

**CALFED PROPOSAL- CATEGORY 3 FUNDING: HABITAT RESTORATION****Section II: Executive Summary**

**a. Title:** Biological Restoration and Monitoring in the Suisun Marsh/North San Francisco Bay Ecological Zone: an Ecosystem Approach to Improve Effectiveness of Bay/Delta Restoration

**Applicant Names:** Drs. Rees, Kitting, McGinnis, Environmental Research Center and Dept. of Biological Sciences, Cal State Univ. Hayward; and Mr. Karl Malamud-Roam, Contra Costa Mosquito and Vector Control; in collaboration with Dr. Joy Andrews, Chemistry, CSUH, and Ms. Louise Vicencio, USFWS San Pablo Bay National Wildlife Refuge.

**b. Project Description and Primary Biological/Ecological Objectives:** Our proposed project will biologically restore, maintain, and monitor at least three major eastern San Pablo Bay and southern Suisun Bay restorations within a single CALFED-defined ecological zone (Suisun Bay/North San Francisco Bay), and compare and improve these restorations through an integrated monitoring program. Using areas recently acquired and designated for restoration (Tubbs Island Setback, between Novato and Vallejo, and Shell Marsh, near Martinez), our primary biological objectives are to restore emergent and immersed marshland, monitor the restored ecosystems, and seek to improve restoration success. Emphasis will be placed on the provision and maintenance of suitable habitats for priority fish species. Our proposed program will enable completion of the planned provision of water circulation at each of these sites, as required monitoring has not been previously funded. The Mare Island Site is adjacent to a recent CALFED Restoration (on Tolay Creek), which also requires monitoring. Taken together, our project areas form fragments of marshlands with a range of salinities (including freshwater), which formerly rimmed North San Francisco Suisun Bays. This Suisun Bay/North San Francisco Bay ecological zone shares most of the characteristics of the Sacramento/San Joaquin Delta ecological zone: emergent and submerged marsh flora and fauna, slough meanders, endangered anadromous fish, and other native and introduced aquatic species. In proximity to our proposed sites we have found fish species of primary concern in CALFED's restoration goals: chinook salmon (all runs), steelhead, delta smelt, green and white sturgeon, splittail, and others.

**c. Approach/Tasks/Schedule.** Our 3-year proposed project includes: Small-scale, followed by larger-scale biological restoration, including transplantings of native vegetation and animals in our Suisun Bay sites (Tasks 1&2: years 1-2, eventually as a Demonstration Marsh), and integrated, non-destructive physical-chemical-biological monitoring of replicate stations throughout each restoration (and adjacent older marshes) to evaluate and improve restoration success (Tasks 3&4: yrs. 1-3). The combined tasks will enable adaptive management and ecological maintenance of these marshes. Marshes will be restored in association with the USFWS (San Pablo Bay Wildlife Refuge), and with Contra Costa Mosquito and Vector Control (in Suisun Bay), and coordinated with the Delta Science Center, including the East Bay Regional Park District. Our proposed monthly monitoring will include the following parameters at replicate sites within each restoration: sedimentation rates, analysis of heavy metals\* (\*encouraged or required by SPBNWR), emergent vegetation, submerged vegetation (including seagrasses), fish migration and colonization (including CALFED priority species), planktonic foods and fish larvae, birds (including \*clapper rail), \*salt marsh harvest mouse, and sediment invertebrates. We also will monitor temperature, salinity, turbidity, and water flow rates. Abundances of fish populations in our restored areas will be compared with nearby offshore sites sampled monthly for fish species by Cal Fish and Game and the USFWS. Our monitoring program will provide a measure of both specific and overall successes of restoration efforts in the Suisun Bay/North SF Bay over the proposed monitoring period, and will indicate useful improvements for future restorations and monitoring within other CALFED designated ecological zones.

**d. Justification for Project.** Our proposed project addresses CALFED's mission and specific RFP concerns for habitat restoration: (a) improvement of aquatic habitats and ecological functions in the Bay/Delta, reduction of risk to land use (through flood control), (b) restoration of priority habitats (tidal perennial freshwater habitat, saltwater tidal habitat, instream aquatic habitat, shaded riverine aquatic habitat), and priority species: all migratory runs of local salmon, delta smelt, splittail, migratory birds, and resident endangered bird species.

**e. Budget Costs and Third Party Impacts.** Total project budget request is \$772,667 for 3 years. It covers personnel (for four agencies), expenses, and reduced indirect costs. Matching funds are provided by CSUH and in-kind matching from SPBNWR. Land and physical restorations are being provided by SPBNWR and CCMVCD. Due to the nature of our proposed work (biological restoration and monitoring of previously acquired, designated land) we anticipate no third party negative impacts.

**f. Applicant Qualifications** (1) *Chris Kitting, Ph.D.*, Professor, Biological Sciences at CSUH; 24 years of experience in aquatic ecology; received a recent US EPA Excellence award for storm water marsh program in Alameda County; received a local Environmental Achievement nomination for his Delta education program; has made related conference presentations internationally; has published over 25 related works in major journals (2) *John T. Rees, Ph.D.*, Adjunct Professor, Biol Sciences at CSUH; heads CSUH's Environmental Research Center at Alameda Point; 20 years experience in the environmental field, including 10 years field and research experience in California freshwater habitats; has published over 30 peer-reviewed journal articles and other significant contributions on fresh, estuarine, and marine ecology, pollution control, and introduction of exotic aquatic species. (3) *Sam McGinnis, Ph.D.*, Professor, Biol. Sciences at CSUH; has published over three dozen papers, book chapters, and books dealing with the ecology of California wildlife, recently emphasizing endangered and threatened plants and animals; researched and wrote the Plant and Animal Resources section of the Contra Costa County General Plan Conservation Element in 1988; has conducted field studies and written reports for the biological sections of environmental impact reports for over 100 projects since 1979, including 25 in Contra Costa County. (4) *Karl Malamud-Roam, M.A.*, has been the marsh restoration specialist for CCMVC for 6 yr, has completed several successful restorations already, is a doctoral candidate at UC Berkeley, conducting his dissertation on hydrology/ecology at these sites, and already has authored a book chapter and four articles on this area.

**g. Monitoring and Data Evaluation.** Monitoring will be an essential and integral part of the proposed marsh restorations. Analysis of species colonization, migration and other environmental parameters will take place throughout (and beyond) the 3-year project. Our program will follow the scientific protocol of similar successful biological restoration work carried out elsewhere (e.g., Zedler's PERL handbook). We would submit quarterly reports throughout the project, and final reports after the completion of each year's restoration and monitoring. Results of our work will be prepared and presented to local and national conferences and agencies, where our oral presentations will provide immediate feedback from colleagues. We plan to publish our work in academic and applied journals.

**h. Local Support/Coordination with other Programs/Compatibility with CALFED objectives.** The USFWS is providing sites in the North Bay. Contra Costa Mosquito and Vector Control District is providing sites in Suisun Bay, with Shell Marsh Advisors. We are also coordinating our program with Ducks Unlimited (North Bay), and the Delta Science Center and its affiliated agencies, such as East Bay Regional Parks. We plan to share information with the USFWS and Cal Fish and Game (fish monitoring in outer North Bay and Suisun Bay, out of the Stockton office), Shell Marsh Management Advisory Committee, San Francisco Estuary Institute, and other programs. Activities of all these programs/agencies/organizations are compatible with CALFED objectives.