Interagency Ecological Program
2027 Annual Work Plan

Figure: Fish Restoration Program staff pull in a beach seine at Horseshoe Bend on March 10, 2025.
Photo Credit: Emma Murry, CDFW

Interagency Ecological Program
Cooperative Ecological Investigations Since 1970

9/16/2026 DRAFT

Disclosure

This Work Plan does not necessarily represent compliance with regulatory, permit, or other requirements and each agency remains individually responsible for ensuring compliance with its requirements.

Acronym Definitions

CDFW - California Department of Fish and Wildlife

CVP - Central Valley Project

DJFMP - Delta Juvenile Fish Monitoring Program

DSC/DSP - Delta Stewardship Council/Delta Science Program

DSLCM - Delta Smelt Life Cycle Model

DWR - Department of Water Resources

EBMUD - East Bay Municipal Utility District

EDSM - Enhanced Delta Smelt Monitoring

FMWT - Fall Midwater Trawl Survey

NASA - National Aeronautics and Space Administration

NMFS - National Marine Fisheries Service

NOAA - National Oceanic and Atmospheric Administration

PESP - Phytoplankton Enumeration Synthesis Project

SDFPF - Skinner Delta Fish Protective Facility

SFEI- San Francisco Estuary Institute

SLS - Smelt Larva Survey

SMSCG - Suisun Marsh Salinity Control Gate

STN - Summer Townet Survey

SWRCB - State Water Resources Control Board

TFCF- Tracy Fish Collection Facility

USACE - United States Army Corps of Engineers

USBR - United States Bureau of Reclamation

USEPA - United States Environmental Protection Agency

USFWS - United States Fish & Wildlife Service

USGS - United States Geological Survey

YBFMP - Yolo Bypass Fish Monitoring Program

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2027 Project Element Details

The Long-term Monitoring, identified in this document, is implemented as a component of regulatory commitments provided through State Water Project and Central Valley Project endangered species consultations and Water Right Conditions. ESA and CESA take coverage for the long-term monitoring programs are provided to entities performing

the monitoring. DWR and Reclamation provide service contracts to implementing monitoring agencies/entities. Service contracts define the scope of work and annual deliverables in accordance with applicable regulatory requirements.

Projects identified with a superscript 1 are covered under the Section 7 Biological Opinion issued to the U.S. Bureau of Reclamation by USFWS in 1996, and additional amendments directly from the USFWS to the CDFW for take of Delta Smelt and the Section 7 Biological Opinion issued to USFWS on August 22, 2024, for the take of Longfin Smelt.

Projects identified with a superscript 2 are covered under ESA Section 10(a)(1)(A) permit 1440-3R issued to IEP from NMFS on March 30, 2021, for the take of Central Valley spring-run Chinook salmon, Sacramento River winter-run Chinook salmon, California Central Valley Steelhead, Central California Coast Steelhead, and Southern Distinct Population Segment green sturgeon.

2027-003 Fall Midwater Trawl Survey (FMWT) [1, 2]

PI: Steve Slater (CDFW)

The Fall Midwater Trawl Survey (FMWT) was initiated by the California Department of Fish and Wildlife (CDFW) to determine the relative abundance and distribution of age-0 Striped Bass (*Morone saxatilis*) in the San Francisco Bay/Sacramento-San Joaquin Delta. While initiated for the purpose of sampling Striped Bass, the survey is designed to sample young pelagic species and the data is routinely used for other upper estuary pelagic fish, including Delta Smelt (*Hypomesus transpacificus*), Longfin Smelt (*Spirinchus thaleichthys*), American Shad (*Alosa sapidissima*), and Threadfin Shad (*Dorosoma petenense*). Sampling has been conducted annually since the project's inception in 1967 and adapted over time to respond to new management questions. Monitoring currently includes 130 stations sampled monthly September through December. FMWT also includes zooplankton sampling (CB and Mysid net samples routine since 2011) at a subset of 35 stations to assess food available to young fish to inform annual recruitment success. These fish species are considered important indicators of estuary health, and all have suffered substantial population declines in recent decades. The Delta Smelt and Longfin Smelt are of particular importance as listed by Federal and State Endangered Species Acts. The FMWT conducts compliance monitoring in collaboration with USBR and DWR to meet permit obligations to the State Water Resources Control Board (SW and DRCB), USFWS-NMFS biological opinions for Delta Smelt and salmonids, for the ITP issued for operation of the State Water Project (SWP), and the USBR BA/ROD, and also informs Suisun Marsh Salinity Control Gate (SMSCG) and Summer-Fall Habitat Action Monitoring Plans (includes additional zooplankton sampling for SMSCG in collaboration with DWR PEN 335).

2027-007 Summer Townet Survey (STN) [1, 2]

PI: Steve Slater (CDFW)

The Summer Townet Survey (STN) is a long-term monitoring effort that samples for young pelagic fishes and their food (zooplankton) in the upper San Francisco Estuary (SFE), from San Pablo Bay upstream through the Sacramento-San Joaquin River Delta ("Delta"). This California Department of Fish and Wildlife (CDFW) survey has been conducted since 1959 and is one of the longest running pelagic fish sampling efforts in the United States. The study targets small fish (12-55 mm FL) during 6-biweekly surveys, June – August, using a small trawl net, towed obliquely through the water column. Catch from 40 stations is used to determine the relative abundance and distribution of young fish to understand the annual recruitment success of fish populations that spawn in the late-winter and spring and rear during the summertime. A mesozooplankton sample (CB net) targeting copepods and cladocerans occurs at each station concurrently with young fish, to determine density of zooplankton which is important food for young pelagic fish. The area sampled, Suisun Bay and Delta, is an important nursery for many species of young fish. Originally designed to determine the annual success of age-0 Striped Bass, the study has evolved to inform on the State and Federally listed Delta Smelt and Longfin Smelt, and other pelagic fish. Summer Townet currently provides fish, zooplankton, and water quality information used to inform Water Rights Decisions (1485 and 1641), the Summer-Fall Habitat Action (SFHA), modified operation of Suisun Marsh Salinity Control Gates (SMSCG), and tidal wetland restoration identified in the Delta Smelt Resiliency Strategy, federal biological opinions, and incidental take permit (ITP) issued by CDFW to Department of Water Resources (DWR) for long-term operation of the State Water Project (SWP). Added zooplankton samples will be collected from SFHA and SMSCG efforts in 2027.

2027-011 Estuarine and Marine Fish and Crab Abundance and Distribution Survey (Bay Study) [1, 2]

PI: Kathy Hieb (CDFW)

The San Francisco Bay Study was implemented by CDFW in 1980 to determine the requirements of fish, crabs, and shrimp downstream of the delta, as related to the Bay-Delta Water Quality Standards. The Bay Study currently samples 52 stations monthly from South San Francisco Bay to the lower Sacramento and San Joaquin rivers with an otter trawl and midwater trawl. The study was designed to sample young (age-0) fishes and crabs and juvenile and adult shrimp from open water habitats deeper than 3 meters. Note that shrimp are the focus of the companion program element "Shrimp Abundance and Distribution Survey" (2027-012).

Bay Study calculates and reports annual abundance indices for 30+ species of fish and 5 species of crabs. We also track and report seasonal abundance patterns and annual and seasonal distributional patterns for these species. Ultimately, the abundance trends and distributional patterns are related to physical factors - primarily freshwater outflow, but also ocean and estuarine water temperature, ocean upwelling, and ocean climate indices, such as the Pacific Decadal Oscillation and North Pacific Gyre Oscillation. The goal is to determine what factors may control recruitment and distribution of important estuarine and marine fishes and crabs that rear or reside in San Francisco Estuary.

2027-012 Bay Shrimp Abundance and Distribution Survey (Bay Study)

PI: Kathy Hieb (CDFW)

The San Francisco Bay Study (Bay Study) was implemented by CDFW in 1980 to determine the requirements of fish, crabs, and shrimp downstream of the delta, as related to the Bay-Delta Water Quality Standards. The Bay Study currently samples 52 stations monthly from South San Francisco Bay to the Sacramento and San Joaquin rivers with an otter trawl and midwater trawl. The study was designed to sample young (age-0) fishes and crabs and juvenile and adult shrimp from open water habitats deeper than 3 meters.

For the shrimp program element, the Bay Study calculates and reports annual abundance indices and abundance trends for 7 common species of shrimp. We also track and report seasonal abundance patterns and annual and seasonal distributional patterns for these species. Abundance trends and distributional patterns are related to physical factors - primarily freshwater outflow, but also ocean and estuarine water temperature, ocean upwelling, and ocean climate indices, such as the Pacific Decadal Oscillation and North Pacific Gyre Oscillation. The goal is to determine what factors may control recruitment and distribution of the most common shrimp that rear and reside in the San Francisco Estuary.

2027-029 San Francisco Bay Salinity and Temperature Monitoring

PI: David Hart (USGS)

The USGS will collect specific conductance (related to salinity) and water temperature data on a 15-minute interval at the following six continuous monitoring stations in San Francisco Bay (listed geographically from south to north):

- San Francisco Bay at Dumbarton Bridge
- San Francisco Bay at San Mateo Bridge near Foster City
- San Francisco Bay at Alcatraz
- San Francisco Bay at Richmond Bridge
- Carquinez Strait at Carquinez Bridge
- Suisun Bay at Benicia Bridge

The stations are currently installed, and regular maintenance includes approximately monthly visits to the sites for sensor calibration and cleaning, along with other routine maintenance of the water-quality sondes and infrastructure. All stations except Alcatraz include instruments located at two depths, typically one each in the lower and upper half of the water column. The Alcatraz station has a single instrument located roughly at mid-depth. All equipment, travel expenses, supplies, and labor are provided by the USGS. This project does not include data interpretation.

2027-030 Delta Flow Measurement and Database Management (Delta Flows Network)

PI: Catherine Ruhl (USGS)

The US Geological Survey, Bay Delta Hydrodynamics Program has been collecting water level, velocity, and flow data in the Sacramento-San Joaquin Delta since 1978. The network has recently substantially contracted and now is comprised of 16 stations, 12 of which are supported through this program element. Two additional stations are expected to come online in 2027 (funding through another source). The data collected at these stations is critical for understanding the circulation and mixing patterns in the complex and interconnected channels that comprise the Delta region. Understanding Delta hydrodynamics is imperative to documenting current conditions and to understanding the impacts of proposed major infrastructure projects and regulatory actions being taken to protect threatened and endangered species in the Delta.

Understanding transport processes enhances our understanding of physical processes impacting aquatic species and aquatic habitats. This understanding can then guide decision-makers.

As significant changes are considered and implemented (restoration projects, infrastructure projects) there are impacts to the hydrodynamics of the system. This network documents those changes.

2027-033 20mm Delta Smelt Survey (20mm) [1, 2]

PI: Colin Brennan (CDFW)

The 20-mm Survey employs a 1,600 µm mesh conical net to sample post-larval fish. The net is 5.1 m in length with a mouth opening of 1.5 m^2 and is mounted to a weighted townet frame. The mesh size was chosen based on the minimum width of a 20 mm Delta Smelt, as reported by Griffin (pers. comm.). A 160 µm Clark-Bumpus (CB) net is mounted to the top of the sled frame and is used to concurrently collect a zooplankton sample. The CB net is 78 cm long with a 12 cm mouth diameter.

Sampling events begin in March and are conducted every other week until early July, for a total of nine surveys. The 20-mm Survey has sampled 47 core stations since its inception in 1995. Fourteen stations were added to the 2023 sampling year in the San Pablo Bay region in response to the 6-agency redesign committee. The 20-mm Survey now samples 61 fixed stations distributed throughout the upper SFE. At each site, the following water quality data is collected: temperature (°C), specific conductance (µS/cm at 25°C) for both top water (taken by bucket) and bottom water (taken by Van Dorn sample bottle), turbidity (ntu's) and clarity (cm), and tidal stage. Flowmeters mounted across the mouth of each net are used to estimate the volume of water sampled. Three 10-minute oblique tows are conducted to collect fish samples. During one of these tows, a concurrent zooplankton sample is collected. The samples are concentrated in a removable, screened cod-end jar, and preserved in 10% formalin for identification in the lab at CDFW Stockton.

2027-043 Estimation of Pelagic Fish Population Sizes

PI: Lara Mitchell (USFWS)

Estimates of fish abundance, and corresponding measures of uncertainty, are critical for assessing the status of the population, estimating vital rates such as survival and reproduction, and developing management actions aimed at population recovery and sustainability. This work focuses on advancing abundance estimation methods for multiple life stages of Delta Smelt and Longfin Smelt based on a variety of sampling surveys, including the 20-mm Survey, Summer Townet Survey, Fall Midwater Trawl Survey, Spring Kodiak Trawl Survey, Bay Study, and Lodi Fish and Wildlife Office monitoring surveys. Such abundance estimates serve as input data for models linking environmental covariates and management actions to population dynamics.

2027-047 Yolo Bypass Fish Monitoring Program (YBFMP) [1, 2]

PI: Mackenzie Miner (DWR)

The objectives of this interdisciplinary monitoring effort are to collect baseline data on juvenile and adult fish, lower trophic levels, and water quality to inform management decisions and enhance our understanding of floodplain dynamics. Understanding the specific environmental conditions that facilitate increased lower trophic productivity and the survival and growth of native fishes are of critical importance for restoration efforts. The program collects baseline data to examine ecological responses to restoration efforts that are likely to increase the frequency and duration of floodplain inundation. As such, during periods of flooding or inundation, the Yolo Bypass Fish Monitoring Program (YBFMP) increases monitoring efforts spatially and temporally to better characterize ecosystem responses. It also characterizes how the Yolo Bypass is utilized by a broader range of native species, including taxa such as sturgeon, lamprey, splittail, and hitch through year-round monitoring efforts. Lastly, YBFMP collects data to examine mechanisms underlying patterns of increased primary productivity in response to management actions and Yolo Bypass hydrology to better understand food web dynamics.

The Yolo Bypass has been identified as an area of high restoration priority by the National Marine Fisheries Service and US Fish and Wildlife Service Biological Opinions for Delta Smelt, winter & spring-run Chinook Salmon. The YBFMP informs the restoration actions that are mandated or recommended in these plans, provides valuable response data for adaptively managing bypass weirs, and provides critical baseline data on floodplain ecology.

2027-053 Juvenile Salmon Monitoring (DJFMP) [1]

PI: Adam Nanninga (USFWS)

The Delta Juvenile Fish Monitoring Program conducts weekly beach seining (year-round) within the lower Sacramento River and Delta and the lower San Joaquin River, and bi-weekly seining (year-round) in San Francisco Bay and San Pablo Bay to monitor the relative abundance and distribution of juvenile Chinook Salmon and other juvenile fishes in unobstructed near-shore habitats. Year-round surface trawling is conducted in the Sacramento River near Sacramento and in the San Joaquin River near Mossdale to monitor juvenile Chinook Salmon entering the Delta. In addition, year-round surface

trawling at Chipps Island monitors juvenile Chinook Salmon exiting the Delta. Surface trawling at Mossdale is conducted in cooperation with the California Department of Fish and Wildlife.

Due to contracting changes PEN 071 Mossdale Trawl will be fully incorporated into PEN 053 in 2027. USFWS or its subcontractors will be sampling year-round. Sampling will typically be conducted three days per week, except during the spring mark-recapture study, when effort increases to five days per week.

2027-062 Quantitative Analysis of Stomach Contents and Body Weight for Pelagic Fishes (Fish and Diet Condition Study)

PI: Steve Slater (CDFW)

The Diet and Condition Study provides information on the food habits of pelagic fishes in the San Francisco Estuary. We focus on the temporal and spatial differences in diet composition and feeding success of Delta Smelt and Longfin Smelt, along with competitors Striped Bass, Threadfin Shad, American Shad, Mississippi Silversides, and Wakasagi. Measures of length and mass informs inform condition and growth. Additional measures for Delta Smelt include gonad maturation and tissue samples for genetic tests. This study was created to address management questions of food limitation in young fish by understanding the types and amount of prey eaten among seasons and regions of the upper estuary. Food limitation can be an important factor to the annual recruitment success of young fishes. Fish samples are preserved and archived from ongoing monitoring elements. Stomach contents are identified to describe fish diets and stomach fullness. Diet data is related to zooplankton monitoring data to understand use relative to available food for young fish. This study is a collaboration with IEP monitoring surveys with samples provided by STN (2027-007), FMWT (2027-003), 20-mm (2027-033), Smelt Larva Survey (2027-096), Bay Study (2027-011), USFWS EDSM (2027-325), and SMSCG (2027-335). Focus in 2027 will be the analysis of Delta Smelt and Longfin Smelt diet data to inform habitat and population growth modeling.

2027-071 Mossdale Trawl (Mossdale)

PIs: Steve Tsao (CDFW)

Mossdale Trawl will be incorporated into PEN 2027-053 DJFMP.

2027-072 Environmental Monitoring Program [1]

PI: Theodore Flynn (DWR)

EMP's monitoring and reporting mandates are described in Water Right Decision D-1641. Under this decision, the permit holders (DWR and USBR) must conduct a comprehensive environmental monitoring program to determine compliance with the stated water quality standards. The EMP is also mandated in the Incidental Take Permit for operation of the State Water Project. The EMP collects monthly samples of discrete water quality, nutrients, phytoplankton, zooplankton and benthic samples and

continuous water quality data throughout the San Francisco Bay-Delta estuary. The program objectives are as follows:

1) document compliance with Bay-Delta water quality objectives

2) maintain a long-term baseline record and provide a record of trends

3) develop and improve predictive tools to assess changes within the Bay-Delta

4) provide accurate and validated water quality information on a timely basis in a format appropriate for a variety of users

5) respond to the findings of ongoing monitoring, changing conditions within the Bay-Delta, and the needs of management with special studies.

2027-073 San Joaquin River Dissolved Oxygen Monitoring

PI: Julianna Manning (DWR)

EMP monitors dissolved oxygen (DO) levels in the Stockton Ship Channel to ensure that water quality objectives established by the Central Valley Regional Water Quality Control Board and State Water Resources Control Board are being met as well as to document long term trends in water quality in the area. EMP's continuous water quality station near Rough and Ready Island (RRI) records DO measurements at 15 minutes intervals at three separate depths. If daily average DO values remain below minimum thresholds for three consecutive days, additional discrete monitoring is triggered to measure DO values at fixed stations upstream and downstream of RRI.

2027-077 Upper Estuary Zooplankton Sampling [1, 2]

PI: Kathy Hieb (CDFW)

The Zooplankton Study has monitored zooplankton abundance in the upper San Francisco Estuary since 1972 to assess trends in food resources for fish. In collaboration with CDWR, the Zooplankton Study samples monthly at 19 stations encompassing San Pablo Bay, Suisun Marsh, Suisun Bay, and the Delta. Zooplankton are collected using three gear types that target specific size ranges: 1) a pump sampler for microzooplankton <1.0 mm long, including rotifers, copepod nauplii, and adult copepods of the genus *Limnoithona*; 2) a modified Clarke-Bumpus (CB) net for mesozooplankton 0.5-3.0 mm long, including cladocerans, copepodids (immature copepods), and adult copepods; and 3) a macrozooplankton net for zooplankton 1-20 mm long, including mysid shrimp and amphipods. This information is used by aquatic ecologists to investigate physical and biological drivers of the lower food web and relationships between food resources and fish that feed on zooplankton in the upper estuary, including listed species such as Delta and Longfin Smelt.

2027-093 UCD Suisun Marsh Fish Monitoring [1, 2]

PI: John Durand, UC Davis (UCD)

The Suisun Marsh Fish Study, a collaboration among UC Davis, DWR, and volunteers that began in 1980, monitors the aquatic ecosystem monthly throughout Suisun Marsh, primarily with otter trawls and beach seines. The main purpose of the study has been to understand environmental and anthropogenic factors affecting the aquatic community, in part by providing baseline data and methods for finer-scale ancillary studies focused on elucidating mechanisms. Aside from papers in peer-reviewed publications and presentations at conferences such as the Bay-Delta Science Conference, the primary conduit of the study's information is the annual report, which is completed each April and is available on either DWR or UC Davis publications websites (e.g., https://sites.google.com/ucdavis.edu/aquaticresearchcollective/publications?authuser=0). Information collected by the study is crucial for delineating long-term trends, documenting and understanding new species invasions, and gauging restoration and management actions.

2027-096 Smelt Larva Survey (SLS) [1, 2]

PI: Colin Brennan (CDFW)

SLS survey samples the upper San Francisco Estuary every other week from December through March at 59 fixed stations to determine the distribution and relative abundance of larval Longfin Smelt. Results from this survey are provided in near-real time to assess the risk of entrainment.

At each station, the following water quality data is collected: temperature (°C), specific conductance (µS/cm at 25°C) for both top water (taken by bucket) and bottom water (taken by Van Dorn sample bottle), turbidity (ntu's) and clarity (cm), and tidal stage. Flowmeters mounted across the mouth of the net are used to estimate the volume of water sampled. A single 10-minute oblique tow is conducted to collect fish samples. The samples are concentrated in a removable, screened cod-end jar, and preserved in 10% formalin for identification in the lab at CDFW Stockton.

2027-104 Operation of Thermograph Stations

PI: Travis Hiett (USGS)

The Water-quality work at these sites, 11389500 and 11303500, consists of continuous monitoring of water temperature. Measurements are recorded at fifteen-minute intervals during the entire water year. Sediment sampling conducted at site 11303500. Samples are normally collected once each day by the observer along with recording the water temperature and gage height. Additional sampling is conducted by USGS crews on a regular basis as part of the sampling protocols.

Water-quality work at these sites consists of continuous monitoring of water temperature at sites 11303500, San Joaquin River at Vernalis, CA and 11389500, Sacramento River below Wilkins Slough near Grimes, CA. Measurements are recorded at fifteen-minute intervals during the entire water year. Sediment sampling is conducted at site 11303500 (San Joaquin River at Vernalis, CA). Samples are normally collected once each day by the observer along with recording the water temperature and gage height. Additional

sampling is conducted by USGS crews on a regular basis as part of the sampling protocols.

2027-296 Investigation of the Distribution and Abundance of Longfin Smelt in the San Francisco Estuary [1]

PI: Levi Lewis (UCD)

Longfin Smelt (*Spirinchus thaleichthys*) populations have declined rapidly in the San Francisco Estuary (SFE), and their use of wetland habitats in the lower estuary remains poorly understood. This project addresses key priorities in the IEP Longfin Smelt Science Plan (LFSSP), including the need for expanded monitoring and support for a captive culture program. In coordination with the Wetland Regional Monitoring Program (WRMP), fish and habitat data are collected across a network of benchmark, reference, and restored tidal wetlands in the lower SFE.

Field sampling targets Longfin Smelt to assess spatial and seasonal variation in occurrence, size structure, and maturity. Water quality data are collected concurrently to evaluate habitat associations and identify critical environmental conditions. Captured fish may also serve as broodstock for the Longfin Smelt captive culture program.

This project is a collaboration between CDFW, UC Davis, and other WRMP partners. Major products include annual data summaries, contributions to WRMP and IEP reporting, and data inputs for restoration planning. Findings will help identify important habitats, assess restoration performance, and guide adaptive management of Longfin Smelt and tidal wetland conservation in the SFE.

2027-301 Juvenile Salmon Emigration Real Time Monitoring (DJFMP)

PI: Adam Nanninga (USFWS)

Beach seining is conducted 3 days/week from October 1st to December 31st near Sacramento to detect the arrival of older juvenile Chinook Salmon entering the Delta. Monitoring data is used to inform Delta Cross Channel Gate closure decisions from October 1st to December 15th in order to minimize the diversion and mortality of emigrating juvenile winter-run sized Chinook Salmon. This data also was and will continue to be used to inform biological opinions, and drought operations planning decisions. (Note: This is part of the US Fish and Wildlife Service Delta Juvenile Fish Monitoring Program.)

2027-311 Tidal Wetland Monitoring Study [1, 2]

PI: Christy Bowles (CDFW)

The CDFW Fish Restoration Program will collect fish, invertebrates, and water quality data near existing and planned tidal wetlands. This data will provide information on how fish and invertebrate communities change pre-/post-restoration. A suite of sampling gears will be deployed to capture fish and invertebrates throughout the year to characterize their use, relative abundance, and community composition in tidal wetlands. Over time, the Fish Restoration Program will assess the effectiveness of tidal

wetland restoration as it relates to providing food sources and habitat refuge for at-risk native fishes.

2027-322 Estimating Abundance of Juvenile Winter-run Chinook Salmon Entering and Exiting the Delta from Genetic Monitoring Data, Estimates of Trawl Efficiency from Coded Wire Tags, and Acoustic Telemetry Release (SAIL)

PI: Bryan Matthias (USFWS)

This is a long-term continuation of a five-year project funded by CDWR and CDFW and the Central Valley Project Improvement Act in 2017. The objective of the project is to improve estimates of population abundances for fall, winter and spring run juvenile Chinook Salmon at Sacramento and Chipps Island by improving trawl efficiency estimates using data from releases of coded wire tags (CWT), acoustic tags (AT), and by genetically sampling the trawl catch in 2025 and 2026. The project will (1) develop statistical models for estimating trawl efficiencies using 2016-2025 data for paired AT-CWT releases of winter run and fall-run Chinook Salmon; (2) use 2016-2025 genetic sampling of trawl catch in combination with efficiency estimates to estimate population abundances of fall, spring and winter run at Sacramento and Chipps Island for 2016-2025; (3) implement trawl efficiency studies for multiple salmon runs in 2025-2026 informed by the prior results and in coordination with hatcheries for inclusion of AT fish with existing CWT releases; and (4) combine trawl efficiencies with genetic samples of trawl catch to provide estimates of fall, spring and winter-run salmon abundance (with estimated precision) entering and exiting the Delta in 2016-2025.

2027-325 Enhanced Delta Smelt Monitoring (EDSM) [1]

PI: Denise Goodman (USFWS)

The U.S. Fish and Wildlife Service Enhanced Delta Smelt Monitoring Program (EDSM) is a year-round monitoring effort that deploys multiple crews sampling concurrently across predefined strata within the San Francisco Estuary. EDSM uses Kodiak trawls approximately July through March to sample juvenile and adult Delta Smelt, and 20-mm trawls approximately April through June to target post-larvae. The primary objective of EDSM is to enhance the data available for calculating life stage-specific estimates of abundance and distribution for Delta Smelt at management-relevant time scales. The program also incorporates gear efficiency testing, genetics, Delta Smelt supplementation support, and other experimental elements where feasible. Daily catch summaries and weekly Delta Smelt abundance reports are distributed to managers and stakeholders. Catch data on smelt and salmonids are also made available to the Delta Action Team as part of their risk assessment processes to support implementation of the Long-term Operations of the CVP and SWP-Action 5.

2027-329 Extracting Better Information from Long-Term Monitoring Data: Estimating Occupancy and Abundance of Near-Shore Fishes in the Sacramento-San Joaquin River Delta [1]

PI: Adam Nanninga (USFWS)

The purpose of this study is to expand IEP monitoring and inference to other dominant near-shore, littoral habitats not sampled by beach seines through the use of boat electrofishing. To accomplish this, we will sample key littoral fish species across various near-shore habitats in order to determine how best to estimate abundance, occupancy, capture probabilities, and related environmental drivers.

2027-330 Estuary Monitoring Platform: Standardized Fish Community Sampling Across Habitat Types [1]

PI: Joe Merz, Cramer Fish Sciences (CFS)

The purpose of this study is to quantify and characterize fish response to engineered levee slope attributes near setback levees with waterside habitat and to measure the fish community response to large scale tidal restoration at Dutch Slough Tidal Restoration Project. Analyzing environmental DNA (eDNA) coupled with observations by the Aquatic Habitat Sampling Platform (Platform) will provide an unprecedented assessment of fish community response to altered and restored environments. The Platform is an integrated aquatic species and habitat sampling system that can effectively sample fish and invertebrates and reveal habitat associations while having minimal or no "take" of sensitive species. The sampling apparatus is suspended by hydraulic arms allowing fine-scale adjustments to sampling depth during operation. Wheels attached to the bottom of the net frame allow the frame to roll over obstacles, reducing impact and facilitating continued sampling across variable habitats. Additionally, collection of water during transects for the detection of eDNA, the data collected by the Platform gives an unprecedented view of fish use of various habitats. The Platform also records environmental data including water quality and depth. Deployment of this versatile sampling system expands data collection to shallow and off-channel habitat, while offering the capability to transition to deeper and open water habitats, improving our knowledge about populations, habitat associations and stressors of key organisms. *Continued funding for PEN 2027-330 is still under consideration.*

2027-333 Enhanced Acoustic Tagging, Analysis, and Real-Time Monitoring

PI: Cyril Michel, U. C. Santa Cruz (UCSC) / (NMFS-SWFSC)

Understanding the movement and survival rates of outmigrating salmonids in real-time is critical for resource managers to make informed decisions. Through the development of a website and deployment of real-time acoustic receivers, detections of acoustically tagged fish can be displayed in real-time at multiple locations in the Sacramento River, Delta and SF Bay (https://oceanview.pfeg.noaa.gov/CalFishTrack/index.html). Movement and survival rates are estimated between receiver sites and route selection is predicted at critical junctions in the Delta. ESA listed salmonids will be acoustic tagged and released at different locations during the winter and spring to track movement and survival rates in different regions, and relate survival to environmental factors such as flow, temperature and turbidity.

2027-335 Suisun Marsh Salinity Control Gate Action

PI: Rosemary Hartman (DWR)

The Suisun Marsh Salinity Control Gate (SMSCG) have been identified as a management tool to improve habitat conditions for Delta Smelt in summer-fall. The proposed effort is the scientific evaluation of the project. Much of the evaluation will be based on existing IEP surveys and instrumentation (e.g. EMP, TNS, FMWT, EDSM), but we will include some additional evaluation tools such as hydrodynamic modeling and Delta Smelt life cycle modeling to increase our understanding of the action.

2027-353 Fish Facilities Monitoring

PI: Virginia Afentoulis (CDFW)

The Fish Facilities Monitoring Project manages the data collected on fish entrained and salvaged at the Skinner Delta Fish Protection Facility (SDFPF) and Tracy Fish Collection Facility (TFCF). Directed by cooperative agreements and funded by USBR and DWR, project staff are responsible for key entry, quality assurance, data processing, data reporting, and other database management activities for these facilities. Staff participate, give input, and feedback in multiagency State Water Project and Central Valley Project work team meetings (the Tracy Technical Advisory Team and Central Valley Fish Facilities Review Team, and Salvage Biology Meetings). Wherein fish facility and water project report documents, SOPs, permit document changes, and project work plans are presented. Furthermore, the staff provide quality control (QC) and assistance with fish identification and processing at SDFPF and TFCF. QC is conducted quarterly on all State facility staff conducting fish identification, and training is provided by CDFW for all new employees expected to identify fish at SDFPF. An annual review of salvage collected by SDFPF and TFCF is provided at the conclusion of each water year (Oct 1st-Sept 30th).

2027-355 Phytoplankton Enumeration Synthesis Project

PI: Sarah Perry (DWR)

Phytoplankton community composition is an important driver of zooplankton productivity and food supply for higher trophic levels. However, research involving the organisms has been hindered by lack of access to existing phytoplankton datasets and a lack of a standardized way to combine and analyze them. Having a synthesized dataset will facilitate further research into productivity in the estuary.

2027-357 Submersed Aquatic Vegetation in the Delta: Composition, Niche Occupancy and Response to Climatic Factors

PI: Shruti Khanna (IEP at CDFW)

Invasive submerged aquatic species (SAV) greatly impact habitat for endangered species in the Delta. In the past decade, we have seen a huge increase in SAV cover and an influx of new invasive species like ribbon weed. This study will build species distribution models (SDM) for SAV using predictors such as water speed, depth, salinity from the UnTRIM hydrodynamic model, turbidity derived from Sentinel-2 and temperature derived from ECOSTRESS satellite imagery. The SDMs will be used to study the effect of flow management actions and restoration activities on SAV

distribution. SAV community data collected in the field (available on EDI) will be analyzed to study if the SAV community composition has changed from 2007-08 to present time. The same dataset will be used to explore if the SAV SDM can be refined based on species presence data to see if there are significant differences in SDMs of individual SAV species.

2027-360 Genetic Analysis and Storage of Listed Species to Inform Multiple Studies for State Water Project Operations

PI: Melinda Baerwald (DWR) and Daphne Gille (DWR)

The project element aims to genetically analyze listed species to obtain accurate information about species identification, distribution, and abundance as well as genetic diversity assessments, species response to environmental changes, and species response to management actions. In addition to archiving and analyzing tissue samples of listed fish species (e.g., Chinook Salmon, Delta Smelt, and Longfin Smelt) as part of regular IEP monitoring, Chinook Salmon and Delta Smelt samples for two SWP-related studies are being routinely genotyped and archived at the DWR Genetic Monitoring (GeM) laboratory. These studies are: 1) rapid genetics of Chinook Salmon to inform water operations; 2) run identification for Spring-run Chinook Salmon Juvenile Production Estimate. Products include reports for all studies (minimally produced annually), presentations at regional conferences, weekly distribution of salvage data to the interagency Salmon Monitoring Team (SaMT), and scientific publications. DWR's Genetic Monitoring (GeM) lab coordinates all project activities and works collaboratively with CDFW, USFWS, USBR, NMFS, Cramer Fish Sciences, and UC Davis.

2027-361 Evaluation of Morphological Characteristics Used in Identification of Larval Delta Smelt *Hypomesus transpacificus* in the San Francisco Estuary

PIs: Denise Goodman (USFWS) and Evan Carson (USFWS)

This collaborative study is an initial step towards improving reliable identification of larval San Francisco Estuary *Osmeridae* (Delta Smelt, Longfin Smelt, and Wakasagi) to species by establishing a baseline of key morphological and phenotypic attributes of cultured larval Delta Smelt. We will evaluate morphological and phenotypic variation in relation to age and size of up to 600 cultured larval Delta Smelt from the UC Davis Fish Conservation and Culture Laboratory to establish a baseline of key attributes in fish born and reared in a controlled (hatchery) environment. Wild-caught *Hypomesus* will be incorporated into the study in 2026 and 2027, if possible. Through coordinated methods development between USFWS and CDFW staff we also hope to improve standardization of larval *Osmeridae* identification methods and account for effects of different preservative-formulations used between the programs. This PEN was identified as closing in the 2026 Work Plan. However, the PEN will remain open so results from CDFW's allotment of cultured study fish and results from wild-caught Wakasagi and Delta Smelt captured in 2026 larval sampling can be included in the analysis. A publication is anticipated by the end of 2028.

Closing PENs

2027-346 Using Delta Smelt Enclosures to Support Species Recovery

PIs: Melinda Baerwald, Brian Schreier, and Trishelle Tempel (DWR)

With the wild Delta Smelt population's continued decline, cultured Delta Smelt are being used to evaluate management actions and support species recovery through future population supplementation. In the Spring of 2026 this project deployed Delta Smelt enclosures at two field sites (Lookout Slough and a pond on Bouldin Island) to assess the feasibility of hatching embryos in a naturalized environment. We are currently analyzing the results of that study. No additional studies are planned for this project, and we are currently writing up final publications.

2027-352 Larval Smelt Entrainment Monitoring [1]

PI: Morgan Gilbert and Tim Malinich (CDFW)

Delta Smelt and Longfin Smelt are protected under the Endangered Species Act. Water exports at the State Water Project entrain fish and are a source of mortality, with take authorized by the 2024 Incidental Take Permit for the Long-Term Operation of the SWP in the Sacramento-San Joaquin Delta. Entrainment "loss" of fish from the population has only been quantified for juvenile and adult smelt (>20 mm). However larval loss (fish >20mm) is also a concern and may have a significant impact on fish populations. No quantitative larval smelt monitoring currently occurs at the salvage facilities, and existing larval smelt monitoring is only appropriate for detecting presence. This project's primary purpose fulfills the 2024 ITP Condition of Approval 7.6.2; "Permittee shall fund and implement a new Smelt Larval Entrainment Program to quantify larval DS and LFS entrainment into Clifton Court Forebay." During 2022-2026, the Larval Entrainment project conducted a series of regular monitoring and special studies to improve detection, and abundance estimates of larval fish within the entrainment influence of the State Water Projects. In 2027, this project will complete its final report and publications and provide recommendations for future Native osmerid sampling.

PENs No Longer Included in the IEP Work Plan

The following projects are continuing through direct funding from USBR and will no longer be included in the IEP Work Plan.

- 2027-059 Coleman National Fish Hatchery Late-Fall Run Production Tagging
- 2027-074 Central Valley Juvenile Salmon and Steelhead Monitoring (Knights Landing)

Technical Teams

2027-T20 IEP Data Utilization Work Group (DUWG)

Chairs: David Bosworth (DWR) and Sam Bashevkin (SWRCB)

The Data Utilization Work Group (DUWG) is a multi-agency technical team established to address the IEP's data management needs by setting internal procedures and guidelines, defining and implementing shared data standards across member agencies, facilitating data sharing in a timely manner, and coordinating with other data management teams in the Delta science community. Studies that are included in the IEP Work Plan would follow any guidelines set up by DUWG; studies conducted by IEP partners could use these guidelines as they see fit. The DUWG's activities include (1) developing data standards and best practices, including minimum standards for data descriptions, definitions, and documentation, (2) increasing efficiency and openness of data sharing and interoperability among datasets, and (3) providing support for IEP member agencies. Membership in the DUWG is limited to individuals representing IEP member agencies and affiliated groups.

Organizations Involved: CDFW, DSC/DSP, DWR, USBR, USFWS, USGS, Water Boards

2027-T28 Longfin Smelt Technical Team

Chair: Adam Chorazyczewski (CDFW) and Brian Schreier (DWR)

On November 4th, 2024, the California Department of Fish and Wildlife (CDFW) issued the California Department of Water Resources (DWR) an Incidental Take Permit (ITP) for the operation of the State Water Project (SWP) in the Sacramento-San Joaquin Delta (ITP No. 2081-2023-054-00). The 2024 ITP included a provision to implement a Longfin Smelt Science Program with science activities intended to further our understanding of the species. To fulfill this provision of the ITP, DWR is required to fund and implement the science program based on the priorities identified within the Longfin Smelt Science Plan (LFSSP) for the term of the ITP. The LFSSP is expected to inform scientific priorities relevant to the management of the Longfin Smelt within the Delta. The LFSSP was approved in writing by the California Department of Fish and Wildlife (CDFW) on February 13, 2026, and it articulates six priority science areas relevant to Condition of Approval 7.8.1 of the 2024 ITP. The Longfin Smelt Technical Team (LFSTT) was established to coordinate implementation of the LFSSP through a collaborative forum between DWR, CDFW, the United States Fish and Wildlife Service (USFWS), United States Bureau of Reclamation (Reclamation), Federal Water Contractors (FWCs), and the State Water Contractors (SWC). This process is expected to ensure advancement in Longfin Smelt scientific understanding over the term of the ITP (10 years).

Organizations Involved: CDFW, DSC/DSP, DWR, Metropolitan Water District of Southern California, State Water Contractors, USBR, USFWS

2027-T30 Tracy Technical Advisory Team (TTAT)

Sponsor: J. Carly Dealy, South-Central California Area Office Manager (USBR)

The Bureau of Reclamation began the Tracy Fish Facility Improvement Program (TFFIP) in 1989 with the overall goal of improving fish protection and fish salvage at Trach Fish Collecting Facility (TFCF).

The TFFIP identifies potential physical improvements and operational changes, assessing fishery conditions, and monitoring fish salvage operations per 1992 signed agreements with CDFW and legal requirements under the 1992 Central Valley Project Improvement Act and California Water Rights orders.

The TTAF is to provide a forum for a collaborative interdisciplinary approach involving Federal, State, and local stakeholders to facilitate the identification and implementation of structural and nonstructural fish conservation measures at the TFCF. Improvements to fish salvage efficiency will result in improved reliability of water supplies and environmental compliance.

Organizations Involved: Reclamation's Tracy Office Operations Branch, Reclamation's Tracy Biology Branch, Reclamation's Denver Technical Service Center, USFWS, CDFW, SWRCB, SLDMWA, and public environmental interest.

Dormant Technical Teams:

2027-T21 Central Valley Fish Facilities Review Team (Dormant)

The main objective of the Central Valley Fish Facilities Review Team is to review, coordinate activities, and provide oversight for Central Valley fish screen and fish passage projects. The team is comprised of scientists and engineers who generally meet two to three times per year but will meet more frequently if necessary. Meetings are used to introduce and provide guidance for new fish screen related study programs, provide updates for ongoing programs, and disseminate information on new fish screen technologies. Currently, this team is dormant but may be reconvened in the summer/fall as part of one of the conditions of approval in the SWP/ITP for utilization of the CVFFRT for technical review.

Organizations Involved: CDFW, DWR, Innovasea, Intake Screens Inc. NOAA, ProTroll, USBR, USFWS

Project Work Teams

2027-T03 Sturgeon PWT

Chairs: John Kelly (CDFW) and Alicia Seesholtz (DWR)

The Sturgeon Project Work Team encourages, facilitates, and coordinates sturgeon monitoring, research, and information dissemination, and provides a technical forum for Central Valley sturgeon issues. The objectives of the Sturgeon Project Work Team are to 1) Encourage, facilitate, and assist development of research on life history, distribution, population dynamics, abundance, and ecology of Central Valley sturgeon, 2) Encourage, facilitate, and assist development of monitoring and research to evaluate the effects of water development/management and other stressors on Central Valley sturgeon, 3) Identify research questions and data gaps, 4) Provide technical review of

sturgeon research, monitoring, and restoration proposals and recommendations on technical issues related to the protection, restoration, and management of sturgeon, 5) Promote dissemination of project updates, research results, and current literature among scientists, resource managers, restoration specialists, and constituent organizations, and 6) Promote sustainable management of California's sturgeon species. The Sturgeon PWT meets twice a year, with occasional special sessions or subcommittee meetings, as needed.

Organizations Involved: CDFW, Cramer Fish Sciences, DSC/DSP, DWR, Enterprise Rancheria, ICF, Kern County Water Agency, Metropolitan Water District of Southern California, NOAA, Oregon State University, Pacific States Marine Fisheries Commission, River Run Consulting, Robinson Rancheria, UC Davis, USACE, USBR, USEPA, USFWS, USGS, Yurok Tribe

2027-T04 Estuarine Ecology Team (EET) PWT

Chair: Rosemary Hartman (DWR)

The Estuarine Ecology Team (EET) is an interdisciplinary forum to improve understanding of the Bay-Delta ecosystem by fostering communication and collaboration among scientists. The purpose of the group is to provide a forum for emerging scientific ideas and problems and improve scientific communication. Unlike other PWTs that focus on specific species or habitats, the EET is a place to take on broader ecological issues with an interdisciplinary group. In spring of 2026, the EET merged with the Climate Change PWT to highlight the impacts of climate change on all aspects of estuarine ecology. Some characteristics that make EET unique are that it explicitly makes connections with ecosystems upstream and downstream of the Delta, considers linkages and interactions between species across trophic levels, discusses impacts of climate change, and fosters interdisciplinary partnerships.

Organizations Involved: Anchor QEA, Cal Maritime, CDFW, Contra Costa Water District, Cramer Fish Sciences, DSC/DSP, DWR, FISHBIO, Hanson Environmental, ICF, Lawrence Berkeley National Labs, Metropolitan Water District of Southern California, NOAA, RMA, San Francisco Bay Keeper, San Francisco State University, State Water Contractors, UC Davis, USBR, USFWS, Valley Water, Vollmar Consulting, Water Boards, Westlands Water District

2027-T05 Biotelemetry PWT

Chairs: Curtis Yip (DWR) and John Kelly (CDFW)

The mission of the IEP Biotelemetry PWT is to provide a conduit for communication and coordination among scientists engaged in biotelemetry activities in the Central Valley, Delta, Estuary and near shore Pacific Ocean. This communication entails regular meetings, identification and discussion of current and future projects, and proposal review as solicited to facilitate collaboration, standardization of methods and technologies where possible and the leveraging of resources. The purpose of the Biotelemetry PWT is to coordinate Biotelemetry Projects taking place in the Central

Valley and provide a forum for collaboration between Biotelemetry projects within the Central Valley (sharing equipment, tagged fish, etc.). The Biotelemetry PWT meets twice per year.

Organizations Involved: CDFW, Cramer Fish Sciences, DSC/DSP, DWR, EBMUD, FISHBIO, H. T. Harvey & Associates, ICF, Innovasea, Lotek, Metropolitan Water District of Southern California, NOAA, Sonoma County Water Agency, Thomas Gast & Associates Environmental Consultants, UC Davis, USACE, USBR, USFWS, USGS, Water Boards

2027-T06 Spring Run Salmon PWT

Chairs: Flora Cordoleani (NOAA) and Ryan Revnak (CDFW)

Since 1999 Central Valley spring-run Chinook (CVSC) salmon ESU is state and federally listed as a threatened species and is currently faced with three primary threats: (1) loss of most historic spawning habitat; (2) degradation of the remaining rearing and migration habitats; and (3) genetic introgression with the Feather River Fish Hatchery spring-run Chinook salmon strays (NMFS 2014). While a large amount of monitoring occurs in the Central Valley, the understanding of CVSC dynamics is still very data limited, and the existing CVSC salmon monitoring programs seem to be fragmented and lack a common thread. Therefore, the goal of the IEP spring-run Chinook salmon PWT is to provide a venue for scientists from diverse agencies/groups to coordinate and synthetize findings, which will in turn inform research and monitoring needs in the future. Key roles and activities include: 1) coordination on in-season status and trend monitoring updates, 2) technical guidance to IEP Lead Scientist, Coordinators and Directors on science priorities, 3) development, coordination, and technical review of management-relevant research and studies for IEP and other partners (e.g., modeling, manipulation, and monitoring). The PWT meet twice a year, in the spring and the fall of each year. Sub-teams that will potentially be created to tackle a specific PWT question will meet on a more regular basis (not determined yet) and report their conclusions to the PWT during the bi-annual meeting.

Organizations Involved: CDFW, Cramer Fish Sciences, DSC/DSP, DWR, Environmental Science Associates, FISHBIO, McBain Associates, Metropolitan Water District of Southern California, NOAA, Trout Unlimited, UC Davis, USBR, USFWS, USGS, Valley Water

2027-T07 Resident Fishes PWT

Chairs: Adam Nanninga (USFWS) and Jacob Stagg (USFWS)

The IEP Resident Fishes Project Work Team (PWT) is a forum for information exchange, discussion, synthesis, and exploring and recommending next steps in research and monitoring activities related to populations of resident fishes in the San Francisco Estuary. Resident fishes are defined rather loosely to include fishes spending all or part of their life cycle as residents in the San Francisco Estuary. This definition will exclude salmonids and sturgeons because PWTs dedicated to these taxa already exist;

however, we encourage members of the salmonid and sturgeon PWTs to share their information with the Resident Fishes PWT as certain topics are likely to be of interest to both groups. The Resident Fishes PWT has a special interest in fish identification, and it is one of the main topics of discussion during quarterly meetings. Members can also choose to participate in sub teams which are focused on exploring key topics in further detail. The Resident Fishes PWT will serve as an avenue for feedback and information/data exchange for studies and sub teams. The Resident Fishes PWT will also continue to highlight any important or management-relevant work on resident fish species that are not covered by the IEP workshop or other PWTs. This PWT meets every three months, year-round.

Organizations Involved: California State University Los Angeles, CDFW, Cramer Fish Sciences, DSC/DSP, DWR, FISHBIO, GEI Consultants, Metropolitan Water District of Southern California, UC Davis, USACE, USBR, USFWS, NOAA, Valley Water, Water Boards

2027-T09 Tidal Wetland Monitoring PWT

Chair: Stacy Sherman (CDFW)

The IEP Tidal Wetland Monitoring Project Work Team (TWM PWT) facilitates collaboration in the design of monitoring and research programs to evaluate the effectiveness of tidal wetland restoration in providing habitat and food web resources to native fishes, particularly Delta Smelt and juvenile Chinook Salmon. The geographic focus of the team's work is the Sacramento-San Joaquin Delta and Suisun Marsh, but we strive to coordinate and collaborate with scientists who work in other areas of the estuary or watershed and with those who focus on non-fish aspects of wetland ecology. TWM PWT membership is open to all and currently includes experts in a wide variety of wetland-related disciplines as well as representatives of many agencies, universities, non-profits, and private interests. The team acts as a forum for the discussion of monitoring and research proposals and for presentation of preliminary results. The team currently meets on an ad-hoc basis according to need, typically semi-annually.

Organizations Involved: CDFW, DSC/DSP, DWR, Environmental Science Associates, NMFS, Oregon State University, SacSewer, RMA, Sacramento-San Joaquin Delta Conservancy, San Francisco Bay National Estuary Research Reserve, SFEI, State Water Contractors, UC Davis USFWS, USGS

2027-T11 Winter-Run Salmon PWT

Chair: Tracy Grimes (CDFW)

The Winter-run Project Work Team coordinates research, monitoring and management activities for the state and federally listed endangered Sacramento River winter-run Chinook salmon. The team facilitates communication and information exchange on technical issues among the agencies and stakeholders. The team also provides advice, peer review, and recommendations on technical issues related to the protection, restoration, and management of winter-run Chinook.

Team members currently include staff from the California Departments of Fish and Wildlife and Water Resources, The Metropolitan Water District of Southern California, National Marine Fisheries Service, Bureau of Reclamation, the U.S. Fish and Wildlife Service and other Stakeholders. The team meets bi-annually or as needed.

Organizations Involved: CDFW, Cramer Fish Sciences, DSC/DSP, DWR, FISHBIO, HDR, ICF, Kearns & West, Metropolitan Water District of Southern California, NOAA, Pacific States Marine Fisheries Commission, QEDA Consulting, UC Berkeley, UC Davis, University of Washington, USBR, USFWS, USGS, Water Boards

2027-T14 Aquatic Vegetation PWT

Chairs: Shruti Khanna (CDFW) and Nick Rasmussen (DWR)

The IEP Project Work Team (PWT) for Aquatic Vegetation formed to address a gap within the IEP science program for coordination of science efforts related to aquatic vegetation, and the lack of a consistent monitoring program for aquatic vegetation coverage. The goals of the PWT are to provide a forum for research and monitoring activities, help guide and evaluate management efforts and support development of work plans for new studies. In 2026-27, key activities will include (1) updating the integrated SAV dataset published on EDI; (2) providing feedback for ongoing research activities in the Delta, including support of the NASA-funded aquatic vegetation monitoring project spearheaded by Dr. Erin Hestir, the Delta Invasive Species Mapping project led by Dr. Susan Ustin, and any other ongoing aquatic vegetation studies; (3) updating the aquatic plant identification resources and continuing to offer the aquatic vegetation identification workshop. The Aquatic Vegetation PWT meets on a quarterly basis.

Organizations Involved: CDFA, CDFW, Central Valley Flood Protection Board, Cramer Fish Sciences, CROWE, DSC/DSP, DWR, Metropolitan Water District of Southern California, NASA, NOAA, SacSewer, Sacramento-San Joaquin Delta Conservancy, San Francisco State University, SEPRO, State Parks, Suisun RCD, UC Berkely, UC Davis, UC Merced, USBR, USDA, USFWS, USGS

2027-T15 Steelhead PWT

Chair: Erin Ferguson (CDFW)

The primary goal of the Steelhead PWT is to serve as an open forum for information exchange, discussion, synthesis, and exploring and recommending next steps in research and monitoring activities related to coastal rainbow trout/steelhead populations in the Central Valley. Specific objectives include identifying research questions and data gaps, standardizing sampling techniques and data collection, serving as technical advisory group to IEP, CVPIA, and other enhancement programs, collaborating on data compilation projects in an effort to expand the knowledge of fisheries biology within the Central Valley of California. Team members currently include staff from the California Department of Fish and Wildlife and Water Resources, East Bay Municipal Utility

District, United States Fish and Wildlife Service, and Bureau of Reclamation, and various private consulting groups and partners.

Organizations Involved: Anchor QEA, CDFW, Cramer Fish Sciences, DSC/DSP, DWR, EBMUD, FISHBIO, Metropolitan Water District of Southern California, NOAA, Oregon State University, UC Santa Cruz, UC Davis, USBR, USDA, USEPA, USFWS, Westlands Water District, and Turlock Irrigation District

2027-T17 Contaminants PWT

Chair: Amelie Segarra (UC Davis) and Krista Hoffmann (CDFW)

The Contaminants Project Work Team, initially formed to investigate the role of contaminants in the Pelagic Organism Decline (POD), continues to engage in this critical research while also serving as a collaborative forum for sharing and synthesizing the latest scientific findings on contaminants affecting the Bay-Delta ecosystem. The team facilitates ongoing dialogue on contaminants of emerging concern, identifies critical research gaps, and provides scientific guidance on contaminant management practices. Serving both as an advisory body to contaminant-focused research initiatives and as a connector across other IEP Project Work Teams, the Contaminants Work Team actively promotes integration of contaminant considerations into broader ecological assessments and management strategies. The team supports the development of coordinated monitoring efforts, synthesis of contaminant impacts, and prioritization of research to inform adaptive management in this multi-stressor environment.

Organizations Involved: AECOM, CalRice, Cal Maritime, CDFW, CDPR, Central Valley Clean Water Association, DSC/DSP, DWR, Environmental Solutions Group LLC, G. Fred Lee, Larry Walker Associates, Metropolitan Water District of Southern California, MLJ Environmental, NOAA, Oregon State University, SacSewer, Robertson-Bryan, San Francisco State University, Sacramento County, Sacramento-San Joaquin Delta Conservancy, SFEI, Southern Illinois University, UC Berkeley, UC Davis, U Mass Boston, USFWS, USGS, Valley Water, Western Washinton University, Water Boards, Zone 7 Water Agency

2027-T22 Predation PWT

Chairs: Andrew Hampton (CDFW) and Brian Hutchinson (USFWS)

The Predation Project Work Team provides a forum to examine impacts of predators in the Delta and its tributaries. The Project Work Team can provide guidance on collaboration and coordination of predation studies, so existing work can become more productive and can better inform resource management. Specific functions of the team include the following: 1) provide a forum for discussion of current or planned projects related to predation upon fishes, 2) provide guidance on the development of work plans and studies, and 3) foster collaboration among different organizations currently working on predation studies.

Organizations Involved: Cal Trout, CDFW, Cramer Fish Sciences, DSC/DSP, DWR, EBMUD, Environmental Science Associates, Farallon Institute, FISHBIO, Cal Poly Humboldt, Innovasea, Metropolitan Water District of Southern California, Pacific State Marine Fisheries Commission, SacSewer, San Francisco State University, UC Davis, UC Santa Cruz, Water Boards

2027-T23 Water Quality and Phytoplankton PWT

Chairs: Silvia Angles (DWR), Ellen Preece (DWR, Keith Bouma-Gregson (USGS), and Janis Cooke, Central Valley Water Board (CVWB)

The IEP Water Quality and Nutrients PWT will provide a venue for scientists from diverse agencies and groups to coordinate and synthesize data and information that will inform IEP research and monitoring needs for water quality and phytoplankton in the future. A small workgroup within the PWT is working on a Phytoplankton Enumeration Synthesis Project, which will create a standardized and integrated phytoplankton dataset for use by Delta researchers. Another workgroup is the CHABs Sub-Team, focused on implementing the Delta CHABs Monitoring Strategy (chairs Ellen Preece (DWR), Laura Twardochleb (State Water Resources Control Board), Keith Bouma-Gregson (USGS), and Nick Rowlands (Delta Science Program). This group functions as a sub-team of the Water Quality and Phytoplankton Project Work Team and regularly reports out on major milestones and progress updates to the Water Quality and Phytoplankton Project Work Team.

Organizations Involved: CDFW, DSC/DSP, DWR, Water Boards, Sacramento-San Joaquin Delta Conservancy, East Bay Parks, San Francisco Estuary Institute, USBR, USGS, US EPA, San Francisco State University, UC Berkeley, UC Merced, UC Davis, Metropolitan Water District of Southern California, SacSewer, Restore the Delta, Shingle Springs Rancheria, ICF, Peggy Lehman Consulting, MLJ Environmental, Environmental Science Associates, Palencia Consult, BSA Environmental Services, Eutrophix, California Water Research, LimnoTech, Ag Innovations, Aquatic Sensors.

2027-T24 Genetics PWT

Chairs: Bryan Barney (CDFW), Evan Carson (USFWS) and Daphne Gille (DWR)

The Genetics PWT will provide a venue to communicate and coordinate current and proposed genetic activities in the SFE. Previously, a salmonid genetics PWT met to focus on coordinating research and monitoring of Central Valley salmon and steelhead genetics. Herein we propose to redirect and broaden the scope of the Salmon Genetics PWT to include genetic research and monitoring for any species found, at any point in its life cycle, in the San Francisco Estuary (SFE). Genetic analysis is a powerful and well-established tool that can be used to enhance the information content provided by existing monitoring programs and directly inform managers of biological effects from proposed and existing activities, such as restoration actions and modifications to water operations.

Organizations Involved: California State University Los Angeles, CDFW, Cramer Fish Sciences, DSC/DSP, DWR, FISHBIO, Metropolitan Water District of Southern California, Michigan State University, NOAA, Oregon State University, SacSewer, Southern California Coastal Water Research Program, UC Davis, UCLA, USBR, USFWS

2027-T25 Data Science PWT

Chairs: Rosemary Hartman (DWR) and Travis Hinkelman, Environmental Science Associates (ESA)

The Data Science PWT is a forum for IEP Scientists and their partners to share resources and skills for dealing with complex data sets. The PWT provides opportunities to teach advanced data science skills to new users, connect data scientists with subject-matter experts, provides a forum for feedback on draft analyses, and hosts a repository for resources. The team has quarterly meetings with a variety of presentations covering any aspect of statistics, data science, data analysis, and computer science, and also facilitates training in data science skills.

Organizations Involved: 34North, Balance Hydrodynamics, CDFW, CHWM Hill, Cramer Fish Sciences, City of San Diego, Contra Costa Water District, DSC/DSP, DWR, Environmental Science Associates, FlowWest, Metropolitan Water District of Southern California, NOAA, Oregon State University, San Francisco Estuary Institute, Stanford University, UC Berkeley, UC Davis, USBR, USEPA, USFWS, USGS, University of Washington, Valley Water, Water Boards

2027-T26 Climate Change PWT (Merged with EET PWT)

Chairs: Celeste Dodge (CDFW) and Denise Colombano (DSP)

In 2026, the Climate Change PWT merged with the EET. The EET is a forum providing a framework for addressing climate change and other broad ecological issues within the SFE. More specific technical issues can still be addressed by a CC MAST (Management, Analysis, and Synthesis Team) that would include selected EET members and outside experts who can commit to substantive work for the team as needed.

Organizations Involved: CDFW, DSC/DSP, DWR, FISHBIO, Metropolitan Water District of Southern California, NASA, SacSewer, UC Berkeley, UC Davis, USBR, USFWS, USGS, Westlands Water District

2027-T29 Zooplankton PWT

Chair: Christina Burdi (DWR)

The 2020-2024 IEP science strategy (Interagency Ecological Program 2019) recommends improved zooplankton monitoring as well as increased research into the growth, production, abundance, and biomass of zooplankton to restore food webs. The Zooplankton PWT is a forum for discussion and collaboration around issues of concern for zooplankton monitoring and research in the upper SFE. In addition to regular

meetings, the Zooplankton PWT also holds yearly symposiums based on identification, ecology, and utilization of emerging data.

Organizations Involved: CDFW, Cramer Fish Sciences, DSC/DSP, DWR, ICF, Metropolitan Water District of Southern California, San Francisco State University, UC Berkeley, UC Davis, USBR, USFWS, Water Boards

Dormant Project Work Teams

The following PWTs are currently dormant, if there is interest in reviving a specific team, please contact iep@wildlife.ca.gov.

2027-T12 Juvenile Monitoring PWT (Dormant)

The Juvenile Monitoring Project Work Team (JMPWT) is a satellite team of the Central Valley Salmonid Project Work Team. The goal of the JMPWT is to bring together biologists to collaborate in a manner that will benefit juvenile monitoring activities in the Central Valley. The specific objectives of the group include, but are not limited to, increase the quality and utility of juvenile monitoring data, standardize sampling techniques (where applicable), improve methods for analyzing and presenting monitoring data, identify research questions and data gaps, provide expert recommendation and/or review of issues affecting juvenile salmonids, and collaborate on data compilation projects in an effort to expand the knowledge of fisheries biology within the Central Valley of California. Team members currently include staff from the California Department of Fish and Wildlife and Water Resources, East Bay Municipal Utility District, United States Fish and Wildlife Service and Bureau of Reclamation, and various private consulting groups. Team meetings are held quarterly throughout the year.

2027-T13 Central Valley Salmonid Hatchery PWT (Dormant)

The Central Valley Hatchery Project Work team, a satellite team of the Central Valley Salmonid Project Work Team, facilitates communication and information exchange related to the propagation, marking and tagging, distribution, research, and monitoring of Chinook salmon and steelhead from Central Valley Hatcheries, including Livingston Stone National Fish Hatchery, Coleman National Fish Hatchery, Feather River Hatchery, Nimbus Fish Hatchery, Mokelumne River Hatchery, Merced River Hatchery, and the San Joaquin Conservation Hatchery. The team provides a forum for interagency coordination among hatchery managers and supervisors, and between hatchery managers and agency and stakeholder biologists involved in the management of Central Valley fisheries and recovery of listed stocks. The team will review issues related to Central Valley Hatchery production and discuss recommendations for improved hatchery management.

2027-T16 Upper Sacramento River Salmon PWT (Dormant)

Chair: Kevin Niemela (USFWS)

The Upper Sacramento River Monitoring Project Work Team mission statement is "to meet on an annual basis to facilitate communication and information exchange among

the agencies monitoring Chinook salmon and steelhead in the Upper Sacramento River Basin." Since its formation, we have extended data sharing to include Green Sturgeon studies and ecological monitoring in the Upper River. The team traditionally meets in March to coordinate exchange of study plans prior to the upcoming field season. In more recent years, at least half of the annual meeting has focused on informal oral presentations of the results of the monitoring activities from previous years. The annual meeting chair rotates each year among US Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife, National Marine Fishery Service, US Bureau of Reclamation, and the California Department of Water Resources. The year-to-year primary contact for the PWT is Matt Brown - USFWS, Red Bluff Fish and Wildlife Office.

2027-T18 Flow Alteration PWT (Dormant)

Chairs: Rosemary Hartman (DWR) and Marissa Wulf (USGS)

The Flow Alteration (FLOAT) Project Work Team is on hold indefinitely. The FLOAT PWT was a forum for communication and engagement on flow alterations being considered by management agencies to improve conditions for Delta Smelt. It provided opportunities for engagement with work being done by the Delta Coordination Group on the Summer-Fall Habitat Action, including Suisun Marsh Salinity Control Gates, Fall X2, and the North Delta Flow Action.