

**Multidisciplinary Monitoring of Environmental Processes in CALFED Restored Marshes in the Suisun Bay Ecological Zone. Phase Two: Importance of Marsh Tidal Pools, Algae, and Other Features along Marsh Channels.**

**Victoria I Jensen**

# Technical Panel Review

*Technical Review Panel's Overall Evaluation Rating:*

Inadequate

## Explanation Of Summary Rating

The technical reviewers found the proposal poorly organized, rambling and sometimes "incoherent". The writing demonstrates a poor grasp of how the project fits into CALFED's science framework, leaving the reviewers searching for clarity. The major weakness was the lack of description of an overall sampling design. The reviewers were then unable to connect the hypotheses with the research or evaluate whether the monitoring would be able to test the hypotheses.

## Goals And Justification

Four restoration sites where tidal barriers have been removed to support intertidal marshes will be monitored along with three reference marshes in the Suisun Bay region in order to assess support of native fish. Specific actions, especially the previous and planned creation and connection of marsh ponds were not given in detail. The technical review panel agreed with all the technical reviewers that the proposal suffered from a serious lack of organization. The goals and restoration actions were clearly presented, but the conceptual model was incomplete and the applicant failed to support the model using scientific literature.

Many questions were outstanding: How do the toxic metals enter, mobilize and leave the restoration marshes, and why are these processes expected to be similar or different in the reference marshes? The hypotheses stated in the appropriate section are fine (but would benefit from documentation in peer-reviewed literature). Furthermore, the external technical reviewers determined that the hypotheses were not consistent

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throughout the proposal. Also, the trophic linkages outlined in the conceptual model drive much of the data collection, but it is unclear how these will be tested. For example, how will standing biomass be converted into production? Will all types of algae (macroalgae by species, epiphytes, phytoplankton and epibenthic algae) be measured?

### Approach

The general approach appears to be well founded. Monitoring restorations are needed for adaptive management and several restoration and reference sites will make conclusions stronger and more widely applicable. However, all external reviewers recognized the absence of a clear experimental design, either for a representative site or for the program as a whole. Without a design, reviewers could not evaluate whether the data collection could be used to test the hypotheses. Further, although the monitoring clearly builds upon previous work (this is described very well), the authors have not demonstrated that they know how to use the data to test hypotheses. Results from prior monitoring are cited to suggest significant effects from restoration activities, but these suggestions are not supported by data.

The external reviewers agreed that the research might make significant contributions to our knowledge of marsh features beneficial to native fish. However, the lack of a statistically rigorous experimental design and the lack of peer-reviewed papers from the proposal team drained their confidence.

### Feasibility And Likelihood Of Success

The project is technically feasible, but as one reviewer states, is "so poorly described that this reviewer has little confidence in the researchers bringing the work to a successful conclusion." Other reviewers had so many questions about the proposed habitat modifications and the sampling design that they were unable to determine feasibility.

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The regional review found no local issues that might impede the project. The environmental compliance review found several inconsistencies with permit requirements and found that state and federal permits for collection/sampling of listed species might interfere with the start of the project.

### **Performance Measures**

The lack of design has prevented a meaningful technical review with respect to restoration evaluation and hypothesis testing. Most reviewers appreciated the type and methods for data collection as described and recognized the extensive work previously done in these systems to establish methods to produce quality data.

### **Products**

Overall, if the sampling design was described and statistically valid, the external reviewers had confidence the research results would be valuable to resource managers. The external reviewers were satisfied with the dissemination through lectures, meetings and final reports, but all were dissatisfied with the lack of peer-reviewed publications stemming from the previous funding or other research in the system. They did not believe the results would be synthesized into peer-reviewed publications. The regional review pointed out that the results from Phase I have been disseminated, but do not appear to be influencing restoration designs - calling to question the quality and utility of their results. The links to other regional sites and monitoring and data management programs were minimal.

### **Capabilities**

The project team is well qualified to perform the work with an appropriate mix of disciplines. Most reviewers felt the team could complete the project (Phase I was completed), but the results would not likely be written up for journal publication.

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### Budget

Most reviewers felt the budget high but reasonable given the broad suite of parameters to be collected. However, without an explicit sampling design, the budget could not be evaluated effectively.

### Regional Review

The regional panel review was extensive, assigning it a rank of 'medium'. While the benefits from the needed monitoring were recognized and welcome, the panel found: 1) The potential results would be limited in applicability to the Suisun region. 2) The contaminant work was interesting, but unconnected to the other work and without consequence. (If contaminants were found in high concentrations, what would be done?) 3) The level of coordination is very limited, as are outreach activities. 4) "Recommendations from the Phase 1 study do not seem to be influencing restoration planning of tidal . . . marshes of Suisun and San Pablo Bays." "Review of the summary of their previously completed study didn't clearly establish assertions which were made and the relationships between actions and responses." 5) Expansion of the monitoring to restored marshes farther away was suggested. The panel suggested the technical review should carefully evaluate the results of Phase 1.

### Administrative Review

The prior-phase funding review found no problems or issues with CSU Hayward. The environmental compliance review found several inconsistencies with permit requirements and advised immediate application for a federal permit to sample listed species. The budget review found the 8% annual inflation rate too high for the consulting costs and required more detail on the expenses incurred that lead to the overhead rate. Overhead is not allowed on equipment, but was charged on equipment. A reduced overhead rate should be charged on subcontracts. Tasks and deliverables needs to be broken down and detailed in the budget and justification.

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**Additional Comments**

Reviewers did not believe that the removal of mobile non-native species (gobies) could reduce their abundance in the marshes.

# Bay Regional Review

*Bay Regional Panel's Overall Ranking:*

Medium

## Summary:

Our committee agreed to a medium ranking due to lack of clarity of study objectives and the potential limited applicability of findings to other restoration throughout the estuary. This committee was concerned that outreach for the Phase 1 study adequately disseminated the results to influence ongoing restoration planning. A closer look at results of the Phase 1 study is warranted before the proposal is considered for funding.

## 1. Applicability To ERP Goals And Regional Priorities.

1. The proposal indicates that it will continue monitoring of existing and prospective tidal marsh restorations/enhancements on the Contra Costa shore of Suisun Bay. Investigation of the role of tidal marshes in support of fisheries is poorly understood for west coast marshes; this study would continue what appears to be unique investigations for the estuary. It was unclear if restoration is CalFED/CVPIA funded. Most of the marsh restoration and enhancement being evaluated is associated with ongoing vector control related marsh enhancement by Contra Costa Mosquito Abatement. 2. The proposal indirectly describes how multi-species Conservation Strategy milestones are being addressed in the context of specific restorations on the Contra Costa Shore. The focus of the proposal is on the effect of marsh enhancement on habitat for larval fishes, particularly Delta smelt and splittail. 3. The proposal focuses on splittail and delta smelt and the habitat functions provided by connected tidal ponds and sloughs channels for those species. The proposal would evaluate habitat quality and identify stressors. The previous phase 1 study identified that ponds are good for fish in restored and enhanced tidal habitats. This study would do

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additional monitoring to followup and expand on those findings. It would have been good if the factors hypothesized to be responsible for this increased use were investigated more specifically. The previous study demonstrated the benefits of tidal ponds and connectng channels. The scope of proposed monitoring appears to be of limited applicability to other restoration situations. It does not appear that the results will be particularly translateable to large restorations in Suisun Marsh or San Pablo Bay. The study proposal should have been extended into these areas. The proposal hypothesizes that increased productivity of ponds and channels is responsible for higher fish abundances, which is an important question particularly since the productivity of lower estuary has been reduced by presence of invasive species. An expanded investigation of productivity in ponds and channels and their contribution to the larger ecosystem would be of interest. The proposal doesn't appear to link in-marsh productivity to the larger bay or explore the processes for export and its farfield effect. Sediment and WQ: Proposal provides for general sampling, but it is not clear how pathways of bioaccumulation and export would be evaluated if contaminates of concern were identified. The proposal would investigate tidal marsh and shallow water habitats within the marsh, particularly the value of ponds to fish and inverts. The area of study is not one inwhich CalFed has made a major investment todate. The proposal is very focused on channels and ponds in restored and to be restored marshes on Contra Costa Shore. It is unclear how their test sites relate geomorphically to control marshes and how results will translate to other restoration projects.

## 2. Links With Other Restoration Actions.

The projectis focused on those restorations it has monitored in the past and additional proposed restorations/enhancements in the same vicinity, only passing reference is made to monitoring in San Pablo and other areas. The proposal doesn't appear to add additional restorations that are underway or



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which broaden the geographic range of the monitoring. The proposal does not take advantage of opportunities to assess cumulative effects of several restoration actions. The level of coordination appears limited. The applicants reference other programs but no specifics are provided on how they are coordinated beyond conference presentations and informal communication. No indication that the proposed investigations are coordinated with any identified monitoring activities with possible exception of IEP. Data storage is consistent with CALFED Standards and an FTP site is maintained. The proposal would continue previously funded monitoring. It is not of the scope to provide info on status and trends and ecosystem status. The proposal documents progress of specific restoration and enhancement actions in a limited geographic area. The applicability of this information to other restoration in other parts of Bay is unclear, other than ponds connected by channels are good for native fish. The proposal addresses fish use of marshes and invert production, it is unclear that it will provide significantly greater information than the Phase 1 study and results may be unique to area being studied. Will the proposal provide information that helps inform planning or design of new projects: Maybe, it is unclear how info would be used since the study is limited in geographic scope and the findings may be unique to its geographic area. The study results may have applicability to micro/muted tidal management of managed wetlands in Suisun Marsh, which may be analogues of Shell marsh management. Will the proposal create Monitoring Capacity: Maybe, some of techniques seem to be particularly innovative for fish sampling in tidal marshes and the applicants have demonstrated the capacity to conduct the proposed study.

### 3. Local Circumstances.

There don't appear to be any circumstances which affect the projects feasibility. This work has been previously done, evidently successfully and access is available to all publicly owned properties.

A benefit of the past study and current proposal is that they provide information on marshes within the bounds of the

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Concord Naval Weapons Station.

### 4. Local Involvement.

Outreach is very generally described. It is not clear that they are reaching the desired audience ie. agencies planning and implementing large scale tidal restorations. There is some involvement of research organizations particularly PRBO, who conducts avian monitoring within the study area. The proposal is not coordinated with IRWIM or other large restoration planning /implementation projects, ie. Napa Marsh, Suisun Restoration/Management Plan, South Bay Salt Ponds. Outreach is somewhat limited to landowners/managers within the study area. Outreach to broader restoration community seems limited and could be improved. Recommendations from the Phase 1 study do not seem to be influencing restoration planning of tidal and muted/micro tidal marshes of Suisun and San Pablo Bays. The Proposal appears to be a component of an established ongoing program through CSUH.

### 5. Local Value.

Results Will Be Most Applicable To Restorations On Contra Costa Shoreline. It Would Have Been Good If The Applicants Had Included Sites In San Pablo Like Pond 2A Or American Canyon. This Project May Have Some Applicability For Micro/Muted Tidal Management When Results Of Monitoring Of Shell Marsh Tidal Circulation Enhancement Project Become Available. Monitoring Of That Project Would Be Of Benefit To Evaluate The Feasibility Of Re-Establishing Muted Tidal Influence To Subsided Diked Lands Which Would Be Flooded Openwater Habitats Otherwise. The Study Would Determine If The Monitored Restoration Actions Are Obtaining Their Objectives. The Results Will Demonstrate A Localized Response To Multiple Actions In A Limited Geographic Area. The Applicability Of The Monitoring May Be Limited Geographically And To Certain Types Of Restorations, Ie. Diked Minimally Subsided Baylands Where Full Or Partial Tidal Influence Is Reestablished.

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### 6. Other Comments:

The Proposal Wasn't Well Presented. It Was Difficult To Relate The Study To Proposed Restoration And Management Actions, Where The Restoration Actions Are And Their Geographic Extent. The Scale Of The Restorationactions To The Overall Area Affected Was Difficult To Ascertain And Seemed To Be Limited. Review Of The Summary Of Their Previously Completed Study Didn't Clearly Establish Assertions Which Were Made And The Relationships Between The Actions And Responses. This Project Appears To Be Primarily A Continuation Of Phase 1 For An Additonal 3 Years. It Provides Interesting Information Which Appears To Be Of Limited Utility In Broader Application.

Technical Panel Should Evaluate The Results Of Phase 1 Project And Utility Of The Findings To Inform Tidal Marsh Restoration And Management.

If The Project Were Funded, Outreach And Coordination Must Be Clarified And Expanded, Fisheries Information Could Be Listed On CalFish Database.

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## Goals And Justification

Does the proposal identify the restoration actions whose outcomes will be monitored?

The authors propose to continue both monitoring and restoration activities at a series of ~replicate marshes (with comparison to nearby ancient reference marshes) in the Suisun Bay ecological zone. Restoration of these marshes was initiated during Phase I of this project (1999). Based on the authors' finding during Phase I that there were greater densities of target species in restored marshes encompassing tidal pools connected to tidal channels, the proposed restoration and monitoring effort would increase the number of marsh pools and/or connect existing marsh pools to tidal channels in these same marshes. Through proposed monitoring and adaptive management, the authors will monitor biological and physical conditions in these restored and reference marshes and adjust local management practices based upon the monitoring outcomes.

Does the proposal present a clear and internally consistent statement of the goals and objectives of these restoration actions?

The overarching objectives of this proposal are to continue monitoring of previously restored marshes and to investigate the impact that increasing marsh morphology (creation of tidal pools) has on biotic productivity within the marsh. The goals and objectives of the proposed activities appear to be consistent with the following CALFED goals: Goal 1: Recovery of at-risk species, Goal 2: Ecosystem processes and biotic communities, Goal 4: Estuary habitats and Goal 5: Non-native invasive species. Through the restoration and enhancement of tidal activity in these marshes, the authors propose to create more optimal habitat for species of concern (particularly fishes: delta smelt, splittail, salmonids). It appears that through their monitoring and associated adaptive management, restoration activities will be adjusted to theoretically

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maximize the local densities of these species. Other listed objectives of the study are to monitor water quality (Se, Hg, Pb and nutrients), biotic diversity of zoobenthos and zooplankton, birds, plants and algae. These goals appear to be consistent throughout the proposal, but at times it is difficult to weed out how the monitoring will specifically lead to adaptive management. This is particularly true in the case of the water quality monitoring. It is not clear what role the reference marshes play in the monitoring effort.

Does the proposal present a clear conceptual model that adequately explains the underlying basis for the restoration actions?

The conceptual model, presented as a simple figure in the appendix, presents a logical model for the proposed activities. Given the capabilities of graphical production available, this model could be greatly improved upon. It is not clear what the arrows pointing up signify? In any case, this model was derived from Phase I of this project, where the authors found a positive correlation between the presence of marsh pools (presence of "marsh morphology" in the conceptual model) and densities of aquatic animals. The authors proposed causative chain is as follows: marsh pools increase the density of birds occupying the marsh; bird guano fertilizes emergent vegetation and algae; increased primary producer abundance leads to increased zooplankton and zoobenthos, which in turn leads to increased fish abundance (larval, juvenile, and adult). While this model makes conceptual sense, the authors present no information that substantiates the link between pools, birds, nutrients and algae (nor does this link appear to be investigated directly in the proposed monitoring). As an alternative hypothesis, it is suggested that fishes may not depend on West coast tidal marshes in the same fashion as East coast populations. I don't believe that the authors state whether or not the ancient reference marshes contain pools. However, it appears that their previous monitoring found that some of the restored marshes had greater densities of biota than the reference marshes. The model does not incorporate the monitoring of heavy metals. What role do the pools play as refugia for juveniles? In addition to the

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presence of adequate food resources, are these areas a respite from predation?

Does the proposal clearly state the hypothesis(es) that the proposed monitoring will test?

The overarching hypothesis is that "different conditions in our reference and restoration marshes may yield very different population densities of native fishes and other animals". The basis of this hypothesis is that marsh pools, particularly those connected to channels, create environmental conditions (vegetation and food resources) within the marsh that promote the proliferation of fishes and other animals. Later in the proposal (in "Criteria Used in Hypothesis Testing"), it is explained more clearly that both emergent vegetation (which provides habitat and shade) in connected marsh pools and invertebrate food sources are important for fish colonization. Another hypothesis is that restored marsh values will increase over time, possibly peaking at an intermediate age, and then decrease to the level of reference marshes. Ultimately, the hypotheses are clear, but they are restated/reworked/reworded throughout the proposal and other bits of information added here and there. It would be clearer if the hypotheses, with all related information, were stated up front.

Are these hypotheses justified relative to existing knowledge and knowledge gaps?

The hypotheses are justified, particularly based upon the authors' previous experience with restoration of these marshes. It is not clear what role marsh pools play in the intertidal landscape and this work may help shed light on that role.

## Approach

Is the approach well-designed and appropriate to meet the project's objectives?

The approach is probably adequately designed, although it is not always clear what is being done when/where. A detailed

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table of each parameter measured, the location within the marsh (channel, surface), the method, the number of replicates, etc... would be immensely helpful. It is also not clear how the creation of the pools is designed to experimentally test the role of these pools in productivity. It appears that all restored marshes will have pools created. If this is the case, what are the controls? Other regions within the restored marshes? The reference marshes? However, it has already been stated that the reference marshes have much lower densities of biota than the restored marshes, so these may not serve as an adequate control.

The presence of algae, as enhanced by the tidal pools, is a central component of the objectives and hypotheses of the proposed work; it is even part of the title. However, it is not clear what type of algae is under consideration (macroalgae, benthic microalgae, phytoplankton), nor are the methods clear. Major algae will be quantified in thrown cage samplers and rates of algal overgrowth used to quantify benthic algal productivity. Will species be identified in the cage samplers? Not all species are considered good "food" sources, so the presence of algae doesn't necessarily indicate the presence of abundant food resources. Given the centrality of algae to the proposed work, I would like to see a better description of the methods used. It may also be important to look at phytoplankton abundance among marshes (as Chlorophyll a).

Based on the conceptual model, it appears that birds play a central role in the linkage between pools and biotic productivity. There is, however, little description of bird monitoring aside from counting foot prints and a brief mention of monitoring by other agencies. This could be stated more clearly.

Does the project adequately build upon previous monitoring, including appropriate modifications to respond to lessons-learned during the prior monitoring?

Yes, the proposed work will build upon an existing monitoring effort and includes good modifications to improve restoration

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efforts.

Are the monitoring and evaluation activities described in the proposal likely to make significant contributions to our knowledge-base? If so, please describe the contributions and their significance. Will these contributions be useful to decision-makers?

If adequately assessed (with appropriate controls, as described above), these activities should give insight into the role that marsh pools play in marsh habitat restoration. In addition, by increasing the length of time that the prior restoration activities are monitored, the trajectory of improvement in marsh function over time can also be assessed. If marsh pools do indeed improve marsh performance, this will be useful information for decision-makers.

### Technical Feasibility

Is the project fully documented and technically feasible?

It is not clear to me exactly how and/or when these restoration activities will take place. The authors do not present a clear time line of restoration activities. In a table in the appendix they list what modifications will be made to each marsh. However, it isn't clear if there will be monitoring before these activities take place. If the goal is to create and/or enhance a pool at each site, this is likely feasible. It isn't clear how the sampling at each site is to be done, particularly given the very different morphologies at each site. i.e. what tides (high/low) are sampled? Are differences in tidal elevation among sites taken into consideration? Are sites without pools sampled in the same way as sites with pools? Prior to funding, a more detailed table of performance measures and a more specific time line should be provided by the authors.

Is the scale of the project consistent with the objectives?

Yes, I believe that the scale of the project is consistent with the objectives.



## Performance Measures

Will the data collected by the proposed monitoring allow evaluation of the restoration actions that are being monitored?

The authors have proposed to collect a comprehensive set of data that should allow evaluation of the restoration actions. While it may not be adequate to show the direct causative pathway between the presence of marsh pools and biotic productivity, it should be sufficient to show if these pools do improve productivity.

Are specific performance measures proposed for evaluating these restoration actions?

Yes. The authors propose to measure a large suite of biological and physical parameters within the marshes.

Is the rationale for the performance measures clearly demonstrated?

The rationale for the biotic measures is very clear. The rationale behind the measures of contaminants (Hg, Se, Pb) in water, sediments and biota is less clearly described. This portion of the work appears to be added on, and is not as clearly incorporated into the larger conceptual framework. It is nonetheless important.

Will these data and performance measures allow evaluation of the conceptual models underlying the previous restoration actions?

As described above, the proposed measures may show that restoration is effective, and that marsh pools may (or may not) improve productivity. It is unlikely that the proposed monitoring will be able to elucidate the individual linkages between the various component parts. A greater level of experimental manipulation would be necessary to truly evaluate the pathways outlined in the conceptual model.

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Is the monitoring and evaluation plan explicit and detailed enough to assess the performance of the restoration actions?

If the goal of the restoration is to increase local abundances of fishes, then yes, I believe that it is, with the exception of the bird and algae monitoring as discussed above.

### Products

Will the project lead to information that is useful to resource managers, other decision makers, and/or scientists?

Yes, this information will be useful to other resource managers seeking to restore marshes in the Bay-Delta.

Does the project explicitly describe how others will be able to access the data produced by this monitoring effort?

Yes, there is an adequate description of how data will be made accessible via the web, classrooms, conferences, etc...

Are data handling, storage, and dissemination measures adequate to allow resource managers, other decision makers, and scientists to access and use the project's results?

Yes, by adhering to CALFEDs standards, the data procured by this project will be available.

Is the project designed to produce high-quality results that are likely to stand up under peer-review?

The data produced through the routine monitoring should stand up to peer review. The larger experimental manipulation of marsh landscape are not adequately described in order to determine if the results will stand up to rigorous peer review. As mentioned previously, I have concerns about the use of controls, the use of the reference marshes, and the presence of replication within and among the different marshes.

## Capabilities

Are the project team's qualifications commensurate with the project?

Yes, each of the investigators are well qualified to carry out the proposed work.

Is the mix of disciplines appropriate to the project as described?

Yes. Kitting is an experienced biologist with a number of years working in this system. Andrews brings a solid working knowledge of contaminant chemistry into the project. Malamud-Roam appears to have a good deal of on-the-ground experience in marsh restoration.

Does the project team's performance record indicate that they have the ability to complete the project?

I believe so.

## Budget

Is the budget reasonable and adequate for the work proposed?

Yes, I believe so. However, not enough detail is given in the budget justification to ascertain whether or not the budget demands are reasonable for the work described.

## Additional Comments

This proposal could benefit from better organization and a better use of tables and figures. Some parts of the proposal were very difficult to wade through. In some cases it was difficult to ascertain the hypotheses and objectives of the proposed work and throughout the course of the proposal, the hypotheses and specific objectives changed.

There is a clear benefit to documenting the presence of non-native species in these marshes. However, it does not seem

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reasonable that routine monthly sampling and removal of invaders (gobies, in particular) will actually result in a decline in numbers of such a mobile species.

# External Technical Review #2

## Goals And Justification

There is no question that a better understanding of sustainable methods for marsh restoration is needed. As Zedler and Turner point out, lack of both enforcement and adequate restoration techniques contribute to realized restoration falling far short of targets. Adequate monitoring that includes both reference and restored sites is critical to improving restoration success. The proposed study is aimed as much at habitat enhancement as at habitat restoration in that it seeks to further examine the effects of marsh tidal pools connected to channels - a feature that the PIs suggest may have contributed to higher fish abundance in restored marshes than in reference marshes in their previous studies. The idea that connections among tidal pools may enhance secondary production and habitat value of these marshes is interesting from both basic science and management perspectives. In general, habitat complexity increases production and diversity. However, the effects of increasing connectedness can include decreases in target species if connections increase access of their predators, or increased abundances if connectedness increases access to their prey or to refuges from their predators. Since the presence of tidal pools and their connectedness can be incorporated in the design of restoration efforts, a better understanding of the role of connected pools can contribute to adaptive management. The proposal could have been improved by enhancing the level of detail and specificity in both hypotheses and experimental design. The PIs suggest that pools promote high productivity by retaining guano and nutrients associated with birds. This is an interesting and potentially important idea that can provide insight and guidance to improving the value of restored marshes for secondary production. But the hypotheses presented for testing (narrative p5) only suggest that fish abundance or export will differ between marshes with and without these connected pools. More specific predictions would allow a clearer test of the nutrient retention hypothesis. Similarly, the question of whether fish abundance and other measures of production that are elevated in the restored

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marshes will decline to become more similar to those in the reference marshes is important. Well supported expectations are needed to assess restoration success. However, a clear mechanism by which that convergence might happen would better guide sampling and provide a clearer test.

### Approach

Monitoring the fate and success of restoration programs is always important. It is not possible to evaluate the success of restoration projects or to implement adaptive management with good monitoring data. The proposed study has considerable merit on this basis. As indicated above, however, the lack of specific details in the restoration (i.e., experimental) design, as well as the paucity of specific predictions of outcomes and mechanisms, make it difficult to evaluate the interesting and important part of this proposal - the potential role of connected tide pools to habitat value and a wide range of ecological parameters. For example, exactly how many restored and reference marshes will be studied. How many new tide pools will be connected to channels? Will additional connections be made in the marshes already having connections? Or will only the restored marshes previously lacking connected pools have connections made? What is the general design - In the former case perhaps a Bayesian analysis may be most appropriate, but in the latter, a BACI design using standard statistical techniques may also be applied. The text refers to a 'basic data table in appendix', but the pdf version of the proposal did not include this table. More questions: If the primary focus is on the contribution of connected tidepools, why not include reference marshes both with and without connected pools? If the natural marshes lack connected pools and have lower fish abundance, will such structures and fish abundance be sustainable in restored marshes?

### Technical Feasibility

The proposal is technically feasible. The scale appears adequate, however, the number of replicate marshes is not clear

## Performance Measures

The suite of biological and physical measurements proposed are the appropriate ones to judge the performance of restored marshes relative to the types of restoration efforts employed and relative to reference systems. Replication appears adequate. Information provided on design (number of sites of various sorts, and number of manipulations within sites) is insufficient. It is not clear whether this indicates a lack of planning by PIs or the necessity to take advantage of management-initiated manipulations.

## Products

The basic data generated by this project will be valuable to managers because it will provide an indication of performance measured in a suite of parameters and over a more appropriate time frame than possible in the first phase of the project.

There is good evidence of dissemination to both management and research communities through presentations. Reporting and web-posting of data appear appropriate. Increased publication in the peer-reviewed literature is warranted; several papers are listed as submitted, but the journal to which they have been submitted (and whether the submissions are to peer-reviewed journals) are not listed. Data generated has the potential to result in good-quality peer-reviewed publications.

## Capabilities

Kitting is highly qualified to lead the proposed effort and his collaborators will provide the needed expertise in both chemistry and on-the-ground restoration. The project team's performance indicates they have the ability to complete the project.

## Budget

The budget is high but appears reasonable given the broad suite of parameters to be measured at monthly frequencies and

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multiple sites.

### **Additional Comments**

The 'restoration maintenance' activities and invasive species removals are a plus, but it is not clear that combining a serious effort at these activities contributes to the scientific effort proposed. In particular, it seems unlikely that removal of invasive fish species collected during routine sampling will substantially influence population levels.



# External Technical Review #3

## Goals And Justification

The 'problem' is not clearly defined and the objective are only generally stated (page 3). It is unclear how the productivity of bird, fish, invertebrate, plant and major algae populations will be measured. There is an apparent confusion of standing biomass with measures of productivity. This is just one example of fuzziness in language—others are 'linkages' and 'replicates'. Elsewhere 'goals' merely echo CALFED language (page 12).

## Approach

The overall design is exceedingly vague and amounts to a comparison of four reference and three restored marshes with or without connections to marsh ponds. The seven marshes are not adequately described or even visible on the map provided, so it is not obvious that they should be compared. Details of sampling and subsequent statistical analyze are inadequate.

## Technical Feasibility

The project is probably feasible, but so poorly described that this reviewer has little confidence in the researchers bringing the work to a successful conclusion.

## Performance Measures

This is where the proposal is weakest. How can the authors monitor, manipulate and compare seven marsh systems to convincingly show what factors they have identified are responsible for differences in productivity, community structure or population responses, particularly for species of concern? They did not tell us.

## **Products**

Deliverables seem to be largely limited to public and scientific presentations and semiannual, annual and final reports. There are no descriptions of how the various data will be assembled to test any hypotheses or how products might be useful to managers.

## **Capabilities**

The resumes of investigators other than the lead-PI are too brief to evaluate; however, the team appears to have earned PhDs from premiere institutions. Refereed publications seem very limited and do not backup the proposal's assertion that the proposed work will be published '... in academic and applied journals' (page 11).

## **Budget**

It is difficult to visualize how the work will be performed, so the reasonableness and adequacy of the budget cannot be evaluated. In particular it is unclear how marsh manipulations will be performed and who will be paying for the heavy labor or how much it will cost.

## **Additional Comments**

The proposal is repetitive, rambling and often incoherent.

# Budget Review

1. Does the proposal include a detailed budget for each year of the requested support?

**Yes.**

2. Does the proposal include a detailed budget for each task identified?

**Yes.**

If no, please explain:

**There's an 8% increase per year in inflation rate applied to all of the consulting costs. This is too high.**

**Task and Deliverables - Grantee must provide detailed information for all work including subcontractor work for each specific task, services, and work to be performed with the appropriate and corresponding deliverable or end product for each task(s) and/or sub-task(s). Costs associated with each task and deliverable should be evaluated based on what is considered to be reasonable costs for performing similar services.**

3. Are project management expenses appropriately budgeted?

**Yes.**

4. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs? Are indirect rates, if used, appropriately applied?

**No.**

If no, please explain

**No explanation of what makes up overhead and indirect rates.**

**Budget Detail/Administrative Overhead Fees - Budget detail combines the labor rates with the direct overhead rate. The labor rate, benefits and indirect rate should be itemized in the format provided by the PSP to enable reviewers to better evaluate and ensure that proposed labor rates are comparable to state rates.**

## Budget Review

If proposal is funded, a detailed list of items included in the indirect cost rate should be provided by the grantee. Grantee must provide itemized and detailed information included and charged as part of Indirect Rates (IDC) charges.

Note: No overhead or indirect rate charges on the equipment purchases should be allowed as part of the budget that shall be funded as a result of this PSP.

5. Does the budget justification adequately explain major expenses? Are the labor rates and other charges proposed reasonable in relation to current state rates?

No.

If no, please explain:

The proposal has a lot of equipment buying, includes buying a boat. Mobile lab expenses per year are very high, no explanation.

Major Expenses - If the grantee is awarded a detailed list of equipment purchases should be provided by the grantee so reviewers can better evaluate whether it is more cost effective for the state to purchase large dollar equipment items through the state procurement process. If the equipment list is available within the State inventory or stock, then purchase of some or all of the listed items may be provided, loaned, or leased by the state to the grantee. In the event, that the equipment is purchased by the grantee, the grantee shall maintain an inventory of major equipment for auditing purposes and potential use for future projects. Grantee shall follow State Contracting Manual [SCM] Section 7.61 thru 7.62 rules pertinent to equipment purchase, lease, etc.

6. Are other agencies contributing or likely to contribute a share of the projects costs?

Yes.

If yes, when sufficient information is available, please sum the amount of matching funds likely to be provided:

\$363,367.00: CSU Hayward CCMUCD SFBWS

## Budget Review

Cost Sharing - Grantee shall provide information regarding its financial capability and stability as well as its level of commitment for any proposed cost share funds. A detailed budget of the project's proposed cost share funds should be provided prior to grant funds being awarded. A financial evaluation is recommended for grant agreements that state/claim over 30 % or \$250,000 (which ever is less) of matching funds. The evaluation will avoid likelihood of the grantee requesting an amendment to increase project funding due to lack of or miscalculation of matching funds to complete the project.

7. Does the applicant take exception to the standard grant agreement's terms and conditions? If yes, are the approaches the applicant proposes to address these issues a reasonable starting point for negotiating a grant agreement?

**Yes.**

If no, please explain:

**They want an interagency agreement.**

Contract Language Exceptions - Proposals submitted by grantees which identify exceptions to State of California's standard contract language provisions as provided in the 2004 PSP; and/or submit alternative contract language in lieu of the State's standard contract language should be carefully reviewed prior to awarding grant funds. Review will initially be conducted by the funding agency's contract office and referred to the legal department as needed.

8. Are there other budget issues that warrant consideration?

**Yes.**

If yes, please explain:

**The task and deliverables need to be broken down and explained in more detail.**

# Environmental Compliance Review

1. Is compliance with California Environmental Quality Act (CEQA) required for this project?

**Yes.**

2. Is compliance with National Environmental Policy Act (NEPA) required for this project?

**Yes.**

3. Does this project qualify for an Exemption or Exclusion under CEQA and NEPA, respectively?

**No.**

Comments

**It is unclear whether the current proposed project is covered under the CEQA document indicated in the checklist (CCMVCD Environmental Assessment of Integrated Vector Management Program). This project may qualify for a Cat. Exclusion under NEPA.**

4. Did the applicant correctly identify if CEQA/NEPA compliance was required?

**No.**

Comments

**If the applicant requires a Section 10 permit, then NEPA may be triggered.**

5. Did the applicant correctly identify the correct CEQA/NEPA document required for the project?

**No.**

Comments:

**See comments above**

6. Has the CEQA/NEPA document been completed?

**No.**

## Environmental Compliance Review

7. If the document has not been completed, did the applicant allot enough time to complete the document before the project start date?

**Yes.**

8. If the document has not been completed, did the applicant allot enough funds to complete it?

**Yes.**

9. Did the applicant adequately identify other legal or regulatory compliance issues (Incidental Take permits, Scientific Collecting permits, etc.) that may affect the project?

**No.**

Comments:

**There is the potential to take both state and federally listed species during sampling. The applicant will likely need a section 2081 (state) and a section 10 (federal) permit. The text states that all necessary permits are in prep or complete, but not all permits are indicated on the checklist.**

10. Does the proposal include written permission from the owners of any private property on which project activities are proposed or, if specific locations for project activities are not yet determined, is it likely that permission for access can be obtained?

**Yes.**

11. Do any of these issues affect the project's feasibility due to significant deficiencies in planning and/or budgeting for legal and regulatory compliance or access to property?

**No.**

Comments:

**One caveat: the applicant should contact USFWS and NOAA immediately to determine if a section 10 permit is required in order to start that process as soon as possible.**

# Prior-Phase Funding Review

List the CALFED or CVPIA funded phases of this project for which your agency manages contracts:

<b>Project Title</b>	Biological Restoration and Monitoring ...in the Suisun Marsh/North San Francisco Bay Ecological Zone: an Ecosystem Approach to Improve Effectiveness of Bay/Delta Restoration.in the Suisun Marsh/North San Francisco Bay Ecological Zone: an Ecosystem Approach to Improve Effectiveness of Bay/Delta Restoration.Biologic
<b>CALFED Contract Management Agency</b>	USFWS
<b>Amount Funded</b>	\$ 772,667
<b>Date Awarded</b>	1999/01/01
<b>Lead Institution</b>	CSU Hayward
<b>Project Number</b>	Cooperative Agreement # 114209J018

3. Have negotiations about contracts or contract amendments with this organization proceeded smoothly, without persistent difficulties related to standard contract terms and conditions?

**Yes.**

4. Are the status, progress, and accomplishments of the organization's current CALFED or CVPIA project(s) accurately stated in the proposal?

**Yes.**

5. Has this organization made adequate progress towards these project(s)' milestones and outcomes, without unreasonable divergences from project schedules or poor-quality deliverables?

**Yes.**

6. Is the applicant's reporting, record keeping, and financial management of these projects satisfactory?

**Yes.**

7. If this application is for a next phase of a project whose contract your agency currently manages, will the project(s) be ready for next-phase funding to monitor and evaluate project outcomes in fiscal year 2005/6, based on its current progress and expenditure rates?

#0129: Multidisciplinary Monitoring of Environmental Processes in CALFED Rest...



## Prior-Phase Funding Review

**Yes.**

