Table 1. High Impact Science Actions That May Be Addressed by Rapid-Response Implementation

	Science Action	Product or Outcome of Science Action	Significance and Management Implications of Science Action
Topic 1. Assessing drought-related effects on the Delta			
A	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.	Insight on effects of the drought, identification of future research needs and information to create a set of metrics to monitor key drought indicators to aid future management efforts.	Although several topic and species-specific drought synthesis reports exist, none provide a broad assessment of drought impacts and responses. Understanding the implications of the full range of drought effects is important to support development of management actions that minimize the impacts of current and future droughts and related management to all interests.
B	Evaluate tools supporting real-time operations, monitoring, reporting, data management, and accessibility of data.	A report on real-time management tools and technology to improve salinity and Delta outflow measurements for informing management decisions.	Nimble drought management requires rapid delivery of useful information regarding the current state of the system. Although a system of real-time monitoring information is available, it can be improved and enhanced so that more timely information may be used to guide decision making.
Topic 2. Effectiveness and implications of habitat restoration and actions			
C	Synthesize established knowledge about designing effective habitat restoration projects in the Delta.	A report outlining lessons learned from past restoration studies and efforts, providing a list of specific knowledge gaps and design principles for habitat restoration. This information can be used to adaptively guide the design of habitat restoration monitoring efforts and provide recommendations for effective adaptive management.	Previous Delta restoration projects must be evaluated and the information gained used to adaptively guide the design of habitat restoration efforts and provide recommendations for effective adaptive management. Such processes are critical to ensure projects are planned and implemented in an integrated, consistent and systematic way to improve native species habitat.
D	Enhance current and promote additional monitoring efforts in the Delta and Suisun marsh to gather pre-restoration data.	Plans for and implementation of baseline monitoring needed for pre/post habitat restoration analyses.	There is a need to evaluate habitat restoration effectiveness and document lessons learned to support adaptive management and increase the likelihood of achieving restoration goals.
E	Develop the landscape vision and decision support framework for the Northeast Delta pilot effort.	A vision and decision support framework that will offer an adaptive roadmap for management of restoration progress in the Cosumnes-Mokelumne Priority Habitat Restoration Area.	The Landscape Vision and Decision Support Framework aims to make the best available science actionable — implementing advanced analytical tools, scientific knowledge base, and interdisciplinary expert collaboration—for the task of reconnecting land and water for native species recovery and ecosystem resilience.
Topic 3. Science support for management of estuarine and migratory species			
F	Conduct follow-up work to improve collaborative temperature modeling of cold water forecasting for Shasta Dam releases into the Sacramento River.	A synthesis report of current temperature modeling efforts and recommended improvements to better forecast cold water release, followed by implementation of the recommendations.	Current temperature models need improvement to better forecast water releases from Shasta Dam to protect winter-run Chinook salmon. This is especially critical in the face of the current drought affecting storage and cold water temperatures.
G	Peer-review of the Southwest Fisheries Science Center’s winter-run Chinook salmon life-cycle model.	A scientifically robust salmon life-cycle model to inform decisions to adapt water operations and prescribed RPA actions.	The SWFSC model has been identified as the most promising life cycle model to date. This model is already being utilized for a variety of management questions due to the urgent need for the information it provides; thus a peer-review of this tool is needed.
H	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).	Information to fill knowledge gaps identified by respective synthesis efforts for informing management actions intended to protect key species and habitat.	With the current drought and changing environment, both water supply and endangered species in the Delta are in critical condition. These collaborative efforts are specifically designed to identify knowledge gaps and are important tools for providing research recommendations to inform management actions intended to protect key species and habitat.
Topic 4: Science supporting flood risk reduction and the economies of Delta communities			
I	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.	A synthesis report identifying state of knowledge, gaps, research recommendations, and economic impacts of flood management effects on wetland and floodplain projects.	Past economic analyses of levee changes have focused primarily on impacts rather than offsetting benefits. There is a need to synthesize current information and identify knowledge gaps and research recommendations on economic impacts of wetland and floodplain restoration and levee setback management to inform upcoming decision points regarding levee modification and the Delta Levee Investment Strategy.

Table 2. High Impact Science Actions That May Be Addressed by Longer-Term Implementation in the form of a Proposal Solicitation or Delta Science Fellows

	Science Action	Example Research Projects	Significance and management implications of science action
Topic 1. Assessing drought-related effects on the Delta			
i.	Investigate effects of drought-induced flow changes on native fish survival and migration patterns.	Effects of temperature changes on juvenile green sturgeon recruitment, effects of flow and increased salinity on population distribution of Chinook salmon during summer months.	Products from this research would provide additional knowledge to inform water management, species needs, and recommendations for emergency response.
ii.	Advance models that assess effects of changes in flow, entrainment, water quality, food-web dynamics, and contaminants on juvenile fish using recent data from drought-related projects.	Investigate potential alternate mechanisms and factors affecting juvenile fish mortality, such as pathogens, in addition to temperature when running juvenile health condition models.	Investigation of potential alternate mechanisms and factors affecting fish are needed to improve monitoring and management efforts.
Topic 2. Effectiveness and implications of habitat restoration actions			
iii.	Understand the effectiveness of wetland habitat restoration of subsided Delta islands on subsidence reversal, carbon sequestration, mercury methylation, flood protection, and levee stability.	Assessment of increased habitat acreage in relation to flood protection and levee integrity.	There is great interest in investing cap and trade funds in Delta wetland restoration to reverse subsidence and sequester carbon. Landscape-scale assessment of the impacts of large-scale wetland restoration on subsided Delta islands has yet to be done. This information is important so that managers and policy makers can understand the effects of large-scale subsidence reversal and wetland habitat restoration.
iv.	Develop decision-support tools to explore alternative Delta habitat restoration designs and potential regional effects of multi-project implementation on water quality, contaminants, flow, and species population dynamics.	Studies focused on projects that if implemented will have synergistic effects on the system; develop models that identify tradeoffs among habitat restoration designs.	Currently, there is a lack of sufficiently integrated decision-support tools. Improved tools for planning, implementing, and evaluating Delta habitat restoration will allow for better, more efficient outcomes that are more likely to meet management objectives.
Topic 3. Science support for management of estuarine and migratory species			
v.	Support new innovations such as real-time tracking devices and adjustments to monitoring and survey designs to aid in determining temporal and spatial distribution of fish at a finer scale than is currently achieved.		Innovative technology supporting fish distribution and abundance are needed to enhance real-time and decision support tools to increase management efficiency and allow rapid response in the face of emergency.
Topic 4: Science supporting flood risk reduction and the economies of Delta communities			
vi.	Economic impact assessment of Invasive Aquatic Vegetation (IAV) on boating, recreation, operations, and management.	Focused assessments of IAV effects on boating, recreation, operations and management	Currently there are no sufficient economic analyses of the impacts of IAV to inform management decisions.