Introduction from Executive Officer  
Jessica R. Pearson

Each year, challenges in the Sacramento-San Joaquin Delta become more complicated, urgent, and, in some cases, extreme; as these challenges increase, fostering resilience requires greater coordination and new expertise.

Entering year two of the Covid-19 pandemic, our agency sought to address these complexities of environmental management through personal and professional adaptation and resilience. New variants caused a surge in cases, delaying our return to in-person work, Council meetings, and events. Yet, we adapted, thrived, and even broadened our reach.

This year we moved our headquarters to the new California Natural Resources Building at 715 P Street. This move puts us in closer proximity to our Delta Plan implementation partners, fostering opportunities for increased connection and collaboration. It also reduces our carbon footprint.

No matter where we operate, the people who compose our agency are its most essential asset. This year, we saw Christy Smith appointed to the Council, Virginia Madueño appointed to the Council and voted vice-chair, Daniel Zingale confirmed by the California Senate, Ryan Stanbra promoted to chief deputy executive officer, Amanda Bohl reappointed as special assistant for planning and science, Abbott Dutton hired as assistant deputy executive officer for communications, and Lisa Wainger voted chair-elect of the Delta Independent Science Board.
Together, we worked toward our mission of ensuring the coequal goals of a reliable California water supply and a resilient Delta ecosystem in a manner that protects, restores, and enhances the region’s unique values as a place by guiding the implementation of the Delta Plan—California’s blueprint for taking on the region’s current and predicted future challenges—and aligning Delta decision-making with science. We demonstrated leadership by ensuring that significant projects in the Delta are held to high standards, consistent with the Delta Reform Act of 2009 and the Delta Plan.

Despite the ongoing drought, species decline, and climate uncertainty, I am confident there is positive change afoot for environmental management and the health of the Delta in 2022 and beyond and that our work will be a key part of that change. I am particularly excited about developing practical and effective climate adaptation strategies with our partners, deepening our understanding of how to better rise to the challenge of addressing environmental justice in our work, and developing the leadership of tomorrow through our fellowship programs and other mentoring investments.

With gratitude,

Jessica R. Pearson, Executive Officer

(Above) The art installation “Coalition,” sculpted by John Grade, featured at the new California Natural Resources Building. (Below) Located at 715 P Street on the block bounded by 7th/8th and O/P Streets in Sacramento, California, the building houses approximately 800,000 square feet of office space.
An Introduction to Resilience

The Governor’s Office of Planning & Research defines resilience as the capacity of any entity—an individual, a community, an organization, or a natural system—to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience. Through thoughtful and timely ecosystem-based management and strong working relationships with those at work on the federal, state, regional, and local levels, the Council can influence actions in the Delta to improve resilience over time and communicate the statewide implications of anticipated regional impacts. To execute this goal, we must understand the challenges we face; coordinate our response with decision-makers, managers, scientists, and the public; and act.
Understanding the Challenges

Delta Adapts

This year, we completed the first-ever climate change Vulnerability Assessment for the Delta. As phase one of the Delta Adapts initiative, this innovative and comprehensive assessment evaluates the vulnerabilities of the Delta and Suisun Marsh to climate change impacts through the end of the century. The Vulnerability Assessment will act as a launching pad for phase two of the Delta Adapts initiative, the Adaptation Strategy, which will identify a range of policy and management actions that could be taken by the Council and others to improve and safeguard regional resilience.

We all experience the effects of climate change, but not all Delta residents have the same ability to respond. Climate change disproportionately impacts Delta communities; continued partnership and engagement are crucial to developing equitable strategies.

HARRIET LAI ROSS
Delta Stewardship Council
Assistant Planning Director

February

Blog published by Harriet Lai Ross: Delta Adapts (Assessing Climate Change Vulnerabilities)
A comprehensive understanding of the vulnerabilities and challenges that face the Delta is essential to building resilience. As described in the Vulnerability Assessment, resilience must be derived from science and nature-based solutions and coordinated action. To facilitate regional collaboration, the project team hosted a series of meetings on adaptation scoping and strategies alongside community-based organizations and youth leaders.

The partners we worked with positioned us to better reach the Delta communities most vulnerable to climate change and to better understand their concerns.

Through the Adaptation Strategy, we hope to further develop these relationships and to use this collaborative process as a model for effective public engagement, which is essential to the success of our agency’s mission.
Adapting and Evolving Existing Initiatives

As the Delta region evolves, so must our approach to understanding and managing it. In 2021, several significant efforts were made to adapt existent resilience measures.

The proposed amendment to Delta Plan Chapter Four (Protect, Restore, and Enhance the Delta Ecosystem), referred to as the Ecosystem Amendment, provides a comprehensive strategy for restoration in the Delta.

The proposed amendment reflects changed conditions in land use, climate, and regulations and incorporates new science and understanding of what works in existing restoration projects.

DAN CONSTABLE
Delta Stewardship Council
Environmental Program Manager

Through the proposed Ecosystem Amendment, we continue to work toward a dynamic and resilient restored Delta landscape, as envisioned in the Delta Reform Act. Released for public review in September, the Ecosystem Amendment’s Draft Program Environmental Impact Report describes and analyzes the potential environmental effects of implementing the updated regulations and recommendations in the proposed amendment.
The Ecosystem Amendment reflects an important shift toward ecosystem-based management with a particular focus on getting the right projects in the right locations on the landscape as quickly as possible. Larger, more connected restoration areas provide greater resilience in a changing climate.

JEFF HENDERSON  
Delta Stewardship Council  
Deputy Executive Officer for Planning & Performance

This year, with the California Department of Water Resources and the Central Valley Flood Protection Board, we also updated the Delta Levees Investment Strategy—an innovative approach that considers the assets protected by levees, the threats to those assets, and the multiple beneficiaries of Delta levees when prioritizing State investments. This collaboratively developed strategy builds resilience by coordinating a multi-agency response to reducing the likelihood and consequences of Delta levee failures, to protect people, property, and State interests, while advancing the coequal goals. The Delta Adapts Vulnerability Assessment found that anticipated changes in sea levels, precipitation, hydrology, and temperatures could be a driver of heightened flood risks, particularly from levee overtopping, in the future—potentially impacting billions of dollars in assets and economic activity in the Delta and making prioritization of limited State dollars even more important.
In recent years, we have updated the risk assessment of Delta levees using new geometry and hydraulic data with an increased focus on socially vulnerable populations. In 2021, the Council voted to proceed with the Delta Levees Investment Strategy rulemaking.

ERIN MULLIN
Delta Stewardship Council
Supervising Water Resources Engineer
To ensure progress towards a healthy and resilient Delta, we must proactively monitor how effectively Delta Plan regulations and recommendations are carried out today. Our online Performance Measures Dashboard tracks where federal, State, and local Delta Plan implementing agencies succeed and where additional efforts are needed.

MARTINA KOLLER  
Delta Stewardship Council  
Environmental Program Manager

This year, tracking Delta Plan performance measures highlighted the following steps to advance the coequal goals.

Performance Measures

Urban water suppliers who receive water from the Delta received guidance describing how to document their expected measurable reduction in reliance on Delta water and improvements in regional self-reliance. This guidance, issued by the Department of Water Resources once every five years, builds resilience by highlighting actions water suppliers take to ensure they can meet demands in uncertain future conditions.

Did you know?
The Delta provides a portion of the water used by two-thirds of Californians. That's more than 27 million people.
Water quality salinity standard exceedances for agriculture were reported at two compliance stations in the western Delta during the summer and at a compliance station in the southern Delta multiple times throughout the year. This shows that under severe drought conditions, salinity intrusion into the Delta worsens—negatively impacting beneficial uses of water for the second consecutive year. This points to the need for long-term drought planning to boost the Delta’s resilience during dry years.

Did you know?
The combination of low precipitation, warm temperatures, and dry soils has resulted in an unprecedented low amount of runoff from the Sierra-Cascade snowpack, leading to significantly reduced water supplies and storage in California. In response, this year, Governor Newsom signed a package of climate action bills for drought response and long-term water resilience.
The Delta Science Program facilitated an independent scientific review for the Central Valley Regional Water Quality Control Board’s Mercury Control Program, which measures the toxicity of methylmercury (the most toxic form of mercury) in wetland and open areas. This scientific evaluation informs mercury reduction goals, standards for mercury levels in fish that are consumed by humans and wildlife, and compliance dates. Keeping track of mercury levels in fish in the Delta benefits public health as many Delta residents rely on fish for sustenance.

Did you know?
When consumed, methylmercury severely impacts the nervous and reproductive systems. Harmful levels of methylmercury found in the Delta have placed the region on the Clean Water Act’s list of impaired water bodies.

These performance measure highlights are part of a robust portfolio of performance measures, which provide information imperative to adaptive management of the Delta and the resources it provides. They illustrate how the collective actions of agencies charged with managing the Delta contribute to resilience.
The Delta Independent Science Board

This year, the Delta ISB—a board composed of prominent scientists who provide oversight of scientific research, monitoring, and assessment programs in the Delta—drafted reviews on water supply reliability and the monitoring enterprise and completed a review on the science of non-native species. Published in May, the non-native species report recommended a more forward-looking approach to non-native species science in the Delta—one of the world’s most invaded estuaries—with specific consideration for climate change. The report states that we must get ahead of invasions through science prioritization and collaboration across agencies and disciplines to facilitate effective prevention and mitigation.

The Delta ISB has time and time again been on the leading edge of calling out the challenges we must face in the Delta as we collectively work toward resilience. In its deep thematic reviews, the Delta ISB delves into the mechanics of how we must pivot to maintain progressive and science-based management of our precious natural resources.

LOUISE CONRAD
Delta Stewardship Council
Deputy Executive Officer for Science
Following a decade of reviews by the Delta ISB, this year, the Delta Science Program drafted an assessment of the Delta ISB’s impact and value. The draft report presents findings from an inventory of Delta ISB products, a public survey, and interviews with Board members and interested parties. It will inform improvements to the Delta ISB’s processes and increase the value and impact of its reviews.

Staff Publications

Lead Authors on Peer Reviewed Publications

Connectivity metrics for conservation planning and monitoring

*Biological Conservation*  |  Annika Keeley

Striped bass (*Morone saxatilis*) migration timing driven by estuary outflow and sea surface temperature in the San Francisco Bay-Delta, California

*Scientific Reports*  |  Pascale Goertler
Contributing Authors on Peer Reviewed Publications

Large-scale flow management action drives estuarine ecological response

North American Journal of Fisheries Management  | Louise Conrad

Leveraging Delta smelt monitoring for detecting juvenile Chinook salmon in the San Francisco Estuary

San Francisco Estuary and Watershed Science  | Pascale Goertler

The influence of model frameworks in spatial planning of regional climate-adaptive connectivity for conservation planning

Landscape and Urban Planning  | Annika Keeley
Contributing Authors on a Technical Report

Interagency Ecological Program long-term monitoring element review: Pilot approach and methods development

IEP Technical Report  I Long-term Survey Review Team, including Steve Culberson and Sam Bashevkin

Delta Landscapes Primary Production: Past, Present, Future

Understanding how the extensive historical changes in the Delta landscape have altered primary production—the ability of plants to make and use their own food to live and grow— informs the restoration and management approaches taken by those at work in the Delta. As such, this year, our Delta Science Program worked in cooperation with the San Francisco Estuary Institute to fund the Delta Landscapes Primary Production Project.

December

Article published by the San Francisco Chronicle that featured Senior Environmental Scientist Dylan Chapple among others
This unique project evaluated how landscape change in the Delta has altered the magnitude and composition of primary production across major producer groups and habitat types and estimated effects of Delta Plan restoration targets on Delta-wide primary production. The study offers historical context and best available science for informing restoration and management decisions.

KAREN KAYFETZ  
Delta Science Program  
Environmental Program Manager

The resulting report equips decision-makers to manage for improved primary production through a better understanding of historical patterns and synthesizes the best available science on the value of habitats and their configurations. Additionally, we continued to fund SFEI’s development of the forthcoming Delta Landscape Scenario Planning Tool, which will improve the effectiveness of proposed restoration projects in the Delta. The tool, anticipated in 2022, was presented at Council and Delta Plan Interagency Implementation Committee meetings in 2021.

Meeting our objective of achieving balanced ecosystem restoration will require us to analyze a myriad of factors. I’m excited about the Landscape Scenario Planning Tool’s ability to help us perform the analysis, better understand where restoration fits best on the landscape and can provide the greatest ecological function, and determine how individual projects contribute to landscape scale restoration.

CAMPBELL INGRAM  
Sacramento-San Joaquin Delta Conservancy  
Executive Officer
Coordinating Response

Coordinating with Decision-Makers

Following the adoption of the Delta Plan in 2013, the Council established the Delta Plan Interagency Implementation Committee to facilitate collaborative Delta Plan implementation in support of shared national, statewide, and local goals for the Delta.

Gathering to discuss our collective work toward a healthy and resilient estuary has never been more important or more essential.

AMANDA BOHL
Delta Stewardship Council
Special Assistant for Planning & Science
This year, the DPIIC met to discuss nature-based climate adaptation, ecosystem-based management during drought, and the Delta Crosscut Budget Report, and endorsed the creation of a Delta Restoration Subcommittee to better coordinate ecosystem restoration plans and actions and eliminate barriers to building more effective restoration projects. Improving and accelerating ecosystem-based management in the Delta takes collaboration and communication around science, risk management, and reducing barriers to restoration.

With the compounding stressors facing the Delta—from climate change and drought to conflicting interests—this level of coordination is necessary. The DPIIC is the primary venue for exploring how the 18 State and federal agencies with a role in implementing the Delta Plan can better coordinate, collaborate, and communicate.

RYAN STANBRA
Delta Stewardship Council
Chief Deputy Executive Officer
Coordinating with Managers

A key way that we coordinate with Delta managers is collaboratively developing, updating, and upholding the documents that make up the Delta Science Strategy: the Delta Science Plan, the State of Bay-Delta Science, and the Science Action Agenda (SAA). Combined, this three-part planning, implementation, and reporting strategy establishes a foundation for an inclusive Delta science community that works together to build a common body of scientific knowledge. This year, our Delta Science Program prepared for and drafted the second iteration of the SAA, the four-year agenda that prioritizes and aligns Delta science actions to inform management decisions, fill knowledge gaps, promote collaborative science, and build science infrastructure.

2021 marked the final year of the 2017-2021 SAA, which guided $35 million in management-relevant science funding from the Council and its partners and advanced our state of knowledge on key management challenges ranging from water quality to habitat restoration.

HENRY DEBEY
Delta Science Program
Environmental Program Manager
The 2022-2026 SAA builds off the advances made between 2017-2021 and responds to a broad, collaboratively developed list of management questions and needs that ensure science is intentionally funded to fill gaps in policy and management. It was informed by a thorough Progress Summary of the 2017-2021 SAA, which showed that the Delta science community had made significant progress in enhancing its capacity for synthesis, integrating previously disparate datasets, and improving its understanding of the interactions between environmental stressors and managed species.

The Progress Summary positioned us to identify remaining gaps in science—assessing the human dimensions of environmental management, understanding human communities in relation to the effects of habitat restoration, and enhancing capacity for forecasting and comparing resilience across different management and climate scenarios—to inform what science activities and funding we prioritize moving forward.

The draft 2022-2026 SAA was released for public comment in November and will be finalized in 2022.

Coordinating with Scientists

In the face of rapid environmental change, timely science funding, synthesis, and communication are more important than ever, enabling decision-makers and managers to effectively respond to unprecedented and quickly advancing climatic conditions. In addition to funding science media publications like San Francisco Estuary and Watershed Science,
Estuary News, and the Science in Short Podcast, this year, we partnered with the U.S. Bureau of Reclamation and the State Water Contractors to award over $10 million for new science to transform our understanding of the Delta. A total of $63.9 million in funding was requested across 99 submitted proposals. Following evaluation by a review panel, we selected 16 proposals, which were in alignment with the high-priority research topics noted in the 2017-2021 SAA.

The extraordinary response to this solicitation and value of this research underscores the need to prioritize long-term, reliable funding for innovative and diverse science that effectively informs management in the Delta.

DYLAN STERN
Delta Science Program Environmental Program Manager
The Delta Science Program intends to continue to offer large, multi-agency Delta science solicitations on a biennial basis.

The awarded research proposals will fill some of the biggest science gaps in our management of harmful algal blooms, invasive species, habitat restoration, endangered species recovery, and adaptation to sea-level rise, among other topics. Our new and ongoing science communication initiatives actively seek to close the loop for research that is both informed by and informs environmental management.

This year, the Delta Science Program also partnered with the National Center for Ecological Analysis and Synthesis to launch an interagency synthesis working group on the drivers of the estuarine food supply. Ecological synthesis is a critical component of ecosystem-based management and informed decision-making.

The need for increased capacity, dedicated time, and coordinated synthesis is recognized and included as an action in the Delta Science Plan, SAA, and Interagency Ecological Program Science Strategy.
This effort led to a three-week synthesis, collaboration, and statistics training curriculum held in September, October, and November.

Open science products from the synthesis working group include the release of reproducible workflows and databases that bring together disparate data sources and make communicating science outcomes more transparent and accessible.

**Exploring New Ways to Communicate Science**

Understanding that effective science communication transforms information into knowledge, and knowledge into action, the Delta Science Program launched Delta Breeze, a newsletter focused on Delta science funding. The **inaugural issue**, published in July, featured projects from this year’s Delta science research awards. The **second issue**, published in December, highlighted research findings and accomplishments of recent Delta science fellows.
As we continue to innovate and explore new ways to reach scientific and public audiences, our Lead Scientist Laurel Larsen launched an Instagram Live “Ask Me Anything” series in which she hosts office hours alongside Delta scientists, decision-makers, and other interested parties. The series represents a new media avenue that broadens our community outreach.

**Coordinating with Communities and the Public**

Coordination with the public—those who live, work, and recreate in the Delta and those who rely on it throughout California—is essential.

Engaging effectively with the public not only helps inform our understanding of the Delta and the formulation of policy that achieves the coequal goals, but also leads to the successful implementation of solutions that respect and recognize the legacy communities who built and live in the region.

**BRANDON CHAPIN**  
*Delta Stewardship Council*  
*Staff Services Manager*
To that end, the Council endorsed its Public Participation Plan in June 2020, a few months into the Covid-19 pandemic. It serves as a guide for how interested parties and members of the public can inform Council decision-making and comment on Delta Plan implementation.

In 2021, we conducted a survey requesting feedback on the Public Participation Plan a year into its implementation and synthesized the feedback to inform our practices moving forward in a manner responsive to the public’s evolving concerns, needs, and interests. We found that while we have improved in our participation efforts (65 percent rated efforts as excellent/good, compared to 50 percent in 2019), we still have work to do to ensure we are reaching and hearing all voices.

The Council has always been committed to public engagement in its decision-making. Endorsement of the Public Participation Plan reaffirmed that commitment. Based on the results of this year’s survey, staff will continue to work to reduce barriers to participation, expand outreach, and foster new and existing partnerships.

ABBOTT DUTTON
Delta Stewardship Council
Assistant Deputy Executive Officer for Communications
As part of our efforts to elevate and respect community voices and needs, we have worked to incorporate environmental justice into multiple ongoing initiatives, including Delta Adapts, public participation, and our funding and fellowship opportunities. This year, we initiated the preparation of our environmental justice issue paper, which aims to build a network of community leaders to advise the Council, identify environmental justice issues, and explore options to address those issues. This year we also co-hosted a series of virtual environmental justice brown bags with California Sea Grant.

HIGHLIGHT


November
Taking Action

Hosting Virtual Forums, Workshops, and Conferences

**February 3–5**
The second biennial Adaptive Management Forum provided an opportunity for the Delta community to bring scientists and practitioners together, share knowledge, and promote collaboration on adaptive management of the system. Adaptive management provides tools for addressing continuously changing conditions and developing new, effective management strategies for the region.

**February 17–19**
The three-day Steelhead Workshop identified collaborations and partnerships that could contribute to the development of comprehensive monitoring of San Joaquin Basin Steelhead, an important species in the region and protected under the Endangered Species Act.
April 6–9
The biennial Bay-Delta Science Conference, jointly sponsored with the U.S. Geological Survey, is a forum for presenting scientific analyses and results relevant to the management of the San Francisco Bay and the Delta. This conference is our flagship collaborative meeting and brings together scientists and managers from diverse government, academic, and private institutions for discussion of region-wide issues.

July 13–14
As part of the SAA revision efforts, the Science Actions Workshop invited the public and Delta scientists, managers, and interested parties to help shape the near-term priority science actions for the Delta. Based on this workshop, previous events, and public surveys, the 2022-2026 SAA will provide a collaboratively developed framework for prioritizing science that in turn supports strategies to attain resilience for humans and ecosystems.

To protect public health, the 2021 Bay-Delta Science Conference was held virtually, for free, and in partnership with the annual Interagency Ecological Program Workshop. Doing so brought the highest attendance on record for this event and positioned us to truly embrace the theme of building resilience through diversity in science.

MAGGIE CHRISTMAN
Delta Science Program
Environmental Program Manager
Social Science

The 2021 Bay-Delta Science Conference included the kickoff of a Bay-Delta Social Science Community of Practice. The event brought together social scientists and practitioners committed to advancing policy-relevant social science on the human dimensions of the Delta and the San Francisco Bay—providing an opportunity for collaborative research efforts that will inform management and policy in the Delta as we advance our understanding of the estuary as a complex social-ecological system.

The Delta is not only an invaluable natural and ecological resource but also a place of great historical and cultural significance to the people who live in and care about the region. Bringing social science into our line of sight sharpens our understanding of the social-ecological system’s complexities and allows us to better inform Bay-Delta resource management.

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JESSICA RUDNICK
Delta Stewardship Council, California Sea Grant Social Science Extension Specialist

Blogs published by IEP
Lead Scientist Steve Culberson: Complexities: Thinking about the San Francisco Estuary during the 2021 Bay-Delta Science Conference
Blog published by Jessica Rudnick: Social Science in the Delta

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Covered Actions

Realizing the coequal goals for the Delta requires common guidance for projects and plans. To accomplish this, the Delta Reform Act charged the Council with the development and implementation of a comprehensive, long-term management plan for the Delta, the Delta Plan, and established a requirement for projects that fit certain criteria (referred to as covered actions) to demonstrate consistency with the Delta Plan by submitting a certification of consistency for the project to the Council. This year, 10 covered action certifications were submitted, more than double the previous year. The Delta Reform Act gives the Council regulatory authority over covered actions through an appeal process, which allows any person to challenge the consistency of the covered action with the Delta Plan. This year, the certification of consistency for a California Department of Water Resources covered action, the Lookout Slough Tidal Habitat Restoration and Flood Improvement Project, was appealed by four parties. The Council’s findings remanded this covered action in part, on the issues of best available science used to estimate recreational use and project siting for recreational access to address Delta as Place considerations. This multi-benefit project located in the north Delta is important to system-wide ecosystem restoration and flood control objectives and a certification of consistency to address the Council’s findings was submitted to the Council in December.
The covered action certification of consistency process reinforces science-based decision-making in recognition of the complexities of balancing the coequal goals, protecting the Delta as a place, and developing Delta resilience.

Additionally, we analyzed three long-range planning documents and sent 16 comment letters to identify potential covered actions and ensure State and local agencies are aware of the Delta Plan’s requirements and how they may apply to their work. This outreach is part of the Council’s early consultation process, which engages State and local agencies directly regarding certification of consistency requirements to assist with their preparation of certifications of consistency.

Reflecting Thoughts

At the Council, we believe that true resilience is intersectional. As we strive to develop deeper and more inclusive relationships with the Delta community and all those invested in the continued resilience of the region, we must first strengthen our agency internally. In 2021, we approached this through the reimagining of our Justice, Equity, Diversity, and Inclusion efforts, which have evolved to include staff trainings, a climate assessment, and a strategic plan.
This year we deepened our understanding of the issues we face in the Delta. We worked to connect the larger Delta community—scientists, managers, decision-makers, and the public—in open discourse about how best to build collective resilience amid rapid change. We recognize the Delta’s significance is tied to its cultural heritage: we are thankful to those who stewarded the land before us and hope to continue learning from the region’s diverse populations to develop nature-based solutions for a resilient future.

We recognize that our organization is implicated in larger systems that historically reduced progression towards diversity, equity, and inclusion. Therefore, we aim to foster and sustain an environment in which all people feel welcome, safe, respected, heard, supported, and valued.