0 | N | N | 4 |
| Planned | 2/15/2023 | 2/15/2023 | 06:49 - 07:07 | 0 | 0.3 | Y | N | 0 |
| Unplanned | 2/15/2023 | 2/15/2023 | 22:00 - 24:00 | 0 | 2.0 | N | N | 1 |
| Planned | 2/23/2023 | 2/23/2023 | 10:35 - 10:45 | 0 | 0.2 | Y | N | 0 |
| Unplanned | 3/9/2023 | 3/10/2023 | 17:40 - 02:00 | 0 | 8.3 | Y | N | 5 |
| Unplanned | 3/10/2023 | 3/10/2023 | 12:00 - 14:00 | 0 | 2.0 | N | N | 0 |
| Unplanned | 5/22/2023 | 5/22/2023 | 08:00 - 16:30 | 0 | 8.5 | N | N | 0 |
| Planned | 6/6/2023 | 6/6/2023 | 08:40 - 13:40 | 0 | 5.0 | Y | N | 3 |
| Planned | 8/16/2023 | 8/16/2023 | 10:00 - 12:00 | 0 | 2.0 | Y | N | 1 |
| Planned | 8/17/2023 | 8/17/2023 | 02:00 - 03:30 | 0 | 1.5 | Y | N | 0 |
| Unplanned | 8/18/2023 | 8/18/2023 | 08:15 - 10:53 | 0 | 2.6 | Y | N | 1 |
| Unplanned | 8/29/2023 | 8/29/2023 | 07:18 - 07:38 | 0 | 0.3 | Y | N | 0 |
| Unplanned | 8/30/2023 | 8/30/2023 | 10:00 - 14:00 | 0 | 4.0 | Y | N | 2 |
| Planned | 9/7/2023 | 9/7/2023 | 07:00 - 10:00 | 0 | 3.0 | Y | N | 1 |
| Planned | 9/20/2023 | 9/20/2023 | 09:00 - 12:00 | 0 | 1.7 | Y | N | 1 |

Fish Salvage and Operations at the
Tracy Fish Collection Facility for Water Year 2023

Table 4. —Operation Notes for Salvage Interruptions due to Shutdown of the C.W. “Bill” Jones Pumping Plant and Decision 1641 requirements and other events affecting pumping and salvage

Shutdown of the C.W. “Bill” Jones Pumping Plant and Decision 1641 requirements

| Type | Start | End | Time | Duration (day) | Duration (hour) | Salvage Interrupted (Y/N) | Export Interrupted (Y/N) | # of Missed Counts |
|-------------|--------------|------------|---------------|-----------------------|------------------------|----------------------------------|---------------------------------|---------------------------|
| Planned | 2/8/2023 | 2/8/2023 | 03:50 - 05:27 | 0 | 1.6 | Y | Y | 0 |
| Unplanned | 6/12/2023 | 6/12/2023 | 08:00 - 16:00 | 0 | 8 | Y | Y | 4 |
| Planned | 6/13/2023 | 6/13/2023 | 08:00 - 16:30 | 0 | 8.5 | Y | Y | 4 |
| Planned | 6/14/2023 | 6/14/2023 | 08:00 - 16:30 | 0 | 8.5 | Y | Y | 4 |
| Planned | 6/15/2023 | 6/15/2023 | 08:00 - 16:30 | 0 | 8.5 | Y | Y | 4 |
| Planned | 6/16/2023 | 6/16/2023 | 08:00 - 16:30 | 0 | 8.5 | Y | Y | 4 |
| Planned | 7/4/2023 | 7/4/2023 | 13:11 - 15:30 | 0 | 2.3 | Y | Y | 0 |

Other Events Affecting Pumping and Salvage

| Type | Start | End | Time | Duration (day) | Duration (hour) | Salvage Interrupted (Y/N) | Export Interrupted (Y/N) | # of Missed Counts |
|-------------|--------------|------------|---------------|-----------------------|------------------------|----------------------------------|---------------------------------|---------------------------|
| Planned | 3/12/2023 | 3/12/2023 | 02:00 - 03:00 | 0 | 1 | N | N | 0 |

4.1. Tracy Fish Collection Facility Outages

10/26/2022 – Inspection for pipe corrosion at TFCF. Water exports at JPP not interrupted.

11/10/2022 – Removal and replacement of failed Secondary Channel traveling screen #2 at the TFCF.

1/21/2023– Pumping at the JPP was reduced to 2 units at 03:30 on 1/21/2023 so that TFCF operations staff could finish debris removal and reduce differential at the trash rack. Pumping was increased to 4 units at the JPP at 07:30.

1/23/2023- Fish-count minutes reduced due to heavy debris load during 0400 and 0600 fish-counts.

1/24/2023- Fish-count minutes reduced due to heavy debris load during 0600 fish-count. Fish-count minutes returned to 30 mins after debris load was manageable.

1/25/2023– Fish-count minutes reduced due to heavy debris load during 0800 fish-count. Fish-count minutes returned to 30 mins after debris load was manageable.

2/8/2023– No 1600 or 1800 fish-counts due to excessive debris at TFCF trash rack and low water levels within the facility.

2/12/2023 – No fish counts conducted due to lack of operations staff.

2/15/2023 – No salvage due to maintenance in the secondary channel (06:49 -07:07).

2/15/2023 – No 2400 fish-count due to heavy debris load and lack of operations staff.

2/23/2023 – No salvage from 1035-1045 for removal of acoustic receivers from holding tanks.

3/09/2023 – No salvage at the TFCF from 1740 on 03/09/2023 until 0200 on 03/10/2023 due to power outage.

3/10/2023 – Salvage minutes reduced due to large drain being used to drain fish-count sample.

5/22/2023 – Extending pumping and counting minutes due to Holding Tank hoist (used for sampling and fish hauls) certification during the morning and lack of operations staff in the afternoon.

6/06/2023 – TFCF outage for dive inspection of the facility. During this period, all bypass pipes were closed, and all secondary channel VC pumps were turned off.

8/16/2023 – No salvaged at TFCF due to maintenance on the secondary channel traveling screens. Bypass pipes were closed and/or all Velocity Control pumps in the secondary channel were shut off.

8/17/2023 – Reduced Salvage Minutes due to power outage at TFCF from 0200-0330

8/18/2023 – Removal of sand buildup behind secondary channel traveling screen #5.

8/29/2023 – No salvage at TFCF from 07:18 to 07:38 due to power outage.

8/30/2023 –Removal of sand buildup behind secondary channel traveling screen #5. Bypass pipes were closed and/or all Velocity Control pumps in the secondary channel were shut off.

9/07/2023 –Removal of sand buildup behind secondary channel traveling screen #5. Bypass pipes were closed and/or all Velocity Control pumps in the secondary channel were shut off.

9/20/2023 –Removal of sand buildup behind secondary channel traveling screen #4. Bypass pipes were closed and/or all Velocity Control pumps in the secondary channel were shut off.

4.2. Salvage Interruptions/No Salvage Periods Due to Shutdown of the C.W. “Bill” Jones Pumping Plant and Decision 1641 Requirements

2/08/2023 – No pumping at JPP and no salvage at TFCF due to excessive debris at TFCF trash rack and low water levels within the facility.

6/12/2023 –No pumping at JPP from 08:00 to 16:00 and no salvage or fish-counts at TFCF.

6/13/2023 –No pumping at JPP from 08:00 to 16:30 and no salvage or fish-counts at TFCF.

6/14/2023 –No pumping at JPP from 08:00 to 16:30 and no salvage or fish-counts at TFCF.

6/15/2023 –No pumping at JPP from 08:00 to 16:30 and no salvage or fish-counts at TFCF.

6/16/2023 –No pumping at JPP from 08:00 to 16:30 and no salvage or fish-counts at TFCF.

7/04/2023 –No pumping at JPP from 03:11 to 15:30 and no salvage or fish-counts at TFCF. Reduced Count Minutes (30 to 10 minutes) due to heavy debris and fish all day.

4.3. Other Events Affecting Pumping and Salvage

3/12/2023 – Daylight savings time. Pumping/Salvage reduced to 60 minutes for 0400 fish count.

5. References

California Dept. of Fish and Wildlife. 2014. Delta Model length at date Table. Available at [filelib.wildlife.ca.gov - /Public/salvage/](http://filelib.wildlife.ca.gov/-/Public/salvage/)

California Dept. of Fish and Wildlife. 2013. Salmon loss estimation. Available at: [filelib.wildlife.ca.gov - /Public/salvage/](http://filelib.wildlife.ca.gov/-/Public/salvage/)

National Oceanic Atmospheric Administration (NOAA) Fisheries. 2019. Biological Opinion on Long-term Operation of the Central Valley Project and the State Water Project. U.S. Department of Commerce, National Marine Fisheries Service. October 21, 2019.

State Water Resources Control Board (SWRCB). 2000. Revised Water Right Decision 1641. March 15, 2000.

Appendix 1

Annual Salvages and Percentages of Annual Salvage (%) for Fish

| Species | 2023 Salvage | % Composition | 2022 Salvage | % Composition |
|--------------------------|---------------------|----------------------|---------------------|----------------------|
| Threadfin Shad | 5,447,311 | 40.52 | 1,358,971 | 83.21 |
| Common Carp | 4,358,090 | 32.41 | 4 | < 0.01 |
| Splittail* | 2,070,863 | 15.40 | 31 | < 0.01 |
| Largemouth Bass | 353,775 | 2.63 | 52,527 | 3.22 |
| Bluegill | 271,894 | 2.02 | 105,527 | 6.46 |
| White Catfish | 265,295 | 1.97 | 15,100 | 0.92 |
| Striped Bass | 148,305 | 1.10 | 29,753 | 1.82 |
| Black Crappie | 110,576 | 0.82 | 1,311 | 0.08 |
| Channel Catfish | 77,064 | 0.57 | 1,205 | 0.07 |
| Lamprey Unknown | 71,064 | 0.53 | 1,612 | 0.10 |
| American Shad | 63,378 | 0.47 | 18,247 | 1.12 |
| Sacramento Sucker* | 55,436 | 0.41 | 4 | < 0.01 |
| Inland Silverside | 33,053 | 0.25 | 9,071 | 0.56 |
| Redear Sunfish | 26,122 | 0.19 | 2,890 | 0.18 |
| Chinook Salmon* | 21,057 | 0.16 | 1,142 | 0.07 |
| Shimofuri Goby | 13,876 | 0.10 | 7,816 | 0.48 |
| Golden Shiner | 13,292 | 0.10 | 2,787 | 0.17 |
| Prickly Sculpin* | 10,112 | 0.08 | 7,961 | 0.49 |
| Rainwater Killifish | 9,326 | 0.07 | 5,492 | 0.34 |
| Yellowfin Goby | 7,776 | 0.06 | 4,949 | 0.30 |
| Western Mosquitofish | 5,581 | 0.04 | 1,234 | 0.08 |
| Threespine Stickleback* | 2,907 | 0.02 | 128 | 0.01 |
| Red Shiner | 1,751 | 0.01 | 106 | 0.01 |
| Warmouth | 1,564 | 0.01 | 248 | 0.02 |
| White Sturgeon* | 941 | 0.01 | 0 | 0.00 |
| Black Bullhead | 925 | 0.01 | 54 | < 0.01 |
| Bigscale Logperch | 792 | 0.01 | 261 | 0.02 |
| Steelhead/Rainbow Trout* | 788 | 0.01 | 394 | 0.02 |
| Tule Perch* | 654 | < 0.01 | 28 | < 0.01 |
| Goldfish | 437 | < 0.01 | 4 | < 0.01 |
| Brown Bullhead | 359 | < 0.01 | 236 | 0.01 |
| Sacramento Pikeminnow* | 239 | < 0.01 | 0 | 0.00 |
| Pacific Lamprey* | 116 | < 0.01 | 1,048 | 0.06 |
| Starry Flounder* | 72 | < 0.01 | 44 | < 0.01 |
| Green Sunfish | 61 | < 0.01 | 0 | 0.00 |

*Native species.

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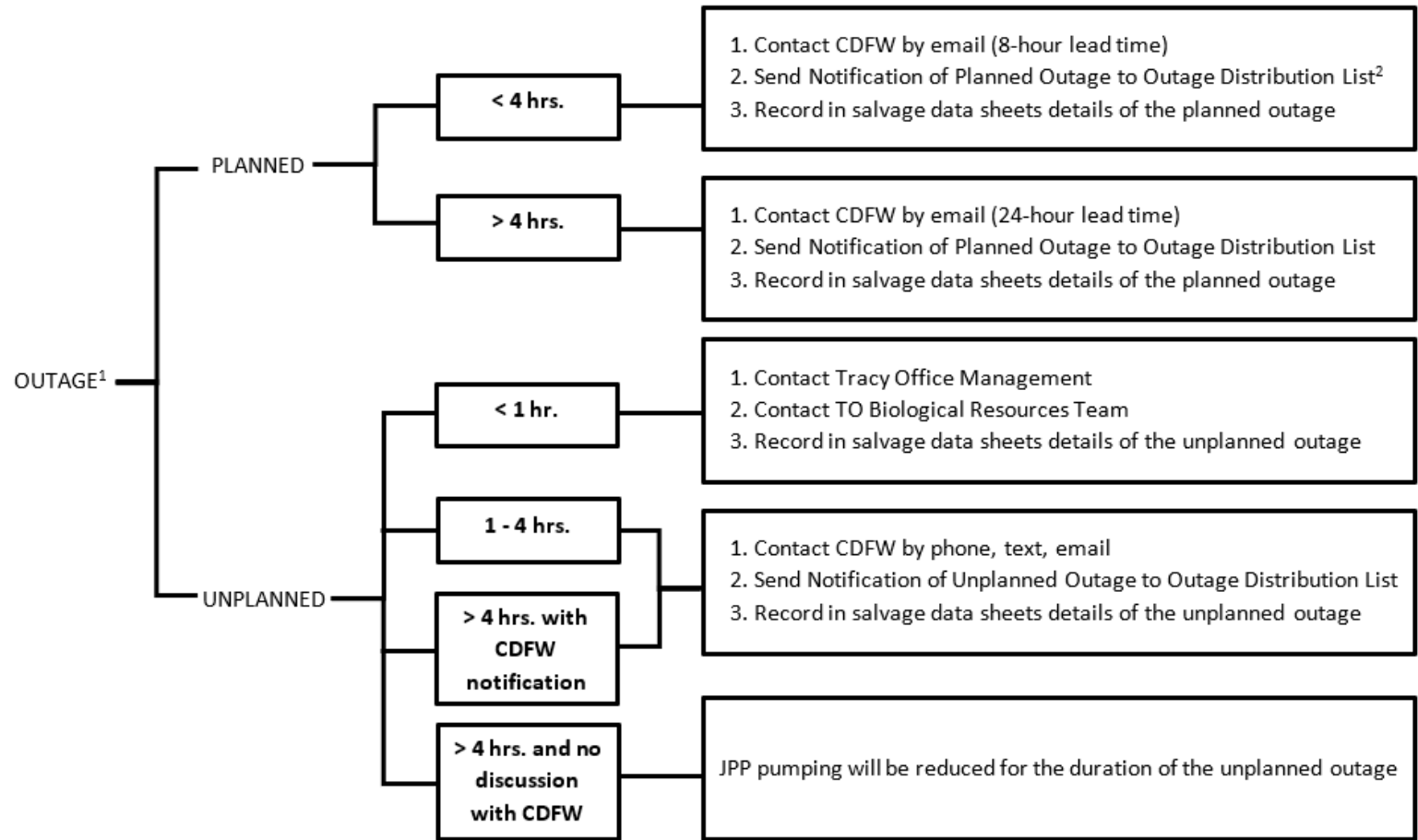
Water Year 2023
TFCF Fish Salvage and Operations

| Species | 2023 Salvage | % Composition | 2022 Salvage | % Composition |
|---------------------------|---------------------|----------------------|---------------------|----------------------|
| Delta Smelt* | 36 | < 0.01 | 4 | < 0.01 |
| Pond Loach | 28 | < 0.01 | 0 | 0.00 |
| Longfin Smelt* | 20 | < 0.01 | 2,982 | 0.18 |
| Sacramento Blackfish* | 16 | < 0.01 | 0 | 0.00 |
| Wakasagi | 16 | < 0.01 | 68 | < 0.01 |
| Hardhead* | 12 | < 0.01 | 0 | 0.00 |
| Loach (all spp.) | 12 | < 0.01 | 0 | 0.00 |
| Fathead Minnow | 8 | < 0.01 | 0 | 0.00 |
| Shokihaze Goby | 8 | < 0.01 | 0 | 0.00 |
| Large-Scale Loach | 8 | < 0.01 | 0 | 0.00 |
| River Lamprey* | 8 | < 0.01 | 0 | 0.00 |
| Blue Catfish | 5 | < 0.01 | 0 | 0.00 |
| Pacific Staghorn Sculpin* | 4 | < 0.01 | 0 | 0.00 |
| White Crappie | 4 | < 0.01 | 0 | 0.00 |
| Hitch* | 1 | < 0.01 | 0 | 0.00 |
| Spotted Bass | 0 | 0.00 | 4 | < 0.01 |

*Native species.

Appendix 2

Notification Decision Tree



¹An outage is defined as the inability to (1) properly screen the entire flow (e.g., due to mechanical breakdown, low water conditions, or excessive debris conditions) and (2) conduct fish salvage operations according to mandated operational criteria.

² Outage Distribution List includes contacts for Reclamation (TO, TO Bio Res, BDO, CVO), CDFW, NMFS and USFWS.

Appendix 3

State of California Department of Fish and Wildlife State Water Project
and Central Valley Project Delta Fish Facility Notification Procedures
for Planned and Unplanned Outages Memorandum



State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
(707) 428-2002
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director



July 12, 2022

Mr. John Mercado
U.S. Bureau of Reclamation
16650 Kelso Road
Byron, CA 94514
JMercado@usbr.gov

Subject: Central Valley Project Delta Fish Facility Notification Procedures for Planned and Unplanned Outages

The California Department of Fish and Wildlife (CDFW) is providing this letter to outline the interagency contact procedures for planned and unplanned outages at the Central Valley Project (CVP) fish salvage facilities. This replaces the previous memorandum distributed on January 17, 2019.

A fish facility outage is defined as inability to (1) properly screen the entire export flow (e.g., due to mechanical breakdown, low water conditions, or excessive debris conditions) and (2) conduct fish salvage operations according to protocol.

Planned Outages

For all *planned outages* conducted for *normal maintenance and repair work* (e.g., predator clean-outs, normal maintenance procedures, repairs to valves and controls) contact Virginia Afentoulis, or any other CDFW Fish Salvage Monitoring staff listed below, by email at least 24 hours in advance of outages of any duration.

To minimize impact of outages on salvage and the take of listed species, it is best to consult with the CDFW Fish Salvage Monitoring staff before scheduling outages with as much advance notice as possible.

Unplanned/Emergency Outages

The procedure and contact list for *unplanned outages or emergencies* will be as follows:

For unplanned outages, pumping should be reduced as soon as feasible for the duration of the outage. Please notify one of the staff below by phone, text, or email immediately, and within 24 hours at the latest. If discussion by phone, text, or email is not possible, leave a message detailing the source, was pumping continued, and estimated duration of the outage.

Conserving California's Wildlife Since 1870

Water Year 2023
TFCF Fish Salvage and Operations

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Mr. John Mercado
U.S. Bureau of Reclamation
July 12, 2022
Page 2

For outages occurring during business hours, please contact:

Virginia Afentoulis: (916) 247-7739
Virginia.Afentoulis@wildlife.ca.gov

For outages occurring outside of normal business hours, please contact:

Lauren Damon (209) 639-2686
Lauren.Damon@wildlife.ca.gov

Fish Facilities Unit Staff

Geir Aasen (209) 639-2750
Geir.Aasen@wildlife.ca.gov

Walter (Kyle) Griffiths (209) 443-4166
Walter.Griffiths@wildlife.ca.gov

Tim Keopadubsy (707) 416-7951
Tim.Keopadubsy@wildlife.ca.gov

Please post this information for all parties to read or incorporate this information into your agency's posted emergency notification procedures and contact list.

Thank you for your cooperation. If you have questions or require further information, please contact Ms. Afentoulis, Fish Salvage Monitoring Senior Environmental Scientist, at (916) 247-7739 or Virginia.Afentoulis@wildlife.ca.gov.

Sincerely,

DocuSigned by:

B77E9A6211EF486...
Erin Chappell
Regional Manager
Bay Delta Region

ec:

Lauren Damon, CDFW Bay Delta Region – Lauren.Damon@wildlife.ca.gov
Virginia Afentoulis, CDFW Bay Delta Region – Virginia.Afentoulis@wildlife.ca.gov
Geir Aasen, CDFW Bay Delta Region – Geir.Aasen@wildlife.ca.gov
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