THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

# Committee Item
INFORMATION

***Subcommittee on Imported Water***

7/28/2026 Subcommittee Meeting

**3a**

## Subject

2025 Scientific Achievements Report

## Executive Summary

The attachment to this report provides a summary of Metropolitan's Bay-Delta scientific accomplishments in Calendar Year 2025. This is the annual report intended to update the Board on the science achievements of the Bay-Delta Initiatives (BDI) group.

## Attachments

**Attachment 1: 2025 Bay-Delta Scientific Achievements Report**

## Details and Background

Science plays a key role in managing the reliability and sustainability of Metropolitan's water resources. With the use of research, Metropolitan is leading the way in water management and informing our policy decisions, regional planning, and regulatory compliance. This is especially important in the Sacramento-San Joaquin Delta. State and federal regulatory permits use the best available science to set goals and objectives related to water operations, water quality, and ecosystem habitat. Science is also used to support flexible and adaptive management of water. In 2025, scientists from Metropolitan participated in an evaluation of potential summer and fall water operations that resulted in a water savings of approximately 105 thousand acre-feet for the State Water Project in wet- and above-normal water year types. Metropolitan's science program seeks grants to support the work as well as partnering with other entities to ensure costs are shared equitably. In 2025, Metropolitan's research budget was approximately $2.5 million, which enabled more than $8 million of research to be conducted. Attached to this board report are summaries (**Attachment 1**) that highlight some of the key accomplishments of BDI science programs culminating in 2025.

**Attachment 1 – 2025 Scientific Achievements Report**

THE METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

# 2025 Scientific Achievements Report

## Bay-Delta Initiatives

*THE METROPOLITAN WATER DISTRICT*
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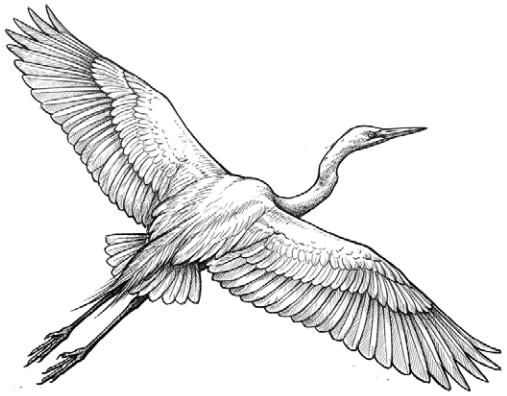
**July 2026**

# Leveraging Science for Sustainable, Resilient Water Management

Science plays a key role in managing the reliability and sustainability of Metropolitan's water resources. With the use of research, we are leading the way in water management and informing our policy decisions, regional planning, and regulatory compliance with science. We work with our partners to tackle shared challenges.

This is critically important in the Sacramento-San Joaquin Delta, the heart of California's water delivery system and home to a vital ecosystem. Metropolitan-owned lands in the Delta – Webb Tract, Bacon Island, Bouldin Island and Holland Tract – allow us to continue exploring ways Metropolitan can work collaboratively to improve the Delta's declining ecosystem and promote water reliability in a living laboratory.

State and federal regulatory documents such as biological opinions, permits, and water quality control plans use the best-available science to manage this balance between the needs of the environment and the needs of communities up and down the state. For example, data on species populations, habitats, and environmental conditions help predict how changes in water flow, temperature, and salinity affect ecosystems. Science also supports the flexibility of water operations in the Delta, adapting operational rules based on real-time data and new findings, encouraging collaboration across agencies.



# Advancing Science and Collaboration: 2025 Highlights of Bay-Delta Initiatives

This report showcases **Bay-Delta Initiatives' (BDI)** scientific achievements in 2025. **BDI** is dedicated to supporting data-driven water management decisions in California through focused research, collaboration, innovative tools, and active involvement in regulatory processes. By partnering with non-profit and private organizations, state and federal agencies, academia, and other stakeholders, **BDI** helps improve results, build understanding of science and data, reduce Metropolitan's costs, better reflect diverse perspectives, and support broad acceptance of project outcomes.

The team shares their findings on an ongoing basis in various formats, including presentations at meetings, symposia, conferences, and publications in peer-reviewed journals. They also organize project tours with external agencies to foster an exchange of knowledge and ideas.

This report highlights key projects from 2025 that exemplify **BDI**'s commitment to collaboration, innovation, and scientific rigor.

Looking ahead, **BDI** plans to expand its scientific efforts, explore new research opportunities, and extend its impact. This includes improving public outreach through updated communication materials, like a revamped website and engaging fact sheets, while ensuring research findings are clear and actionable for diverse audiences.

For more information, contact Maureen Martin at **mmartin@mwdh2o.com**.

## RESEARCH PROJECTS: 15

**Bouldin:** Pond Harvest, Fit for the Wild, Tagging, Floating Wetlands

**Contaminants:** Summer Toxicity, Bayesian Network Relative Risk Model Response Spectrum

**Zooplankton:** Machine Learning ID, Aquatic Weed Control

**Salmon:** Response to Recovery, VOI Redd Dewatering, Collaboration for Equity in Water Allocation Salmon Case Study, Spatial Stream Network Model

**Smelt:** Larval Entrainment Survey, Longfin and Flows

## PRESENTATIONS: 13 TALKS AND 2 POSTERS

**Interagency Ecological Program Workshop:** Larval Entrainment Study, Longfin and Outflow, Fate and Transport of Organic Contaminants, Framework for Juvenile Production Estimate, Sublethal Effects of Dichlorophenyldichloroethylene, Pesticide Residues, Value of Information for Fall X2 = 7 talks

**North American Society of Toxicology and Chemistry**

**Biennial Conference of Science & Management on the Colorado Plateau & Southwest Region:** Value of Information.

## PUBLICATIONS: 6

**"Development of a fipronil insecticide response spectrum model for juvenile Chinook salmon (Oncorhynchus tshawytscha)"** KE Huff Hartz, KJ Knaub, L Cominassi, GS Molinari, SD Power, M Arkles, SDM Chinthaka, A Chandler, M Habibullah-Al-Mamun, G Whitledge, and A Segarra, Environmental Pollution 385, 127122

**"Using a critical body residue approach to assess the acute toxicity of a pesticide mixture to juvenile Chinook salmon (Oncorhynchus tshawytscha)"** KE Huff Hartz, M Arkles, KJ Knaub, SD Power, GS Molinari, SDM Chinthaka, G Whitledge, A Segarra, RE Connon, S Acuña, and MJ Lydy, Environmental Pollution 382, 126709

**"Influence of an impacted estuary on the reproduction of an endangered endemic fish"** CY Lee, S Acuña, BG Hammock, AG Smith, JL Hassrick, S Teh, Science of The Total Environment 959, 178123

**"Water quality and zooplankton data from the floating wetland experiment on bouldin island in the Sacramento-San Joaquin Delta, California"** JM Buxton, FV Feyrer, S Acuña, US Geological Survey Data Release, 439

**"Environmental characteristics of select managed ponds in the Sacramento–San Joaquin Delta — Implications for native fish conservation and research"** FV Feyrer, S Acuña, JM Buxton, ER Enos, ML Hladik, J Orlando, MJ Young, Open-File Report

# Delta Smelt and Native Species Preservation Project

Metropolitan is leading a collaborative effort to preserve Delta smelt and native species in partnership with state and federal agencies and the University of California, Davis. This multi-agency collaboration also helps support the recovery of the Delta smelt population by using innovative and cost-effective breeding methods while gaining strong support from NGOs, academics, and government agencies.

In addition, this project helps to meet permit requirements, including those for the 2024 federal Biological Opinions and state Incidental Take Permit, to support fish populations.

Multiple projects have demonstrated the viability of raising Delta smelt in low-cost pond cultures. Metropolitan staff are developing opportunities for agencies to further invest in the use of Metropolitan's Delta Islands for expanding the hatchery for Delta smelt.

## KEY OBJECTIVES

Metropolitan is helping to provide research and information to help the U.S. Bureau of Reclamation meet the following objectives:

- Enhance breeding methods to support the survival, spawning, and population growth of Delta smelt.
- Achieve a production goal of 350,000 fish annually by 2030, up from the current 100,000 fish in 2024.

For more information, view this video: https://www.youtube.com/watch?v=-_XSOLt7FFQ

**Did you know?** Metropolitan is the first water agency to culture Delta smelt.

**Next Steps:** Develop impoundment designs for expansion of the Delta smelt hatchery onto Bouldin Island and continue research to optimize the production and survival of Delta smelt for release into the wild.

Deployment of Delta smelt into West Bouldin Pond after harvesting from the culture pond.

# Pesticide Risk Model

Contaminants are a ubiquitous hazard risk for aquatic species in the Delta and its watershed. It is known that contaminants such as pesticides enter the Delta routinely and, according to the Delta Independent Science Board (2018), may be a significant threat to species like Delta smelt and Chinook salmon.

With the multitude of stressors, such as predation, high temperatures, and invasive species, it is difficult to attribute the scope of the effect specifically from contaminants. A recent development in collaboration with Metropolitan staff in statistical modeling has allowed researchers to create a framework to organize and systematically test the effect size of the multitude of stressors on listed species. In collaboration with Western Washington University, with support from the Department of Pesticide Regulation, Department of Fish and Wildlife, State Water Contractors, and the Delta Science Program, a model was developed that can determine the significance of the effect of contaminants on species in the Delta.

The Delta Bayesian Network Relative Risk Model was built by Dr. Wayne Landis and his colleagues Emma Sharpe and Steven Eikenberry. It has identified five contaminants of significant hazard to Delta smelt – bifenthrin, chlorpyrifos, malathion, diazinon, and mercury. The model is housed on the website Bay Delta Live and can be run using current use pesticide data.

## KEY OBJECTIVE

- Prioritize contaminants to be reduced for the protection of Delta smelt.

Bay Delta Live:
https://baydeltalive.com/home/new-homepage

**Did you know?** Similar models identified that water runoff from roads was killing Coho salmon in Washington.

**Next Steps:**

- Publish the Delta smelt model
- Develop the Chinook salmon model

Photo courtesy of California Department of Water Resources

# Summer Fall Outflow Structured Decision Making

In spring 2025, Metropolitan collaborated with the U.S. Geological Survey and other state and federal partners to re-evaluate how we manage water for the endangered Delta smelt. For years, a "fall X2" action required releasing significant amounts of water during the fall months to create habitat. However, recent findings from the U.S. Fish and Wildlife Service indicated this costly action was not producing the expected survival benefits for the fish. A study was launched to find a better way forward, specifically testing the hypothesis that shifting those water releases to the summer might be more effective.

The team evaluated several scenarios and discovered that while summer outflows might help the smelt more than fall X2, they came with very high costs. Summer action will incur not only water supply cost but may also unintentionally harm other protected species like Chinook salmon and steelhead by depleting the cold water they need to survive. Ultimately, these findings provided the scientific basis to not pursue the summer X2 action and to off-ramp the fall X2 action, resulting in an average water savings of 105,000 acre-feet per year. At the same time, researchers are exploring smarter, more cost-effective and balanced alternatives like aquatic weed control to protect fish without sacrificing California's water reliability.

**KEY OBJECTIVE**

- Evaluate alternative action to fall X2 for the protection of Delta smelt while avoiding impacts to Chinook salmon.

For more information, see published report here: https://doi.org/10.3133/ofr20251055

**Did you know?** Maintaining "cold-water pools" in reservoirs like Oroville and Shasta is necessary to ensure that river water stays cool enough for salmon and steelhead to survive the summer heat.

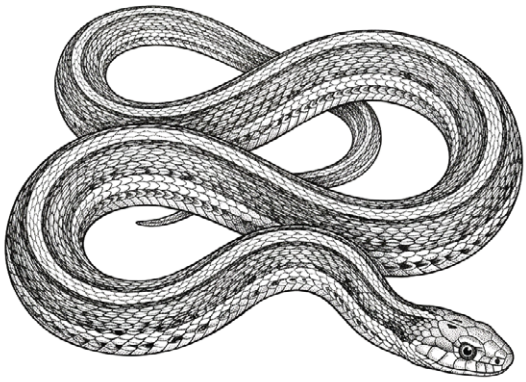
**Next Steps:** Metropolitan staff continue to explore non-flow actions for Delta smelt, as it may aid species recovery without affecting water supply.

Suisun Marsh in the Bay-Delta.
Photo courtesy of Brian Mahardja

# Multi-Benefit Landscape Restoration on Webb Tract

Metropolitan's Webb Tract Rice Conversion and Wetland Restoration Projects will transform a deeply subsided island in the Delta from its existing agricultural use to a more sustainable mosaic of rice farming, wetlands, and high-quality habitat. These projects are made possible by a $20.9 million grant from the Sacramento-San Joaquin Delta Conservancy as part of its Nature-Based Solutions: Wetlands Restoration Grant Program. Land leveling for the rice project is expected to begin summer 2026, with the first rice crop expected in 2027.

The Wetland Restoration Project is in the final stages of the planning and design phase, with construction planned to begin in summer 2026. The Wetland Project received an expedited California Environmental Quality Act Statutory Exemption for Restoration Projects under Gov. Gavin Newsom's Cutting the Green Tape Initiative and has received all permits for the project, including the California Department of Fish and Wildlife Service Restoration Management Permit, U.S. Fish and Wildlife Service Programmatic Biological Opinion, State Water Resources Control Board 401 Water Quality Certification and the U.S. Army Corps of Engineers Clean Water Act 404 Permit. The planned project creates nearly 3,000 acres of wetland that provides diverse habitats for a wide range of plant and animal species.



## KEY OBJECTIVES

- Reverse island subsidence while restoring and enhancing wetland habitat.
- Reduce greenhouse gas emissions and increase carbon sequestration.

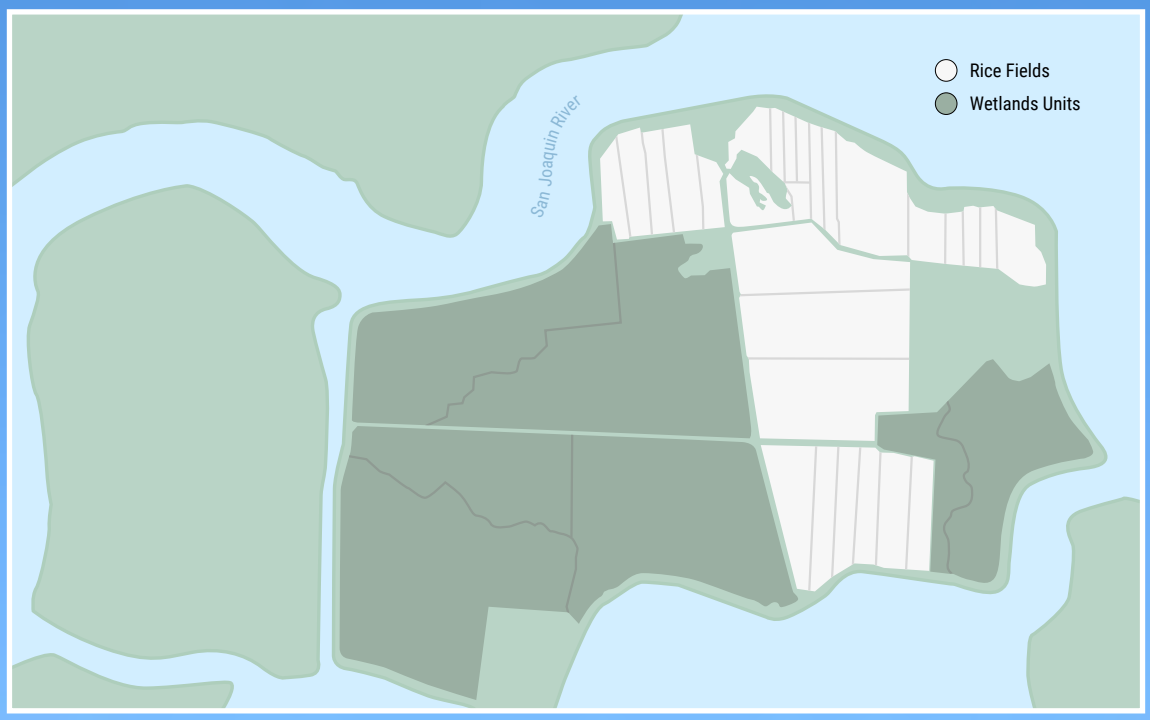
For more about the Webb Tract project. **https://www.mwdh2o.com/securing-our-imported-supplies/state-water-project/sacramento-san-joaquin-delta/**

**Did you know?** Giant garter snakes, which can be found on Webb Tract, are listed as a threatened species under both the state and federal Endangered Species acts. The Webb Tract Wetland Restoration Project will provide new habitat for the snake.

**Next Steps:** Metropolitan's board will consider the award of construction contracts in July 2026. Construction is expected to begin in late summer 2026, with wetland completion expected in fall 2028.

Webb Tract

## WEBB TRACT PROJECTS MAP




# Upper Watershed Forest Health Pilot Investigations

In early 2025, Metropolitan entered into agreements to provide funding for three pilot investigations associated with forest restoration programs in the northern Sierra. These pilot investigations are meant to evaluate the cost-effectiveness and potential benefits of improved forest health on water supply resilience and water quality for Metropolitan and other water agencies across the state.

The forest restoration programs are being funded through a new finance model known as a Forest Resilience Bond, and are managed by the non-profit Blue Forest, which was founded to advance restoration projects through partnerships. The financing mechanism combines public and private funding to expedite restoration efforts that otherwise could take decades to advance.

## PROJECTS

### North Feather

The North Feather project brings together a diverse coalition of organizations to finance the acceleration of forest restoration in an area of the Feather River Watershed heavily impacted by the 2021 Dixie Fire. This project aims to restore forest health and reduce the risk of catastrophic wildfires, protecting communities and creating a more resilient landscape and water supply. The North Feather I Forest Resilience Bond officially launched in December 2024, and preliminary work began under a federal emergency authorization. Additional work on the larger project footprint began in July 2025.

### Plumas Community Protection

The Plumas Community Protection project will aid in the protection of communities, water supply, water quality, and biodiversity in the upper Feather River Watershed. Forest health projects implemented in watersheds upstream of the Delta may help support long-term sustainability, protect key species and habitats, and contribute to climate change adaptation of the State Water Project. Work began on the Plumas Community Protection I Forest Resilience Bond in fall 2025.

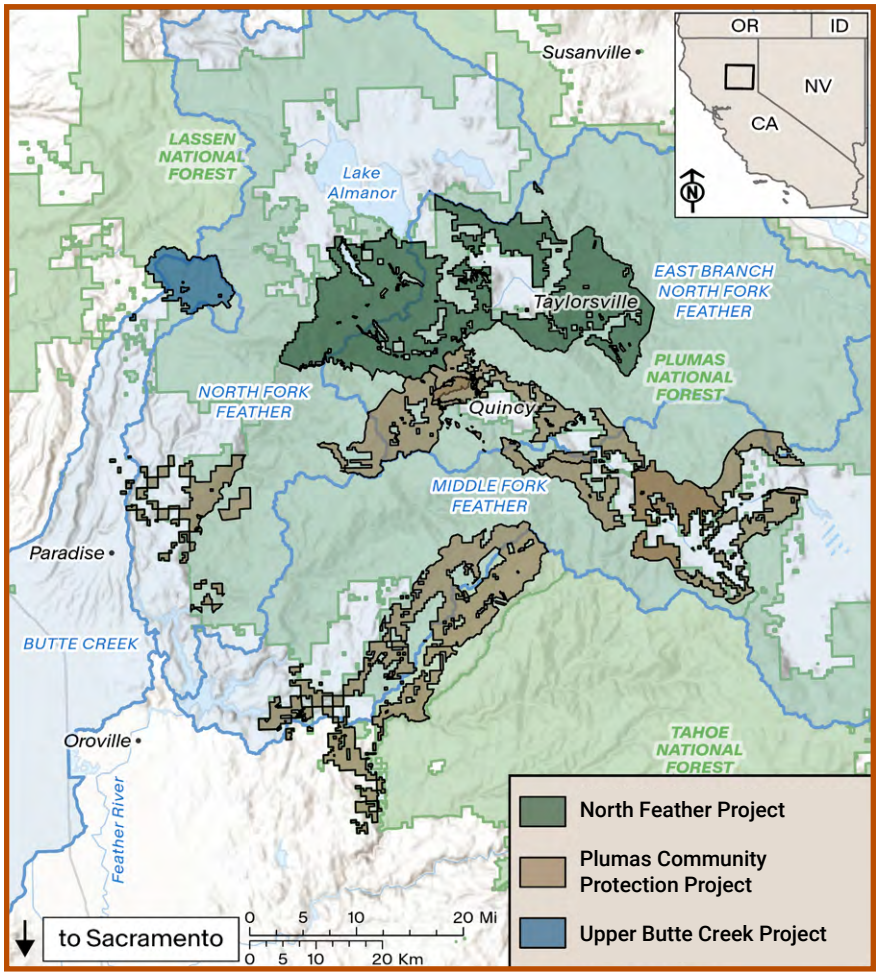
### Upper Butte Creek

The Upper Butte Creek project offers a unique opportunity to investigate the benefits of improving the health of a watershed for vulnerable fish species. Butte Creek supports the largest population of naturally spawning wild spring run Chinook salmon and may be the only remaining naturally spawning population in the region, given recent wildfires. Work on the Upper Butte Creek project began in spring 2026 following delays resulting from recent fires in the area and issues related to the U.S. Forest Service staffing and National Environmental Policy Act processes.

## KEY OBJECTIVES

- Explore how actions to improve forest health in key northern Sierra watersheds might support the long-term resilience of Metropolitan's water supplies and water quality.

## MAP OF PILOT INVESTIGATIONS




For more information on the North Feather Project, view this video: https://youtu.be/ZZfzM_LB1pk?si=rELFfxtoFPmTlSm4

**Did you know?** About 57% of the Upper Feather River Watershed – over 1.3 million acres – has burned in wildfires over the last decade.

**Next Steps:** Staff is working with Blue Forest and other partners to evaluate the cost-effectiveness and benefits of these projects.

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**About Metropolitan**

The Metropolitan Water District of Southern California is a state-established cooperative that provides water to its 26 member agencies in a service area of nearly 19 million people across six counties. The district imports water from the Colorado River and Northern California to supplement local supplies, and helps its members to develop increased water conservation, recycling, storage and other resource-management programs.

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