Agenda Item: 5, Attachment 1
Meeting Date: September 26, 2024

SEP 2024

Delta Plan Five-Year Review 2024

With Performance Measure Report Cards

Delta Stewardship Council
A CALIFORNIA STATE AGENCY

A Note From Our Executive Officer

The past five years have seen significant progress in the Sacramento-San Joaquin Delta, but our work is far from finished. We must remain focused on the goals set by the legislature for the Delta. Our progress is the direct result of effective partnerships and a commitment to equitable, science-based solutions that build resilience in the face of rapid change. The Delta Plan and its recommendations have been instrumental in guiding this momentum, and the Delta Stewardship Council will continue to build on these foundations as we enter the second decade of this long-term management plan.

Key accomplishments in this 2024 Delta Plan Five-Year Review include:

- Prioritized levee improvements (a first for the Delta),
- Diversified water sources, reducing reliance on the Delta,
- Elevated tribal and environmental justice issues, and
- Strengthened relationships across partner organizations.

The recommendations in this report are designed with resilience at their core. We must adopt adaptive, science-based management practices to succeed and to learn from our efforts when we fall short. Urgent action is needed on ecosystem restoration, subsidence reversal, and climate adaptation. New performance management tools and data sources, as well as tourism information, must become more readily available.

For those involved or interested in California's environmental landscape, this report offers crucial insights for driving effective action.

Looking ahead, we face both new opportunities and challenges. California's reliance on the Delta means our approach must be both optimistic and relentless.

Jessica R. Pearson
Executive Officer
Delta Stewardship Council

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Introduction

The Delta Reform Act requires the Council to review the Delta Plan at least once every five years, and the Council may revise the Delta Plan as it deems appropriate. (Wat. Code § 85300(c.)) The Council is conducting a Five-Year Review to evaluate progress in implementing Delta Plan policies, recommendations, and performance measures. The Five-Year Review identifies areas where progress has been made or is lacking and informs the Council of opportunities to address deficiencies. Consistent with the flexible decision-making framework known as adaptive management, this review process ensures that the Delta Plan responds to changes in the environment, science, knowledge, and the pace and uncertainty of climate change to stay the course in pursuit of the coequal goals.

The Council completed the first Delta Plan Five-Year Review in 2019 and has worked toward implementing the priority actions recommended in the 2019 Review. This second Delta Plan Five-Year Review, completed in 2024, has four objectives:

1. Evaluate progress implementing the Delta Plan using performance measures summarized in Report Cards.
2. Identify where progress toward Delta Plan objectives has been made by implementing the Plan.
3. Identify where progress is needed to achieve Delta Plan objectives.
4. Focus and prioritize the Council's near-term Delta Plan implementation efforts.

The 2024 Five-Year Review is organized into four parts. Part 1 presents key accomplishments from the past five years connected to the priorities identified in the 2019 Five-Year Report. Part 2 presents progress report cards for Delta Plan chapters drawn from Delta Plan Performance Measures and describes key findings and issue spotlights from performance measure assessments. Part 3 reviews all covered actions submitted to the Council since 2013 by state and local public agencies, considers the applicability of Delta Plan regulatory policies to covered actions and appeals, and recommends actions and emerging topics to ensure that the Delta Plan responds to contemporary issues and opportunities. Part 4 lists recommended actions the Council could take in the next five years to improve performance measure progress and affirm the Council's regulatory roles to achieve the Delta Plan's objectives better.

The Delta Plan is implemented through the efforts of many partners, and the Council leads partnerships with agencies, academia, and organizations to achieve both short- and long-term goals. This Five-Year Review represents a feedback

loop in adaptively managing the Delta Plan and informs the Council's next set of near-term priorities. The Council recognizes the need for urgency in the recommended actions and is committed to using its leadership role to ensure collective progress toward the coequal goals.

The 2024 Five-Year Review includes the following recommendations. Each recommendation is supported by one or more action(s) described in Part 4.

1. Reduce Reliance on Delta Water
2. Accelerate Ecosystem Restoration
3. Accelerate Subsidence Reversal Efforts
4. Promote Delta Recreation and Tourism
5. Improve State and Federal Assurances for Delta Levees
6. Consider and Implement Performance Measure Updates
7. Implement the Delta Levees Investment Strategy
8. Consider the Impacts and Benefits of Capturing and Storing Carbon
9. Conduct Covered Action Early Consultation and Post-Project Updates
10. Improve the Use of the Best Available Science in Certifications of Consistency
11. Enhance Adaptive Management Plans
12. Develop a 'Delta as an Evolving Place Facing Rapid Change' Report
13. Implement New Climate Adaptation and Tribal and Environmental Justice Recommendations as Directed by the Council

Part 1: Key Five-Year Accomplishments (2019-2023)

The accomplishments summarize the past five years while the report cards cover the full ten years of the performance measures. Key achievements between 2019 and 2023 include updating policies and recommendations in response to new knowledge and lessons learned, amending the Delta Plan, and finalizing regulations that implement the Delta Plan. Other accomplishments include advancing interagency coordination and providing the best available science to support decision-making.

The 2019 Five-Year Review identified emerging issues the Delta Plan has not addressed. The Council has made progress on some of these issues, such as advancing planning for climate change risks and addressing environmental justice in the Delta (Table 1). The 2019 Review identified federal coordination and participation as an area of future focus – these objectives are currently advanced through Delta Plan Interagency Implementation Committee (DPIIC) activities and engagement.

TOPIC/ ISSUE	ACTIONS	STATUS
1) Environmental Justice and Disadvantaged Communities	2018 Delta Plan amendments include recommendations that support sustainable water management statewide, benefit disadvantaged communities, and help ensure the right to safe clean, affordable, and accessible water for consumption and domestic use.	✓
	Develop a public participation plan that will address how environmental justice and disadvantaged communities can be better integrated into the Council's decision-making processes.	✓
	Develop an issue paper that summarizes the best available science for additional responses within the Delta Plan to address disadvantaged communities and environmental justice.	◉
2) Robust Treatment of Climate Change Risks to the Delta	Integrate climate change into Delta Plan Chapter 4, Protect, Restore, and Enhance the Delta Ecosystem. Proposed revisions will focus on achieving successful restoration under predicted future conditions, consistent with updated state climate change guidance.	✓
	Create a climate change vulnerability assessment and adaptation strategy for the Delta Suisun Marsh, working closely with federal, state, and local agencies. Upon completion, the Council will evaluate the potential for Delta Plan amendments to better address climate change risks.	◉
3) Federal Coordination and Participation	Develop an issue paper that outlines opportunities and potential strategies for further engagement with federal agencies.	○
4) Delta as an Evolving Place	Develop an issue paper that summarizes the best available science and identifies policy options related to the Delta as an evolving place.	○
	Continue to engage the Delta Protection Advisory Committee and the Delta Protection Committee, focusing on specific efforts to engage with Delta representatives when conducting future Delta Plan amendments.	◉

✓ Completed ◉ In Progress ○ Not Started

Table 1. Status of Priority Issues and Topics Identified in the 2019 Review.

Some initiatives identified in the 2019 Five-Year Review will sequentially build on recently completed work. For example, the 2024 Review includes a recommendation to prepare a Delta as an Evolving Place report that will build on the Environmental and Tribal Justice issue paper and the recent Delta Residents Survey to identify policy options to continue to promote human well-being and economic development in Delta communities and improve State and federal assurances for Delta levees.

Amending and Updating the Delta Plan

Ecosystem Amendment

In 2022, the Council completed an update to Delta Plan Chapter 4, "Protect, Restore and Enhance the Delta Ecosystem" (Ecosystem Amendment), setting forth a vision and strategies to achieve the dynamic and resilient restored landscape envisioned in the Delta Reform Act. The Ecosystem Amendment includes policies and recommendations designed to protect existing ecosystems, restore ecosystems, and enhance working or urban landscapes that provide habitat resources and performance measures to assess outcomes. These approaches aim to reestablish ecological processes and functions to be more resilient to land conversion and climate change. The Ecosystem Amendment leverages decades of research and recovery planning to identify a path forward, increasing agency coordination and working with community members toward a common vision for a restored Delta ecosystem. Updated regulations to implement the Ecosystem Amendment are anticipated to take effect in 2025.

Delta Levees Investment Strategy

The Delta Levees Investment Strategy (DLIS) is a method the state uses to prioritize investments in Delta levee operations, maintenance, and improvements based on risk analysis, economics, and engineering to reduce the likelihood and consequences of levee failures. The Council amended Delta Plan Policy RR P1 to implement the DLIS under an inclusive process spanning ten years. The revised version of RR P1 (Cal. Code Regs., tit. 23, § 5012) became law on January 1, 2024.

Administrative Procedures Governing Covered Actions Appeals Update

Identified as a priority in the 2019 Five-Year Review, updating the Administrative Procedures Governing Appeals (Appeals Procedures) built on feedback received and lessons learned from ten years of processing covered actions and appeals. The updated Appeals Procedures improve the process for both certifying agencies and appellants. Updated amendments were adopted by the Council in 2022, and the

updated Appeals Procedures are now contained in the California Code of Regulations. (Cal. Code Regs., tit. 23, §§ 5020 – 5035)

Emerging Issues from the 2019 Five-Year Review

Delta Adapts: Creating a Climate Resilient Future

The 2019 Five-Year Review identified climate change adaptation as an emerging priority. In response, the Council completed the Delta Adapts Vulnerability Assessment in 2021. The Vulnerability Assessment analyzes how changes in precipitation, temperature, and sea level rise would increase impacts on the Delta related to droughts, floods, extreme heat, and wildfire smoke. It is based on comprehensive flood and water supply models that can be replicated and updated. It also includes a customized social vulnerability index identifying Delta communities most vulnerable to climate risks. Informed by the vulnerability assessment, the Council leads a climate adaptation planning effort with a robust engagement process and anticipates releasing the Delta Adapts Climate Adaptation Plan in 2024.

Tribal and Environmental Justice Issue Paper

The 2019 Five-Year Review identified environmental justice as an emerging priority. In response, the Council is preparing a Tribal and Environmental Justice Issue Paper summarizing the best available science concerning tribal and environmental justice issues impacting Delta communities and identifying potential policy options for the Council to consider. The issue paper is being prepared in coordination with community members and tribes and is based on interviews with community-based organizations. The Council expects to complete the issue paper in 2024.

Coordinating Implementation of the Delta Plan across Federal and State Agencies

Achieving the coequal goals is a shared responsibility for the many local, state, and federal agencies active in the Delta. The DPIIC exists to enhance coordination and dialogue. In 2019, the DPIIC endorsed priority actions to begin implementing the Science Funding and Governance Initiative, which focuses on understanding how science is funded, how to increase science funding, and how governance structures can best meet science needs. As a result, the annual Delta Crosscut Budget report was created, which provides a process for collecting funding data across the entire Delta science enterprise. In 2022, the DPIIC convened the Restoration Subcommittee to identify and implement strategies to reduce landscape-scale restoration barriers and increase estuary-wide coordination. The Restoration

Subcommittee organized two Delta Restoration Forums in 2023, where community members joined agency staff in discussing challenges and opportunities in implementing restoration.

Supporting the Delta Plan through Best Available Science

The Delta Plan is rooted in the best available science developed through a process that meets relevance, inclusiveness, objectivity, transparency and openness, timeliness, and peer review criteria. Bolstered by its Delta Science Program, the Council is a champion for an open Delta science community and an advocate for using the best available science in covered actions, Delta Plan implementation and updates, and other resource management decisions that affect the Delta.

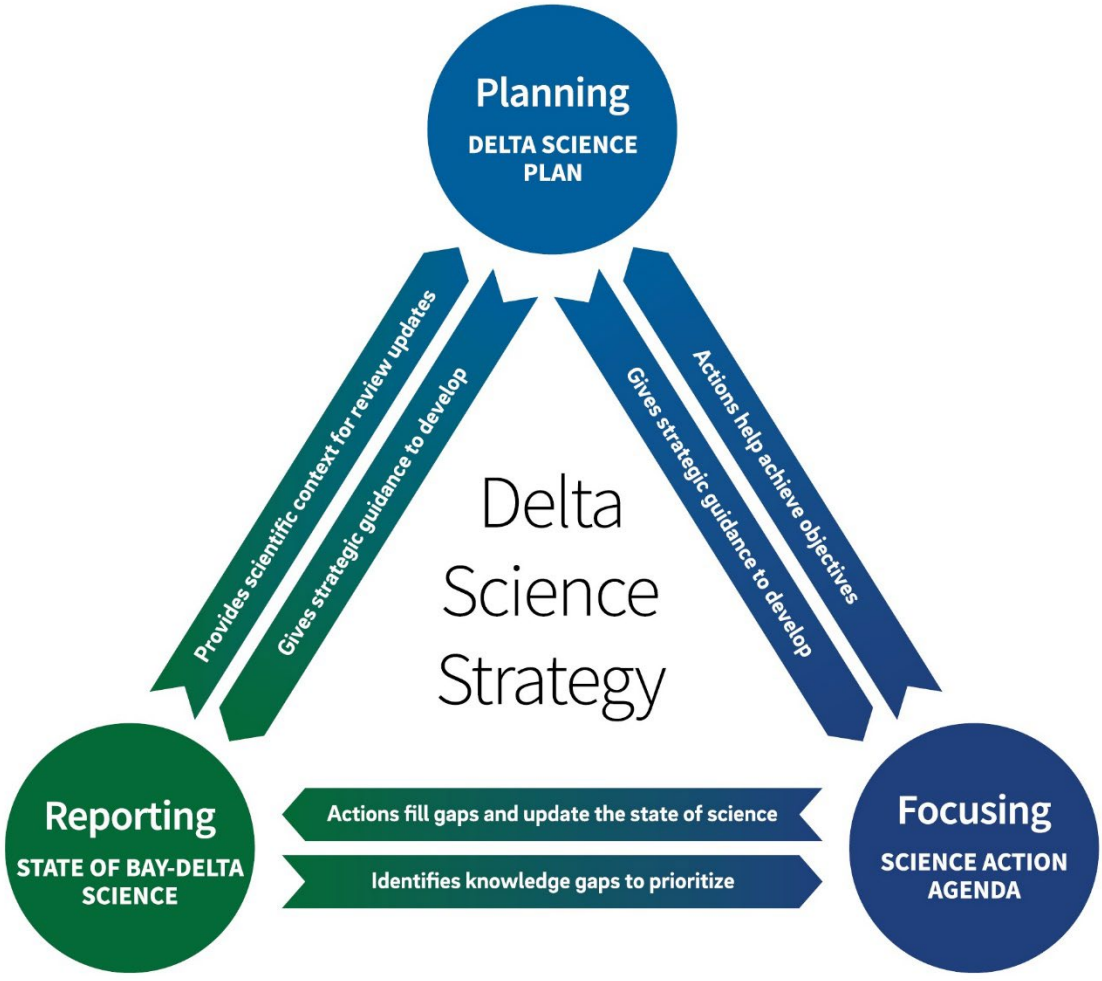


Figure 1. *The Delta Science Strategy.*

Implementing the Delta Science Strategy

The Delta Science Program has collaboratively produced updates to each element of the Delta Science Strategy: Delta Science Plan, 2022-2026 Science Action Agenda,

and 2022 State of the Bay-Delta Science—a three-part planning, implementation, and reporting strategy that embodies an open and collaborative community of scientists, policymakers and decisionmakers—and supported their implementation across the Delta science enterprise. Additionally, the Delta Science Program has advanced a number of knowledge- and data-driven synthesis efforts. In 2021, in partnership with the National Center for Ecological Analysis and Synthesis, the Delta Science Program provided data science training for early career Delta scientists across state and federal agencies and academia and generated new insights on Delta food web dynamics by synthesizing multiple datasets. To further promote transparency, foster open science, and improve collaboration, the Delta Science Program launched the Delta Science Tracker in 2022, providing a free, comprehensive tool to track and summarize Delta science activities.

Category	Accomplishments by the Numbers
Science Funding and Fellowships	**66** research projects funded, led by researchers from different disciplines, institutions, and career stages, to advance our understanding of the Delta.
	$34 million in competitive science funding was awarded to advance the 2017-2021 Science Action Agenda.
	18 Sea Grant State Policy Fellows hosted to provide early career experience and direct placement within state agencies.
Collaborative Science	**26** workshops, symposia, forums, and conferences convened to elevate the state of science, promote learning and understanding, and use of science for decision-making.
	10 collaborative groups led to foster science collaboration and coordination.
	9 web-based tools collaboratively developed, including the Delta Science Tracker, to enhance science infrastructure for better collaboration.
Science Communication	**36** seminars were organized to promote community learning on topics ranging from social science to governance to environmental justice.
	Delta Lead Scientist's "Ask Me Anything" podcasts and the Delta Breeze newsletter are new social media outlets that inform the community about up-to-date science.
Peer Reviews	**6** major independent scientific peer reviews facilitated.

Table 2. 2019-2023 Delta Science Program Accomplishments.

Delta Science Program activities continue to be an important mechanism for scientists and agencies to coordinate research and communicate findings and forecasts to policymakers and resource managers who rely on the best available science to make informed decisions for the region (Table 2). Scientific

advancements and collaborative science are integral to adaptively managing the Delta Plan.

Strengthening Social Science and Interdisciplinary Inclusiveness

Integrating the social sciences into environmental science, management, and decision-making in the Delta can contribute to a better understanding of the people who live, work, and recreate in and around the estuary, how the management of the estuary impacts the health and well-being of people statewide, and the behavioral, cultural, and political influences on environmental issues central to the Delta's long-term sustainability. The Social Science Task Force Report assessed the state of social science in the Delta and developed recommendations for holistic integration of the social sciences into Delta science, management, and decision-making. In 2020, the Council hired social science extension specialist Dr. Jessica Rudnick to build capacity and progress interdisciplinary issues.

The Bay-Delta Social Science Community of Practice was founded in 2021 as a community of social science scholars, practitioners, and allies committed to advancing applicable and relevant research on the human dimensions of the Bay-Delta. In 2022, a first-ever **Delta Residents Survey** was launched to collect statistically significant, representative data on Delta residents' social and environmental well-being. Additionally, multiple ongoing Council-led projects and work groups integrated the theory, methods, and data from the social sciences into the best available science synthesis, planning initiatives, and decision-making.

Advancing Science Funding for the Delta

The Council continues to ensure that funding for activities in the Delta and its watershed aligns with the objectives of the Delta Plan, the Delta Science Plan, and the Science Action Agenda. The **Delta Research Awards** fund critical research projects that address key knowledge gaps and advance the understanding of the dynamic Bay-Delta socio-ecological system. Additionally, the **Delta Science Fellows Program** provides up to two years of support to early-career scientists to work collaboratively with academic and community mentors, addressing priority biophysical and social science research topics related to water management and ecosystem health in the Bay-Delta. Between 2019 and 2023, over $20 million was allocated to support critical Delta science, with an additional $6 million to be distributed in 2024-2025 (Table 3).

Year	Amount Awarded ($ mil)	Research Projects Funded	Award Program Type
2019	9.6	15	Delta Science Research Awards
2020	1.5	10	*Delta Science Fellows Research*
2021	9.6	16	Delta Science Research Awards
2022	1.0	8	*Delta Science Fellows Research*
2025	6.0	TBD	Delta Science Research Awards

Table 3. 2019-2024 Delta Science Funding Allocations.

Delta Independent Science Board

The Delta Independent Science Board (Delta ISB) is recognized as an important source of independent scientific oversight and review in the Delta. Delta ISB reviews increase scientific credibility, improve research clarity, and evaluate the effectiveness of the Delta science enterprise. Between 2019 and 2023, Delta ISB reviews included:

- **Non-native Species Science Review** highlighted the importance of getting ahead of invasions for prevention and mitigation; and recommended an ecosystem-level, forward-looking, and integrated approach to non-native species science in the Delta with specific consideration of climate change.
- **Monitoring Enterprise Review** assessed how monitoring programs meet the needs of resource management agencies and recommended better links between monitoring and management, development of management-informed priority science needs, reimagination of monitoring designs, and strengthening organizational and funding structures.
- **Water Supply Reliability Review** evaluated the science and practice of water supply reliability estimations for various human and environmental purposes. It recommended better representation of changes in climate, ecosystems, regulations, demand, and extreme events, employing clear communication, and integrating reliability analyses into decision-making to improve water supply reliability estimation.

Delta ISB reviews inform the Council and enable the use of the best available scientific information to adaptively manage the Delta Plan through the development of Delta Plan amendments, review of covered actions, and implementation of Delta Plan policies and recommendations.

Part 2: Performance Measure Report Cards

The Delta Reform Act requires that the Delta Plan include "performance measurements that will enable the Council to track progress in meeting the objectives of the Delta Plan." (Wat. Code, § 85211) Accordingly, the Delta Plan establishes performance measures to evaluate whether resource management actions recommended in the Delta Plan are producing expected results. The Council developed quantitative performance measures based on the best available data and science and management relevance through an inclusive multi-year process involving state, federal, and local agencies, scientists, and interested persons.

This Five-Year Review uses performance measures to evaluate and rate progress in implementing the Delta Plan. Ratings are based on quantitative targets for each measure established in the Delta Plan and consider the portion of the target achieved by 2023. Ratings are summarized below using performance report cards aligned with several Delta Plan chapters.

As envisioned in the Delta Reform Act, the performance measure report cards provide a roughly ten-year snapshot of measured progress toward Delta Plan objectives – a relatively short time to discern the effects of recommended management actions on system outcomes. For example, many ecosystem outcomes would not be expected in the short term, as it takes years to see the desired outcomes of near-term investments.

Delta conditions are also affected by external drivers beyond management's control. Hydroclimatic variables can magnify, diminish, and obscure the effects of management actions, making assessments of management effectiveness difficult to interpret and uncertain. Over the past ten years, California has experienced climate and hydrologic extremes, oscillating between extended dry periods and record heat waves to wet years with extreme precipitation and flooding. As climate change intensifies, performance-based evaluations provide a regular 'pulse-check' on the state of the Delta Plan implementation. As more data is collected, the performance measure report cards can provide structured, consistent feedback on the hydrological, ecological, and human characteristics that define the Delta as a unique and evolving place. The Council uses such feedback to inform adaptive management of Delta Plan recommendations to improve the trajectory toward desired targets.

The progress report cards in this report consist of performance measure ratings, findings at a glance, and issue spotlights describing more complex performance areas. A rating scale scores each performance measure based on the portion of the performance target achieved at the time of the evaluation.

Symbol	Status Rating	Target Achieved	Status Description
	POOR	0-25%	Conditions are not improving or are worsening.
	FAIR	26-50%	Conditions show potential for improvement.
	GOOD	51-75%	Conditions are developing toward the target.
	VERY GOOD	76-100%	Conditions are generally very good, and desired outcomes are close to or fully achieved.

Figure 2. Performance Measure Rating Levels.

Progress ratings are provided for each performance metric. Performance measures with multiple metrics calculate the overall score as an arithmetic mean of the individual metric scores. Technical details from the analysis supporting the performance measure evaluations are provided in Appendix 1.

As shown in the report cards, much progress has been made toward meeting the objectives of the Delta Plan, and many desired outcomes are already being achieved. Still, many performance measures show slow improvement or demonstrate a lack of progress, and action is needed to change their trajectory. Recommendations regarding Council actions to better achieve the objectives of the Delta Plan, as informed by the report cards, are presented in Part 4 of this report.

Delta Plan Chapter 3:
A More Reliable Water Supply for California

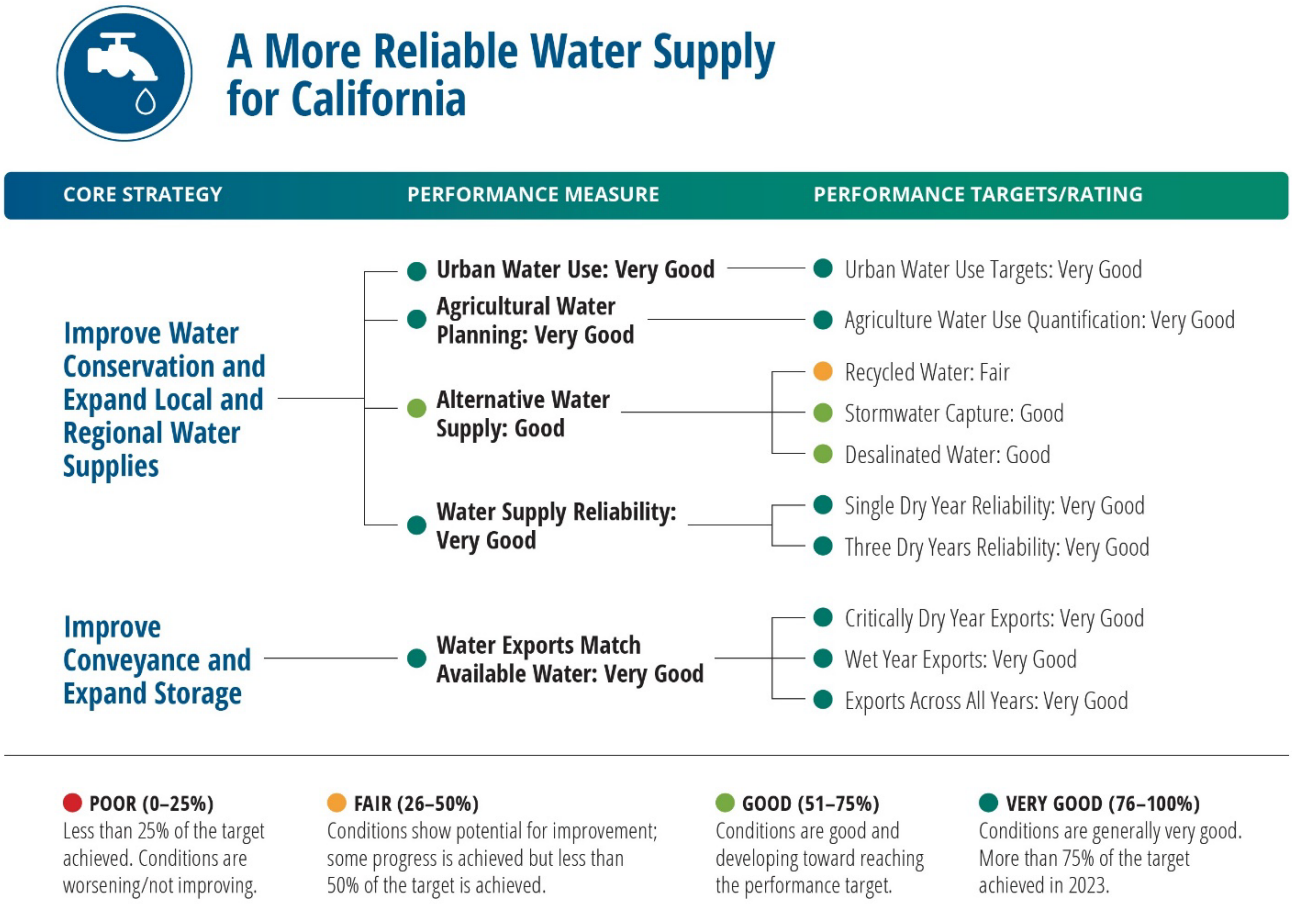


Figure 3. Reliable Water Supply Report Card with Performance Measures.

Findings At-a-Glance

Measured with respect to the performance targets, **progress toward a reliable water supply for California over the past 10 years is commendable.** Improvements in urban water conservation and water use efficiency have contributed to increased local self-reliance and reduced demand for Delta water relative to baseline conditions. An expanding portfolio of alternative local water supply sources contributed to regional reliability and local self-reliance. Extended dry conditions dominated the decade, triggering emergency drought proclamations that impacted water allocations and mandated statewide water conservation. Managing the demand for water through urban conservation needs to continue to prepare for a hotter and dryer climate and to offset California's population growth.

Issue Spotlights

Improve Water Conservation and Expand Local and Regional Water Supplies

The Delta supplies water to more than two-thirds of Californians. Water conservation and improved water use efficiency contribute to reduced demand for Delta water and improved regional self-reliance. **Urban water users reduced consumption by 20% between 2010 and 2020, using an average of 50 gallons less water per person.** In 2015 and 2020, urban water use efficiency improved to 133-135 gallons per person per day (GPCD), compared to 183 GPCD in 2010, implementing water conservation during periods of extended drought.

Agricultural water suppliers must comply with water planning laws requiring quantified agricultural water use efficiency reporting. By 2023, 92% of agricultural water suppliers that directly use State Water Project water reported water use efficiency, and 75% included accounting for Delta water use. Consistent reporting of Delta reliance in urban and agricultural water management plans for water suppliers who rely on Delta water will be important for meeting the State policy of reduced reliance on the Delta.

As California experiences routine droughts, water suppliers are planning for regional water supply reliability during dry years. **Over 90% of urban suppliers who rely on Delta exports demonstrated preparedness for at least three consecutive dry years.** The increased use of local alternative supplies supports local water supply reliability. **By 2020, about half of California's urban water suppliers reported making progress toward achieving alternative water supply targets for recycled water, desalination, and stormwater runoff capture.**

Water Exports Match Available Water

The amounts of water available for exports and for the Delta ecosystem are driven by climate and hydrological variability, and decreased water exports are expected in the future under changing climate patterns. Managing Delta water exports based on the amount of water available in the system can benefit the ecosystem. Water exports during dry years have a greater chance of impacting the Delta ecosystem. Delta water exports, the main water supply for California's agricultural and urban areas, responded to drier-than-average hydrology. Water suppliers used less water in dry years when that water is critically important for the Delta ecosystem, and water suppliers used more water during wet years, resulting in an overall water export decrease. **During 2015-2023, dry-year annual Delta exports decreased (1.92 million acre-feet [MAF]), while wet-year exports increased (5.9 MAF)**

compared to historical averages (3.9 MAF and 5.0 MAF, respectively). Overall, average annual Delta exports decreased slightly across all water year types, reflecting lower-than-average precipitation and extended dry conditions.

Delta Plan Chapter 4: Protect, Restore, and Enhance the Delta Ecosystem

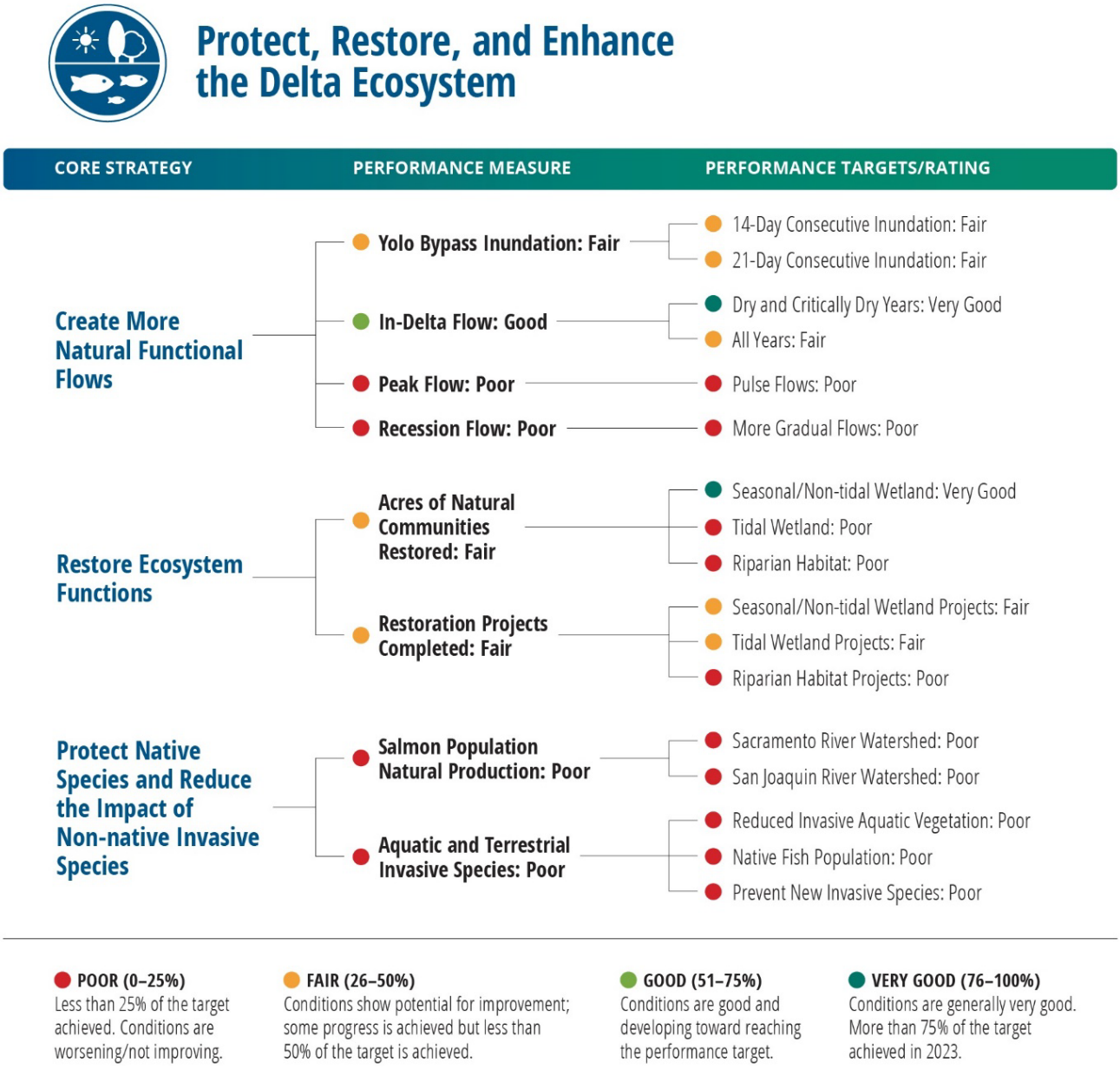


Figure 4. Delta Ecosystem Report Card with Performance Measures.

Findings At-a-Glance

Progress to date toward a healthy Delta ecosystem has not been at a scale sufficient to slow or reverse the decline of native species and functioning habitats. Rather, ecosystem conditions, the status of native species, and water quality continue to deteriorate – while invasive species, hazardous harmful algal blooms affecting public health, and more are on the rise. Despite a recent increase in habitat acreage and completion of numerous restoration and multi-benefit projects, restoring ecosystem function is a slow, gradual process, and it may take many years for the ecosystem to respond positively to management actions and more time still to achieve the desired ecosystem outcomes. Reversing these declining trends remains a high priority that requires focus, resources, and perseverance.

Issue Spotlights

Create More Natural Functional Flows

The Delta Plan advocates for more natural functional flows as a foundational element of Delta ecosystem restoration. A key part of creating these flows is restoring floodplain inundation levels that are wide enough, at the right time, and for enough time to support native fish species. The Yolo Bypass, located adjacent to the lower Sacramento River, delivers important ecological benefits to native fish in the river's mainstem and throughout the northern Delta. The Yolo Bypass floodplain was sufficiently inundated in only three out of the last ten years to support desired ecological functions. **More frequent and longer floodplain inundations are needed** to meet the Delta Plan targets. With the anticipated completion of the Big Notch project on Fremont Weir, Yolo Bypass inundation will be controlled to enable more frequent flooding for a longer duration and with less river flow, increasing opportunities for native fish spawning and rearing.

Restore Ecosystem Functions

Re-establishing native vegetation and restoring complex ecosystems are the desired outcomes of restoration. For example, management strategies supporting re-establishing natural communities include restoring tidal and seasonal flooding in natural areas and supporting Delta native species and habitats. Restoring various vegetation cover types promotes both ecological resilience and native biodiversity, contributing to the desired outcome of protecting, restoring, and enhancing the Delta ecosystem. Large areas of restored natural communities provide functional, diverse, and interconnected habitats suitable for fish and other wildlife and support the recovery of native species.

Evaluation of vegetation conditions in 2016 (the most recent data available) reveals that restoration progress for tidal wetlands and riparian habitats is only partially on track, while seasonal and nontidal wetlands approached the desired acreage targets. More recent restoration projects (since 2016) have contributed over 5,300 acres of tidal wetlands and over 700 acres of riparian habitat in the Delta. Still, **significantly more acres need to be restored at a sufficient scale, elevation, and connectivity to meet the Delta Plan habitat restoration targets**. Long-term maintenance and monitoring of restored ecosystems and implementation of adaptive management will be important to maintain a resilient, restored Delta ecosystem.

California Salmon Strategy, 2024

California salmon is an iconic fish species of great importance to California's natural and human environments. The statewide strategy outlines a portfolio of priority actions state agencies are already taking to stabilize and recover salmon populations and additional or intensified actions needed in coming years. With six priorities and 71 actions, the Salmon Strategy is set to achieve a healthier, thriving salmon population in California and restore entire aquatic ecosystems in the age of climate change.

Protect Native Species – Salmon Population Natural Production

One of the key outcomes of ecosystem restoration is to support the life cycle activities of native species. Salmon are native anadromous fish and a strong indicator species of ecosystem health and the effectiveness of habitat restoration in the watershed. Salmon use the Delta as a migration corridor and as an important habitat for young salmon to grow while they migrate to the ocean. The current salmon population depends on hatchery-produced fish, and the natural production of **Chinook salmon populations is declining**. In light of the long-term decline, in 2024, Governor Newsom released a statewide strategy to restore populations of salmon amidst hotter and drier weather exacerbated by climate change.

Reduce the Impact of Non-native Invasive Species – Invasive Aquatic Vegetation

One of the major stressors on Delta ecosystem health is invasive aquatic vegetation, which can take over habitat space, modify physical habitat structure, and alter food webs that benefit native wildlife and plants. Despite consistent annual herbicide treatment**, the acreage of submerged and floating aquatic vegetation has increased in the Delta over the last 10 years**. Additionally, invasive vegetation expanded in areas with planned restoration activities, making the control of invasive species an additional challenge (and expense) for ecosystem restoration. Many agencies conduct invasive species control. An integrated approach to invasive species management should continue to include strong collaboration (both in implementation and research), readiness and rapid response to new invasions, and anticipation and consideration of climate change.

Delta Plan Chapter 5: Protect and Enhance the Unique Cultural, Recreational, Natural Resource, and Agricultural Values of the California Delta as an Evolving Place

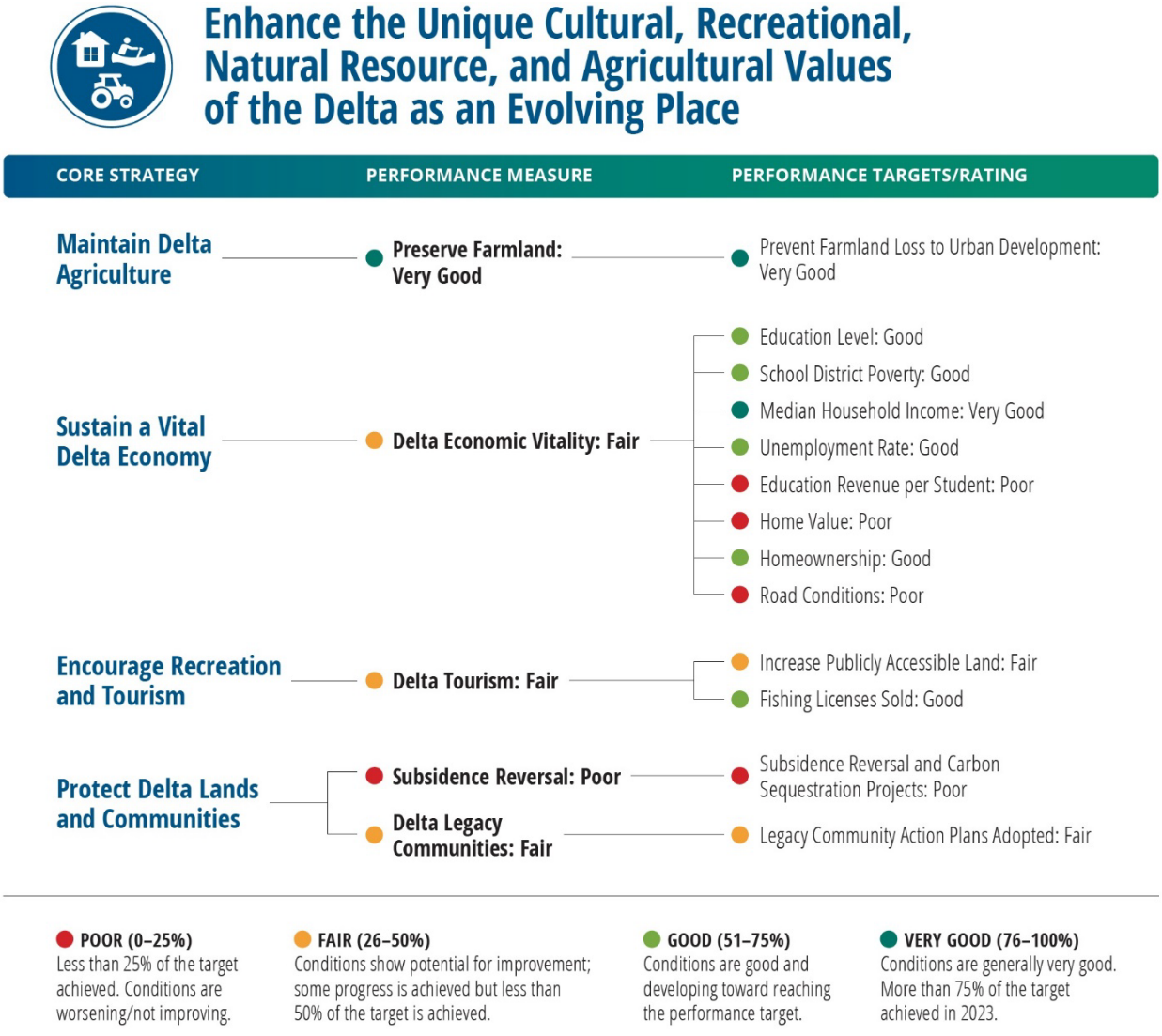


Figure 5. Delta as an Evolving Place Report Card with Performance Measures.

Findings At-a-Glance

Progress on Delta as an Evolving Place objectives is mixed. The metrics underlying performance measures for the Delta as an Evolving Place reveal diverging outcomes. Insufficient progress toward Delta Plan subsidence reversal and carbon sequestration targets is most alarming. Losing land to subsidence impacts agriculture, the economy, flood risk reduction, ecosystem restoration, and greenhouse gas emission reduction goals. Land management practices in the Delta

should focus on rebuilding soil, stopping and reversing subsidence, and sequestering carbon.

Issue Spotlights

Sustain a Vital Delta Economy

Improvements in the Delta economy are evaluated using a mix of socioeconomic indicators that describe the Delta region's quality of life and economic vitality. **The Delta economy relies mainly on agriculture, tourism, and (relatively) affordable housing**. These industries are cyclical in nature and affected by global market changes. The Delta is located near large urban hubs, and the availability of affordable housing contributes to economic opportunities. Quality of life for Delta residents is bolstered by school districts that outperform the state average despite higher childhood poverty rates. Labor market dynamics in the region reveal a need to support the Delta's economic base with infrastructure investments. Improving infrastructure to withstand sea level rise and other stressors will improve recreation and tourism opportunities and, consequently, the Delta economy. Trends in the Delta's economic development and population growth affect many aspects of the region's economy and current and future workforce and inform future needs for further growth. Enhanced socioeconomic indicators and performance measures would highlight the key current contributors to the Delta economy and identify the future needs of Delta communities. The Delta Protection Commission's Economic Sustainability Plan is updated periodically to incorporate this information.

Encourage Recreation and Tourism

The Delta is a popular destination, and **tourism is an important economic driver**. Many recreation and tourism opportunities are already present, but additional opportunities called for in the Delta Plan have not been fully realized due to a lack of understanding of visitor and resident recreation preferences, aging and inaccessible facilities, and restricted access to public lands. Over 58,000 acres of land (about 10% of the Delta) are publicly accessible for recreation and tourism in the Delta; however, this amount of land has not increased during the past ten years.

Protect Delta Lands – Reverse Subsidence

Progress on subsidence reversal activities and carbon sequestration projects has been slow and not at a sufficient scale. A little over 10% of the 30,000 acres

of subsidence reversal and carbon sequestration projects called for in the Delta Plan have been implemented over the past ten years. While additional projects are in the planning stages, more acres with subsidence halting and reversing activities are urgently needed to support California's carbon emission reduction goals. Many subsidence reversal and carbon sequestration projects have occurred to date, but they have been small demonstration projects. Implementing larger areas of subsidence reversal has been limited by factors including economic viability, long-term commitments by landowners, and available incentives. An additional strategy to slow subsidence is rice cultivation. Increasing areas with rice production would expand the portfolio of economic options for stopping subsidence.

Protect Delta Communities

Delta legacy communities have a unique character and rich cultural, historical, agricultural, and natural heritages. Delta legacy towns develop Community Action Plans to ensure they remain vital areas that achieve positive social, economic, and environmental outcomes and that, as a community, they can endure economic downturns, natural disasters, social difficulties, and unforeseen stressors. Implementation of economic vitality and historic preservation actions is ongoing and varies among the legacy communities. Out of eleven legacy towns, five have completed Community Action Plans. **A Delta National Heritage Area (NHA) was established in 2019** to recognize the region's unique historical and cultural values. Designating the Delta as a region of national importance was recommended in the Delta Plan. A draft management plan for the Delta NHA was completed in 2024, providing a roadmap to support further historic preservation, natural resource conservation, recreation, heritage tourism, and educational projects that promote the Delta as a unique place. Approval of the management plan creates funding opportunities that are anticipated to contribute to enhancing the Delta's legacy communities.

Delta Plan Chapter 6: Improve Water Quality to Protect Human Health and the Environment

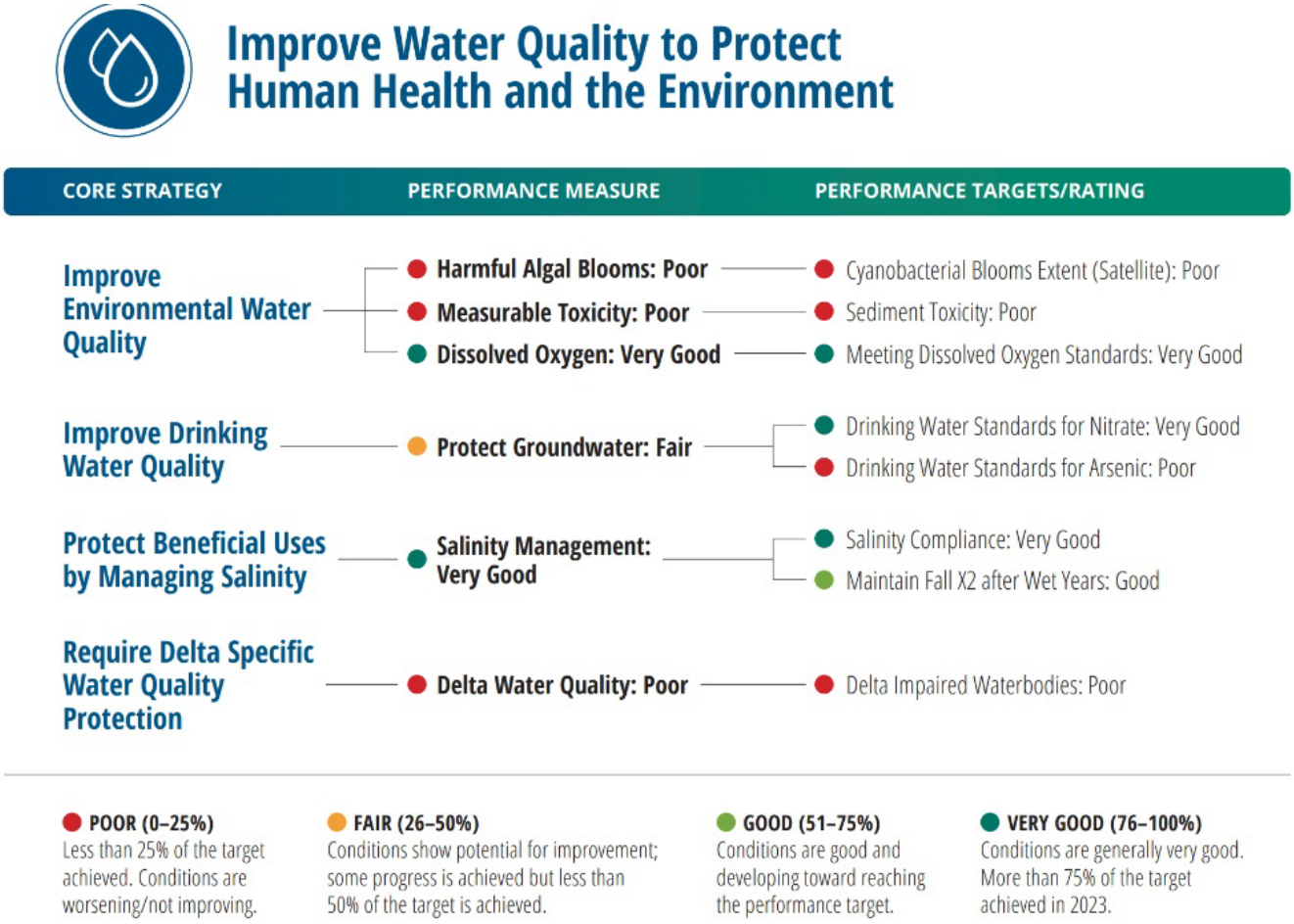


Figure 6. Water Quality Report Card with Performance Measures.

Findings At-a-Glance

Progress in improving water quality and protecting human health and the environment has generally not been sufficient. Pollution of Delta waterways and persisting toxicity from legacy, regulated, and emerging contaminants continue to be present. Specifically, the extent of hazardous harmful algal blooms is increasing. Reversing these declining trends remains an important priority to support the unique and dynamic conditions in the Delta, its ecological resources, its residents and visitors, and the critical water supply services it provides.

Issue Spotlights

Harmful Algal Blooms

Harmful algal blooms (HABs) are triggered by environmental factors such as high nutrient levels and warm, stagnant water; they produce toxins potentially harmful to humans and wildlife. **Over the past five years, HABs in the Delta increased in frequency, extent, and duration.** HABs have increased more during drought years than wet years, but each Delta waterbody experiences HABs differently. HABs impacts on water quality, recreation, and public health are becoming increasingly frequent and more severe. A forthcoming estuary-wide HAB monitoring strategy will create a unified approach to data collection, agency coordination, and research, enabling improved modeling and forecasting that will lead to more proactive mitigation of HAB impacts.

Improve Drinking Water Quality – Protect Groundwater

Groundwater wells in the Delta used for domestic and municipal water supply that exceed arsenic and/or nitrate drinking water limits present water quality issues and may indicate the presence of more serious contaminants. This is especially true among small water systems and disadvantaged communities relying on groundwater sources that may not meet certain drinking water quality standards. While levels of **nitrate contamination in groundwater wells have improved over the past ten years, arsenic contamination is not improving.** Attention should be focused on water wells that serve small water systems and disadvantaged communities. Conducting increased and regular monitoring of these wells will be necessary to mitigate and respond to drinking water issues.

Delta-Specific Water Quality Protection

Improved water quality supports a healthy ecosystem and multiple beneficial uses of water, including municipal supply and recreational uses such as fishing and swimming. Delta waterways contain pollutants, including insecticides, herbicides, mercury, selenium, nutrients, and legacy organic pollutants (dichlorodiphenyltri-chloroethane (DDT) and polychlorinated biphenyls (PCBs)). Additional water quality issues in the Delta include temperature, salinity, turbidity, low dissolved oxygen, bromide, dissolved organic carbon, pathogens, and harmful algal blooms (HABs). Between 2014-2022, Delta waterway segments not meeting water quality standards increased by 30% overall, mostly in categories for pesticides, total dissolved solids, nutrients, and metals. Continued regulation of

contaminant discharge and control of pollutants that affect Delta surface water is important for protecting beneficial uses in the Delta.

Delta Plan Chapter 7: Reduce Risk to People, Property, and State Interests in the Delta

Figure 7. Reduce Risk Report Card with Performance Measures.

Findings At-a-Glance

Over the past decade, levee maintenance and improvement activities have focused on raising levee heights, achieving modern flood protection standards, and improving levee stability. **While progress has been made in maintaining and improving Delta Levees, much remains to be done.** Despite ongoing improvements to urban and rural levees, less than 30% of Delta islands and tracts are fully protected by levees, meeting the applicable state or federal levee design standards. Despite this, flood risk decreased significantly between 2007 and 2017

due to a combination of levee improvements, new elevation data, and updated calculations concerning the probability of flooding.

Issue Spotlight

Multi-Hazard Coordination Task Force

Federal, State, and Local agencies work together in the Multi-Hazard Coordination Task Force and implement recommendations to improve emergency preparedness and response to any hazard in the Delta. **All 2012 Delta Multi-Hazard Task Force Report recommendations were completed by 2018.** However, these efforts will continue because emergency preparedness requires continual effort. A well-planned and executed emergency preparedness and response strategy is critical to reduce potential casualties and damages from all hazards.

Flood Casualties and Damages

The Delta Plan promotes several strategies to reduce flood risks in the Delta, including continued emergency preparedness, strategic levee investments, managing land use, and protecting and expanding floodways, floodplains, and bypasses. Evaluating risks to people and assets considers the probability and the consequences of flooding. **Updated risk projections in 2021 resulted in a greater than 50% reduction in Estimated Annual Damages (EAD) and Estimated Annual Fatalities (EAF)** from 2007-2017. These updated projections account for improved hydrology, a decade of levee improvements, and improved levee fragility methodology. However, continued investment in Delta flood management is essential as climate change will increase flood risk over time.

Levees

Delta levees protect approximately 740,000 acres of land and create an extensive system that spans over 1,100 levee miles. Reducing flood risks to people, property, and state interests is critically important in the Delta, and levees play a major role in flood-related risk reduction. State and federal guidelines and criteria establish minimum levee design and maintenance standards. Despite continual improvements to urban and rural levees, around 30% of Delta islands and tracts are fully protected by levees, meeting the applicable state or federal levee design standards. In other words, **about 70 percent of Delta land is protected by levee systems that fall short of the applicable U.S. Army Corps of Engineers standards** (PL 84-99). Climate change will intensify current risks to levees, including land subsidence, changing inflows, sea-level rise, and even earthquakes, and consequently increase the risk of climate-induced flooding that could expose

thousands of people to flooding, jeopardize economic activity, damage infrastructure that supplies a considerable portion of the state's water supply, and further degrade critical ecosystems within the Delta.

National Flood Insurance Community Rating

Community Flood Insurance Rating Scores (CRS) are specific floodproofing activities a community can take to obtain a discount in the National Flood Insurance Program. According to National Flood Insurance Community Rating Program data, flood risk reduction activities varied greatly among the larger Delta communities. Continued floodproofing allows a community to increase its national flood insurance rating score, reducing insurance rates. **Between 2013 and 2023, Delta communities participating in the national flood insurance program increased their community rating scores by 4.3%.** The CRS discount program on national flood insurance saved participating Delta communities over $3 million in 2023. Despite this progress, average Delta community ratings remain below California and national community averages. Additionally, continued solvency of the NFIP program remains a priority.

Part 3: Delta Plan Implementation Review – Regulatory Analysis

The Delta Plan establishes enforceable state regulations that apply to covered actions as defined in the Delta Reform Act. This section of the Five-Year Review considers the Delta Plan's regulatory functions over the past ten years, recommends additional priority actions, and identifies emerging planning topics to ensure that the Council's coordination and regulatory roles respond to contemporary issues and opportunities.

Covered Actions Review

In the 2009 Delta Reform Act, the Legislature gave the Council regulatory and appellate authority over "covered actions" and provided a definition (Wat. Code § 85057.5):

- plans, programs, or projects as defined under Public Resources Code section 21065,
- taking place, in whole or in part, in the Legal Delta and Suisun Marsh
- carried out, approved, or funded by a State or local public agency,
- covered by one or more provisions of the Delta Plan and
- that will significantly impact achieving one or both of the coequal goals or implementing government-sponsored flood control programs to reduce risks to people, property, and state interests in the Delta.

The Delta Plan contains 14 regulatory policies specifying requirements to be implemented by certifying agencies through the Council's certification of consistency and appeals processes. The state or local public agency leading a covered action is required to certify consistency with applicable Delta Plan policies. Project agencies use a web-based (Portal) within the Council's website. The Council has established an early consultation process through which a certifying agency receives assistance from Council staff in preparing the required certification of consistency.

Findings and Recommendations

Part of the Council's stakeholder engagement and early consultation process includes analyzing draft environmental documents and writing comment letters to state or local public agencies proposing potential covered actions affecting the

Delta or Suisun Marsh. The letters inform the state or local agency of regulatory policies that may apply to the project and provide information about the Council's early consultation process and resources available to support certifications. Since the previous Five-Year Review in 2019, the Council has written 75 such letters regarding projects funded, approved, and/or carried out by a state or local public agency, and also to select federal agencies when a project had both state and federal components which intersected with Delta Plan policies.

As of January 1, 2024, a total of 51 certifications of consistency had been submitted to the Council since the Delta Plan's regulations took effect in 2013, with 69 percent

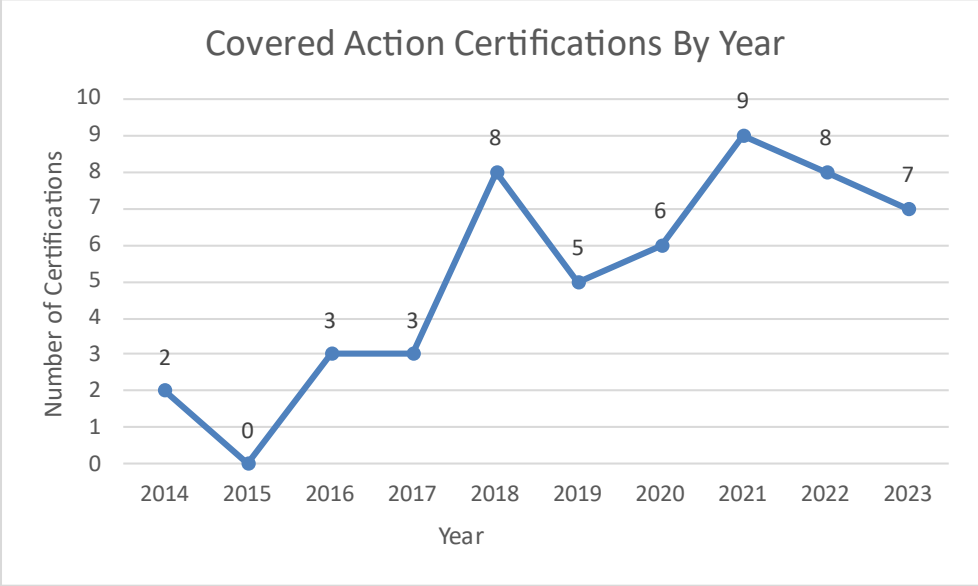


Figure 8. Number of Covered Action Certifications Submitted (2013-2023).

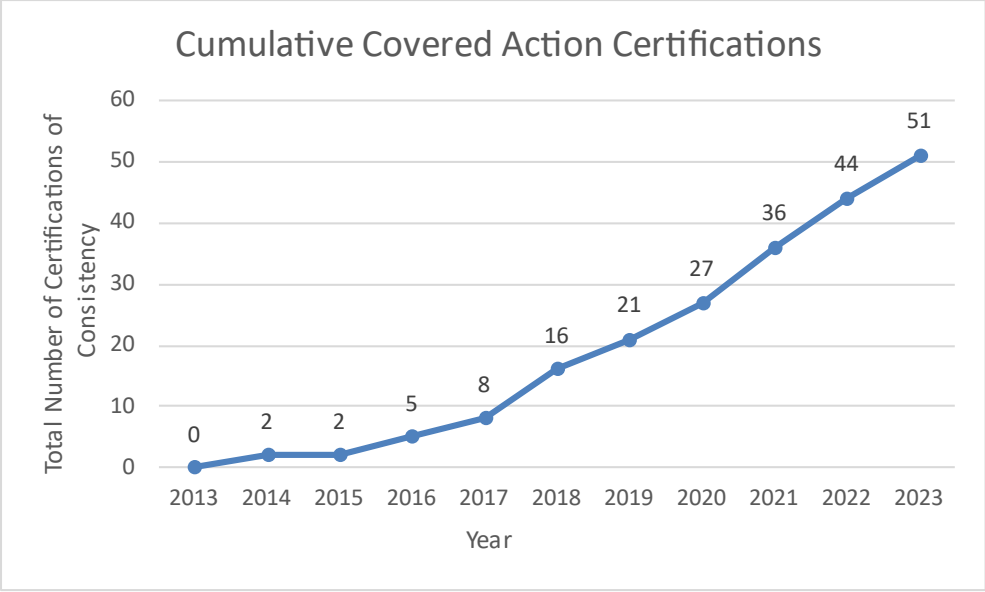


Figure 9. Cumulative Number of Covered Action Certifications (2013 -2023).

submitted within the last five years, reflecting both a growing number of Delta projects and a growing awareness of the Council's process and authority.

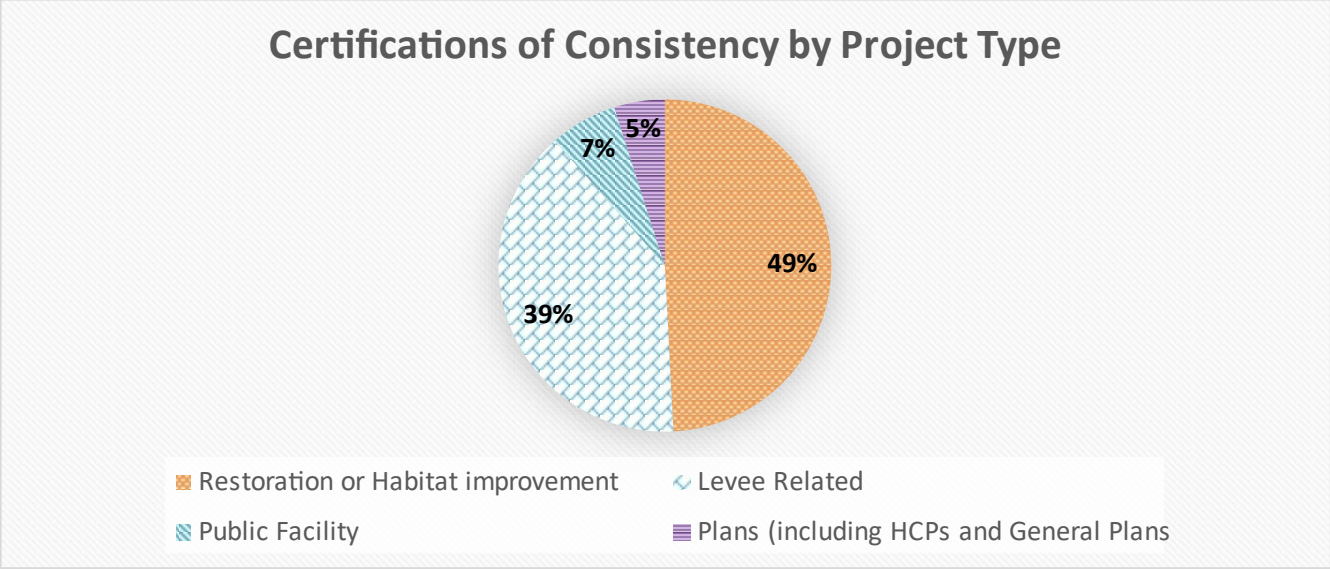
Certifications of Consistency

For the purposes of this review, certifications are sorted into five categories:

- Restoration or habitat improvement actions
- Levee-related actions
- Public facility actions (e.g., public education or science research facility, water desalination plant)
- General plans and habitat conservation plans, and
- Water infrastructure actions.

A project may be counted in more than one category. For example, a multi-benefit project could be counted as a restoration or habitat improvement action and a levee-related action. Nearly half of the certifications of consistency submitted to date have been for restoration or habitat improvement actions, a few of which were multi-benefit projects that were also levee-related actions. Levee-related actions were the next most common project type. Nearly all covered actions implicated **G P1(b)(2)**, *Mitigation Measures*, **G P1(b)(3)**, *Best Available Science*, **G P1(b)(4)**, *Adaptive Management*, **ER P5**, *Invasive Nonnative Species*, and **DP P2**, *Respect Local Land Use*.

Figure 10. Covered Action Certifications by Project Type (2013-2023).



The 2019 Five-Year Review recommended that Council staff be proactive in outreach and communication with certifying agencies seeking early consultation. Staff have implemented this recommendation by engaging with certifying agencies earlier in the California Environmental Quality Act (CEQA) process. Of the 75 letters sent since the 2019 Five-Year Review, 31 were sent to state agencies, 4 to federal agencies involved in state projects, and 42 to local agencies with potential covered actions. Most letters were prepared for restoration and habitat improvement or levee-related actions, but public facilities, water infrastructure, water management, general plans, and habitat conservation plans accounted for 34 of the letters.

Collaborative relationships are key to productive early consultation, and staff have worked to establish professional working relationships with a wider range of certifying agencies proposing or funding projects in the Delta and Suisun Marsh. State and local agencies are now more regularly contacting the Council regarding the ongoing preparation of environmental documents and questions about how best to incorporate Delta Plan regulatory policies and the Council's process into their project timeline. Early consultation outreach materials have been developed and are distributed to certifying agencies.

The Council has also completed improvements to the online Covered Action Portal on the Council's website, which is used by certifying agencies to submit certifications (coveredactions.deltacouncil.ca.gov). Some "behind the scenes" improvements include additional security and reliability measures, while public-facing improvements include updated content and instructions and updates to the form that makes the applicability of each policy to a covered action clearer. A new search index enables users to search for and within documents submitted via the portal.

General awareness of the Council's regulations and certification process has increased with the assistance and collaboration with other agencies such as the Sacramento-San Joaquin Delta Conservancy, California Department of Fish and Wildlife, and Department of Water Resources. These agencies routinely inform permit and grant applicants that their projects may be covered actions and advise them to reach out to the Council for early consultation. Other certifying agencies receive information about early consultation by participating in groups like the Suisun Marsh Adaptive Management Advisory Team and Interagency Adaptive Management Implementation Team.

Prior to submitting a certification of consistency, a certifying agency can download a checklist from the Council's Covered Actions Portal. The checklist walks the agency through the questions that require responses and offers a complete list of the Delta Plan regulatory policies. Nevertheless, the Council often receives requests for instructions on how to submit a certification of consistency. Work remains to improve the process, and Council staff should continue with and expand on current strategies.

Gathering information about the post-certification implementation of covered actions would allow for evaluations of the impacts of Delta Plan regulatory policies on specific outcomes. For example, Policy **ER PA** will require ecosystem restoration-covered actions to disclose anticipated project contributions to restoring ecosystem functions and providing social benefits. These data will be provided to the Council at the time of project certification before the on-the-ground implementation. Developing a process for post-project tracking would allow the Council to understand better the realized benefits of **ER PA** on the human dimensions of the Delta, including the social and economic benefits of habitat restoration projects. Additionally, this information can serve as a 'lessons-learned' repository of best practices and restoration designs for subsequent projects.

Developing a GIS-based web map to advise certifying agencies whether covered actions may be covered by one of the Delta Plan's eight spatial policies was identified as a priority action in the 2019 Five-Year Review. Progress has been made on this recommendation, and a finished product is anticipated in 2024. Furthermore, the Council is developing infographic materials to visually show the covered action and appeal processes set forth in the Delta Reform Act. These materials will be posted on the Council's website, providing a visual aid guiding parties through the Council's regulatory and appellate processes.

Delta Plan Policy Analysis

The figure below shows cumulative responses by regulatory policy for every certification of consistency submitted since the Delta Plan's regulations took effect in 2013.

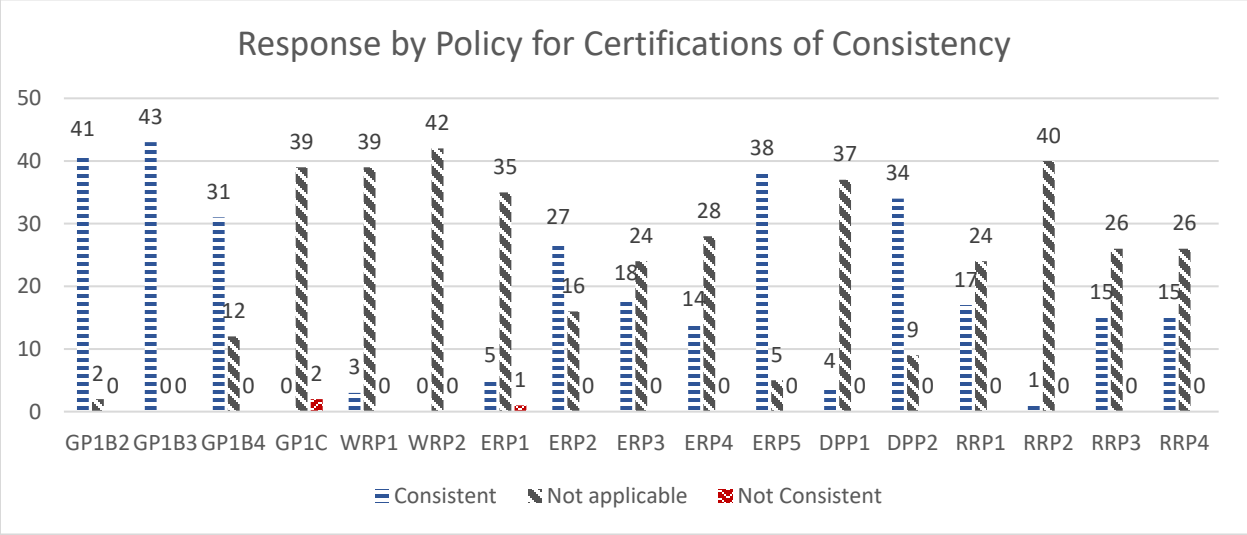


Figure 11. Delta Plan Policy in Covered Action Certifications (2013-2023).

Most covered actions implicate the Delta Plan's governance policies, in particular, **G P1 (b)(2)** *Mitigation Measures* and **G P1 (b)(3)** *Best Available Science*. Other frequently implicated policies are **ER P5** *Invasive Nonnative Species* and **DP P2** *Respect Local Land Use*. Most certifications of consistency received by the Council have been for habitat restoration or multi-benefit projects. These project types have the potential to introduce or improve habitat for many invasive species and may conflict with local land uses. **G P1(c)** *Habitat Conservation Plans* provide an alternative pathway for projects approved and permitted prior to adoption of the Delta Plan to demonstrate consistency with Delta Plan ecosystem regulations. It thus has narrow applicability, and most projects identify **G P1(c)** as "Not Applicable." Other policies often identified as "Not Applicable" include **WR P1** *Reduced Reliance*, **WR P2** *Transparency in Water Contracting*, **ER P1** *Delta Flow Objectives*, **DP P1** *Locate Urban Development Wisely*, and **RR P2** *Flood Protection for Residential Development*.

DP P2 *Respect Local Land Use* applies to the siting of water infrastructure and restoration projects. As California works toward fulfilling its climate adaptation goals and objectives, solar and wind farm projects and carbon capture and storage projects will become more prevalent in the Delta. Although they may have similar

conflicts, **DP P2** does not address the siting of these types of projects in a way that avoids or mitigates conflicts with existing or planned uses.

The Delta Plan policies were written in the context of 2013 conditions. As climate change progresses, policy responses need to keep pace with current goals, projections, and project types. For example, new developments are again being proposed in and around the Delta to meet California's housing needs. In addition, California's greenhouse gas emissions reduction strategy promotes carbon capture and storage (CCS), and proposals for CCS projects are emerging in the Delta. The challenge lies in creating policies that are broad enough to foresee potential futures but are also focused enough to be clear and effective for current conditions.

The frequency of applicability is also not an exclusive measure of success, as the impact of a policy could be large even if it is rarely applied. Delta Plan Policy **WR P1** *Reduced Reliance* has been identified as applicable once to date – within the 2018 California WaterFix Certification of Consistency. Similarly, **WR P2** *Transparency in Water Contracting* has never been identified as applicable.

On June 23, 2022, the Council adopted revised and new policies as part of the Delta Plan Ecosystem Amendment. The amended regulatory policies will take effect after a currently underway rulemaking process is concluded. The adopted amendment contains one new policy (**ER PA** *Ecosystem Restoration Tiers*), three revised policies (**ER P2** *Restore Habitats at Appropriate Elevations*, **ER P3** *Protect Opportunities to Restore Habitat*, **ER P4** *Expand Floodplains and Riparian Habitat in Levee Projects*), and two policies that were not changed (**ER P1** *Delta Flow Objectives* and **ER P5** *Invasive Nonnative Species*). **ER P5** applies to almost all covered actions, given the ubiquitous presence of invasive species in the Delta.

RR P1 *Prioritization of State Investments in Delta Levees and Risk Reduction* was revised following a rulemaking process completed in 2023 and now contains a priority designation for each island and tract in the legal Delta based on the Delta Levees Investment Strategy (DLIS) risk analysis. The policy requires DWR to present an annual report to the Council detailing discretionary levee investments in the Delta and how the investments align with the DLIS priorities. The priority assignment of the levees covered by the regulation is expected to be updated as levee investment continues and the risk to Delta levees changes.

Appeals – By the Numbers

Any person may appeal a certification of consistency to the Council. Out of the 51 certifications submitted to the Council, five certifications have been appealed[1].

In one case, the 2020 Lower Yolo Ranch Restoration Project, the appeal was withdrawn prior to being heard by the Council. The Department of Water Resources withdrew the 2018 California WaterFix project before the Council reached a determination regarding multiple appeals. One appeal resulted in the Council remanding a project (2021 Lookout Slough Tidal Habitat Restoration and Flood Improvement Project), and the Council has denied appeals of two projects (2019 Smith Canal Gate Project and 2022 Lookout Slough Revised Certification of Consistency). A total of 17 appeals were filed across these five certifications of consistency, collectively implicating all 14 Delta Plan regulations.

The two most appealed policies across these projects were **G P1(b)(3)** *Best Available Science* and **DP P2** *Respect Local Land Use*. Appeal issues under **G P1(b)(3)** are discussed in the following section. For **DP P2**, appellants asserted inconsistency across all 17 appeals for the five covered actions. Most appeals raised multiple issues under **DP P2**. Six appellants raised land use, water quality, and municipal water use issues. Recreational land use issues were raised five times, and agriculture and cultural resources issues were raised by four and two appellants, respectively.

The 2019 Five-Year Review recommended updating how the Council conducts appeals to streamline the process based on recent experiences. These updates were completed in 2022 as an amendment to the Administrative Procedures Governing Appeals (Appeals Procedures). The Council's original Appeals Procedures were adopted in September 2010, several years before the first certification of consistency for a covered action was filed and eight years before the first appeal of a certification of consistency. Conducting several appeals proceedings highlighted areas where the Appeals Procedures could be revised to address issues not foreseen in 2010 when they were first adopted.

[1] Both certification and appeal counts contain a recertification and second appeal of the same project.

In December 2021, the Council released proposed draft amendments to the Appeals Procedures for a 90-day public review period. Following a workshop and additional opportunity for public comments in 2022, the updated appeals procedure amendments were adopted by the Council in October 2022. These procedures were subsequently organized with headings and published in the California Code of Regulations.

Best Available Science in Certification Appeals

Delta Plan Policy **G P1(b)(3)** *Best Available Science* requires that "as relevant to the purpose and nature of the project, all covered actions must document use of best available science." The best available science is defined in the Delta Plan as the best scientific information and data for informing management and policy decisions. (Cal. Code Regs, tit. 23, § 5001, subd. (f).) Best available science must be consistent with the guidelines found in Code of California Regulations, Title 23, Appendix 1A, which lists six criteria for best available science: 1) relevance, 2) inclusiveness, 3) objectivity, 4) transparency and openness, 5) timeliness, and 6) peer review. The best available science is further described in the Delta Plan Appendix 1A as follows:

> "The Delta Reform Act requires the Council to make use of best available science in implementing the Delta Plan. Best available science is specific to the decision being made at the time frame available for making that decision. Best available science is developed and presented in a transparent manner consistent with the scientific process (Sullivan et al. 2006), including clear statements of assumptions, the use of conceptual models, description of methods used, and presentation of summary conclusions. Sources of data used are cited and analytical tools used in analyses and syntheses are defined. Best available science changes over time and decisions may need to be revisited as new scientific information becomes available. Ultimately, best available science requires scientists to use the best information and data to assist management and policy decisions. The process used should be clearly documented and effectively communicated to foster improved understanding and decision making."

The Delta Plan's best available science criteria were adapted from criteria developed by the National Research Council (Table4). Certifying agencies submitting certifications of consistency with the Delta Plan for covered actions should document a scientific rationale across the following criteria.

Relevance	Information used should relate to the Delta ecosystem. Information from a different region that is applicable to the Delta can be used if Delta-specific information does not exist or is insufficient.
Inclusiveness	Information used should be reviewed and analyzed across relevant disciplines.
Objectivity	Data collection and analyses should meet scientific method standards and be free from nonscientific biases.
Transparency and Openness	Sources and methods used for analyzing the science used should be clearly identified, including any uncertainty in the information used.
Timeliness	Data collection should support adequate analyses before a management decision is needed, and scientific information used should be applicable to current situations.
Peer Review	Information used should be independently peer-reviewed for accuracy and validity.

Table 4: Delta Plan's Best Available Science Criteria.

Findings and Recommendations

The best available science is applied to specific issues concerning a covered action in its certification of consistency (e.g., the science supporting how a covered action approaches the topic of sea level rise). In covered action certifications, a certifying agency outlines how project development was grounded in the best available science using each criterion (e.g., documenting that a project's sea level rise science was peer-reviewed). Analyzing how best available science was challenged in past covered action appeals provides useful insight into the effectiveness and applicability of the criteria. In total, 17 appeals were filed for five certifications of consistency, and all 17 appeals involved Delta Plan Policy **G P1(b)(3)** *Best Available Science*.

Council staff prepared draft determinations on appeals for three covered actions: California WaterFix (2018), the Smith Canal Gate Project (2019), and the Lookout Slough Tidal Habitat Restoration and Flood Improvement Project (2022). The Council acted on two of the three draft determinations. For this analysis, each determination was considered regarding the best available science criteria most

raised as issues within an appeal and considering the scientific issues identified in the issues raised. All six best available science criteria were raised on appeal at least once. Inclusiveness (raised 16 times), relevance (raised 11 times), and objectivity (raised five times) criteria were most often the **G P1(b)(3)** criteria raised on appeal. Peer review was raised only once as a criterion on appeal across these three covered actions.

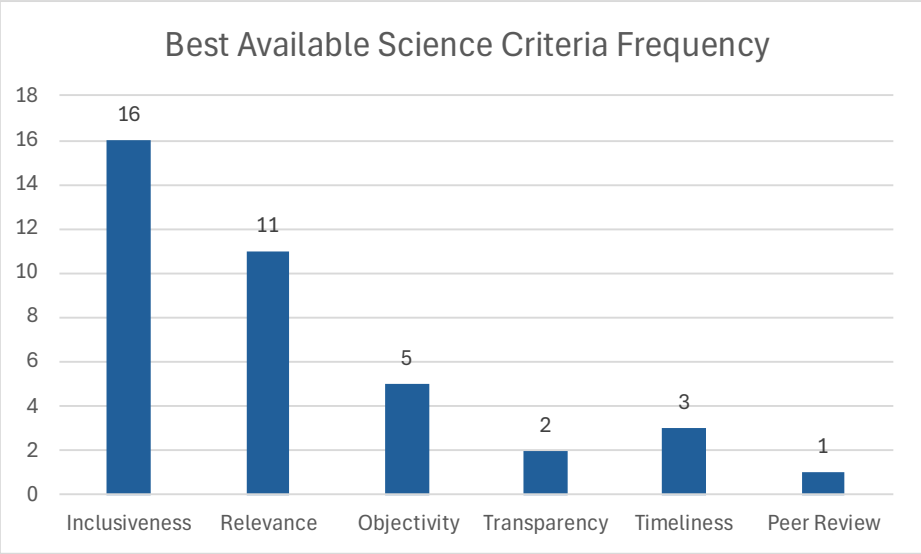


Figure 12. Best Available Science Criteria in Certification Appeals.

Appeals claimed inconsistency with **G P1(b)(3)** across nine different scientific topics. Most appeals claimed inadequate evidence for the best available science related to water quality and cyanobacteria (harmful algal blooms). Issues related to water quality were raised 17 times by appellants across these covered actions. Water quality was raised as a discrete claim in all three appeals (five times in California WaterFix, twice in the Smith Canal Gate Project, and 11 times in the Lookout Slough Project).

Issues raised on appeal related to salinity were claimed five times by appellants across these three covered actions. Issues related to cyanobacteria (harmful algal blooms) were also raised five times by appellants. Recreation issues were raised on the Lookout Slough Project, and five additional Best Available Science issues were raised across the California WaterFix appeals.

Adaptive Management Plans Review

Adaptive management is defined in the Delta Reform Act as "*a framework and flexible decision-making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning and implementation of a project to achieve specified objectives.*" (Water Code section 85052) Adaptive management can be employed at a program, plan, or project level. The Delta Plan requires an adaptive management plan for water management and ecosystem restoration covered actions under Policy **G P1(b)(4)**. This section of the Five-Year Review evaluates how certifying agencies submitting covered action certifications to the Council over the last ten years have approached adaptive management based on the adaptive management framework established in the Delta Plan, Appendix 1B.

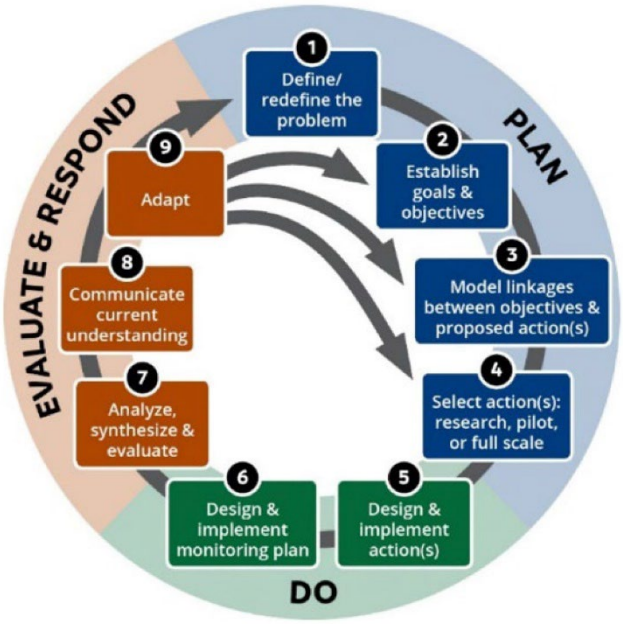


Figure 13. Delta Plan Nine-step Adaptive Management Framework.

The adaptive management of Delta resources requires decisions to be made under uncertain conditions based on the best available science rather than delaying action until more information is available. Adaptive management enables continuous learning, resulting in decisions based on knowledge gained through scientific discovery and monitoring. It also increases the likelihood of success in obtaining goals in a manner that is both economical and effective by using new knowledge, experience, and participant input to manage natural resources under changing conditions.

Adaptive Management Plans – By the Numbers

A total of 34 water management and ecosystem restoration-covered action certifications that required adaptive management plans were submitted to the Council between 2013 and 2023. One water management covered action certification for California Water Fix was withdrawn but is included in the following analysis. Among these certifications where **G P1(b)(4)** was applicable, 31 were project-level actions, while the remaining four described larger-scale plans and programs. Of the project-level covered actions, 23 certifications provided plan documents explicitly addressing adaptive management, which are discussed quantitatively below. Eight certifications did not submit an explicit adaptive management plan[2]. Certifications for the four plan- or program-level covered actions are described qualitatively.

Council staff reviewed the 23 project-level certifications providing adaptive management plans to determine whether elements of the adaptive management cycle (as presented in Delta Plan, Appendix 1B) were incorporated into the plans. The Council's Adaptive Management Plan Checklist recommends that fifteen elements be included in an effective adaptive management plan. These elements were used to evaluate the quality of submitted adaptive management plans.

Overall, the quality of the adaptive management plans submitted was high (Table 4). More than half of the Adaptive Management Plans included all adaptive management elements (13 out of 23 plans). The completeness of adaptive management plans also improved significantly over time. For example, the first certification submitted contained only five of 15 recommended adaptive management elements, whereas the most recent included 13 of 15.

[2] Projects certifying consistency with **G P1(b)(4)** that did not submit an explicit adaptive management plan were mostly levee projects with habitat enhancement components. Other projects in this category included the Delta-wide Aquatic Invasive Plant Program, Pacific Flyway Center, North Delta Fish Conservation Bank, and Yolo Bypass Wildlife Area road and drainage improvements. Adaptive management information for these covered actions was dispersed throughout the certification documents.

Project Name	Year	Number of Adaptive Management Elements Included in the Project (Maximum is 15)
Sherman Island Whale's Mouth Wetland Restoration Project	2014	5
Dutch Slough Tidal Marsh Restoration Project	2014	12
Tule Red Tidal Restoration Project	2016	15
Southport Sacramento River Early Implementation Project	2016	15
Yolo Bypass Corridors for Flood Escape on The Yolo Bypass Wildlife Area	2016	14
Decker Island Restoration Project	2017	15
California WaterFix	2018	14
Yolo Flyway Farms Restoration	2018	15
Rush Ranch Lower Spring Branch Creek and Suisun Hill Hollow Tidal Connections Project	2018	14
Grizzly Slough Floodplain Restoration Project and McCormack-Williamson Tract Restoration Project (North Delta Project)	2018	15
Winter Island Tidal Habitat Restoration Project	2019	15
Three Creeks Parkway Restoration Project	2019	15
Sherman Island Belly Wetland Restoration	2020	15
Lower Yolo Ranch Restoration Project	2019	14
City Of Antioch Brackish Water Desalination Project	2020	14
Wings Landing Tidal Habitat Restoration Project	2020	15
Yolo Bypass Salmonid Habitat Restoration and Fish Passage Project	2020	15
Bradmoor Island and Arnold Slough Tidal Habitat Restoration Project	2021	10
Sacramento River Erosion Control and Habitat Enhancement Project	2021	12
Lookout Slough Tidal Habitat Restoration and Flood Improvement Project	2021	15
McCormack-Williamson Tract Levee Modification and Habitat Restoration Project-Phase B	2023	15

Prospect Island Tidal Habitat Restoration	2023	15
Ulatis Creek Habitat Restoration Project	2023	13

Table 4. Project Certifications with Adaptive Management Plans (2014-2023).

Additionally, most recommended elements from the checklist were included in the submitted Adaptive Management Plans (Table 5). Data storage, data sharing, and communication timeframes are elements least often included in the plans.

Adaptive Management Element	Number of Certifications with Adaptive Management Elements Included (Maximum is 23)
Goal(s)	23
Problem Statement	22
Objective(s)	22
Conceptual Models	21
Select Actions	22
Performance Measures	23
Data Collection	23
Data Storage	18
Data Sharing	17
Monitoring Plan	22
Analysis and Evaluation Plan	22
Communication Plan	21
Communication Target Audience	21
Communication Timelines	17
Adaptive Management Actions	23

Table 5. Adaptive Management Elements Included in Certifications.

Data Management Gaps

While all 23 adaptive management plans mentioned data collection methods, five did not mention data storage, and six did not describe how data would be shared with interested parties. These represent shortcomings, as without data storage and

sharing plans, the data collected about the effectiveness of the projects are not accessible and cannot support larger-scale synthesis. Making data available and usable is a critical step to help decision-makers close the adaptive management loop.

The Council should provide additional technical support to help certifying agencies develop data management and communication plans. In a 2019 white paper, the Interagency Adaptive Management Integration Team identified a need to provide project sponsors advice and guidance on producing effective data management plans that would be integrated into adaptive management plans.

Communication Gap

While most adaptive management plans articulated a plan for communicating monitoring and adaptive management results to interested parties, two plans could improve upon communication plans, and four additional plans could improve the timing of planned communication. This gap in specific communication protocols represents a shortcoming in closing the adaptive management loop and helping other managers learn from the findings of past projects.

Best Practices

The strongest adaptive management plans clearly addressed the specific steps and stages of the adaptive management cycle, often dedicating separate sections for each step/stage. Using the adaptive management "wheel" as a resource provides a logical structure for the plan. Many plans use tables to organize objectives, methods, performance measures, and possible adaptive management actions in a concise, easy-to-follow manner. For example, the Tule Red Tidal Restoration Project Certification effectively organized its adaptive management stages and response and can be used as a template for other adaptive management plans.

Authority and Funding

All but two project-level adaptive management plans delineated the certifying agency's authority to complete the project. Of those 21 plans, 12 demonstrated authority through ownership or co-management agreements for the land where the project would be built. Six plans demonstrated authority to implement the project through a contractual memorandum of understanding pertaining to a regulatory requirement to implement the project, such as the Fish Restoration Program Agreement (FRPA). The remaining three plans stated that the

certifying agency held easements or leases that allowed them to complete the work on the land required for the project. Three of these plans stated their authority in a document other than the adaptive management document. Five plans did not mention how to fund adaptive management and monitoring activities.

Successful implementation of adaptive management requires long-term funding and a defined governance structure. The Delta Plan requires documentation of access to adequate funding and delineated authority for ecosystem restoration and water management covered actions to ensure adaptive management is implemented as proposed.

Adaptive Management for Programs and Plans

Most covered actions analyzed addressed specific projects, but a few adaptive management plans were submitted for program-level activities or habitat conservation plans that act as an umbrella covering multiple projects.

The South Sacramento Habitat Conservation Plan Certification of Consistency did not include a stand-alone adaptive management plan. However, the components of adaptive management are described in an appendix to its Environmental Impact Report. The Environmental Impact Report identifies specific circumstances where adaptive management may be appropriate, how effective storage of monitoring data supports adaptive management, and the need for projects specified within the plan to be designed in a way that enables experimentation and adaptive management.

The Lower Marsh Creek Certification of Consistency included an adaptive management plan similar in structure and content to many project-level certifications. This plan varies from the project-level plans by setting a vision for a larger-scale collection of related projects within the program area, all of which would be supported by this plan to achieve large-scale goals and objectives. This program actively seeks collaboration with other entities to help implement projects within the program's scope.

The adaptive management plan for the Yolo Habitat Conservation Plan also contained common elements. This plan did a particularly good job of providing details describing how projects within the program could conduct monitoring and manage potential threats to species of interest. The plan also highlights the importance of collaboration with partners who will ultimately be responsible for conducting adaptive management activities.

Program-level activities and plans should include all adaptive management elements at a programmatic level to provide a path for flexible decision-making and continued learning under changing conditions.

Water Management Adaptive Management Plans

While most adaptive management plans have been prepared for ecosystem restoration covered actions, **GP 1(b)(4)** also requires that certifying agencies for water management covered actions complete an adaptive management plan. Adaptive management ensures that water resources are managed sustainably and effectively, considering changing environmental conditions, climate variability, and stakeholder needs. Adaptive management can help ensure that water resources in the Delta are managed in ways that benefit human communities and the natural environment by fostering flexibility, collaboration, and ongoing learning.

In the 10-year history of the Delta Plan, only two water management projects have gone through the covered actions certification process and prepared adaptive management plans: California WaterFix and the City of Antioch Brackish Water Desalination Project. The California WaterFix plan notes that it largely relied on other adaptive management, monitoring, and related programs, including the Biological Opinion adaptive management plan, the Collaborative Science and Adaptive Management Program, the Interagency Ecological Program, the Delta Science Program, and EcoRestore adaptive management efforts. The Department of Water Resources explicitly stated that their plan was meant to supplement other ongoing efforts. While such a relationship and integration with other existing programs could be beneficial, many required details were left uncertain. Additionally, several key sections were not a part of the adaptive management plan, including data management plans. While the existing programs WaterFix intended to coordinate with have robust data management plans, **a project-specific adaptive management plan should include clear statements that describe how the project will manage the collection and dissemination of monitoring data.**

By contrast, the City of Antioch Brackish Water Desalination Project Adaptive Management Plan described a data management and monitoring approach. The plan offers details related to water quality monitoring, trigger points, and potential management responses if targets are not met, providing a clear model for how other water management projects could incorporate adaptive management into the planning process.

While assessing the successes or shortcomings of water project adaptive management based on two examples is difficult, sources beyond prior covered actions provide important resources to guide how future certifications for water management projects approach adaptive management. The Delta ISB Water Supply Reliability Review included findings and recommendations regarding the use of performance metrics, analytical methods, and uncertainty analysis (see the text box). Certifying agencies could also look to strategies employed in adaptive management plans for water projects outside the Delta, including the Colorado River Management Plan and the Everglades Restoration Adaptive Management Plan.

Delta ISB, Water Supply Reliability Review, 2022 reviewed the science of water supply reliability estimation for a variety of human and environmental purposes. The review concluded with these practice and research recommendations:

- Water supply reliability analyses in California should reflect portfolio-based water management to improve cost-effectiveness and equity in water management among diverse entities.
- More assessments of water system reliability should include public health, economic,
- More formal quality control and documentation of supply analyses should be encouraged and sometimes required for water supply reliability studies.
- A common State water accounting system should ecological, and social performance. be developed to improve analysis quality, comparability, and communication for technical and non-technical audiences.
- The next generation of state-sponsored water supply system models for reliability estimation should be built, updated, and evaluated by a consortium of state and federal agencies and external experts.
- Specific performance metrics and analysis methods for environmental water supply reliability should be developed and employed to better inform policies that support the Delta's co-equal goals.
- Estimation methodology should be updated to reflect accumulated and expected climate change effects, combined with uncertainty analysis.
- Investment in research and education should increase to improve water supply reliability estimation science and practice and maintain expertise in government agencies.

Part 4: 2024 Five-Year Review Recommendations

This section lists the recommendations and actions identified during the Five-Year Review process stemming from the performance measure evaluation and the regulatory analysis. Subject to Council approval, staff will pursue these priorities over the next five years and is committed to using the Council's leadership role to improve the performance areas to achieve the objectives of the Delta Plan better. In selecting the following priority actions, staff considered areas where improved leadership and coordination could catalyze the implementation activities of the multiple agencies progressing the Delta Plan.

The following list of recommended actions focuses on and prioritizes the Council's near-term Delta Plan implementation efforts. A short problem statement provides an at-a-glance context and rationale for each recommendation and associated actions.

1. Reduce Reliance on Delta Water

Drawn From: Performance Measures Evaluation

Problem Statement

For the first time, certain water suppliers detailed and quantified reduced reliance on Delta water and improved regional self-reliance in their 2020 Urban Water Management Plans or Agricultural Water Management Plans. This represents an opportunity to establish a routine and consistent accounting of reduced reliance on Delta water, which will enable the Council and others to monitor trends in Delta water use. Without routine reporting, determining progress in meeting the State policy of reduced reliance on the Delta will remain challenging. The quantification of reduced Delta reliance is also required for covered actions seeking to demonstrate consistency with Delta Plan Policy **WR P1**.

Actions

1a: Work with the Department of Water Resources and water suppliers who rely on Delta water to:

(1) Regularly report quantified reduced reliance and improved regional self-reliance as a mandatory component of urban and agricultural water management plans (Modify Delta Plan Recommendation **WR R4**); and

(2) Set numerical targets for future reduced reliance and improved regional self-reliance and evaluate progress toward those goals within their water management plans.

2. Accelerate Ecosystem Restoration

Drawn From: Performance Measures Evaluation

Problem Statement

The Delta ecosystem continues to decline despite progress in implementing restoration projects. The Council adopted the Delta Plan Ecosystem Amendment that set updated strategies, policies, and recommendations to restore a healthy Delta ecosystem resilient to climate change. Subsequently, the DPIIC established a Restoration Subcommittee to reduce barriers to large-scale restoration and increase estuary-wide coordination. The Council will re-double its efforts to advance ecosystem restoration and lead agency and partner coordination. There is an urgent need to expand and expedite the restoration of ecosystem functions, increase areas of working landscapes, and hasten the creation of new opportunities to restore the Delta ecosystem.

Actions

2a: Promote the need for dedicated funding for local agencies and districts to restore ecosystem functions and improve agricultural land management practices that support native species (Current Delta Plan Recommendation **ER RD**).

2b: Increase the pace and scale of ecosystem restoration by supporting the DPIIC Restoration Subcommittee to advance its workplan goals (i.e., Provide forums for meaningful community participation in Delta restoration efforts; Increase interagency collaboration to streamline restoration implementation; Identify opportunities in restoration planning and long-term management efforts, Increase transparency and coordination around existing, new, and needed restoration funding).

2c: Lead and coordinate with agencies owning land in the Delta to advance subsidence reversal projects, update applicable land management plans, identify appropriate uses for subsided properties, and implement actions that reduce, halt, and reverse subsidence. (Current Delta Plan Recommendation **ER RE**).

2d: Working with the Department of Water Resources and California Department of Fish and Wildlife, prepare a periodic report on progress

toward the Delta Plan restoration goals, including progress regarding early consultation with Tribes in the restoration design process. Such periodic reporting on restoration outcomes would maximize opportunities for learning, knowledge transfer, and adaptive management of restoration actions. (Report progress using **PM 4.16.).**

The updated Delta Plan ecosystem chapter defines a core strategy to improve institutional coordination and recommends that the DPIIC should:

- Consider establishing an ecosystem restoration subcommittee that includes tribal representation.
- Develop strategies for acquisition and long-term ownership and management of lands necessary to achieve ecosystem restoration consistent with the guidance in Appendix Q2 of the Delta Plan.
- Develop a funding strategy that identifies a portfolio of approaches to remove institutional barriers and fund Ecosystem Restoration Tier 1 or 2 actions within the Delta.
- Establish program-level endangered species permitting mechanisms that increase efficiency for Ecosystem Restoration Tier 1 or 2 actions within the Delta and compatible ecosystem restoration projects within the Delta watershed.
- Coordinate with the Delta Science Program to align State, federal, and local resources for scientific support of restoration efforts, including adaptive management, data tools, monitoring, synthesis, and communication.
- Develop a landscape-scale strategy for recreational access to existing and future restoration sites, where appropriate and while maintaining ecological value.
- Increase tribal engagement and input in planning conducted by agencies responsible for implementing and coordinating ecosystem restoration and protection projects in the Delta.

DPIIC Restoration Committee has adopted a workplan in 2022 incorporating these Delta Plan recommendations.

3. Accelerate Subsidence Reversal Efforts

Drawn From: Performance Measures Evaluation

Problem Statement

The pace and scale of subsidence halting and reversal activities in the Delta are insufficient. Just over 10% of the 30,000-acre Delta Plan target for subsidence halting and reversal has been achieved by 2023. Additional acreage is urgently needed to support California's carbon emission reduction goals. Land management practices in the Delta should focus on rebuilding soils, stopping and reversing subsidence, and sequestering carbon. Managed wetlands and tidal marshes can reverse subsidence, and rice cultivation can stop subsidence. These management practices have high initial set-up costs. Incentives to transition lands using sustainable management practices will play an important role in making large-scale transitions economically viable.

Actions

3a: Work with the Sacramento-San Joaquin Delta Conservancy (SSJDC) and California Air Resources Board (CARB) to advance incentives and protocols that support transitioning subsided lands to sustainable farming practices and make subsidence halting and reversal activities more economically viable (Current Delta Plan Recommendations **DP R7 and ER RE**). This includes supporting CARB efforts to standardize the compliance carbon market for carbon sequestration in rice farms and wetlands and securing funding for landowners to offset the conversion cost into rice and wetlands. (Current Delta Plan Recommendations: **ER RC, ER RD**)

3b: Work with SSJDC and the California Department of Food and Agriculture (CDFA) to increase outreach to landowners and farmers regarding opportunities and permitting requirements to support carbon markets for rice and wetland conversion.

4. Promote Delta Recreation and Tourism

Drawn From: Performance Measures Evaluation

Problem Statement

Tourism is an important driver of the Delta economy. Many existing recreation and tourism opportunities are available, but additional opportunities recommended in the Delta Plan have not been realized due to inadequate visitor information, aging and inaccessible facilities, and restricted access to public lands. The amount of

publicly accessible land for recreation in the Delta has not increased between 2013 and 2023. Improving roadways and marinas to withstand climate change and other stressors will improve recreation and tourism opportunities and benefit the Delta economy.

Actions

4a: Work with the Delta Protection Commission, Department of Parks and Recreation, and others to identify new tourism opportunities, increase heritage tourism and recreational access to public lands, build new recreation infrastructure, and market available recreation opportunities. Implementation of the Delta National Heritage Area management plan benefits Delta legacy communities and supports their community action planning efforts.

4b: Work with the Department of Parks and Recreation to expand state recreation areas in the Delta (Current Delta Plan Recommendation **DP R13**).

4c: Work with the Delta Protection Commission, Department of Parks and Recreation, Department of Water Resources, and California Department of Fish and Wildlife to improve recreational access on public lands (Current Delta Plan Recommendation **DP R16**).

4d: Work with the Delta Protection Commission, Sacramento-San Joaquin Delta Conservancy, and others to support VisitCADelta.ca.gov as a centralized platform to promote Delta businesses.

5. Improve State and Federal Assurances for Delta Levees

Drawn From: Performance Measures Evaluation

Problem Statement

Despite ongoing improvements to urban and rural levees, only about 30% of Delta islands and tracts are protected by levees that meet the applicable state or federal levee design standards. Federal agencies have been essential partners in recovering from previous Delta floods, and as risks from climate change grow, the importance of federal hazard mitigation and recovery assistance also increases. The process of securing and renewing state and federal assurances would benefit from an updated economic valuation of reliable water supply and transportation services protected by Delta levees, as these are important considerations in federal cost-benefit analyses.

Actions

5a: Work with the Department of Water Resources, Governor's Office of Emergency Services, Central Valley Flood Protection Board, and Delta Protection Commission to advocate for sustainable state levee funding and redouble efforts to renew federal commitments for post-disaster response, including hazard mitigation assistance for Delta levees (Current Delta Plan Recommendation **RR R12**).

5b: In partnership with the Department of Water Resources, Central Valley Flood Protection Board, and Delta Protection Commission, evaluate economic costs associated with declining water quality and compare them to the economic benefits of levee maintenance and improvements. Use this cost-benefit data to engage with the US Congress and federal agencies to advocate for the importance of Delta levees in national infrastructure and emergency response planning.

6. Consider and Implement Performance Measure Updates

Drawn From: Performance Measures Evaluation

Problem Statement

The performance measure evaluations completed for this Five-Year Review identified areas where additional metrics and/or revisions to existing metrics and targets would improve the understanding of program outcomes and changes occurring in the system. In some instances, new tools and data sources are available to support the creation of new performance measures. Specifically, assessments of the Delta as Place progress for this Five-Year Review were limited due to a lack of available data and would benefit from more detailed evaluation and application of social science principles.

Actions

6a: Research, resource, propose, and implement refinements to performance measures identified in Appendix 1 to the Five-Year Review.

6b: Review available social science information and gather data from other agencies and existing efforts (Delta Resident Survey, DPC Socioeconomic Indicators Report) to compile a suite of indicators that describe the socioeconomic trends of Delta residents and communities. This will provide a more comprehensive understanding of the Delta's economic development needs and challenges.

6c: Research and identify metrics to quantify areas of deeply subsided public lands, land leases supporting activities that contribute to subsidence, and the rate and amount of subsidence occurring. Use this information to inform and advance strategies to reduce subsidence on public lands.

7. Implement the Delta Levees Investment Strategy

Drawn From: Regulatory Analysis

Problem Statement

The Delta Levees Investment Strategy (DLIS) informs investments in Delta levees, considering risk, economic, and engineering factors. These factors are perpetually changing, creating new information that should be leveraged by future iterations of DLIS to maintain ongoing and achieve greater risk reduction benefits.

Actions

7a: Continue to update and implement DLIS to incorporate new information, with a particular focus on prioritized research on seismic risks to Delta levees, risks in vulnerable and disadvantaged communities, updated hydrology, and local climate change projections.

7b: Prepare an annual assessment of changes in Delta flood risk resulting from new information and annual Delta levee investments. Use the assessments to consider updates to the Delta island and tract priorities established in Delta Plan Policy **RR P1** at least every five (5) years.

8. Consider the Impacts and Benefits of Capturing and Storing Carbon

Drawn From: Regulatory Analysis

Problem Statement

The Delta has been identified as having high geological potential for carbon capture and storage (CCS) projects. CCS projects proposed in the Delta may be covered actions and potentially impact water supply reliability, ecosystem restoration, and the Delta as a Place, including environmental justice considerations. Other climate adaptation projects like wind and solar farms may have similar impacts.

Actions

8a: Research and consider the applicability of existing Delta Plan policies and recommendations on carbon capture and storage, solar, and wind energy

projects in the Delta. Evaluate what additional protections may be needed to achieve Delta Reform Act goals.

8b: Continue coordinating with federal, state, and local agencies to ensure coordinated carbon capture and storage project permitting aligns with the state's Climate Change Scoping Plan.

9. Conduct Covered Action Early Consultation and Post-Project Updates

Drawn From: Regulatory Analysis

Problem Statement

Council staff engage in active outreach to potential proponents of covered actions and provide an early consultation process through which a certifying agency receives assistance in preparing the required certification of consistency. Improvements to early consultation processes should continue, including using innovative tools and approaches. The Council's role in the covered action process is largely front-loaded in the early consultation and certification of consistency processes, with limited follow-up after a project is certified and implemented. Providing the Council with updated information about covered action implementation after the certification is not required under the Delta Reform Act, but it would allow the Council to consider the Delta Plan's influence on project-specific ecosystem outcomes and social benefits.

Actions

9a: Develop a certification guide and accompanying video providing step-by-step instructions for certifying agencies using the Council's Covered Action Portal.

9b: Invite certifying agencies to present updates to the Council on previously certified covered actions, focusing on implementation challenges and successes related to the Delta Plan with a particular focus on implementing adaptive management plans.

9c: Evaluate and consider modifications to existing Delta Plan regulations to ensure clarity and consistent application.

10. Improve the Use of the Best Available Science in Certifications of Consistency

Drawn From: Regulatory Analysis

Problem Statement

Delta Plan Policy **G P1(b)(3)** requires that covered actions consider the best available science in project development. The Delta Science Program advises certifying agencies regarding the application of the best available science to covered actions. Best available science changes rapidly, and decisions may need to be revised as new scientific information relevant to Delta resource management issues becomes available. Appeals of **G P1(b)(3)** have identified recurring topics that would benefit from additional research and synthesis.

Actions

10a: Synthesize science and promote access to the latest research and data to enable certifying agencies to utilize the best available science better when developing covered action projects.

10b: Prioritize research and synthesis concerning harmful algal blooms, salinity, and related water quality issues, and restoration project designs that minimize the presence of invasive species and enable public access and recreation.

10c: In early consultation with certifying agencies, focus more on best practices addressing the best available science's inclusiveness, relevance, and objectivity criteria.

10d: Fund scientific research that addresses Delta Plan implementation needs and emerging resource management gaps, including the need for more collaborative, participatory science, interweaving traditional ecological knowledge and science, and integrating social and environmental science.

11. Enhance Adaptive Management Plans

Drawn From: Regulatory Analysis

Problem Statement

Delta Plan Policy **G P1(b)(4)** requires certifying agencies to prepare adaptive management plans for ecosystem restoration and water management covered actions and specifies required elements of an adaptive management plan. The quality of plans submitted to date for ecosystem restoration projects is high.

However, submitted plans often do not include robust treatment of data storage, data sharing, and communication strategies. Adaptive management plans prepared for water management covered actions are limited to date.

Actions

11a: Provide targeted technical support to help certifying agencies develop more robust data management and communication components within adaptive management plans. Highlight communication best practices drawn from submitted plans describing how certifying agencies can convey adaptive management findings and monitoring data more effectively.

11b: In early consultation, advise certifying agencies to structure their adaptive management plans to correspond to the Delta Plan's adaptive management "wheel" and include synthesis tables that improve the clarity and accessibility of the plan to a wide variety of readers.

11c: In early consultation, advise certifying agencies to provide explicit statements regarding authority and funding to implement adaptive management within an adaptive management plan.

11d: Develop additional tools and resources to assist early consultation with certifying agencies for water management covered actions regarding adaptive management plans that include performance metrics, disclose analytical methods, and incorporate uncertainty analysis.

11e: Establish a practice and process to communicate best practices for adaptive management to practitioners.

12. Develop a 'Delta as an Evolving Place Facing Rapid Change' Report

Drawn From: Regulatory Analysis / Performance Measures Evaluation

Problem Statement

Social, economic, and environmental changes in the Delta have occurred more rapidly than was first anticipated in 2013. Therefore, there is a need to evaluate how the Delta Plan approaches the treatment of the Delta as an evolving place. The Delta needs to adapt to an uncertain future – whether due to climate change (e.g., sea level rise, extreme weather events), growing populations, or shifting commodity markets. An updated focus on additional strategies to increase the Delta's resilience to the forces of change is needed (as recommended in the 2019 Five-Year Review). Recent Council-led projects and other agencies' efforts provide an updated

understanding of how resource management actions impact the health and well-being of Delta communities and set a background for evaluating policies and recommendations to continue to preserve and enhance the unique characteristics and values that distinguish the Delta despite changing conditions.

Action

12a: Using the best available science and findings from recently completed studies and initiatives, develop an approach to consider the forces of change (social, economic, environmental, climate) impacting the Delta's resilience as a place.

13. Implement New Climate Adaptation and Tribal and Environmental Justice Recommendations as Directed by the Council

Drawn From: Regulatory Analysis

Problem Statement

The Council's Environmental and Tribal Justice Issue Paper and Delta Adapts Adaptation Plan will be completed in 2024, recommending strategies and actions regarding environmental and Tribal justice issues impacting Delta communities and climate adaptation strategies for the Delta. Dedicating staff resources to implement actions adopted by the Council is an important step toward implementing the recommendations.

Action

13a: Resource and implement strategies and actions identified in the Environmental and Tribal Justice Issue Paper, Delta Adapts Climate Adaptation Plan, and related Delta Plan implementation activities as directed by the Council.

Conclusion

The 2024 Five-Year Review of the Delta Plan provides an opportunity to consider and review progress in implementing the state's Delta Plan. Performance measure evaluation, coupled with reviews of the Council's implementation of its regulatory and appellate roles, provides a helpful feedback loop to manage the Delta Plan adaptively. Recommendations from the Review inform the Council, partner agencies, and the public regarding near-term priorities and the Council's work plan.

The Council has established itself as a leader over the past ten years through agile, forward-looking facilitation with Delta agencies, partners, and stakeholders and by demonstrating continued support for the best available science to inform decision-making in the Delta. At the same time, the Council must ensure that the Delta Plan responds to changes in physical and social environments, evolving science and knowledge, and the pace and uncertainty of climate change. The Council remains committed to using its leadership role to emphasize the focus and urgency on difficult yet critical actions that can reverse the trajectory of declining and stagnant trends, advance positive trends, and remain on the path toward achieving the coequal goals.

Appendix 1. Performance Measure Report Card Technical Details