



California Water Boards 7th Annual Water Data Science Symposium & California Water Data Challenge



North Yuba River, Photo Credit: Greg Gearheart

***Assessing What We Know
+ Preparing for a More
Resilient Future***



California Water Boards
7th Annual California Water Data Science Symposium
& California Water Data Challenge
Assessing What We Know + Preparing for a More Resilient Future
June 28 – 30, 2022

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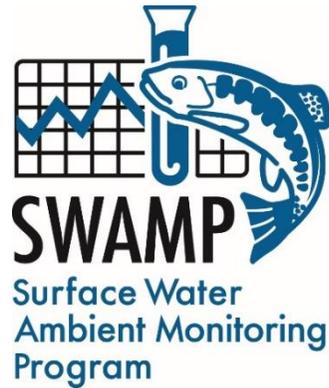
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Event Partners & Presenters



California Water Boards
COLLEGE OF WATER INFORMATICS



Collaboratory for Indigenous Data Governance

Research, Policy, and Practice for Indigenous Data Sovereignty



**California Water
Data Consortium**



**Delta
Stewardship
Council**

A CALIFORNIA STATE AGENCY



**Interagency
Ecological Program**



**The Moore Institute for
Plastic Pollution Research**

Tackling the plastic pollution crisis with scientific research & innovation



OEHHA
California Office of Environmental
Health Hazard Assessment

Agenda Overview
California Water Boards
7th Annual California Water Data Science Symposium & California Water Data Challenge
Assessing What We Know + Preparing for a More Resilient Future

Day	Time Block	Activity
Jun 28	9:00 am - 12:30 pm	Science Symposium Presentations (registration link*) Plenary Session: Welcome & Keynote Session 1: Understanding your community lens - a case study using the Tribal lens
	12:30 pm - 1:30 pm	Lunch
	1:30 pm - 4:30 pm	California Water Data Challenge Workshop (registration link*)
Jun 29	9:30 am - 12:30 pm	California Water Data Challenge Workshop (registration link*)
	12:30 pm - 1:30 pm	Lunch
	1:30 pm - 4:30 pm	Science Symposium Presentations (registration link*) Plenary Session: Welcome & Keynote Session 2: California Water Data Spotlight
Jun 30	9:30 am - 12:30 pm	California Water Data Challenge Workshop (registration link*)

* Science Symposium Presentation attendees are able to register for one or both days through a single [registration link](#). After registering, you will receive a confirmation email containing instructions on how to join the webinar. Those who do not register will still be able to view presentations through a [YouTube Live Stream](#)

+ California Water Data Challenge Workshop attendees will need to register for each workshop they are interested in participating in using the separate registration links provided above. After registering, you will receive a confirmation email containing instructions on how to join the meeting.

Agenda
California Water Boards
7th Annual California Water Data Science Symposium & California Water Data Challenge
Assessing What We Know + Preparing for a More Resilient Future
Tuesday, June 28, 2022

Plenary Session

Time	Topic
8:45 - 9:00	Sign-on using information provided via your customized confirmation email
9:00 - 9:05	Symposium and Webinar Logistics <i>Greg Gearheart / Anna Holder</i> <i>State Water Resources Control Board</i>
9:05 - 9:20	Welcome <i>E. Joaquin Esquivel, Chair</i> <i>State Water Resources Control Board</i>
9:20 - 10:00	<i>Keynote Conversation</i> <i>Bidtah Becker, Deputy Secretary for Environmental Justice, Tribal Affairs and Border Relations</i> <i>California Environmental Protection Agency (CalEPA)</i>
10:00 - 10:05	Break

Session 1: Implementing a Community Equity Lens - Tribal Case Studies

Time	Topic
10:05 - 10:20	Session welcome & California Water Data Challenge framing <i>Greg Gearheart</i> <i>State Water Resources Control Board</i>
10:20 - 10:40	Innovation and inclusion: the CARE Principles in publicly funded projects <i>Andrew Martinez</i> <i>Collaboratory for Indigenous Data Governance</i>
10:40 - 11:00	Implementing a public health based cyanotoxin monitoring program <i>Sarah Ryan</i> <i>Big Valley Band of Pomo Indians</i>

Time	Topic
11:00 - 11:20	A qualitative study into California’s water data practices <i>Aaron Dickenson</i> <i>Duke University & California Water Data Consortium</i>
11:20 - 11:40	Understanding the needs of Native American Tribes in California through Integrated Regional Water Management (IRWM) <i>Carmel Brown, Pablo Ortiz</i> <i>California Department of Water Resources</i>
11:40 - 12:20	Panel Discussion with Speakers
12:20 - 12:30	Daily wrap-up and adjourn <i>Greg Gearheart</i> <i>State Water Resources Control Board</i>
12:30 - 1:30	Lunch

California Water Data Challenge Workshop

Time	Topic
1:30 - 4:30	<p>Each workshop will provide a space for potential California Water Data Challenge participants to:</p> <ul style="list-style-type: none"> • meet other potential California Water Data Challenge participants, and begin to form teams • ask questions about the 2022 California Water Data Challenge process, timeline, and challenge questions • meet California water data stewards and experts • brainstorm and ask questions about: <ul style="list-style-type: none"> ○ how to develop a project that is relevant to water managers and decisions makers that would support the theme of “Assessing What We Know + Preparing for a More Resilient Future” ○ how you might utilize available dataset(s) to answer a 2022 Challenge question ○ how you might apply a community lens to your Challenge project

California Water Boards
7th Annual California Water Data Science Symposium & California Water Data Challenge
Assessing What We Know + Preparing for a More Resilient Future
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California Water Data Challenge Workshop

Time	Topic
9:30 - 12:30	<p>Each workshop will provide a space for potential California Water Data Challenge participants to:</p> <ul style="list-style-type: none"> • meet other potential California Water Data Challenge participants, and begin to form teams • ask questions about the 2022 California Water Data Challenge process, timeline, and challenge questions • meet California water data stewards and experts • brainstorm and ask questions about: <ul style="list-style-type: none"> ○ how to develop a project that is relevant to water managers and decisions makers that would support the theme of “Assessing What We Know + Preparing for a More Resilient Future” ○ how you might utilize available dataset(s) to answer a 2022 Challenge question ○ how you might apply a community lens to your Challenge project
12:30 - 1:30	Lunch

Plenary Session

Time	Topic
1:25 - 1:30	Sign-on using information provided via your customized confirmation email
1:30 - 1:35	<p>Symposium and Webinar Logistics</p> <p><i>Greg Gearheart / Anna Holder</i></p> <p><i>State Water Resources Control Board</i></p>
1:35 - 1:50	<p><i>Keynote Conversation</i></p> <p><i>Karen Mogus</i></p> <p><i>State Water Resources Control Board & California Water Quality Monitoring Council</i></p>

Session 2: California Water Data Spotlight

Time	Topic
1:50 - 2:10	<p>California Surface Water Ambient Monitoring Program data overview</p> <p><i>Ali Dunn, Tessa Fojut</i></p> <p><i>State Water Resources Control Board - Surface Water Ambient Monitoring Program (SWAMP)</i></p>
2:10 - 2:30	<p>A rich legacy of interagency collaboration: five decades of ecological monitoring in the San Francisco Estuary</p> <p><i>Dr. Sam Bashevkin^{1,3}, Rosemary Hartman^{2,3}, The Data Utilization Work Group³</i></p> <p><i>(1) Delta Stewardship Council - Delta Science Program, (2) California Department of Water Resources, (3) The Data Utilization Work Group</i></p>
2:30 - 2:50	<p>Trash and microplastic data analysis and sharing tools</p> <p><i>Walter Yu¹, Dr. Win Cowger²</i></p> <p><i>(1) California Department of Transportation (CalTrans), (2) Moore Institute for Plastic Pollution Research</i></p>
2:50 - 3:10	<p>The Bay-Delta timeline of historical events</p> <p><i>Emily Richardson¹, Jeniffer Soto-Perez¹, Sadie Trombley², Tamara Kraus¹, Rosemary Hartman², Trishelle Tempel²</i></p> <p><i>(1) U.S. Geological Survey - California Water Science Center, (2) California Department of Water Resources</i></p>
3:10 - 3:30	<p>Synthesis science with the Delta Science Program: resources and opportunities</p> <p><i>Dr. Laurel Larsen</i></p> <p><i>Delta Stewardship Council - Delta Science Program</i></p>
3:30 - 3:50	<p>CalEnviroScreen 4.0: what's new and an introduction to the drinking water contaminants indicator</p> <p><i>Komal Bangia</i></p> <p><i>California Office of Environmental Health Hazard Assessment (OEHHA)</i></p>

Time	Topic
3:50 - 4:00	Symposium wrap-up and upcoming events <i>Greg Gearheart</i> <i>State Water Resources Control Board</i>

California Water Boards

**7th Annual California Water Data Science Symposium & California Water Data Challenge
Assessing What We Know + Preparing for a More Resilient Future
Thursday, June 30, 2022**

California Water Data Challenge Workshop

Time	Topic
9:30 - 12:30	<p>Each workshop will provide a space for potential California Water Data Challenge participants to:</p> <ul style="list-style-type: none"> • meet other potential California Water Data Challenge participants, and begin to form teams • ask questions about the 2022 California Water Data Challenge process, timeline, and challenge questions • meet California water data stewards and experts • brainstorm and ask questions about: <ul style="list-style-type: none"> ○ how to develop a project that is relevant to water managers and decisions makers that would support the theme of “Assessing What We Know + Preparing for a More Resilient Future” ○ how you might utilize available dataset(s) to answer a 2022 Challenge question ○ how you might apply a community lens to your Challenge project

Welcome and Keynote Speakers

E. Joaquin Esquivel, Chair, State Water Resources Control Board



E. Joaquin Esquivel was appointed to the State Water Resources Control Board by Governor Jerry Brown in March 2017, designated by Governor Gavin Newsom as Chair in February 2019, and reappointed to the board by Governor Newsom in 2021. Previously, he served as Assistant Secretary for federal water policy at the California Natural Resources Agency in the Governor’s Washington, D.C. office.

For more than eight years prior to that, Joaquin worked for U.S. Senator Barbara Boxer of California, most recently as her legislative assistant covering the agriculture, native american, water, oceans, and nutrition portfolios, in addition to being the director of Information and Technology. He was born and raised in California’s Coachella Valley. He holds a BA from the University of California, Santa Barbara in English.

Bidtah Becker, Deputy Secretary for Environmental Justice, Tribal Affairs and Border Relations, California Environmental Protection Agency (CalEPA)



Bidtah Becker is one of the nation’s leading tribal water rights, energy and environmental justice practitioners. A member of the Navajo Nation, she has served as the head of the Navajo Nation Division of Natural Resources, overseeing 12 departments including agriculture, parks, forestry, land development, mine remediation, archaeological and cultural resources, and water resources, with a staff of more than 500. She is currently with the Navajo Tribal Utility Authority, where she was instrumental in advancing the development of the Navajo Gallup Water Supply Project, a \$1.5 billion project that will provide clean, reliable water to tribal and rural communities.

Bidtah Becker has served on the Water and Tribes Initiative in the Colorado River Basin where she co-chaired the Universal Access to Clean Water effort, on the New Mexico Interstate Stream Commission, and on the Navajo Nation Water Rights Commission. She holds a B.A. in Foreign Service, School of Foreign Service, Georgetown University with a specialty in Latin American Studies and a J.D. from the University of New Mexico School of Law.

Bidtah Becker is also a champion for Indigenous arts and artists. In 2012, President Obama appointed her to serve as a trustee for the Institute of American Indian Arts and Culture (IAIA). She and her husband are Sustainers of GallupARTS, a nonprofit arts council serving Northwest New Mexico and 2021 recipient of the Governor’s Award for Excellence in the Arts in New Mexico. President Biden recently nominated her to serve as Member of the National Council on the Arts. Becker has also served two separate terms on the board for the Southwestern Association of Indian Arts, including one year as board chair.

**Karen Mogus, Deputy Director, State Water Resources Control Board & Council Chair,
California Water Quality Monitoring Council**



Karen Mogus is the Deputy Director for the State Water Board's Division of Water Quality and is responsible for statewide water quality planning, policy development and implementation, statewide permitting, and establishing consistency among the nine Regional Water Quality Control Boards. Prior to joining the Division of Water Quality, Ms. Mogus served as the Assistant Deputy Director of the Division of Drinking Water where she directed the development of a regulatory framework for potable reuse of recycled water, worked to address drinking water quality issues in disadvantaged communities, and led the review of the state's environmental laboratory accreditation program. She also has served as Director of the State Water Board's Office of Information Management and Analysis and spent 10 years at the Central Valley Regional Water Board working on a variety of water quality control and assessment programs.

Tuesday, June 28

Session 1: Implementing a Community Equity Lens - Tribal Case Studies

INNOVATION AND INCLUSION: THE CARE PRINCIPLES IN PUBLICLY FUNDED PROJECTS, **Andrew Martinez, Collaboratory for Indigenous Data Governance**

Data collection in publicly funded projects historically led to the exploitation and misuse of Tribally collected data. Non-Indigenous project leaders, funders, and institutions are identifying mechanisms to better steward Indigenous data. This work highlights areas for innovation and inclusion for Indigenous communities by addressing issues at the metadata level in combination with consulting with Indigenous communities and developing legal mechanisms that govern the collection, analysis, storage, and sharing of Indigenous data. The people and purpose-oriented [CARE Principles](#) (Collective Benefit, Authority to Control, Responsibility, and Ethics) reflect the crucial role of data in advancing innovation, governance, and self-determination among Indigenous Peoples. The CARE Principles complement and extend the more data-centric approach of the FAIR Principles (Findable, Accessible, Interoperable, and Reusable). This presentation will focus on the CARE Principles and identify practical tools for implementing the CARE Principles alongside the FAIR Principles in the context of the open science and open data environments. It will include a discussion of how specific mechanisms, like the Traditional Knowledge (TK) and Biocultural (BC) Labels and Notice system, function as examples of practical tools that actively support the adoption and implementation of the CARE Principles for Indigenous Data Governance.

IMPLEMENTING A PUBLIC HEALTH BASED CYANOTOXIN MONITORING PROGRAM, **Sarah Ryan, Big Valley Band of Pomo Indians**

In 2014, the Big Valley Band of Pomo Indians and Elem Indian Colony began regular shoreline cyanotoxin monitoring of Clear Lake, California's largest freshwater lake. The data collection and evaluation of cyanobacteria, water chemistry, toxins, toxin producing genes and site conditions are shared with the local communities as we undertake a comprehensive look at how cyanotoxins are impacting the beneficial uses of Clear Lake.

A QUALITATIVE STUDY INTO CALIFORNIA'S WATER DATA PRACTICES, **Aaron Dickenson, Duke University, California Water Data Consortium**

Aaron Dickinson partnered with the California Water Data Consortium on a project that explored California's Open and Transparent Water Data Act (AB 1755) through expert interviews and an Environmental Justice (EJ) framework. His talk will include a summary of key takeaways and recommendations for future data policies based on the data he collected.

UNDERSTANDING THE NEEDS OF NATIVE AMERICAN TRIBES IN CALIFORNIA THROUGH
INTEGRATED REGIONAL WATER MANAGEMENT (IRWM), **Carmel Brown, Pablo Ortiz,**
Department of Water Resources

2022 marks the 20th anniversary of the Integrated Regional Water Management Planning Act. This piece of legislation (SB 1672) ushered in a new era for water resources management in California. Rooted in a philosophy of collaboration, 20 years of IRWM in California has resulted in strong trusted relationships forged at the regional level between parties who previously may not have worked together. This includes water agencies, special districts, cities and counties, environmental advocates, among others. A key outcome and success of IRWM has been the equitable inclusion of voices that previously were not part of the conversations and decision-making processes. This includes underrepresented communities and California Native American Tribes. In particular, the involvement of Tribes in regional water management through established IRWM regional groups has increased more and more each year. The opportunities afforded to Tribes, including capacity building and the ability to get State funding for Tribal projects, have also increased. In this short presentation, the Department of Water Resources will speak about the progress today in engaging and benefitting Tribes through IRWM. We recognize that there is much work to be done -- as we have identified some of the needs and challenges facing Tribes -- but there are also some valuable accomplishments to share at this juncture.

California Water Data Challenge Workshop

[Join us](#) to connect with others in the California water data community, learn more about the [California Water Data Challenge](#), this year's [Challenge Questions](#), and meet other potential California Water Data Challenge participants and partners!

Wednesday, June 29

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Session 2: California Water Data Spotlight

CALIFORNIA SURFACE WATER AMBIENT MONITORING PROGRAM DATA OVERVIEW, **Ali Dunn, Tessa Fojut, State Water Resources Control Board - Surface Water Ambient Monitoring Program (SWAMP)**

Data collected under the Water Boards Surface Water Ambient Monitoring Program (SWAMP) are used to guide environmental, resource management, regulatory and public health decisions and investigate and assess water quality and stream health in California's surface waters. SWAMP includes four statewide monitoring programs and monitoring by each of the nine Regional Water Quality Control Boards. The [Bioaccumulation Program](#) collects and analyzes fish tissue for bioaccumulative chemicals such as mercury and legacy pollutants, which are used to inform fish consumption advisories. The [Bioassessment Program](#) collects benthic macroinvertebrate and algae taxonomy, water quality, and physical habitat data to provide a holistic view of stream health. The [Toxicology and Contaminants Program](#) assesses toxicity and contaminants in sediment, which acts as an integrator for stream contaminants throughout the year. The [Freshwater Harmful Algal Blooms Program](#) monitors in response to blooms, provides support for agencies in posting water contact advisories, and researches bloom control and response actions.

SWAMP focuses on generating data of known and documented quality and has developed quality assurance requirements that other programs also use as guidance. SWAMP data are all publicly accessible through the California Open Data Portal and we will demonstrate tools SWAMP has developed to interact with and access SWAMP data.

A RICH LEGACY OF INTERAGENCY COLLABORATION: FIVE DECADES OF ECOLOGICAL MONITORING IN THE SAN FRANCISCO ESTUARY, **Dr. Sam Bashevkin^{1,3}, Rosemary Hartman^{2,3}, The Data Utilization Work Group³, (1) Delta Stewardship Council - Delta Science Program, (2) California Department of Water Resources, (3)The Data Utilization Work Group**

The [Interagency Ecological Program](#) (IEP) is a consortium of three state and six federal agencies that has been collecting ecological monitoring data in the San Francisco Estuary since the 1970s. The IEP operates a network of boats, traps, and sondes to monitor wildlife, habitat, and water-quality, mostly in the upper estuary. Surveys record data on fish, zooplankton,

phytoplankton, benthic organisms, water quality, flow, and aquatic vegetation. These datasets are primarily used to understand the impacts and inform operation of the State Water Project and Central Valley Project. However, because the IEP has collected such a valuable, long-term dataset, the data are also used to answer broader questions of population dynamics, estuarine ecology, climate change, and species invasions, among other topics. In recent years, the IEP has made a concerted effort to follow open data practices, with many survey datasets now published and citable on the [Environmental Data Initiative](#) data repository. Ongoing efforts by the IEP and partners such as the [Delta Science Program](#) are aimed at increasing the accessibility and usability of IEP data through data integration, automated reporting, and R shiny apps, while catalyzing synthesis efforts to make the most of our rich legacy of monitoring data.

TRASH AND MICROPLASTIC DATA ANALYSIS AND SHARING TOOLS, Walter Yu¹, Dr. Win Cowger², (1) California Department of Transportation (Caltrans), (2) Moore Institute for Plastic Pollution Research

Trash and microplastic data are complex due to the diverse nature of these contaminants. Analyzing and storing this data is no simple task and requires artificial intelligence models database systems. During this presentation, we will discuss two new projects we are working on in this space: (1) A new data analysis tool (www.trashai.org) where users can upload images of trash and retrieve computer vision analytics, and (2) A data portal for sharing and analyzing data on microplastics in drinking water. We will discuss opportunities for you to be involved in these projects to help us improve trash and microplastic data analysis.

THE BAY-DELTA TIMELINE OF HISTORICAL EVENTS, Emily Richardson¹, Jeniffer Soto-Perez¹, Sadie Trombley², Tamara Kraus¹, Rosemary Hartman², Trishelle Tempel², (1) U.S. Geological Survey - California Water Science Center, (2) California Department of Water Resources

Relating historical legislative, management, or natural events in the Sacramento-San Joaquin Bay Delta (Bay-Delta) to changes in the aquatic habitat can be challenging because of number and complexity of major events over the last century. Bay-Delta scientists will often, understandably, cite only one or a few such alterations as a contributing cause to an observed ecosystem change with little acknowledgement of other potential contributing events due to the lack of a central organized record of major events. For example, a Bay-Delta scientist examining invasive species impacts may not be aware of potential confounding effects associated with changes to hydrology resulting from barrier constructions, levee failures, wetland restorations, etc.

The USGS and DWR are working together to create a public and explorable timeline of significant historical events in the Bay-Delta. We envision this to be a continuously evolving repository of information, allowing the Bay-Delta community to both access and contribute information. Access to the Bay-Delta Timeline is through a public web-based interactive

application containing our current compendium of events and milestones dating back to the 1920s. By presenting the database in an easy-to-use interface with download capabilities, we will provide ready-access to decades of historical context. Find the Timeline here:

<https://tableau.usgs.gov/views/Bay-DeltaTimeline/DeltaTimeline>.

SYNTHESIS SCIENCE WITH THE DELTA SCIENCE PROGRAM: RESOURCES AND OPPORTUNITIES, Dr. Laurel Larsen, Delta Stewardship Council - Delta Science Program

One of the core functions of the Delta Science Program, a division of the Delta Stewardship Council, is to coordinate and promote science synthesis activities that can inform decision-making processes in the Delta. The Delta Science Program approaches this function in several ways: through peer-reviewed review papers that comprise the State of Bay-Delta Science publication, focused projects that involve data curation, visualization, and analysis, and hosting workshops and working groups that provide training and bring community members together around data challenges. Presently, the need for synthesis to fill knowledge gaps for management-relevant Delta science by far exceeds the science community's capacity for performing synthesis. Another function of the Delta Science Program is to identify these knowledge gaps and priorities through the Science Action Agenda and other mechanisms. In this talk I highlight recent focused synthesis efforts undertaken by the Delta Science Program and highlight opportunities for workshop participants to identify management-relevant challenges ripe for synthesis and discovery.

CALENVIROSCREEN 4.0: WHAT'S NEW AND AN INTRODUCTION TO THE DRINKING WATER CONTAMINANTS INDICATOR, Komal Bangia, California Office of Environmental Health Hazard Assessment (OEHHA)

CalEnviroScreen 4.0, released in 2021, is a science-based mapping tool that identifies vulnerable California communities by census tract that are disproportionately burdened by multiple sources of pollution. The tool comprises a number of indicators that characterize Californians' potential exposure to different forms of environmental pollution. In particular, the Drinking Water Contaminants indicator represents an index of contaminant concentrations in drinking water. This indicator combines reported contaminant data from community water systems and available data for areas relying on domestic wells. This presentation provides an overview of OEHHA's effort to assess drinking water quality and address data gaps. We will also demonstrate how this work has contributed to the understanding of disproportionate contaminant burdens and how various efforts are being made to improve and refine understanding of drinking water quality across California.

Thursday, June 30

California Water Data Challenge Workshop

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Presenter and Panelist Index

Bangia, Komal; California Office of Environmental Health Hazard Assessment (OEHHA)



Komal Bangia is a Research Scientist with the Office of Environmental Health Hazard Assessment. She received a Bachelor of Arts in Psychology from the University of Texas at Austin and a Master of Public Health from the University of Texas Health Science Center in Houston. Her professional interests include data analysis, environmental health sciences and GIS. She has been involved in developing and maintaining CalEnviroScreen, a statewide cumulative impacts mapping tool, since 2013. She also has been the lead in the development of CalEnviroScreen's Drinking Water

Contaminants Indicator since it was added in version 2.0. Additionally, she assists academic researchers navigate California's drinking water data and is working with the State Water Resources Control Board in developing water quality, accessibility, and affordability indicators to help California meet the human right to water. In her spare time, she enjoys playing with her son, Riaan, and daughter, Aneri, and two dogs, Zoey and Remy. She also loves being in the outdoors, traveling, and cooking.

Bashevkin, Sam; Delta Stewardship Council - Delta Science Program, The Data Utilization Work Group



Dr. Sam Bashevkin is a Senior Environmental Scientist in the Delta Science Program, Delta Stewardship Council. Sam works to leverage long-term monitoring data for new management-informing insights while making these datasets more accessible through data integration and science communication. He applies data science, statistics, and interagency collaborations to diverse topics including water quality, zooplankton, fishes, and monitoring survey design. Sam completed his Ph.D. in ecology at the University of California, Davis.

Brown, Carmel; Department of Water Resources



Carmel Brown manages the Financial Assistance Branch with the Division Regional Assistance at the California Department of Water Resources (DWR). Her multi-disciplinary team administers and delivers millions of dollars in grants made possible by voter-approved bonds. The funding targets multi-benefit projects planned and conducted through integrated, collaborative, watershed-based processes, with a special emphasis on meeting the needs of traditionally underrepresented vulnerable communities and Tribes. The funds enable local and regional communities

and water organizations throughout CA to manage water resources more sustainably and

become more resilient to the impacts of climate change, including drought, floods, wildfires, sea level rise and ecosystem degradation. Prior to joining the State in 2013, Carmel worked for nearly 30 years in the private environmental consulting world. She is a registered Civil Engineer in California.

Cowger, Win; Moore Institute for Plastic Pollution Research



Dr. Win Cowger (AKA Dr. Trash) is a Research Scientist at the Moore Institute for Plastic Pollution Research. He studies the sources, transport, and fate of plastic pollution in the environment. His science focuses on identifying solutions to plastic pollution and assessing their effectiveness. As an applied scientist, Win works with nonprofit groups like Let's Do It World and Algalita, Government agencies like the Ocean Protection Council, and academics to implement science in practice.

Dickenson, Aaron; Duke University, California Water Data Consortium



Aaron Dickinson is a recent graduate from Duke's Sanford School of Public Policy. He has worked in water policy in both California and Texas, having worked with a number of environmentally focused organizations, including S.D. Bechtel Jr., Foundation, Water Education for Latino Leaders, and Save Our Springs Alliance.

Dunn, Ali; State Water Resources Control Board - Surface Water Ambient Monitoring Program



Ali Dunn is a Senior Environmental Scientist in the Office of Information Management and Analysis at the State Water Resources Control Board. She is the statewide program coordinator for the Surface Water Ambient Monitoring Program (SWAMP) and oversees program coordination and implementation of SWAMP's statewide monitoring programs. She obtained her degree at California State University, Sacramento in Biological Conservation and has 10 years of experience working in natural resource conservation and watershed management for the state of California. Her past positions included work in municipal storm water and wetland permitting, mitigation banking and land conservation, stream restoration and grant management.

Fojut, Tessa; State Water Resources Control Board - Surface Water Ambient Monitoring Program



Tessa Fojut is a Senior Environmental Scientist in the Office of Information Management and Analysis at the State Water Resources Control Board. She is the quality assurance officer and database manager of the Surface Water Ambient Monitoring Program (SWAMP), overseeing quality control and data management. Tessa has worked for the Water Boards for 10 years and previous positions included working on pesticide TMDLs, recycled water and contaminants of emerging concern. She received her Ph.D. in Agricultural and Environmental Chemistry and completed postdoctoral research in environmental toxicology at UC Davis.

Gearheart, Greg; State Water Resources Control Board



Greg Gearheart, PE (greg.gearheart@waterboards.ca.gov / 916.341.5892): Greg is a Deputy Director at the California State Water Resources Control Board of the Office of Information Management and Analysis for six years. Prior to this appointment Greg served as the statewide Storm Water Program Manager for about seven years. In his 29 years at this organization Greg has worked in many different program areas, including wetlands, watershed management, organizational development and enforcement. Greg received a B.S. in Environmental Resources Engineering from Cal Poly Humboldt and also grew up behind the redwood curtain.

Hartman, Rosemary; California Department of Water Resources, The Data Utilization Work Group

Rosemary Hartman is the lead of the Interagency Ecological Program's (IEP) synthesis team. In that role, she builds teams that pull together disparate data sets and uses them to answer big management questions for the Sacramento-San Joaquin Delta. She is a current co-chair of the IEP Data Utilization Work Group where she tries to get other people as excited about open data as she is.

Holder, Anna; State Water Resources Control Board



Anna Holder is an Environmental Scientist in the Office of Information Management and Analysis (OIMA) at the State Water Resources Control Board. She is the Program Coordinator for the Surface Water Ambient Monitoring Program (SWAMP) Bioaccumulation Monitoring Program (Program) and OIMA's Tribal Coordinator. Anna is leading the Program through a Realignment process, which is focused on incorporating the perspectives and needs of California Native American Tribes and subsistence-dependent communities into Program monitoring efforts.

Anna obtained her M.S. and B.S. from California State University, Monterey Bay in applied marine and watershed science.

Larsen, Laurel; Delta Stewardship Council - Delta Science Program



Dr. Laurel Larsen is the Delta Lead Scientist, an associate professor in Geography and Civil and Environmental Engineering at the University of California, Berkeley, and a senior fellow at the Berkeley Institute of Data Science. Dr. Larsen leads the Environmental Systems Dynamics Laboratory at UC Berkeley, which applies a complex-systems approach to environmental problems, seeking to understand the set of interactions and feedbacks that produce surprising or unanticipated behaviors. Her expertise lies in hydrodynamics and hydrology, biogeochemistry, modeling, and fluvial geomorphology.

Martinez, Andrew; Collaboratory for Indigenous Data Governance



Martinez is citizen of the Salt River Pima Maricopa Indian Community. He is also Diegueno/Iipay with ties to the Mesa Grande Band of Mission Indians in San Diego County. He graduated from the University of Arizona in the Business Management program at the Eller College of Management with a double minor in American Indian Studies and Government and Public Policy. He came to NNI as an intern in Fall 2013 where he was tasked with gaining a better understanding of the BIA Secretarial Election process.

Andrew has assisted Dr. Stephanie Russo Carroll in her work in the Indigenous data sovereignty arena for the last five years. This work began with organizing and presenting at the first ever Indigenous Open Data Summit at the International Open Data Conference in Spain. For the last three years Andrew and Stephanie have worked to identify pathways to bring the Indigenous data sovereignty framework into the American Geological Union sphere. In 2019 Andrew was selected to be a member of the AGU Voices for Science Policy Track. As a member of Voices for

Science program Andrew's goal was to broaden the scope of our audience and introduce non-Indigenous community members, academics, and policy makers to the Indigenous data sovereignty framework. Also, in 2019 Martinez co-authored "Indigenous Data Governance: Strategies from United States Native Nations" with Stephanie and now Dr. Desi Rodriguez-Lonebear.

Ortiz, Pablo; Department of Water Resources



Pablo Ortiz is a CivicSpark Fellow serving at the Department of Water Resources in Sacramento. He is involved in projects in the Financial Assistance Branch and Office of the Tribal Policy Advisor – primarily benefiting Tribes and underrepresented communities – and also supports local beneficiary Big Valley Rancheria's Environmental Protection Department. Pablo has been working in State service for a couple of years with the Department of Pesticide Regulation, as part of the School and Child Care Integrated Pest Management data team. He has experience working on databases with SQL and Tableau and enjoys editing videos in Adobe Premier. Before that, he graduated from Brown University with a B.A. in Biology, and served a summer interning with a US Forest Service lab in Flagstaff, AZ. He is passionate about sustainability, education, and media.

Richardson, Emily; United States Geological Survey



Emily Richardson is a U.S. Geological Survey water quality researcher who primarily focuses on studying phytoplankton and associated water quality parameters in the Sacramento-San Joaquin River Delta and San Francisco Bay. She specializes in data analysis and creating interactive visualizations. She received a B.S. in environmental science from the University of Texas at San Antonio and M.S. in wildlife, aquatic, and wildlands science and management at Texas Tech University.

Ryan, Sarah; Big Valley Band of Pomo Indians



Sarah Ryan is the Environmental Director for the Big Valley Band of Pomo Indians, located on the shores of Xabatin (Clear Lake), the largest natural freshwater lake in California. She has a degree in Government from the College of William and Mary in Virginia and has obtained various certifications for the environmental protection activities that she performs on a regular basis.

Sarah works to bring Tribal data to bear on policy development and implementation. As a representative of the Tribe, she works closely with the Central Valley Regional Water Quality Board and US EPA on water quality and natural resource protection issues.

Yu, Walter; California Department of Transportation (Caltrans)



Walter Yu is a Principal Transportation Engineer with the Caltrans Clean California Program and leads its local grant projects and technology implementation. Previously, he helped implement the Caltrans Enterprise Data and Geospatial Governance Program. He also served as one of the technical leads for the Caltrans On-Land Visual Trash Assessment (OVTA) automation project from 2017-2020. Walter has over 16 years of experience with Caltrans, including over 7 years in implementing its stormwater compliance program. He has a B.S. in Civil Engineering from UC Berkeley and Post-Baccalaureate Certificate in Data Science from the Harvard Extension School.

The Data Utilization Work Group

The Data Utilization Work Group (DUWG) is a multi-agency group established to address IEP's data management needs and foster a culture of open data within IEP. The DUWG assists in setting internal procedures and guidelines, recommending 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.

About The 2022 Mascot

Salmon are this year's mascot for the Symposium and Water Data Challenge kickoff. Salmon images bear significant power to convey the importance of caring for our lands and waters. For eons in what is now known as California, Indigenous communities have held – and continue to hold – deeply complex relationships with salmon and their watershed colleagues, including the Steelhead trout, Pacific lamprey, California condor, Pacific giant salamander, and many others. It is with great humility, respect, and reverence that we choose the salmon to guide us forward this year.



Did you know?

1. Four species of salmon can be found in California: Chinook (*Oncorhynchus tshawytscha*), Chum (*Oncorhynchus keta*), Coho (*Oncorhynchus kisutch*), and Pink (*Oncorhynchus gorbuscha*) (caltrout.org).
2. Although Chinook salmon currently spawn in the San Francisco Bay watersheds, they are officially regarded as non-native. A recent environmental DNA (eDNA) analysis of archaeological samples from a Native American midden in the city of Santa Clara dating back more than 200 years has provided evidence that the Chinook range may have in fact extended to the southern end of San Francisco Bay (fishbio.com).
3. Pacific salmon are the great redistributors and transfer large quantities of marine-derived nutrients to “upland” forest ecosystems with profound effects on plant and wildlife production – they feed “downstream” ecosystems, but they don’t extract from inland watersheds. They are an integral part of California's watersheds and their loss would not only impact riparian and ecosystem function, but also river systems where people and salmon coexist ([Merz and Moyle, 2006](#)).

Salmon are on the brink of extinction, this is widely known, but we are here to affirm that they are us and we are them. Salmon are changing to be more resilient for our collective future. You may notice that our salmon mascot is morphing, not only for spawning but for a future that is going to challenge what we all know and love. Salmon and how they have the power to organize and energize those around them is an inspiration. So let’s all listen to our ancestors – for they are also our future alevin and smolt – and use our collective power, energy, and data to inform and build a healthy, bright, resilient, and equitable future for all.

Thank you for joining the 2022 California Water Data Science Symposium!

Stay connected with the water data science community by:

Registering for the [Water Boards College of Water Informatics Email List](#)
(under the General Interests drop down)

Attending future [water data science events!](#)



@cawaterdatadive @CaMonitoring @swamp_water_ca
#cawaterdatadive #caswamp #waterdata #cawater



Stay Involved in the 2022 California Water Data Challenge!

While this year's California Water Data Science Symposium is over – the California Water Data Challenge has just begun! If you and/or your team has data-related skills to offer, please consider joining the Challenge as an individual or as a team. Community members experiencing water issues should join as mentors or community liaisons to guide the design and development of solutions.

[Learn more about the Challenge](#)

[Review this year's Challenge Questions](#)

[Get involved!](#)

