EDAW

EDAW INC

2022 J STREET

SACRAMENTO

CALIFORNIA

95814

TEL 916 414 5800

FAX 916 414 5850

www.edaw.com

MEMORANDUM

TO **Lauren Hastings, California Bay Delta Authority**

FROM **Debra Bishop, EDAW; Don Kurosaka and Dan Fua, DWR; Flooded Islands Project Team**

DATE **February 23, 2005**

SUBJECT **Flood Islands Feasibility Study, Technical Memorandum #2**

Problem and Objectives Statement

Introduction

The grant application to CalFed for the "Feasibility Study of the Ecosystem and Water Quality Benefits Associated with Restoration of Franks Tract, Big Break, and Lower Sherman Lake" (Flooded Islands Feasibility Study) was submitted in 2001. Since that time, additional information regarding the physical and social environment has become available through modeling and information gathering (see Baseline Report). In addition, several preliminary design concepts are currently being evaluated by the team. Given new information and preliminary design concepts, the goals established in 2001 are evaluated below and updated, as necessary.

Analysis and Revision of Objectives

The CalFed proposal included the following four objectives. Analyses and revisions follow each of the objectives.

Original Objective 1: Evaluate the feasibility of habitat diversification approaches for Lower Sherman Lake, Big Break, and Franks Tract with the objectives of restoring ecosystem values, improving water quality conditions for water supply, and enhancing recreation and other social values of the flooded islands.

Discussion: This objective relates to the process of evaluation and is being achieved through a review of published literature, discussions with experts, hydrological modeling, and development of matrices that qualify and compare the effects that various conceptual alternatives (see Conceptual Alternatives Report, to be released May 1, 2005) may have on the ecosystem and recreational activities. Key issues that are currently being examined include carbon cycling and primary productivity; mercury methylation, salinity, dissolved oxygen, and other water quality factors; temperature and residence time; habitat variability and native vegetative communities; native and sport fisheries; invasive species management and control; and recreational facilities and boating access.

Preliminary modeling and data collection suggest that modifications at Franks Tract have a high potential for beneficial water quality effects.. Site improvements at Big Break and Lower Sherman Lake are not expected to significantly improve water quality; however, these locations provide opportunities for achieving part of the habitat restoration objective while assisting the landowners (East Bay Regional Park District at Big Break and California Department of Fish and Game at Lower Sherman Lake) with habitat improvement goals. Ongoing study efforts include continuing to work with landowners and other knowledgeable and interested parties to help determine project effects on recreation and the ecosystem. Overall, preliminary investigations indicate that modifications at Franks Tract may achieve all project goals to varying degrees, while Big Break and Lower Sherman Lake actions may provide restored ecosystem values and/or recreation enhancement. Accordingly, it may be desirable to implement restoration and/or recreation actions at Big Break and Lower Sherman Lake to maximize and balance benefits among the three sites. Additionally, restoring tidal marsh at adjacent subsided islands may be a more cost effective and sustainable approach to diversifying habitat in the general study area.

Revised Objective: Evaluate the feasibility of habitat diversification approaches for Lower Sherman Lake, Big Break, and Franks Tract and adjacent areas with the objectives of restoring ecosystem values, improving water quality conditions for water supply, and enhancing recreation and other social values at one or more of the flooded islands.

Original Objective 2: Develop and evaluate innovative and cost-effective Delta tidal marsh restoration concepts that re-create dendritic channels and provide ecological benefits for native plants, fish, and wildlife, and impede the success of invasive, nonnative fish and aquatic plants.

Discussion: Preliminary discussions suggest restoration of dendritic channels at the project sites may be feasible by (1) repairing levees adjacent to Franks Tract and creating adjacent tidal marsh habitat, (2) using dredge and/or borrow material to create islands within one or more of the flooded islands, and (3) restoring tidal marsh conditions to subsided (but not flooded) islands adjacent to one or more of the three islands (e.g. Jersey Tip, Mayberry Point, Quimby Island).

Ecological benefits to native plants and wildlife are expected, given that new islands would be vegetated with native plants, which would provide habitat for native wildlife. Because of the limited knowledge regarding habitat use and importance of the specific study sites to native fish, the effect on native fish, either beneficial or adverse, cannot be ascertained without additional monitoring. However, given that the existing conditions provide a beneficial environment for nonnative fishes and have resulted in the decline of native fish species, native habitat restoration is likely to benefit native fishes, although to an unknown extent.

Invasive, nonnative fish and aquatic plants as they exist at the flooded islands are a problem for which there are no known viable methods of

eradication. Although there are mechanical and chemical techniques for limiting invasive aquatic plant species, it may be financially and environmentally infeasible to implement a long-term control program. New invasive plant and fish species may yet colonize the study sites. In addition, a few of the invasive species are considered desirable game fish species (e.g., striped bass, catfish). Because their habitat requirements overlap with less desirable species, it may not be possible to selectively inhibit some invasive species while encouraging others. Similarly, some native species and invasive plant species share similar habitat requirements; for this reason, it would be difficult to encourage some native species while impeding the success of some invasive species. Because the study sites are unnatural ecosystems, it is difficult to design a restoration project that will clearly benefit native species. When designing restoration projects, it is best to attempt to replicate highly functioning native ecosystems to the extent feasible in order to limit nonnative species.

Revised Objective: Develop and evaluate innovative and cost-effective Delta tidal marsh restoration concepts that re-create the dendritic channels or other desirable environmental conditions and provide ecological benefits for native plants, fish, and wildlife, and impede the success of undesirable invasive, nonnative fish and aquatic plants.

Original Objective 3: Evaluate restoration of shoreline levees with strategically located openings to beneficially alter the salt-trapping and mixing characteristics of the three flooded islands while retaining tidal flow to the island interiors.

Discussion: Preliminary modeling results suggest that repairs of remnant levees and/or installation of operable gates at strategic locations at Franks Tract and adjacent channels have a high potential for beneficial water quality effects. Site improvements at Big Break and Lower Sherman Lake are not expected to significantly improve water quality.

The magnitude of the cost of CALFED actions is becoming an increasing concern to many CALFED stakeholders. As a result, the potential project alternatives need to carefully consider the benefits and the corresponding costs of these alternatives and develop cost-effective recommendations for consideration and implementation. The phasing of a project and/or a pilot approach should therefore be considered.

Revised Objective: Evaluate cost-effective restoration and modification of shoreline levees and adjacent channels ~~with strategically located openings, to beneficially alter the salt-trapping and mixing characteristics of~~ to one or more of the flooded islands to improve water quality in the central and south Delta. ~~while retaining tidal flow to the island interiors~~.

Original Objective 4: Achieve concurrent resource benefits for the three flooded islands, including recreation, aesthetics, and flood control.

Discussion: Recreation, aesthetics, and flood control remain important considerations for the study. Equivalent, concurrent benefits may, however, be difficult to achieve based on initial investigations. Trade-offs between different

benefits may arise at a site. For instance, to improve water quality and habitat conditions, preliminary designs being considered may obstruct the existing boating paths through Franks Tract. To preserve boating access, it may be possible to install lock(s) and gate(s) and to dredge channels for boating access through Franks Tract. Creation of islands would provide additional habitats (e.g., edge habitat) that are preferred for fishing and hunting activities. New beach areas may also be created to increase recreational opportunities. However, the long-term sustainability of created islands, especially in Franks Tract, is in question because of subsidence and wave generated erosion.

Implementation pursuant to the feasibility study is not expected to have major aesthetic consequences. Preliminary designs have included only infrastructure (e.g., locks, flood gates) and modifications (e.g. vegetated islands) that are commonly found in the Delta. It is not clear if any design would improve the aesthetic quality at the study sites. It is likely that the existing expansive viewshed (e.g., open water and occasional island) would be maintained.

An increase or reduction of flooding risk is not expected. However, creation of habitat islands could protect adjacent levees from wave erosion, resulting in reduced maintenance. Flooding effects would be evaluated as a part of the modeling effort, and any substantial increase would cause reconsideration of the design.

Revised Objective: Achieve ~~concurrent~~ resource benefits ~~for the three flooded islands~~, ~~including~~ or maintain existing, desirable characteristics related to recreation, aesthetics, and flood control at the three flooded islands.