INFORMATION ITEM

Lead Scientist Report

Summary

A recent publication led by United States Geological Survey scientists shares results from the first known study in the Delta aimed at detecting and quantifying the toxic tire wear byproduct known as 6PPD-Q. The project detected small amounts of 6PPD-Q in archived Delta water samples collected between 2018 and 2024, some at concentrations known to be harmful to sensitive fish species. Samples containing 6PPD-Q were mostly found in waters impacted by urban areas or wastewater discharge and were associated with recent storm events. 6PPD-Q is one of a number of contaminants of emerging concern (CEC's) in the Delta. More monitoring and research is needed to better understand its distribution and concentrations and the implications for ecosystem health.

Quantifying the toxic tire wear byproduct 6PPD-Q in the Delta

Black, G. P., De Parsia, M., Uychutin, M., Lane, R., Orlando, J. L., & Hladik, M. L. (2025). 6PPD-quinone in water from the San Francisco-San Joaquin Delta, California, 2018–2024. *Environmental Monitoring and Assessment, 197*(4), 369. https://doi.org/10.1007/s10661-025-13757-5

Among many new chemicals that scientists are able to detect in water samples with improved laboratory techniques, some have been highlighted by toxicologists as Contaminants of Emerging Concern (CEC's). One of these is 6PPD-Quinone, a byproduct of a ubiquitous rubber additive used in tires to prevent oxidative cracking of tire treads. 6PPD-Q is a toxic chemical produced as vehicle tires wear out on the roads. Its impact on human health is difficult to assess amidst other liver and lung toxins, but biota in aquatic ecosystems are known to be impacted as the toxin is flushed into waterways often in concentrations documented to cause harm to many species. In particular, it has been found present in urban runoff at

concentrations lethal to Coho Salmon in numerous recent studies of the Pacific Northwest, While 6PPD-Q has been found around the world in urban-impacted surface water, stormwater, and wastewater, and even in snowmelt, its existence had not previously been documented in the Sacramento–San Joaquin Delta, even though urban and roadway runoff is known to carry contaminants into the Delta.

In a recent publication entitled *6PPD-quinone in water from the San Francisco-San Joaquin Delta, California, 2018–2024*, Black et al. (2025) analyzed 61 archived Delta water samples collected from 14 sites by the US Geological Survey between 2018 and 2024. As an initial survey of the spatial and temporal likelihood of 6PPD-Q presence, the samples were chosen based on their proximity to urban influences and the occurrence of precipitation ahead of their collection, both of which made it more likely that 6PPD-Q would be present due to the flushing of urban surfaces by storm water. The authors detected 6PPD-Q in a total of 17 samples across 7 sites. All but one of these samples was associated with a recent rain event, indicating that stormwater runoff contributed to the chemical entering waterways. The highest concentration was in a sample collected on the edge of the city of Stockton less than one kilometer downstream from a stormwater outlet. The second-highest concentration was in a sample from an area that receives urban runoff and wastewater discharge. It is also worth noting that the concentrations measured in the study may underestimate actual environmental conditions, given the length of time between sample collection and analysis and the uncertainty over 6PPD-Q stability during storage.

An important measure of environmental toxicity is the concentration of a chemical at which half of exposed individuals would die within 24 hours. For juvenile Chinook Salmon this concentration is 67,000 ng/L, whereas for Coho Salmon this concentration is much smaller at just 95 ng/L for adults and 41 ng/L for juveniles. None of the samples analyzed by the authors were above these thresholds, though two samples did have concentrations above the US Environmental Protection Agency's recently released acute aquatic life screening level of 11 ng/L, which represents 6PPD-Q concentrations that can be considered harmful to sensitive species within the ecosystem following only short periods of exposure.

Overall, the study showed for the first time that the toxic chemical 6PPD-Q is present in the Delta, and possibly at concentrations that are causing harm to the

ecosystem. The authors conclude that more research is needed into the ecological implications of 6PPD-Q in the Delta and how it may interact with other environmental stressors to contribute toward ecosystem degradation.

Recognizing that thousands of contaminants enter the Delta's waterways, and the immense complexity of their interactions with the ecosystem, the Delta Independent Science Board has proposed a review to assess current contaminant monitoring in the Delta. Taking place throughout 2025 and 2026, the review will focus on chemical contaminants and toxicity monitoring in surface waters, sediments, and wastewater treatment effluents. The review aims to: determine the degree to which current monitoring programs capture the full ecological risk of Delta contaminants; understand how monitoring can inform decision-making; review emerging technologies and methods; and identify knowledge gaps and areas for improvement.

Delta Science Program Activities

Early Career Leadership Workshop

From April 30 to May 2, the 2025 cohort of Delta Science Fellows took part in the Early Career Leadership Workshop. Delta Science Program staff organize an Early Career Leadership Workshop for each fellowship cohort to provide an opportunity for fellows to meet each other, interact with Council staff, and receive professional development training. Over three days participants learned about science and policy in the Delta, received hands-on science communication training, refined their ability to deliver a compelling 3-minute research pitch, and heard presentations covering a range of leadership and career-building topics. Participants also attended a field trip to Cosumnes River Preserve, where they learned about riparian and floodplain research.

The Delta Science Fellowship Program is funded by the Council's Delta Science Program and administered by California Sea Grant. Fellowships provide early-career scientists with up to two years' funding for research on high-priority science impacting management of the Sacramento-San Joaquin Delta system. More information about the latest Delta Science Fellows awards can be found on the Council's Research Funding and Fellowships webpage

(https://deltacouncil.ca.gov/delta-science-program/research-funding-and-fellowships).

Delta Restoration Forum

The Delta Plan Interagency Implementation Committee's Restoration Subcommittee sponsored the third Delta Restoration Forum on May 1 at the 1883 Clarksburg Schoolhouse. More than 20 projects or programs presented brief talks, posters, or informational handouts on topics that included active and planned projects, funding programs, and opportunities for landowners to implement wildlife-friendly practices. The Delta Restoration Forum is a critical opportunity for restoration practitioners, agency representatives, members of the public, and scientists to meet and discuss developing restoration projects in the system, with an overarching goal of advancing the pace and quality of ecosystem restoration in the Delta. The events are co-hosted by the Delta Stewardship Council and the Delta Conservancy.

Bay–Delta Water Tour

From May 7–9 the Delta Stewardship Council's five California Sea Grant State Fellows and one Sacramento State Executive Fellow attended the Water Education Foundation's annual Bay–Delta Water Tour (https://www.watereducation.org/tour/bay-delta-tour-2025). Placed within different Divisions at the Delta Stewardship Council, these recent graduates are working at the intersection of science, communication, and policy within the context of Delta resource management. This three-day tour deep into the Sacramento–San Joaquin Delta offered the fellows a valuable opportunity to explore the Delta in person, and included visits to the Delta Cross Channel, the Bay Model in Sausalito, Los Vaqueros Reservoir, and Suisun Marsh. Along the way, fellows heard from a range of experts in the field about topics including ecosystem restoration projects, fish passage, levee integrity, flood management, and drinking water supply and reliability. This immersive experience presented the fellows with first-hand insights from diverse perspectives across the region and allowed them to build connections with professionals working in the Delta.

Microplastic Pollution Symposium at UC Davis

On May 9, 2025, the Council's Delta Science Program and the UC Davis Coastal and Marine Sciences Institute co-hosted a symposium exploring the impacts of microplastics on aquatic ecosystems, with a focus on the heavily urbanized San

Francisco Bay–Delta and its diverse habitats. Scientists from across North America came together on the UC Davis campus to present their ongoing research to understand how these tiny pollutants affect ecosystems and the challenges in studying them. Symposium attendees discussed what the most pressing needs are for microplastics research, and how that could inform monitoring, management, and remediation strategies. A synthesis paper summarizing the symposium's major takeaways is now in development.

California Water and Environmental Modeling Forum (CWEMF) Presentation by the Delta Lead Scientist

On Wednesday May 14, 2025, Delta Lead Scientist Dr. Lisamarie Windham-Myers gave a presentation at the CWEMF Annual Meeting. The presentation covered a suite of collaborative open science initiatives supported by the Delta Science Program that enhance science-informed governance and management of natural resources in the face of a changing and increasingly volatile climate. Dr. Windham-Myers explored key findings from the 2025 edition of the State of Bay Delta Science, which is focused on extreme climate and weather events in the Delta, and highlighted tools, techniques, and other promising avenues to inspire innovative approaches to science-informed management. Dr. Windham-Myers also showcased new and existing efforts to build capacity in collaborative open science, including work underway to establish a Delta Collaboratory.

On Your Radar

Golden Mussels Response

On April 16 California Department of Fish and Wildlife (CDFW), in coordination with other agencies, released the Golden Mussel Response Framework (https://wildlife.ca.gov/News/Archive/california-takes-action-to-halt-golden-mussel-invasion). The framework lays out strategies to prevent further introduction and spread of golden mussels, alongside ways to mitigate harm to ecosystems and infrastructure. CDFW is also offering $1 million in grant funding to boating facility operators to enhance efforts against invasive mussels, funded by the federal Sport Fish Restoration Act. Delta Stewardship Council staff participate on the Partners team of the Golden Mussel Task Force.

2025 Delta Synthesis Working Group

The Delta Science Program is now seeking input on priority synthesis topics and interested participants for a Fall 2025 Delta Synthesis Working Group convened in partnership with the National Center for Ecological Analysis and Synthesis (NCEAS). This will be the third time the Delta Science Program and NCEAS are collaborating on this unique opportunity to teach scientists how to use advanced data science and statistics to create and communicate new knowledge derived from combining multiple existing datasets. The 2025 Delta Synthesis Working Group will involve three weeks of focused open science and synthesis training followed by up to a year of work applying new skills in synthesis projects aimed at informing priority Delta management needs.

Appropriate topics for submission include ideas for which publicly available data exist that can be leveraged to inform Bay–Delta management needs. Ideas can be submitted by anyone, regardless of their ability to participate in the training. Additionally, an open call has been issued for people to express their interest in participating in the Synthesis Working Group. Priority will be given to those who express interest by June 13, 2025. For more information, please visit the Delta Science Program–NCEAS synthesis working group webpage (https://deltacouncil.ca.gov/delta-science-program/science-synthesis-working-group).

To share ideas or express interest in participating, please complete the following surveys.

Call for ideas:
https://docs.google.com/forms/d/e/1FAIpQLSf6FDeRzhOepSn3XlWLTYvtU2uRQAzz0YGr9epAbMqsC6WNyg/viewform

Call for participants:
https://docs.google.com/forms/d/e/1FAIpQLSdItT642YhFAGeFpQCKSfhycYDG09Sy4vDH7xjXOpScZXDu3g/viewform

2025 State of the Estuary Conference Call for Abstracts

The call for abstracts for poster, oral, and creative session presentations for the 2025 State of the Estuary Conference is now open. Abstracts are due by June 13, 2025. Abstracts can address any topics related to the four 2022 Estuary Blueprint goals (living resources, climate resilience, water quality, and stewardship), and can

touch on policy and management, socioeconomic issues, and environmental educational programs.

The next biennial State of the Estuary Conference will be held October 28–29, 2025 at the Henry J. Kaiser Center for the Arts in Oakland, CA. The San Francisco Estuary Partnership organizes this event every two years to highlight the current management and ecological health of the San Francisco Bay-Delta Estuary. More information is available here: https://www.sfestuary.org/state-of-the-estuary-conference/.

By the Numbers

Science Program staff will summarize current numbers related to Delta water and environmental management. The summary (Attachment 2) will inform the Council of recent counts, measurements, and monitoring figures driving water and environmental management issues.

List of Attachments

Attachment 1: Visual Summary of Article

Attachment 2: By the Numbers

Contact

Dr. Lisamarie Windham-Myers

Delta Lead Scientist

Phone: (916) 275-6888