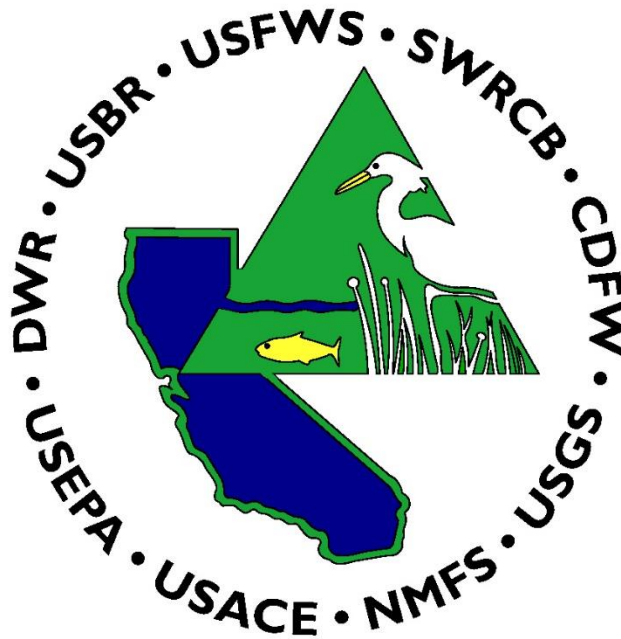


**INTERAGENCY ECOLOGICAL PROGRAM  
2023 ANNUAL WORKSHOP**

**MARCH 21-24, 2023**



**Interagency  
Ecological Program**

**COOPERATIVE ECOLOGICAL  
INVESTIGATIONS SINCE 1970**

### **2023 Workshop Planning Committee Co-Chairpersons**

Steven Culberson, Interagency Ecological Program (Lead Scientist)

Christine Joab, Interagency Ecological Program (Program Support Team)

### **2023 Workshop Planning Committee**

Adam Nanninga, U.S. Fish and Wildlife Service

Alex Parker, California State University, Maritime Academy

Anna Feerick, University of California, Davis

Brian Mahardja, Bureau of Reclamation

Brock Huntsman, United States Geological Survey

Elishebah Tate-Pulliam, California Sea Grant Fellow

Jordan Buxton, United States Geological Survey

Lynn Takata, Delta Science Program/Delta Stewardship Council

Shruti Khanna, Interagency Ecological Program

Stephanie Fong, Interagency Ecological Program

Steve Tsao, California Department of Fish and Wildlife

Ted Flynn, California Department of Water Resources

Vanessa Tobias, U.S. Fish and Wildlife Service

## **IEP Mission Statement**

The Interagency Ecological Program's mission is to provide and integrate relevant and timely ecological information for management of the Bay-Delta ecosystem and the water that flows through it. This is accomplished through collaborative and scientifically sound monitoring, research, modeling, and synthesis efforts for various aspects of the aquatic ecosystem. The IEP addresses high priority management and policy science needs to meet the purposes and fulfill responsibilities under State and Federal regulatory requirements. The IEP relies upon multidisciplinary teams of agency, academic, non-governmental agencies, and other scientists to accomplish its mission.

## **Interagency Ecological Program Science, Synthesis, Service**

## 2023 Theme – Community Collaborations

The 2023 IEP Workshop is acknowledging the hard work and efforts of the IEP community members through their participation in IEP Project Work Teams, as defined in our mission statement. So, this year’s workshop theme is highlighting the research being completed by these collaborative, community-based IEP Project Work Teams.

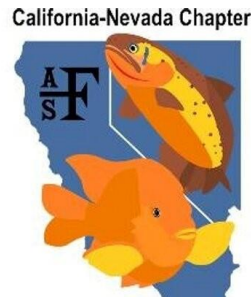
### IEP Community Statement

The Interagency Ecological Program celebrates equity, diversity, and inclusiveness. We embrace these pillars of excellence as crucial to healthy people and healthy communities. We welcome collaborative scientists of all affiliations and ask that you contribute within a spirit of supportive collegiality.

### Acknowledgement to IEP Workshop Partners

IEP Program Management and the IEP Workshop Planning Committee wish to extend a wholehearted “Thank You!” to our workshop partners. The State Water Contractors are supporting this year’s Student-Mentor Luncheon and will be providing a nourishing lunch to our hungry mentors and mentees as they discuss their career aspirations and pathways!

IEP Program Management would also like to extend thanks to the Executive Management leaders of the Cal-Neva Chapter of the American Fisheries Society, whose partnership has assisted IEP in securing poster boards for the workshop poster session.



### COVID Safety Guidelines

The California Natural Resources Agency follows COVID-19 health and safety measures set by the [Sacramento County Public Health Office](#). There is no mandate that requires masks be worn inside the building. However, it is highly recommended to wear masks in crowded indoor public places. For more information on how to protect yourself and others, review the [guidelines from the Centers for Disease Control](#).

We strongly encourage participants who don’t feel well or who are sick to stay home and watch the workshop remotely.

# To Our Attendees

Welcome and thank you for your interest in attending the 2023 IEP Annual Workshop!

## Workshop Format and Registration

The workshop is a free, hybrid event that will be held in the California Natural Resources Agency building (715 “P” Street, Sacramento) on March 21 through March 23, 2023.

Live workshop presentations will be held in the auditorium (North Lobby, 1st floor) on March 21-23. Registration for in-person seating is required as seating is limited. The registration link can be found on the [IEP Workshop web page](#). Registration will open in late February.

The California Department of Fish and Wildlife will be live-streaming the presentations via Zoom for those unable to attend in-person. The link will cover the entire 3-day workshop. Registration for remote viewing is required. The registration link can be found on the [IEP Workshop web page](#). Registration will open in late February.

Workshop posters will be shown on 2<sup>nd</sup> floor in conference rooms 2-221 A-C. An overflow seating area is available next to the posters in room 2-221A and will allow participants to sit and watch the livestream of presentations. No registration is required to view the posters or sit in the overflow area.

## Early Career Luncheon

An Early Career Luncheon will take place March 21 for students and early career scientists. Mentees will discuss career pathways with career professionals. Registration (separate from the regular workshop registration) is required to participate as seating is limited. The registration link can be found on the [IEP Workshop web page](#). Registration will open in late February.

## IEP Training Courses

Two IEP training courses will be held on March 24 from 9:00 a.m. – 12:00 p.m. Registration (separate from the regular workshop registration) is required as seating is limited. The registration link can be found on the [IEP Workshop web page](#). Registration will open in late February. More information on the course, instructor, and prerequisites can also be found on the IEP Workshop web page.

- Introduction to GIS with QGIS
- Introduction to hierarchical models in R with application to abundance modeling

## Next Year’s Workshop

Do you have an idea for a future workshop theme or session topic? Are you interested in volunteering to help plan the 2024 IEP Annual Workshop? Send your name to [iep@wildlife.ca.gov](mailto:iep@wildlife.ca.gov). Our first planning meeting will begin in August/September 2023. Announcements will also be sent via the IEP Workshop email listserv, so make sure to [subscribe](#).

# DAY 1: Tuesday, March 21

## REGISTRATION CHECK-IN

**Auditorium Lobby**

**7:30 am – 8:30 am**

## SESSION 1 – WELCOME AND PLENARY

**Moderator:**

**8:30 am – 9:30 am**

Steven Culberson, Interagency Ecological Program

7:30am-8:30am      Registration Check-In

8:30am-8:42am      Who's Prioritizing Our Priorities  
Steven Culberson, Interagency Ecological Program

8:42am-9:06am      Building on the IEP Foundation: Stewarding our Partnerships to Advance  
Science as a Service  
Louise Conrad, California Department of Water Resources (Lead Scientist)

9:06am-9:30am      Floods, Droughts, and Climate Change, Oh My!  
Jay Lund, University of California, Davis

## BREAK

9:30am-9:50am      20-MINUTE BREAK

## SESSION 2 – DELTA SMELT EXPERIMENTAL RELEASE

**Moderators:**

**9:50 am – 11:30 am**

Katherine Sun, U.S. Fish and Wildlife Service

Brian Schreier, California Department of Water Resources

9:50am-10:10am      Experimental Release Overview and Future Plans  
Katherine Sun, U.S. Fish and Wildlife Service

10:10am-10:30am      Soft Release Design, Planning, and Initial Observations  
Brian Schreier, California Department of Water Resources

10:30am-10:50am      Fish Behavior During Delta Smelt Experimental Releases Inferred from  
ARIS Sonar  
Fred Feyrer, United States Geological Survey

10:50am-11:10am      Enclosure Studies Informing Experimental Release  
Trishelle Tempel, California Department of Water Resources  
Brittany Davis, California Department of Water Resources

11:10am-11:30am CDFW Monitoring Design Review and Fall Midwater Trawl Survey Updates  
Steve B. Slater, California Department of Fish and Wildlife

### **Session 3 – POSTER SESSION**

**Moderators:** **11:30 am – 12:30 pm**

Jordan Buxton, United States Geological Survey  
Anna Feerick, University of California, Davis

11:30am-12:30pm 2<sup>nd</sup> Floor Conference Rooms 2-221 B and C

### **LUNCH BREAK**

12:30pm-2:00pm **Early Career Luncheon:** Registered attendees only

12:30pm-2:00pm **Regular Lunch:** Area Restaurants - On Your Own

### **SESSION 4 – LIGHTNING TALKS**

**Moderators:** **2:00 pm – 3:20 pm**

Lynn Takata, Delta Science Program/Delta Stewardship Council  
Elishebah Tate-Pulliam, California Sea Grant State Fellow

2:00pm-2:05pm Mercury from Space: Remote-Sensing Based Proxy Models for Mercury Retrievals in the San Francisco Bay Delta  
Dulcinea Avouris, University of California, Merced

2:06pm-2:11pm The 2022 Cyanobacterial Bloom in Franks Tract  
Keith Bouma-Gregson, United States Geological Survey

2:12pm-2:17pm Comparing Food-Webs in Restored and Reference Tidal Marshes using Stable Isotope Techniques  
Megan Pagliaro, University of California, Berkeley

2:18pm-2:23pm Reintroduction of Spring-Run Chinook Salmon in the San Joaquin River: Evaluating Efficacy of Decision-Making in the Captive Breeding Program  
Kasey Pregler, University of California, Berkeley, Department of Environmental Science, Policy & Management

2:24pm-2:29pm Examining Phenological Shifts and Potential for Trophic Mismatches Across Multiple Estuaries  
Robert Fournier, University of California, Berkeley, Department of Environmental Science, Policy, and Management

- 2:30pm-2:35pm Quantifying the Evolutionary Potential for Delta Smelt Persistence in a Warming Habitat  
Joanna Griffiths, University of California, Davis, Department of Environmental Toxicology
- 2:36pm-2:41pm Sub-Surface Chlorophyll in the Northern San Francisco Estuary  
Reed Hoshovsky, Wilkerdale Lab, Estuary and Ocean Science Center, San Francisco State University
- 2:42pm-2:47pm Fitness Tradeoffs for Migratory and Resident Delta Smelt in the San Francisco Estuary  
Leticia Cavole, Otolith Geochemistry and Fish Ecology Laboratory, University of California, Davis
- 2:48pm-2:53pm Years of Drought and Salt: Decreasing Flows Determine the Distribution of Zooplankton Resources in the Estuary  
Christina Burdi, California Department of Fish and Wildlife
- 2:54pm-2:59pm A Multiparameter Approach to Modeling Light Attenuation in the Delta  
Emily Richardson, United States Geological Survey
- 3:00pm-3:05pm Message in a Bottle: eDNA Metabarcoding to Complement Existing Monitoring of Fishes and Invertebrates in the Bay-Delta  
Ravi Nagarajan, Genomic Variation Laboratory, University of California Davis, Department of Animal Science
- 3:06pm-3:11pm Should IEP use ExCell Plus as a Fixative?  
Christian Denney, University of California, Davis
- 3:12pm-3:17pm Near-Term Prediction of Fish Movement, Guidance, and Entrainment in Water Management Operations Across Different Reservoir and Tidal River Environments  
R. Andrew Goodwin, U.S. Army Engineer Research and Development Center, Environmental Laboratory, U.S. Army Corps of Engineers

## **BREAK**

3:20pm-3:40pm 20-MINUTE BREAK

## **SESSION 5 – SYNTHESIS TEAM**

**Moderator:**

**3:40 pm – 5:00 pm**

Rosemary Hartman, California Department of Water Resources

3:40pm-4:00pm The Phytoplankton Enumeration Synthesis Project: Synthesizing Phytoplankton Datasets in the San Francisco Bay Delta  
Sarah Perry, California Department of Water Resources

- 4:00pm-4:20pm      Amazing Graze – Responses of *Maeotias* and *Potamocorbula* to Flow and Drought  
 Laura Twardochleb, California State Water Resources Control Board  
 Rosemary Hartman, California Department of Water Resources
- 4:20pm-4:40pm      Ecosystem Restoration Progress Review for the Delta and Suisun Marsh  
 Daniel Constable, Delta Stewardship Council (presenting author)  
 Dylan Chapple, Delta Stewardship Council (corresponding author)
- 4:40pm-5:00pm      Structured Decision Making for Delta Smelt Habitat – Synthesizing Multiple Streams of IEP Data to Inform Management  
 Brittany Davis, California Department of Water Resources  
 Rosemary Hartman, California Department of Water Resources

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## DAY 2: Wednesday, March 22

### REGISTRATION CHECK-IN

**Auditorium Lobby** **7:30 am – 8:30 am**

### SESSION 6 – WATER QUALITY & PHYTOPLANKTON

**Moderators:** **8:30 am – 9:50 am**

Keith Bouma-Gregson, U.S. Geological Survey  
 Janis Cooke, Central Valley Regional Water Quality Control Board

- 8:30am-8:50am      Phytoplankton Community Here and There: Comparison of 1 Meter Depth and Surface Water Samples  
 Tiffany Brown, California Department of Water Resources
- 8:50am-9:10am      Nutrients Before and After the Regional San Upgrade  
 Brian Bergamaschi, United States Geological Survey
- 9:10am-9:30am      Cyanobacteria and Nutrient Dynamics in the Stockton Deep Water Ship Channel  
 Ellen Preece, Robertson-Bryan, Inc.  
 (current affiliation: California Department of Water Resources)
- 9:30am-9:50am      Development of a Coordinated Partner HABs Monitoring Strategy  
 Tricia Lee, Delta Science Program/Delta Stewardship Council



## SESSION 7 – POSTER SESSION

### Moderators:

9:50 am – 11:10 am

Jordan Buxton, United States Geological Survey  
Anna Feerick, University of California, Davis

9:50am-11:10am 2<sup>nd</sup> Floor Conference Rooms 2-221 B and C

## SESSION 8 – ZOOPLANKTON IN THE SAN FRANCISCO ESTUARY

### Moderator:

11:10 am – 12:30 pm

Sam Bashevkin, State Water Resources Control Board  
Christina Burdi, California Department of Fish and Wildlife

- 11:10pm-11:30pm Assessing Phenological Shifts in Zooplankton and Forage Fishes with Dynamic Linear Models  
Denise Colombano, University of California, Berkeley
- 11:30pm-11:50pm Zooplankton Transport in the Cache Slough Complex  
Charlie Norton, San Francisco State University
- 11:50pm-12:10pm Directed Outflow Project Lower Trophic Study  
Calvin Lee, ICF
- 12:10pm-12:30pm Using High-Throughput Sequencing to Determine the Diets of the Copepods *Eurytemora carolleeae* and *Pseudodiaptomous forbesi*  
Amy Wong, San Francisco State University

## LUNCH BREAK

12:30pm-2:00pm **Regular Lunch:** Area Restaurants - On Your Own

## SESSION 9 – WETLAND BUGS AND FISH

### Moderator:

2:00 pm – 3:20 pm

Stacy Sherman, California Department of Fish and Wildlife

- 2:00pm-2:20pm Environmental Drivers and Correlates of Invertebrate Communities in Restored Tidal Wetlands  
Gabriel Ng, California Department of Fish and Wildlife
- 2:20pm-2:40pm Trophic Complexity and Prey Productivity: Food for Thought in Delta Wetland Restorations  
Susan De La Cruz, United States Geological Survey
- 2:40pm-3:00pm If you Build It, Will They Come? Controls on Salmon Use of Estuarine Habitat Downstream of the Delta  
Brett Harvey, California Department of Water Resources

3:00pm-3:20pm Fish Response to Nutrient Export from Managed Wetlands  
Randy Mager, California Department of Water Resources

**BREAK**

3:20pm-3:40pm 20-MINUTE BREAK

**SESSION 10 – ESTABLISHED AND NEW AQUATIC PLANT INVADERS IN THE BAY-DELTA**

**Moderators:** **3:40 pm – 5:00 pm**

Shruti Khanna, Interagency Ecological Program  
Nicholas Rasmussen, California Department of Water Resources

3:40pm-3:56pm Updates from the Aquatic Vegetation Project Work Team  
Shruti Khanna, Interagency Ecological Program  
Nicholas Rasmussen, California Department of Water Resources

3:56pm-4:12pm Controlling Invasive *Phragmites australis* at a Restoration Site in Suisun Marsh  
Madison Thomas, California Department of Water Resources

4:12pm-4:28pm Ecosystem Engineering Impacts of Water Primrose in the Delta  
Bailey Morrison, University of California, Merced

4:28pm-4:44pm Spilling the Allelopathic “Tea”: The Potential Role of Allelochemicals in Water Primrose Invasion of the Delta  
Michael Gross, United States Geological Survey

4:44pm-5:00pm Status Update on Ribbonweed (*Vallisneria australis*), a Recently Identified Aquatic Weed in the Delta  
Nicholas Rasmussen, California Department of Water Resources



**Day 3: Thursday, March 23**

**REGISTRATION CHECK-IN**

**Auditorium Lobby** **7:30 am – 8:30 am**

**SESSION 11 – STURGEON**

**Moderators:** **8:30 am – 9:50 am**

John Kelly, California Department of Fish and Wildlife  
Alicia Seesholtz, California Department of Water Resources

- 8:30am-8:50am 2016-2019 Upper Sacramento River Juvenile Green Sturgeon Outmigration Investigation  
Josh Gruber, U.S. Fish and Wildlife Service
- 8:50am-9:10am Annual Recruitment and Movement Patterns of Juvenile Southern Distinct Population Segment in the Lower Sacramento River and Sacramento-San Joaquin Delta  
Marc Beccio, California Department of Fish and Wildlife
- 9:10am-9:30am Sturgeon Abundance Trends and Recent Mortality in the San Francisco Estuary  
Dylan K. Stompe, California Department of Fish and Wildlife
- 9:30am-9:50am Diversity in Habitat Use by White Sturgeon Revealed Using Fin Ray Geochemistry  
Kirsten Sellheim, Cramer Fish Sciences

### Break

9:50am-10:10am 20-MINUTE BREAK

## SESSION 12 – DIVERSITY OF FISHES OF THE SAN FRANCISCO ESTUARY

**Moderator:** **10:10 am – 11:30 am**

Adam Nanninga, United States Fish and Wildlife Service

- 10:10am-10:30am Supplementing Beach Seine Surveys with Boat Electrofishing to More Comprehensively Monitor Littoral Delta Habitats  
Eric Huber, U.S. Fish and Wildlife Service
- 10:30am-10:50am Hitch in the Yolo Bypass  
Emily Hubbard, California Department of Water Resources
- 10:50am-11:10am eDNA  
Scott Blankenship, Cramer Fish Sciences
- 11:10am-11:30am Variability in Coastal Habitat Available for Longfin Smelt *Spirinchus thaleichthys* in the Northeastern Pacific Ocean  
Matt Young, United States Geological Survey

## SESSION 13 – CENTRAL VALLEY STEELHEAD POPULATION DYNAMICS: FISHERY TRENDS, MONITORING INSIGHTS, AND MODELLING

**Moderators:** **11:30 am – 12:50 pm**

Mike Beakes, Bureau of Reclamation  
Robyn Bilski, California Department of Fish and Wildlife

- 11:30am-11:50am Trends in the Central Valley *O. mykiss* Fishery as Determined through Angler Derived Data  
Erin Ferguson, California Department of Fish and Wildlife
- 11:50am-12:10pm Use the Right Tool for the Job: Monitoring Focused on *Oncorhynchus mykiss* in the Stanislaus River Reveals Critical Life History Information  
Steve Zeug, Cramer Fish Sciences
- 12:10pm-12:30pm Monitoring Steelhead in the Stanislaus River: Methods, Challenges, and Insights  
Michael Hellmair, FISHBIO
- 12:30pm-12:50pm A Meta-Analysis of *Oncorhynchus mykiss* Habitat Use and Ontogenetic Niche Shifts Incorporating Geographic Variability  
Lauren Diaz, Oregon State University

### **LUNCH BREAK**

- 12:50pm-2:00pm **Regular Lunch:** Area Restaurants - On Your Own

### **SESSION 14 – FROM MONITORING TO MANAGEMENT OF CENTRAL VALLEY SPRING-RUN CHINOOK SALMON**

**Moderators:** **2:00 pm – 3:20 pm**

Flora Cordoleani, UC Santa Cruz & NOAA Southwest Fisheries Science Center  
Ryan Revnak, California Department of Fish and Wildlife

- 2:00pm-2:20pm Juvenile Spring-Run Chinook Salmon Feeding and Growth Patterns in the Butte Sink and Sutter Bypass  
Eric Holmes, University of California, Davis
- 2:20pm-2:40pm Collaborating, Coordinating, Compatibilizing, and Computing: Progress Toward Producing a Spring-Run JPE  
Brett Harvey, California Department of Water Resources
- 2:40pm-3:00pm Genetic Monitoring of Central Valley Chinook Salmon: Patterns, Challenges, and Opportunities  
Jeff Rodzen, California Department of Fish and Wildlife
- 3:00pm-3:20pm Models and Methods for Estimating Abundance of Juvenile Spring-Run Chinook Salmon Passing Chipps Island  
Russ Perry, United States Geological Survey

### **BREAK**

- 3:20pm-3:40pm 20-MINUTE BREAK

## SESSION 15 – PREYING FOR A MEAL: PREDATION STUDIES IN THE DELTA AND ITS WATERSHEDS

### Moderators:

3:40 pm – 5:00 pm

Geoffrey Steinhart, U.S. Fish and Wildlife Service

Tyler Pilger, FISHBIO

3:40pm-4:00pm      Understanding Predators to Better Understand Predation  
Tyler Pilger, FISHBIO

4:00pm-4:20pm      An Evaluation of Predation Risk at a Temporary Salinity Barrier  
Paul Bergman, Environmental Science Associates  
Andrew Kalmbach, ICF

4:20pm-4:40pm      Experimental Measurement of Fish Predation in a Restored Wetland  
David Ayers, University of California, Davis

4:40pm-5:00pm      The Impact of Submerged Vegetation Removal on Fish Predation  
Cyril Michel, UC Santa Cruz & NOAA Southwest Fisheries Science Center

### CLOSING ANNOUNCEMENT & AWARDS

5:00pm-5:15pm      Closing remarks & best presentation and poster awards

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## DAY 4: Friday, March 24

Registration separate from the regular workshop is required to attend these training courses. Seating is limited. More information on the course, instructor, and prerequisites along with the registration link can be found on the [IEP Workshop web page](#). Registration will open in late February.

### TRAINING COURSES

9:00am-12:00pm

#### TRAINING COURSE 1 – INTRO TO GIS USING QGIS SOFTWARE

**Instructor:** [Michele Tobias](#), University of California, Davis Data Lab: Data Science & Informatics

**Location:** CNRA Building, 715 “P” Street, Sacramento, CA 2<sup>nd</sup> floor Conference Room 2-309

**Course Description:** An introductory-level workshop that focuses on the fundamental concepts and skills needed to explore and analyze data using Geographic Information Systems (GIS) software with examples using the QGIS platform.

## TRAINING COURSE 2 – INTRODUCTION TO HIERARCHICAL MODELS IN R WITH APPLICATION TO ABUNDANCE MODELING

**Instructor:** [Brock Huntsman](#), United States Geological Survey

**Location:** CNRA Building, 715 “P” Street, Sacramento, CA 2<sup>nd</sup> floor Conference Room 2-301

**Course Description:** An advanced-level course that introduces the concept of hierarchical models and how to use them to answer different ecological questions. The course will focus specifically on using these tools to develop models commonly used to evaluate population and community structure that address issues created by imperfect catchability/detection efficiency. Data simulations will be used to generate data with known parameter estimates for students to explore the “nuts and bolts” of statistical framework to better understand how to analyze survey data commonly collected by fisheries scientists.