Report on Accomplishments and Progress on High-Impact Science Action (HISA) Implementation (May 2016)

History of the Development of the High-Impact Science Actions

At the inaugural meeting, **April 2014**, the Delta Plan Interagency Implementation Committee (DPIIC) acknowledged the critical role of science for effective decision-making related to the sustainability of the Sacramento-San Joaquin Delta. The Committee recognized the value and urgency of working together to reduce uncertainties while managing risk and making necessary investments. At the second meeting, **November 2014,** the DPIIC accepted an Interim Science Action Agenda (ISAA) as a reference for guiding regional science activities in support of policy and management decisions for the Delta. The Committee members also agreed to commit staff to 1) secure a cross-agency understanding of the priority science needs in the Delta; and 2) identify a short list of high-impact, multi-benefit science actions for implementation within the next **two years.** In response to the DPIIC request, staff established the interagency Delta Agency Science Workgroup (Workgroup). Together, the Workgroup narrowed the interim list of over 300 science actions to a list of nine priority near-term actions, organized under four key topics: **High-Impact Science Actions (HISA).** At the **May 2015** DPIIC meeting, the Committee directed the Workgroup to initiate implementation of the HISA list and report back on progress. The Workgroup promptly moved ahead with initiating implementation. By **November 2015**, the Workgroup had made progress on five of the nine near-term actions.

May 2015 to May 2016: Accomplishments to Date

One year after DPIIC endorsement, significant progress is being made on all of the High-Impact Science Actions (HISA) and Action 3G, Salmon Life-Cycle Model Review is complete. The HISA and topics continue to be relevant and timely; they are driving progress on key management topics. For example, at the last Workgroup meeting, members agreed for the need to shift the focus of Action 1A, Drought Effects Synthesis, from an effort focused on data synthesis on the physical effect of the historic four-year drought on the Delta ecosystem, to a effort focused on developing a framework for management actions for the next drought. For this topic, and others, the HISA has proved to be a useful tool in not only keeping common interagency priorities organized, but also to provide guidance to help refine agency efforts where there is a need for greater effectiveness. The HISA topics have been used by several agencies to help refine proposal solicitation processes and coordinate funding priorities, including funding from Proposition 1. The Workgroup members, their staff, and other interested parties have been essential in maintaining momentum around these priority actions.

Next Steps

With sustained DPIIC support, the Workgroup will continue to implement the HISA, engage additional stakeholders, and work to collectively address issues (e.g., funding challenges). More importantly, now that the publication of the 2016 update of *State of Bay Delta Science* (2016 SBDS) is imminent, the Workgroup can continue to drive progress on cross-agency collaborative science. The 2016 SBDS is a synthesis of the current scientific understanding of the Delta, emphasizing progress made on key research questions and remaining knowledge gaps. Workgroup members will be briefed on the 2016 SBDS findings and engaged in the development of the 2017 Science Action Agenda. The Science Action Agenda will serve as guidance for pertinent agency science programs and initiatives (e.g., IEP, CAMT, Delta RMP, Invasive Species Coordination, etc.) and help to support management and policy decisions over the next 3-4 years.

The following tables include:

- Status Summary of High-Impact Science Actions: A brief synopsis of collective progress to date on all actions.
- Individual Action Reports: Each High-Impact Science Action, identified by corresponding table number, is described, including the approach to the problem, progress to date, estimated timeline, associated agencies and organizations, and related projects underway/soon-to-be funded.

Status Summary of High-Impact Science Actions, May 2016						
Topic		Status				
		Awaiting Input	Initiated Discussion	Being Scoped	Work Started	
TABLE 1: HIGH-IMPACT SCIENCE ACTIONS THAT MAY BE ADDRESSED BY RAPID-RESPONSE IMPLEMENTATION						
1A	***Drought effects synthesis*** *Conduct a technical review of current reports concerning the drought to identify what is known about effects of the drought as well as to determine gaps in knowledge and topics not covered in past synthesis efforts. Using results from the review conduct a "lessons learned" workshop and create a set of metrics to monitor key indicators of drought impacts.*			✓	○	
1B	***Real-time decision support tool evaluation*** *Evaluate tools supporting real-time operations, monitoring, reporting, data management, and accessibility of data.*		✓	✓	○	
2C	***Restoration design synthesis*** *Synthesize established knowledge about designing effective habitat restoration projects in the Delta.*		✓	✓	○	
2D	***Pre-restoration monitoring*** *Enhance current and promote additional monitoring efforts in the Delta and Suisun Marsh to gather pre-restoration data.*		✓	✓		
2E	***Northeast Delta landscape vision*** *Develop the landscape vision and decision support framework for the Northeast Delta pilot effort.*		✓	✓		
3F	***Shasta Reservoir temperature forecasting*** *Conduct follow-up work to improve collaborative temperature modeling of cold water forecasting for Shasta Reservoir releases into the Sacramento River.*			✓	○	
3G	***Salmon life-cycle model review*** *Conduct a peer-review of the Southwest Fisheries Science Center's winter-run Chinook salmon life-cycle model.*	Completed				
3H	***Resources and mechanisms to fund collaborative research*** *Identify the process, mechanisms and resources to fund research identified by various efforts*		✓		●	
4I	***Economic analysis of flood control methods*** *Consolidate the current state of knowledge regarding economic analysis of the potential to reduce flood damage through strategic levee setbacks and expanding wetland and floodplain acreage.*		✓			
TABLE 2: LONGER TERM IMPLEMENTATION MECHANISMS - PROPOSAL SOLICITATION/DELTA SCIENCE FELLOWS						
2015 Sea Grant Delta Science Fellows request for applications		Completed				
2016 Sea Grant Delta Science Fellows request for applications				✓	○	
2015 Research topics for Proposition 1 proposal solicitations		Completed				
2016 Research topics for Proposition 1 proposal solicitations				✓	●	
Multi-agency proposal solicitation		✓	✓			

○ – early stages of implementation ● – well underway

Topic 1: Assessing drought-related effects on the Delta

Table 1 Science Action 1A	*Conduct a technical review of current reports concerning the drought to identify what is known about effects of the drought as well as determine gaps in knowledge and topics not covered in past synthesis efforts. Using results from the review conduct a "lessons learned" workshop and create a set of metrics to monitor key indicators of drought impacts.*
Approach	A workshop highlighting the lessons learned from key management actions made in response to drought, monitoring and research that contributed to these decisions, and future science actions that would help improve our ability to prepare for future droughts.
Deliverables/Desired Outcomes	A drought response management framework incorporating information from the workshop that would provide both managers and scientists with information needed to better respond to future droughts. Information in the framework should allow managers to consider the trade-offs in making future drought response decisions and also provide guidance for longer-term planning strategies and recovery programs with respect to drought. Scientists may use the framework to identify additional monitoring tools and research that is needed to better prepare for and assess future drought impacts.
Progress to Date	• The focus of this topic has been shirted from understanding drought effects to understanding the effects of management actions in response to drought on the Delta ecosystem. • The DASW suggested incorporation of the lessons learned aspects of the synthesis be applied to future permitting processes related to water operations and into long-term conservation planning supporting system resilience. • Information from the most current MAST drought synthesis report, results from the emergency drought barrier studies, and other documents will be incorporated into this effort. • A draft scope of work for the workshop was presented during the lunch hour at the IEP annual workshop on April 22. The briefing was well attended and the suggestions provided were very insightful.
Estimated Timeline/Next Steps	A planning committee is currently being convened, with an initial meeting expected in Summer 2016.
Related Projects Underway	Emergency Drought Barrier projects: information from these efforts will be incorporated into the synthesis workshop.
Next Steps	Convene a planning committee to initiate coordination of the synthesis effort. Potential products will include a workshop and drought synthesis framework to be completed by the end of 2017.

Topic 1 - Assessing drought-related effects on the Delta

Table 1 **Science Action** **1B**	*Evaluate tools supporting real-time operations, monitoring, reporting, data management, and accessibility of data.*
Approach	1. Develop a governance framework and implementation plan to execute key recommendations in the recently published report *Enhancing the Vision for Managing California's Environmental Information*. This will involve conducting an inventory of the organizations pursuing data sharing initiatives and associated tools these groups are using, and developing a synthesis report that provides an overview of current tools that support monitoring, reporting, and data accessibility. This report will identify remaining gaps and implementation challenges that can lead to specific recommendations for best approaches to improve data access, methods to streamline data synthesis, and integrate complementary efforts. These recommendations will then be incorporated into the forthcoming Science Action Agenda. 2. A Delta Collaborative Analysis and Synthesis (DCAS - *see* Delta Science Plan, p. 39) effort to assess new monitoring approaches and update current ones based on regulatory needs and landscape-scale effectiveness. This will also include a detailed agenda and list of experts to be included in the DCAS planning and implementation, including development of evaluation requirements. 3. Joint pilot studies to investigate appropriate locations to install monitoring equipment to test their efficacy and applying available visualization tools to display this data in an accessible format for managers and decision-makers.
Deliverables/Desired Outcomes	1. Implementation of key recommendations in the recently published *Enhancing the Vision for Managing California's Environmental Information*. 2. A unified monitoring approach to leverage current efforts while also bringing together agencies involved in monitoring various aspects of the Delta including water, habitat, and biota. 3. Joint evaluation of operations that will reduce redundancies and help streamline real-time data processing and sharing, and also enhance communication mechanisms to inform managers and decision-makers in a short period of time.
Progress to Date	• The Delta Agency Science Workgroup confirmed this is a high priority action. • The Delta Science Program is currently managing a contract for a group to begin developing an implementation plan to implement key aspects of the Data Summit White Paper, *Enhancing the Vision for Managing California's Environmental Information*. The group has proposed a steering committee for this effort, which has been endorsed by the CAWQMC. ○ Concepts from the Vision paper has also been reflected in AB 1755, the Open and Transparent Water Data Act, which involves

Table 1 Science Action 1B	*Evaluate tools supporting real-time operations, monitoring, reporting, data management, and accessibility of data.*
	requirements for the development of protocols for data sharing and promotion of open source platforms and decision support tools. • The Delta Science Program in close collaboration with USGS, USEPA, and others is also poised to lead a scoping effort, in close collaboration with USGS, USEPA, and others, to allocate resources toward a DCAS effort, beginning in 2016, on assessing new monitoring approaches responsive to today's and tomorrow's anticipated management needs. • The Delta Science Program has developed a prototype information-sharing and decision-support website to facilitate rapid decisions on finalizing scopes of work and funding contributions to the Emergency Drought Barrier enhanced monitoring effort. • The Delta Conservancy is working with a group of organizations to increase access to high quality Suisun Marsh and Delta data. The project is expanding the San Francisco Data Center to provide a central location for Delta water quality data.
Estimated Timeline/Next Steps	November 2015 - November 2016
Associated Agencies and Organizations	CA WQMC DWR CA Department of Technology CA Digital Library San Francisco State University Strategic Growth Council USGS USEPA NASA Ames UC Davis UFSWS
Next Steps	Increase the focus on real-time decision support tool evaluation to achieve the vision in the Data Management Plan. Complete implementation of the white paper by 2017.

Topic 2 – Effectiveness and Implications of habitat restoration and actions

Table 1 Science Action 2C	*Synthesize established knowledge about designing effective habitat restoration projects in the Delta.*	
Approach	1) Support synthesis efforts that address specific aspects of Delta restoration. 2) Formation of a technical interagency workgroup - the Interagency Adaptive Management Integration Team (IAMIT) - to support information sharing and coordination of restoration adaptive management activities.	
Deliverables/Desired Outcomes	1) To communicate the latest scientific information to support habitat restoration planning and implementation through workshops and symposia on restoration science synthesis, restoration lessons learned, and design of effective habitat restoration projects in the Delta. 2) Formation of an interagency committee to facilitate better science-based landscape level planning and implementation of Delta habitat restoration adaptive management.	
Progress to Date	1) Synthesis • Mercury Workshop, which provided the current state of knowledge of mercury dynamics in the Delta, was held in January 2016 and a final synthesis workshop, which will result in a paper, will be held June 2016. • SFEI Past and Present Delta Primary Production Workshop was held in October 2015 to develop a synthesis of past and contemporary production and its ability to support the Delta food web. A follow up public forum will be held in fall of 2016 to share the resulting updated conceptual model and science plan for addressing key hypotheses with restoration practitioners and decision makers. 2) The IAMIT has been formed to support EcoRestore adaptive management. First IAMIT meeting was held March 2016 to discuss draft charge.	
Estimated Timeline/Next Steps	The draft mercury synthesis paper is to be drafted by the end of 2016. Primary production science plan and synthesis paper targeted for completion by Spring 2017. The IAMIT charge and charter to be finalized by May 2016.	
Associated Agencies and Organizations	CA WQMC CDFW Delta Conservancy DSP DWR EcoRestore IEP Tidal Wetland Monitoring Project Work Team	Resource Management Associates SFCWA SFEI-ASC University of Georgia University of South Carolina University of Washington USGS Virginia Institute of Marine Science

Topic 2 – Effectiveness and Implications of habitat restoration and actions

Table 1 **Science Action** **2D**	*Enhance current and promote additional monitoring efforts in the Delta and Suisun Marsh to gather pre-restoration data.*
Approach	The EcoRestore Steering Committee and Interagency Adaptive Management Integration Team (IAMIT) will evaluate existing adaptive management efforts and develop recommendations for creating a Delta-wide adaptive management program. This effort will include evaluation of current monitoring efforts and suggestions for additional monitoring to include all Delta habitat types (tidal marsh, managed wetland, floodplain, riparian, levee related and channel margin habitats, etc.). IAMIT will recommend enhancements for existing efforts (and addition of new ones where needed) to evaluate region-wide and Delta-wide system response to restoration actions.
Deliverables/Desired Outcomes	White paper identifying needs for development of a Delta-wide habitat restoration adaptive management program, addressing what needs to be done and what is missing, including recommendations for filling gaps and funding needed for implementation.
Progress to Date	The focus of this topic will remain on monitoring efforts but will emphasize its importance in supporting adaptive management. A suggestion was provided for a potential workshop that identifies the needs for pre-restoration monitoring. EcoRestore Steering Committee and IAMIT have been convened and are initiating white paper development.
Estimated Timeline/Next Steps	EcoRestore AM white paper to be completed by end of 2016.
Associated Agencies and Organizations	CA WQMC and associated workgroups SWRCB CDFW DSC DSP Delta Conservancy DWR EcoRestore SFCWA FWS NMFS USBR
Next Steps	Continue to work with DASW on identifying additional opportunities for pre-restoration monitoring (e.g., Sacramento Regional Sanitation District, Echo Water Project, tertiary treatment switchover will eliminate nearly all ammonia, most nitrate and other constituents from the effluent.)

Topic 2 – Effectiveness and Implications of habitat restoration and actions

Table 1 Science Action 2E	*Develop the landscape vision and decision-support framework for the Northeast Delta pilot effort.*
Approach	1) Develop and implement landscape restoration visions, and decision support tools for two pilot priority restoration areas: Northeast Delta and Cache Slough. Scope of works, deliverables and timelines are being finalized for the Cache Slough Planning Framework and the Northeast Delta Landscape Restoration Framework. 2) Integration of ecosystem, flood control, water supply, agriculture and science into the landscape restoration framework. Strong participation of local agencies, coordination among state and federal agencies and science experts.
Deliverables/Desired Outcomes	A landscape restoration vision, data analytics and decision support tools, facilitated meetings, technical documentation and a hub for best available science, all combined into a roadmap for management of restoration progress in the Northeast Delta and Cache Slough regions.
Progress to Date	Several draft proposals and discussions among project planning group, county representatives and Delta Conservancy board
Estimated Timeline/Next Steps	Phase 1 (data integration and visualization) and facilitated kick-off meetings with partners to be initiated in the second half of 2016.
Associated Agencies and Organizations	Delta Conservancy SFEI-ASC DSC DSP TNC Intelligent Ecosystem Institute Solano County Yolo County
Related Projects Underway	Restoration of the McCormack-Williamson Tract by Department of Water Resources and TNC in Northeast Delta and Prospect Island by DWR in Cache Slough.
Notes to DASW	The Conservancy and associated agencies and organizations are working to develop final scopes of work for the pilot projects to bring to the Conservancy Board for approval as soon as possible.

Topic 3 - Science support for management of estuarine and migratory species

Table 1 **Science Action** **3F**	*Conduct follow-up work to improve collaborative temperature modeling of cold water forecasting for Shasta Dam releases into the Sacramento River.*
Approach	A two-day training workshop involving staff from the USBR, State Board, and member representatives of the Sacramento River Temperature Task Group (SRTTG) to enhance understanding of: a. Sacramento River Water Quality Model (SRWQM) strengths and limitations b. SRWQM outputs c. Enable SRTTG member agency staff to conduct additional parallel modeling to increase the robustness of solutions to the increasingly difficult management decisions facing SRTTG member agencies.
Deliverables/ Desired Outcomes	Increased number of staff with in-depth knowledge of the SRWQM model, providing a means for a streamlined, objective review process of Temperature Management Plans.
Progress to Date	Both the USBR and State Board have agreed to participate in the workshop. The next steps will be for the Science Program to coordinate with the model developer (RMA) to conduct the training workshop.
Estimated Timeline	Summer 2016
Associated Agencies and Organizations	DSP USBR SRTTG Members SWRCB
Related Projects Underway	• Collaborative efforts identified in bullets below; timeline uncertain • Automated temperature fiber optic cables in Shasta Reservoir deployed and operable • Recalibration of 2D Shasta Reservoir model, CE-QAL-W2, to finer spatial-scales; summer 2016 • NMFS plan to link newly developed 2D Shasta Reservoir model and Keswick reservoir model to RAFT; timeline uncertain
Future Actions	SRTTG agencies, guided by the 2015 Sacramento River Temperature Management Plan (STMP 2015) and Water Rights Order 2015-0043 (WR 1543), have increased collaboration and have identified actions that would greatly aid collaborative efforts for example: • The NMFS – USBR co-chaired "model review technical working group that will identify limitations with the existing modeling tools and will make recommendation about short-term fixes to the current tools or defer changes to new model development efforts" (STMP 2015)
Next Steps	Hold a training workshop for the SRWQM model involving USBR, the State Water Board, and members of the SRTTG (summer 2016).

Topic 3 - Science support for management of estuarine and migratory species

Table 1 Science Action 3G	*Peer review of the Southwest Fisheries Science Center's winter-run Chinook salmon life-cycle model*
Approach	The SWFSC submitted a proposal to the Office of Science and Technology's Center for Independent Experts (CIE) and received funding for a panel review of the NMFS winter-run life-cycle model.
Deliverables/ Desired Outcomes	A scientifically robust salmon life-cycle model to inform decisions to adapt water operations and restoration actions.
Progress to Date	• Review took place November 5 and 6, 2015. • The peer-review report is schedule to be up on the NMFS website soon.
Associated Agencies and Organizations	University of Southern California UC Santa Barbara USGS USFWS NWFSC DWR USBR NMFS-Central Valley Office CDFW
	Several technical workshops and webinars have been open to the public and stakeholders and have been well attended.
Next Steps	This is a completed action. Information will be available online in the coming weeks.

Topic 3 - Science support for management of estuarine and migratory species

Table 1 **Science Action** **3H**	*Identify the process, mechanisms, and resources to fund research identified by various efforts such as Salmon/Steelhead/Sturgeon Assessment of Indicators by Life Stages (SAIL), the Interagency Ecological Program's Management, Analysis, and Synthesis Team (MAST), the Collaborative Adaptive Management Team (CAMT), and Delta Regional Monitoring Program (Delta RMP).*
Approach	Develop a well-defined methodology for funding research to streamline the process for funding entities. Continue efforts to identify and align funding for high-priority science supporting collaborative synthesis efforts.
Deliverables/Desired Outcomes	Appendices added to the Delta Science Plan that describe a range of funding mechanisms. This information is intended to provide funding agencies with guidance in targeting the most optimum funding mechanism to support various research efforts. Funding opportunities with a focus on research identified by the collaborative efforts listed above.
Progress to Date	The Delta Science Program has developed an update to the Delta Science Plan, which includes two additional appendices that provide a well-defined methodology for a range of funding mechanisms including an outline of the review process, estimated timeframes for implementation, and procedures addressing conflict of interest. The Delta Science Program is collaborating with CDFW in funding three research projects submitted as part of the 2015 CDFW Prop 1 proposal solicitation.
Estimated Timeline/Next Steps	The final edits are to be made to the Delta Science Plan and posted on the web by the end of May 2016.
Associated Agencies and Organizations	All DPIIC agencies and collaborative science initiatives.
Related Projects Underway	The Delta Science Program has recently demonstrated the Directed Action funding mechanisms through identification, review, and funding of four research proposals investigating the effects of the Emergency Drought Barrier. These four projects went from concept to "boats on the water" in less than three months.
Next Steps	• Selection and prioritization of projects for limited funding. • Identification of available funding. • Consistency of research funding methods and decisions across agencies.

Topic 4 – Science supporting flood risk reduction and the economies of Delta communities

Table 1 Science Action 4I	*Consolidate the current state of knowledge regarding economic analysis of the potential to reduce flood damage through strategic levee setbacks and expanding wetland and floodplain acreage.*
Approach	At the October 5 DASW meeting, it was agreed that this topic needs further group discussion to ensure it will be relevant and valuable to a majority of participating agencies. During the April 11th meeting, the DASW expressed interest in making progress on this action. Several efforts relevant to 4I have been recently established including the EcoRestore Yolo Bypass Fish Restoration Project, Delta Flood Risk Management Assessment District Feasibility Study coordinated by the Delta Protection Commission have been initiated
Related Projects Underway	Topics listed in the Sea Grant Delta Science Fellows Request for Applications
Next Steps	The Delta Stewardship Council, DWR, USGS, and EcoRestore representatives will convene a group to discuss progress made on projects related to 4I.

Table 2

The science actions listed in this table include those having a broader scope and those that are appropriate for near-term initiation in the form of a proposal solicitation or Delta Science Fellows Request For Applications. Research initiated through the aforementioned funding mechanisms will also serve to support those science actions in Table 2 that are more appropriate to address on a larger-scale (e.g. agency projects spanning multiple years or decades). The following outlines the recent accomplishments and future steps in executing Table 2 topics:

Accomplishments

1. **Sea Grant Delta Science Fellows 2015 Request for Applications (implemented)**
   The 2015 Sea Grant Delta Science Fellows solicitation resulted in 22 proposal submissions. Of these, 10 were funded by the Delta Science Program, one was jointly funded by the Delta Science Program and NOAA, and another one was funded by State and Federal Contractors Water Agency (SFCWA). The research areas in the request for applications included Topics 1 through 4 from Table 2, which were further clarified and refined by a subgroup composed of interested Delta Agency Science Work Group members, representatives from SFCWA, Sacramento County Regional Sanitation District, NASA – Jet Propulsion Laboratory, and NASA Ames Research Center.

2. **California Department of Fish and Wildlife 2015 research topics for Proposition 1 proposal solicitations (implemented)**
   The California Department of Fish and Wildlife (CDFW) proposal solicitation, published for fiscal year 2015-2016 included research topics that incorporated Table 2 Science Actions 1-3 and associated topic areas of the High Impact Science Actions. The solicitation led to 190 proposals, of which about 15 percent were funded. The Delta Science Program was able to fund three highly-ranked research proposals in addition to those funded by CDFW.

Upcoming Efforts

3. **Sea Grant Delta Science Fellows 2016 Request for Applications (in process)**
   On April 28th, the Delta Stewardship Council authorized the Executive Officer to enter into a nearly $1.526 million contract with California Sea Grant to support a new class of Delta Science Fellows to conduct research on High Impact Science Actions. Research areas from the 2015 Request For Application, which were based on the topics from Table 2, will be used as the backbone for the 2017 solicitation.

4. **California Department of Fish and Wildlife 2016 Proposition 1 solicitations (initiated)**
   The Call for Proposals was opened at the end of April and will remain open for six weeks. The current round will include four research areas which will incorporate aspects of the Table 2 topics. This year's solicitation will include $7 million for Delta-related research.

List of abbreviations

CAMT: Collaborative Adaptive Management Team
CDEC: California Data Exchange Center
CDFW: California Department of Fish and Wildlife
CEDEN: California Environmental Data Exchange Network
CIE: Center for Independent Experts
CWQMC: California Water Quality Monitoring Council
DCAS: Delta Collaborative Analysis and Synthesis
Delta RMP: Delta Regional Monitoring Program
DSC: Delta Stewardship Council
DSP: Delta Science Program
DST: Decision Support Tool
DWR: Department of Water Resources
IAMIT: Interagency Adaptive Management Integration Team
IEI: Intelligent Ecosystem Institute
IEP: Interagency Ecological Program
LCM: Life-Cycle Model
LOBO: Long-term Operations Biological Opinion
MAST: Management, Analysis, and Synthesis Team
NASA: National Aeronautics and Space Administration
NMFS: National Marine Fisheries Service
NWFSC: Northwest Fisheries Science Center
NOAA: National Oceanographic and Atmospheric Administration
PPIC: Public Policy Institute of California
RAFT: River Assessment for Forecasting Temperature
RMA: Resource Management Associates
SAIL: Salmon/Steelhead/Sturgeon Assessment of Indicators by Life Stages
SFCWA: State and Federal Contractors Water Agency
SFEI-ASC: San Francisco Estuary Institute-Aquatic Science Center
TNC: The Nature Conservancy
TWMPWT: Tidal Wetland Monitoring Project Work Team
USBR: U.S. Bureau of Reclamation
USEPA: U.S. Environmental Protection Agency
USFWS: U.S. Fish and Wildlife Service
USGS: U.S. Geological Survey