



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

DEC 18 2018

CECG

MEMORANDUM FOR ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

SUBJECT: Delta Islands and Levees, San Joaquin River Delta, California, Feasibility Study – Final U.S. Army Corps of Engineers Response to Independent External Peer Review

1. An Independent External Peer Review (IEPR) was conducted for the subject project in accordance with Section 2034 of the Water Resources Development Act of 2007, Engineering Circular (EC) 1165-2-214, and the Office of Management and Budget's Final Information Quality Bulletin for Peer Review (2004).
2. The IEPR was conducted by Battelle Memorial Institute (Battelle). Battelle consulted with the Flood Risk Management Planning Center of Expertise to select panel members. The IEPR panel consisted of four panel members with technical expertise in economics, plan formulation, National Environmental Policy Act, hydraulic engineering and geotechnical engineering.
3. The enclosed document contains the approved final written responses of the Chief of Engineers to the issues raised and the recommendations contained in the IEPR Report. The IEPR Report and the USACE responses have been coordinated with the vertical team and will be posted on the internet, as required by EC 1165-2-214.
4. If your staff have any questions on this matter, please contact me or have a member of your staff contact Bradd Schwichtenberg, Deputy Chief, South Pacific Division Regional Integration Team, at 202-761-1367.

Encl

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TODD T. SEMONITE
Lieutenant General, USA
Commanding

Delta Islands and Levees Feasibility Study, California, Ecosystem Restoration Feasibility Report and Environmental Impact Statement

U.S. Army Corps of Engineers Response to Independent External Peer Review June 2018

Independent External Peer Review (IEPR) was conducted for the Delta Islands and Levees Ecosystem Restoration Feasibility Study Report in accordance with Section 2034 of the Water Resources Development Act of 2007, EC 1165-2-214, and the Office of Management and Budget's *Final Information Quality Bulletin for Peer Review (2004)*.

The goal of the U.S. Army Corps of Engineers (USACE) Civil Works program is to provide the most scientifically sound, sustainable water resource solutions for the nation. The USACE review processes are essential to ensuring project safety and quality of products USACE provides to the American people. Battelle Memorial Institute (Battelle), a non-profit science and technology organization with experience in establishing and administering peer review panels for USACE, was engaged to conduct the IEPR for the Delta Islands and Levees Feasibility Study. The Battelle IEPR panel reviewed the Draft Feasibility Report/Environmental Impact Statement (FR/EIS), as well as the supporting documentation. The Final IEPR Battelle Report was provided on July 10, 2014.

Overall, fifteen comments were identified and documented in the IEPR Report. Of the fifteen comments, three comments were identified as having high significance, one comment was rated as having medium/high significance, seven comments were rated as having medium significance, three comments were rated as having medium/low significance, and one comment was rated as having low significance. The definition of these significance rankings is as follows:

- 'High': Describes a fundamental problem with the project that could affect the recommendation, success, or justification of the project.
- 'Medium': Affects the completeness of the report in describing the project, but will not affect the recommendation or justification of the project.
- 'Low': Affects the understanding or accuracy of the project as described in the report, but will not affect the recommendation or justification of the project.

The following discussions present the Final Agency Response to the IEPR comments. All responses to IEPR comments have been accepted and all comments were closed, as documented in the Final IEPR Battelle Report dated July 10, 2014.

1. IEPR Comment #1 – *High Significance*. The inclusion of the BDCP and the Delta Plan as components of the future without-project condition is not well supported given that the BDCP is not approved and there are no identified sponsors for specific measures outlined the Delta Plan.

The comment includes three recommendations for resolution which were adopted in the future, not adopted, and adopted, as discussed below.

USACE Response (#1): Adopted

1. **Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement (FR/EIS) consider revising the future without-project condition to exclude the Bay Delta Conservation Plan (BDCP) and the Delta Plan. Future without-project assumptions and constraints were developed to reduce study risk, based on the uncertainty regarding future Delta conditions. These assumptions will be revisited in any future follow-on studies and will be revised, as appropriate.

USACE Response #2: Not Adopted

2. **Action Not Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final FR/EIS include an analysis of alternatives that assumes that components of the BDCP and the Delta Plan will not be in place. Future without-project assumptions and constraints were developed to reduce study risk, based on the uncertainty regarding future delta conditions. Further, as written, the BDCP is intended to serve as a Habitat Conservation Plan, which could potentially preclude USACE participation in implementation of these features through an Ecosystem Restoration project. These assumptions will be revisited in any future follow-on studies and will be revised, as appropriate.

USACE Response #3: Adopted

3. **Action Taken****Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement consider all “Recommended Areas for Prioritization and Implementation for Habitat Restoration Projects” outlined in the Delta Plan as project alternatives. Future without-project assumptions and constraints were developed to reduce study risk, based on the uncertainty regarding future delta conditions. Sections 3.3 and 3.4.2 of the FR/EIS have been modified to further describe how these assumptions and constraints were used as screening criteria, which precluded further consideration of BDCP/Delta Plan in this interim report. These assumptions will be revisited in any future follow-on studies and will be revised, as appropriate.

2. IEPR Comment – *High Significance*. Criteria used to assess FRM and life safety risks for the existing, future without-project, and future with-project conditions are not fully described, and the data presented do not support the elimination of all FRM measures, especially life-loss-reduction measures.

The comment includes three recommendations for resolution that were adopted and two that were not adopted, as discussed below.

USACE Response (#1): Adopted

- 1. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include a more complete description of life safety issues for the existing condition and the future without-project condition. Additional description of life safety issues has been added to Section 3.3 Future Without-Project Condition Descriptions.

USACE Response (#2): Not Adopted

- 2. Action Not Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include life safety and loss of life as criteria in the screening and evaluation of the final array of alternatives. The FRM analysis follows USACE policy and FRM screening was not applied to the final array of alternatives as the final array only includes single purpose ER alternatives.

USACE Response (#3): Adopted

- 3. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include non-structural FRM measures in the TSP or other recommended plan for action. The FRM analysis follows current USACE policy. Although non-structural FRM measures are recommended, additional Congressional authorization is not necessary to implement these recommendations; therefore, the recommended non-structural FRM measures are not included in the TSP. However, non-structural FRM recommendations have been added to Section 8.3 Additional Recommendations to highlight the importance of future action (Federal, State, or other).

USACE Response (#4): Adopted

- 4. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include a revised FRM section that refers to the DRMS ECTM to reference Appendix C and the DRMS LIFESim modeling and results. The FRM appendix was circulated with the draft report in 2014 and has not been updated or included in the final FR/EIS since it does not directly relate to the final array of alternatives. A note has been added to the list of appendices in the Table of Contents that this draft appendix is available upon request.

USACE Response (#5): Not Adopted

- 5. Action Not Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement define the scope, funding status, and residual risk potentially remaining if specific measures are implemented when considering FRM alternatives for this study. The FRM analysis follows current USACE policy and without an NED Plan, there is no Federal interest in an FRM project purpose under USACE policy. The Structural FRM Summary in Section 3.4 states that there is no Federal Interest at this time.

3. IEPR Comment – *High Significance*. Hydraulic and geotechnical analyses and modeling are not presented in sufficient detail to assess the potential environmental impacts that may result from this project.

The comment includes four recommendations for resolution which were adopted, as discussed below.

USACE Response (#1): Adopted

- 1. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement define the level of analyses and modeling performed (and not performed) with reference to ER 1110-2-1150. More information on the level of analysis and modeling was added to the Final Ecosystem Restoration Measures discussion in Section 3.4.

USACE Response (#2): Adopted

- 2. Action Taken/Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement provide better supporting data for assumptions made in lieu of quantitative analyses or modeling. As discussed in Section 3.4.2 of the FR/EIS, Donlon Island, which is a very similar project completed in 1987, is a few miles away and has been fully successful. Donlon Island provides a physical model that shows the proposed plan is physically feasible. Numeric and computer modeling will be performed in PED to design the project and an explanation of this has been added to the Final Ecosystem Restoration Measures discussion in Section 3.4.

USACE Response (#3): Adopted

- 3. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement expand the assessment of the TSP to consider the potential impacts to salinity levels as tidal waters are forced to flow through more constricted openings on the flood tide. A qualitative analysis in feasibility level design, described in Section 5.4 of the Feasibility Report/Environmental Impact Statement and

Section C-2.4 of Appendix C, showed no potential for salinity effects. Any potential for effects will be revisited in PED.

USACE Response (#4): Adopted

- 4. Action Taken/Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include feasibility-level geotechnical characterization and calculations as it relates to the TSP and the risks associated with dredged material placement. Additional details of the geotechnical characteristics and assumptions have been included in Appendix C. Engineering, Section C-4 Geotechnical. Further geotechnical analysis will be performed during PED.

4. IEPR Comment – *Medium/High Significance*. Individual and cumulative impacts of the TSP to water quality, and specifically salinity, have not been adequately evaluated.

The comment includes two recommendations for resolution, one of which was adopted and one which will be adopted in the future, as discussed below.

USACE Response (#1): Adopted

- 1. Action Taken/Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement clarify all assumptions related to salinity. It is assumed that salinity will not be negatively affected, even though modeling of the TSP has not been done. The salinity impacts have been further described in Section C-2.4 of the Engineering Appendix, to include additional explanation and background on the basis for assumptions. Further evaluations will be performed during the PED phase.

USACE Response (#2): Adopt in Future

- 2. Action Taken/Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include hydraulic modeling or analytical assessments, both individually and in the cumulative analysis, and analyze for potential impacts on salinity, bathymetry, and hydrologic flows. It is assumed that salinity will not be negatively affected, as the sediment placed into the system would have the potential to prevent saline waters from intruding as far into the Delta. Further details have been added to Section 4.1.1 Hydrology and Hydraulics and to the Risk Register, describing the low risk nature of the omission of detailed hydrodynamic modeling. When the project reaches PED, modeling will be done to verify these assumptions, currently based on engineering judgment.

5. IEPR Comment – *Medium Significance*. The hydraulic data used to assess existing conditions and conduct hydraulic analyses do not represent the best available data.

The comment includes five recommendations for resolution which were adopted as discussed below.

USACE Response (#1): Adopt

1. **Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include an assessment of the sensitivity of water elevations adapted from older datasets to water elevations that could be estimated using a more current and complete dataset. While a newer dataset with a larger historical record would reduce uncertainty, this set had the needed information readily available for this study. USACE believes the stage will not be much different in such a large system as the Delta; therefore, plan selection would not be altered by the use of a newer dataset. The sea level rise sensitivity analysis has been described in Section 8.1.7 Risk and Uncertainty in the FR/EIS with relation to applicability of the data used. The sea level rise assessment for the proposed project is also included in Appendix C Engineering.

USACE Response (#2): Adopt

2. **Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include a review of the hydraulic data and methods used for compliance with ER 1110-2-1150. Section 13.6.1 of ER 1110-2-1150 states, "Modeling not required for project formulation, such as modeling that provides only information required for preparation of plans and specifications may be deferred to PED." A discussion of this nature has been included in Sections 3.4.2 and 4.1.1 of the Feasibility Report/Environmental Impact Statement, in addition to a discussion of data selection and use.

USACE Response (#3): Adopt

3. **Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement compare the Rio Vista river gage data to other tide gage data in the Delta and near the location of the TSP. The Rio Vista gauge provides a more realistic stage and tidal influence to the project locations than other Delta gauges, like the Port Chicago. An analysis of the Dutch Slough gauge, which is adjacent to the project area, was used in water level evaluations in the Sea Level Rise Assessment, which is part of Appendix C Engineering. Engineering utilized the San Francisco and Port Chicago gauges. The Rio Vista gauge is on the Sacramento River and is not applicable to the project site.

USACE Response (#4): Adopted

4. **Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement documents the assumptions and validity of using a mean water elevation derived from one year of data, as opposed to the use of published tidal datums. The mean water elevation data set was used to establish a target elevation estimate for intertidal marsh restoration. A more detailed investigation of the appropriate design elevation will be conducted during the PED phase. While it is important

to develop accurate quantities and estimates, the consequences of small discrepancies are small in the planning stage.

USACE Response (#5): Adopted

5. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement justify the use of a mean water level elevation derived from one year of data to establish a target fill elevation, as opposed to the use of mean higher high water as a target marsh plain elevation. Target elevation was refined during Feasibility Level Design rather than PED. Adjusting the target elevation allowed for more acreage of habitat to be created with a minimal increase in costs, which translates to more benefits and a lower cost per acre. The FR/EIS has been updated to reflect the new target elevation in the project description in Chapter 3.

6. IEPR Comment – *Medium Significance*. The completeness and accuracy of the OMRR&R Plan and the Monitoring and Adaptive Management Plan cost estimates could not be assessed.

The comment includes four recommendations for resolution which were adopted as discussed below.

USACE Response (#1): Adopted

1. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include a discussion of the Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) cost estimate that describes the rationale for basing the OMRR&R estimate on the recent experience with Donlon Island and Venice Cut. A discussion of the OMRR&R cost estimate has been included in section 8.1.3, and costs are based on similar projects such as Donlon Island and Venice Cut.

USACE Response (#2): Adopted

2. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include an OMRR&R cost estimate, noting the need for adaptive measures to compensate for the risk of dredged material settlement and placement and flood events. The Monitoring and Adaptive Management Plan, included as Appendix D of the Feasibility Report/Environmental Impact Statement, has been updated and includes monitoring and adaptive management costs. OMRR&R costs have been included as part of the final cost estimate. The OMRR&R Plan is typically not prepared until construction has occurred and will not be included as part of the final submittal for the study.

USACE Response (#3): Adopted

- 3. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include a completed monitoring and adaptive management plan. The Monitoring and Adaptive Management Plan has been developed and is included as an Appendix D to the FR/EIS.

USACE Response (#4): Adopted

- 4. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement communicate any non-Federal OMRR&R responsibilities to the project sponsor and include them in the FR/EIS. Non-Federal OMRR&R financial responsibilities have been detailed in Section 8.1.3 in the Final FR/EIS and appropriately communicated to the non-Federal sponsor.

7. IEPR Comment – *Medium Significance*. Risk and uncertainty associated with the environmental quality of the dredged material relative to wetlands reuse and discharge water quality are not sufficiently analyzed.

The comment includes three recommendations for resolution which were adopted, as discussed below.

USACE Response (#1): Adopted

- 1. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement summarize previous and current chemical/bioassay analyses of dredged material proposed for reuse. Dredged material quality, for both previously placed and direct placed material, has been and will be evaluated prior to placement. A Waste Discharge Requirement permit application will be required. A summary of available information has been included in the FR/EIS Appendix C Engineering, Section C-9 Hazardous and Toxic Materials.

USACE Response (#2): Adopted

- 2. Action Taken/Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement summarize current and probable sediment acceptance criteria for wetland reuse and wetlands cover for similar projects. These specific guidelines will be considered during PED with the appropriate regulatory agencies. (There are no ‘off the shelf’ characterization criteria in California. State water quality 401 permits and respective requirements are issued on an individual case basis.) The San Francisco Bay Regional Water Quality Control Board draft guidelines have been referenced in the FR/EIS with an explanation that they are not directly applicable.

USACE Response (#3): Adopted

- 3. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include a more detailed discussion of the potential impacts of mercury contamination on restoration feasibility. This discussion was added to Appendix C Engineering, Sections C-4.3.2 Physical Characterization of Dredged Material and C-9 Hazardous and Toxic Materials.

8. IEPR Comment – *Medium Significance*. It is uncertain whether the hay bale walls will be capable of retaining the dredged slurry and settled solids during and following placement.

The comment includes six recommendations for resolution which were adopted, as discussed below.

USACE Response (#1): Adopted

- 1. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include feasibility-level engineering analyses to evaluate hay bale walls for dredged material retention. Sections 3.4.2, 3.9.2, and 8.1.1 of the FR/EIS have been updated to include a discussion of assumptions regarding the existing subsurface (e.g., foundation materials, strength, compressibility, etc.) and assumptions regarding the use of hay bales for dredged material retention (e.g., stability, bearing capacity, etc.).

USACE Response (#2): Adopted

- 2. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement describe the ERDC technique for using hay bale walls in other locations across the country. A discussion of hay bale implementation has been added to Appendix C. Engineering, Sections 6.3 and 10.1.2. [Note that feasibility level design no longer calls for hay bales to confine fine-grained sediments, but rather to act as breakwaters for mounds of fine sand.]

USACE Response (#3): Adopted

- 3. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement provide examples of the successful use of hay bale walls for dredged material retention in similar conditions. While there is no known information available on the use of hay bales for dredge material retention, there are examples of this system being used for shoreline erosion protection, which is similar technically (sediment barrier, wave protection). A description of the proposed use of hay bales as temporary breakwaters to promote sand mound stability during vegetative establishment has been added to Appendix C. Engineering, Sections 6.3 and 10.1.2. [Note, feasibility level design has reduced the need to rely on hay bale walls for sediment containment.]

USACE Response (#4): Adopted

- 4. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include feasibility-level designs for alternative dredged material retention methods and evaluate impacts on projects costs. Information was added to Appendix C. Engineering, Section C-4 Geotechnical and in other subsections that document the expected grain size of the available dredged material and mound size. The fine-grained materials expected should naturally settle and be reasonably stable. Temporary hay bales are now used only intermittently as breakwaters to allow for vegetative establishment, which will enhance long-term stability. Hay bales will, by design, naturally decompose and require no retrieval, while geotubes would require removal and thus additional expense.

USACE Response (#5): Adopted

- 5. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include a discussion of the vulnerability of the hay bale wall to overtopping and erosion due to tidal and flood related flows and potential repair options. These bales are used along shorelines, as mentioned above, which are much more erosive (because of wave action) than being surrounded by water. With successful implementation along shorelines, these bales will stand up to overtopping forces. These bales are a sustainable natural resource and are meant to degrade over time. As they break down over time, the vegetation should be well established and able to hold the material. This discussion has been added to Section 3.9.2 Material Placement of the FR/EIS.

USACE Response (#6): Adopted

- 6. Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement identify mitigation confinement measures as a contingency if containment fails. The hay bales are a sustainable natural resource and are meant to degrade over time. The materials they are holding back will settle out very fast (mainly sands) and not escape in the short term. As they break down over time, the vegetation should be well established and able to hold the material. A detailed containment plan will be developed during PED. An emergency containment plan will be considered in PED.

9. IEPR Comment – *Medium Significance*. The settlement behavior of the dredged material and the peat on which the dredged material will be placed has not been sufficiently considered.

The comment includes one recommendation for resolution which was adopted as discussed below.

USACE Response (#1): Adopted

1. **Action Taken****Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement consider the effects of peat and dredge material settlement and evaluate the impacts on placement volumes, long-term marsh target elevations and dredged material retention structures. USACE acknowledges the uncertainty of settlement of the fill material. The similar successful projects of Donlon and Venice Cut Island were constructed over 3 years and they established well and have held up for about 25 years with no additional maintenance. Uncertainty of the settlement rates has been added into the risk register and given high priority, and added to Appendix C. Engineering, Section C-4 Geotechnical. During PED phase, if any more detailed analyses options are available they will be pursued.

10. IEPR Comment – *Medium Significance*. Future without-project condition impacts related to climate change in the Delta and to the TSP are not adequately described or addressed.

The comment includes five recommendations for resolution which were adopted, as discussed below.

USACE Response (#1): Adopted

1. **Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement augment the climate change section to more comprehensively follow guidance from EC 1165-2-212. This comment is no longer applicable because EC 1165-2-212 expired in 2013. New guidance, including ER 1100-2-8162 and ECB 2016-25, has since been adopted and the climate change analysis has been updated to be in accordance with the new guidance.

USACE Response (#2): Adopted

2. **Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement incorporate more discussion on increased flood risk from climate change into Section 3.4.1. The structural FRM section has been expanded to further describe any increased flood risk associated with climate change, and to include a sensitivity analysis.

USACE Response (#3): Adopted

3. **Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement leverage existing quantitative data on local climate change that is pertinent to the Delta and the Recommended Plan. Additional data and information was added to Section 8.1.7 Risk and Uncertainty to explain that the

project is expected to be self-correcting in relation to climate change over time. Accretion and bioaccumulation will exceed sea level rise from climate change and potential settling.

USACE Response (#4): Adopted

- 4. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement expand the climate change discussion to include considerations for “relative sea level rise” for the TSP locations. Additional information was added to Section 8.1.7 Risk and Uncertainty to describe that the Donlon and Venice Cut projects (and other subsidence reversal projects in the area) have maintained a cycle of accretion keeping pace with settlement and sea level rise, and have self-corrected over time.

USACE Response (#5): Adopted

- 5. Action Taken/Action to be Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include monitoring at the Twitchell Island restored site to assess land surface elevation changes and carbon to determine if the assumption that this project will self-mitigate for sea level rise is valid and if plant composition is an important variable. As data is not yet available, any available data for the Twitchell site will be referenced during PED, pending availability, in order to verify assumptions. Monitoring at Donlon Island, Venice Cut, and/or Twitchell Island will be performed during PED if sufficient data is not available, as necessary.

11. IEPR Comment – *Medium Significance*. The current planting plan does not meet ecosystem restoration planning objectives to increase native biodiversity and may not optimize ecosystem restoration opportunities.

The comment includes ten recommendations for resolution which were adopted, as discussed below.

USACE Response (#1): Adopted

- 1. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include detailed data to define the existing vegetation biodiversity at the reference sites. The Donlan and Venice Cut monitoring report (‘Deep Water Ship Channel Monitoring Program’, USACE, 1990) has been added as an appendix to the Final FR/EIS and appropriately referenced.

USACE Response (#2): Adopted

- 2. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include the design guidelines that

resulted from the study at Donlon Island and Venice Cut. The Donlan and Venice Cut monitoring report ('Deep Water Ship Channel Monitoring Program', USACE, 1990) has been added as an appendix to the Final FR/EIS and appropriately referenced.

USACE Response (#3): Adopted

- 3. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement consider multiple species for the planting plan, including listed species that may occur, to optimize the ecosystem restoration planning objectives of the project. An appropriate reference to the findings within the monitoring report ('Deep Water Ship Channel Monitoring Program', Corps of Engineers, 1990) was added to Section 5.3.3 Alternative 2.

USACE Response (#4): Adopted

- 4. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include establishing test plots along elevation gradients to monitor plant establishment rates, diversity, abundance, and survival. The Monitoring and Adaptive Management Plan includes methodologies for monitoring and success criteria and has been included as Appendix D to the FR/EIS.

USACE Response (#5): Adopted

- 5. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include partnering with academic institutions to design, implement, and monitor an adequate planting plan and evaluate the survival success of planting listed species. These data will be valuable to inform future USACE projects. A recommendation for collaboration and partnering with academic, conservation, local, state, and federal agencies has been added to the Final FR/EIS.

USACE Response (#6): Adopted

- 6. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include establishing measurable success criteria in the planting plan, based on specific target species, and to monitor establishment and survival to determine the success of the ecosystem restoration goal of this project. The Monitoring and Adaptive Management Plan Sections 3.1, 3.2, and 3.3 includes methodologies for monitoring and success criteria and has been included as Appendix D to the FR/EIS.

USACE Response (#7): Adopted

- 7. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement define active management to ensure that invasive species that are removed from the project area do not re-establish in the restored habitats. Invasive species control has been included in the planting design and as part of Appendix D. Monitoring and Adaptive Management Plan.

USACE Response (#8): Adopted

8. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement define invasive plant management details to enable confirmation that water quality impacts will not occur. Invasive species control has been included both in the planting design and as part of the Monitoring and Adaptive Management Plan, which are included as appendices to the FR/EIS. Spraying of herbicides would only be recommended if they complied with water quality standards and are acceptable as part of the water quality permitting process.

USACE Response (#9): Adopted

9. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement consider monitoring populations of invertebrates, fish, amphibians, reptiles, birds, and mammals in partnerships with academia to investigate ecosystem restoration goals. The Monitoring and Adaptive Management Plan is focused on measurable success of habitat per USACE guidelines. However, USACE will seek opportunities for a partnership for scientific study of species use of the site. Language has been added to Section 8.1.3 the FR/EIS and Appendix D accordingly.

USACE Response (#10): Adopted

10. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include monitoring hydrologic variables to identify potential impacts from dredged material and define factors potentially influential in increasing dispersal and survival of plant and wildlife species. The Monitoring and Adaptive Management Plan includes methodologies for chemical monitoring and has been included as Appendix D to the FR/EIS.

12. IEPR Comment – *Medium/Low Significance*. Although the Delta Study project is located in a deltaic system, measures or alternatives that incorporate a “natural” process of accommodating and/or designing for natural sediment accretion are not presented.

The comment includes two recommendations for resolution which were adopted, as discussed below.

USACE Response (#1): Adopted

1. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include references and supporting data to substantiate how the physical modifications proposed by the TSP will re-establish some of the critical ecosystem structure and functions. Additional data and references have been added to Appendix D, summarized in Section D-2.2, of the FR/EIS to support the ecosystem structure and functions.

USACE Response (#2): Adopted

2. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include more details as to why natural

sediment accretion was not considered in the formulation of alternatives and selection of the TSP. Additional details on the accretion of sediment and the project being self-correcting over time have been added to Section 8.1.7 Risk and Uncertainty and to Appendix C. Engineering, Section C-2.2.

13. IEPR Comment – *Medium/low Significance*. The cumulative analysis required under NEPA does not provide sufficient analysis results to support the recommendation.

The comment includes two recommendations for resolution, one of which was adopted, as discussed below.

USACE Response (#1): Adopted

1. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement identify and analyze in the cumulative impact section of the FR/EIS all other tidal marsh restoration projects planned for near the study area and potential future USACE channel and port-deepening projects. Additional information about similar tidal marsh restoration projects was added to Section 3.9.2 NEPA Action Alternatives. The deepening projects were not cited in the cumulative effects sections since they were not considered to be foreseeable future projects.

USACE Response (#2): Not Adopted

2. Action Not Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement re-evaluate the use of Decker Island as a source area for dredged material and include the results in the FR/EIS. Based on analysis, consider eliminating this site from the alternatives analysis if future restoration is likely. Decker Island has multiple stockpile sites. The Delta Study analyzed the use of the USACE (Federal) stockpile site which receives dredged materials from the Sacramento Deep Water Ship Channel O&M procedures. The DWR site and its contents are part of a separate planning effort and were therefore not assumed to be available for use in this study.

This comment is no longer applicable to the Recommended Plan because the dredged material placement sites have been eliminated from it.

14. IEPR Comment – *Medium/low Significance*. If salinity levels are not monitored or controlled during dredging activities, water quality in the Delta region could be adversely affected.

The comment includes one recommendation for resolution which was adopted as discussed below.

USACE Response (#1): Adopted

1. Action Taken: The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include information on salinity monitoring during dredging activities to protect water quality. Salinity monitoring will be

conducted during dredged material placement based on terms of a potential permit from the Regional Water Quality Control Board. Salinity is among the water quality constituents that are proposed for monitoring via remote sensing throughout the project life. Further details have been added to Chapter 3 and Appendix C Attachment CE-A.

15. IEPR Comment – *Low Significance*. The Port of West Sacramento, an important resource in the study area, is not described in the transportation resources section of the FR/EIS.

The comment includes one recommendation for resolution which was adopted as discussed below.

USACE Response (#1): Adopted

- 1. Action Taken:** The IEPR Panel recommended that the Delta Islands and Levees Final Feasibility Report/Environmental Impact Statement include a description of the Port of West Sacramento in Section 4.2.6 of the draft FR/EIS. A detailed description of the Port of West Sacramento has been added to Final FR/EIS.

This comment is no longer applicable because the Sacramento DWSC and the Port of West Sacramento are no longer included as part of the proposed action. All material would be acquired through the Stockton DWSC dredging project.