Proposal Reviews

#199: Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species

University of California, Davis

Initial Selection Panel Review	
Research and Restoration Technical Panel Review	
Bay Regional Review	
External Scientific Review	#1 #2 #3 #4 #5
Prior Performance/Next Phase Funding	#1 #2
Environmental Compliance	
Budget	

Initial Selection Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Initial Selection Panel Review

Proposal Number: 199

Applicant Organization: University of California, Davis

Proposal Title: Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species

Please provide an overall evaluation rating.

Explanation of Recommendation Categories: Fund

- **As Is** (a proposal recommended for funding as proposed)
- **In Part** (a proposal for which partial funding is recommended for selected project phases or components)
- **With Conditions** (a proposal for which funds are recommended if the applicant contractually agrees to meet the specified conditions)

Consider as Directed Action in Annual Workplan (a proposal addressing a high priority action that requires some revision followed by additional review prior to being recommended for funding)
Not Recommended (a proposal not currently recommended for funding-after revision may be considered in the future)

Note on "Amount":

For proposals recommended as Fund As Is, Fund In Part or Fund With Conditions, the dollar amount is the amount recommended by the Selection Panel.

For proposals recommended as Consider as Directed Action in Annual Workplan, the dollar amount is the amount requested by the applicant(s).

Fund	
As Is	**X**
In Part	**-**
With Conditions	**-**
Consider as Directed Action	**-**
Not Recommended	**-**

Amount: **$271,804**

Conditions, if any, of approval (if there are no conditions, please put "None"):

none

Provide a brief explanation of your rating:

This is a good proposal by a competent investigator. The main drawbacks of this proposal seem to be related to the inherent difficulties of trying to keep it simple in an age when we understand the complexity of environmental issues. Moyle offers a single investigator effort when a multidisciplinary effort, with a more comprehensive understanding of the basis for productivity in the shallow habitat, could better resolve the basis of knowledge required to maximize the information value form this study. These drawbacks lead the panel to rate the proposal as above average rather than excellent. However, the principle investigator's (PI)reputation for producing something useful to CALFED and the low cost of the project (that will primarily fund students) make it especially viable for funding. The Panel recommends funding of the proposal, as is, but the PI should carefully review the comments of the reviewers and consider the recommendations, especially regarding alternative hypotheses for habitat use and the sources of carbon to drive shallow water systems. A potential solution to solving some of the problems related to productivity measurements might be to collaborate with a primary production/carbon source specialist and include a graduate student that could focus on that aspect of the study.

Research and Restoration Technical Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Research and Restoration Technical Panel Review Form

Proposal Number: 199

Applicant Organization: University of California, Davis

Proposal Title: Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species

Review:

Please provide an overall evaluation summary rating:

Superior: outstanding in all respects;
Above Average: Quality proposal, medium or high regional value, and no significant administrative concerns;
Adequate: No serious deficiencies, no significant regional impediments, and no significant administrative concerns;
Not Recommended: Serious deficiencies, significant regional impediments or significant administrative concerns.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
-Superior	**This is a very good proposal based on excellent knowledge of the Suisun Marsh system. The only cautionary note by the Panel and external reviewers related to some concerns about the sampling plan and the ability to test the fundamental hypothesis with the present design for environmental data. The applicant is encouraged to seriously consider the external reviewers comments in fine-tuning their study plan. Particular attention should be paid to the purpose, design and methodologies of the water quality and related tasks relative to the goal of providing information on the environmental and biological conditions which favor alien and native species. Collaborating with other CALFED researchers in the Suisun Marsh are may offer the opportunity to enhance this aspect of the study. The applicant is also encouraged to consider the potential information that might derive from hidden values in the sampling and samples that will result from the present design, e.g., mysid diet, bivalve growth, stable isotope signatures, etc.**
XAbove average	
-Adequate	
-Not recommended	

1. **Goals and Justification.** Does the proposal present a clear statement of goals, objectives and hypotheses? Does the proposal present a clear justification and conceptual model for the project?

   This very well-received proposal (3 excellent, 2 good) addresses a worthwhile goal of understanding the ability of native species to resist alien species in a relatively natural ecosystem (Suisun Marsh) of the Bay-Delta, is well designed and involves regional experts with extensive background and on-going data collection. The study is highly justified and well based on the excellent prior knowledge; however, one reviewer noted that their

description of the base of knowledge was a bit parochial in its ignorance of existing and on-going studies within their Suisun Bay study area.

2. **Likelihood of Success (Approach, Feasibility, Capabilities and Performance Measures).** Is the project likely to succeed based on the approach, feasibility and project team capabilities? Are the proposed performance measures adequate for measuring the project's success?

   The study appropriately builds on excellent base of knowledge of the Suisun Marsh systems to focus on specific community interactions relative to the prominence of alien species. Although sampling design and methodologies are relatively detailed, and based to some degree on the applicants background in the system, there are still concerns about their knowledge about invertebrate assemblages that are prompted by questions about sampling replication (e.g., number of sites, n=3 for site replication), techniques (e.g., 30-cm plankton net for mysid capture), and taxonomic resolution. Perhaps the largest weakness is the utility of the environmental variables, which tend to be generated almost completely by discrete, grab sampling, which is poor characterization of highly variable parameters, and inference of differences in productivity based on benthic (diatom) primary production, which may be only a fraction of the organic matter supporting local consumers. Although there would be several opportunities, there is no mention of using consumer growth (e.g., bivalve growth increments) as indicators of local production; this just represents considerable, valuable hidden data on the fish, mysids and benthos that would result from this study, which is not described in detail.

3. **Outcomes and Products.** Will the project advance the state of scientific knowledge in general and/or make an important contribution to the state of knowledge of the Bay-Delta Watershed? For restoration proposals, is the project likely to contribute to ecosystem restoration or species recoveries in a significant way? Will the project produce products useful to decision-makers and scientists?

   Routine products (reports, presentations, manuscripts) will be generated by the study.

4. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   Given the level of field effort and sample analyses, the estimated cost ($271,804) of this three-year project is an absolute bargain based on exemplary involvement of undergraduate students, supported by a post-graduate researcher.

5. **Regional Review.** How did the regional panel(s) rank the proposal (High, Medium, Low)? Did the regional panel(s) identify significant benefits (regional priorities, linkages with other activities, local involvement) or impediments (local constraints, conflicts with other activities, lack of local involvement) to this proposal? What were they?

   The Bay Regional Review rated the proposal HIGH, and was highly laudatory without qualification.

6. **Administrative Review.** Were there significant concerns about the proposal with regard to the prior performance, environmental compliance and budget administrative reviews? What were they?

   The two Prior Performance/Next Phase Funding Review noted only on-going contractual difficulties with UC-Davis. There may be a need for a 2081 permit for take of state-listed species, as note by the Environmental Compliance Review. No problems were noted in the Budget Review.

Miscellaneous comments:

None

Bay Regional Review:

Proposal Number: 199

Applicant Organization: University of California, Davis

Proposal Title: Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species

Overall Ranking: **-**Low **-**Medium **X**High

Provide a brief summary explanation of the committee's ranking:

Proposal very well prepared and the a results will provide basic understanding of the support ecosystem support functions provided by tidal marsh channels for native species. Reseach will help decision makers understand the conditions which favor natives over non-natives. Currently we have little understanding of the role of tidal marshes in supporting native aquatic species.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   The study proposal sets realistic and achievable objective. It is based upon preliminary assessments which have lead to a study designed that builds upon existing knowledge and ongoing fisheries and invertebrate investigations in the marsh. The researchers are well qualified and have a long track record of successful investigations.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   Bay Restoration Priorities 4 and 8, Understanding the performance of wetlands restoration efforts, and Use.. new investigations to depvelop improved strategies for restoring Bay fish populations and at risks pecies. ERP Goal 4, Better understanding of benefits of tidal restoration, particularly shalllow water habitats.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   XYes **-**No

   How?

   The proposed research is tied to ongoing research by the investigator and is coordinated with other ongoing investigations through IEP. The research follows up on preliminary finding as part of other studies that small tidal channels are reservoirs of native biodiversity

and centers of high productivity for native species of fish and invertebrates which have not become swamped by non-natives.

4. Does the project adequately involve local people and institutions?

   XYes **-**No

   How?

   This is a research project, it is coordinated with other investigations through IEP. Principle investigator has a good track record of study results being made available for application in understanding and implementing management actions.

Other Comments:

Well conceived study with high potential for understanding benefits of restoring shallow water habitats for aquatic species at risk.

External Scientific: #1

Research and Restoration External Scientific Review Form

Proposal Number: **199**

Applicant Organization: **University of California, Davis**

Proposal Title: **Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Excellent	**Very Good- The proposal has some merit and addresses CALFED goals. Moyle is a good researcher but he may not have all the essential elements covered in his sampling plan.**
XGood	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The goal is clearly stated. Improve the resolution of understanding of the value of marsh habitat for native and exotic organism to better understand impacts of alien species and also serve as a basis for future marsh habitat restoration. Given the amount of restoration activity in this area the proposed research seems timely and important.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

A clear conceptual model is outlined as text and in a figure (2) and explains the basis for the proposal. This is a research project that acknowledges some understanding of the system proposed for study. There has been quite a bit of work done on several aspects of the Suisan Marsh ecosystem and numerous monitoring and publications on some of the target species. In fact the PI present a series of graphs from previously collected data to make his case for additional studies. He makes a case for the importance of the system, but doesnt provide specific details on how important this habitat may be compared to other components of the system.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   A significant strength of this proposal is the fact that the PI has an ongoing longterm project so he knows the system well and has a historical dataset to provide a baseline for comparison. At the core of this project will be an attempt to better understand the value of the shallow water slough habitat within this marsh (goal 2). Moyle hypothesizes that this habitat may serve as a refuge for native species because of the apparent difficulty of the Asian clam to inhabit the small and shallow sloughs. He proposes to understand the biological basis for this by hydrographic and biological sampling. He proposes a reasonable sampling plan for the system (very extensive spatially and temporally), although the design as it stands may produce some ambiguous results. A fair comparison of productivity in a series of very different habitats may be difficult with the proposed methods. For example in the shallow sloughs benthic primary production may prove to be an important source of primary production unavailable to the clams and important to the benthos. Are allochthonous inputs likely to be more important in the shallow verses the deeper sloughs? Abundance of organisms may only be an indicator of the habitat value in a relative sense and productivity of the various sloughs may not play a role for the fishes. For example, shallow sloughs may prove to be a good habitat for many juvenile fishes because they serve as a better refuge from predation (shallower and more heterogenous) and provide sufficient nutrition. Production and turnover may be more important than standing stock for the benthos and the algae as the system shallows. It is also possible that something Moyle does not intend to measure, like light penetration, may be the key to the low numbers of clams in the shallow sloughs. Perhaps the clam larvae only settle at moderate light levels.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   The research plan as outlined is technically feasible. The scale of the project is also reasonable given the experience of the PI in sampling this habitat. The project is likely to be completed but may not provide a comprehensive understanding of the shallow marsh habitat. Of course that may be too much to ask of any one study.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   A performance measures section is listed in the proposal that only speculates on performance measures for the project.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   Several products are listed.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   This is a relatively simple, but labor-intensive project in an environment that the PI has extensive experience with. He is eminently qualified to conduct this research and the infrastructure appears to be in place within his lab.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The budget is reasonable for a two-year study with numerous sampling stations. The third year requests a small amount to finish up reports, data analysis and publish results. I agree with Moyle that if you choose to support this study it ought to be funded for at least two years to look at ecological variability. One year of field studies often provides more confusion than resolution.

Miscellaneous comments:

Does Moyle suggest in this proposal that alien and native species are unable to co-exist in this system or has the introduction of the exotics simply caused a shift in the native species to a new carrying capacity? Does anyone really know for this system?

External Scientific: #2

Research and Restoration External Scientific Review Form

Proposal Number: **199**

Applicant Organization: **University of California, Davis**

Proposal Title: **Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Excellent	**This project has a high probabilty of yielding valuable results. The proposal could benefit by (1) providing more justification for sample sizes and numbers of stations, (2) giving a more detailed summary of specific benefits and products resulting from the work, and (3) explaining more thoroughly how some tasks such as high-level taxonomy will be accomplished.**
XGood	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The goals are clearly stated and consistent. The concept is especially important in the context of resource management and restoration ecology.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The authors of the proposal have not taken into account all of the existing knowledge available that is pertinent to their goals. For example, they indicate that there is little work on small channels and sloughs in the San Francisco Estuary generally, and Suisun Bay in particular. But they do not mention the extensive shallow water work conducted and ongoing by the Simenstad and Bollens "BREACH" group. Results from these studies have appeared both in IEP newsletters and in drafts of the CALFED Tidal Wetlands Whitepaper in which BREACH is extensively referenced as one of the only research programs looking at shallow water habitat. As I recall, BREACH projects sampled on the margin of Suisun Bay at Brown's and Sherman Island, and are currently sampling benthos and plankton at Ryer's Island, which is in Suisun Bay.

Some of the work that Bollens' group is doing at SFSU is related to this proposal and could be referenced and perhaps interfaced with the proposed project. For example, SFSU graduate students are currently developing thesis topics on the subjects of channel size and morphology in relation to both fish and mysid assemblages.

Henry Lee (EPA) and Bruce Thompson (San Francisco Estuary Institute) have conducted extensive analyses of the spatial patterns and associations of nonindigenous benthos in the San Francisco Estuary (extended abstract from International Conference on Marine Bioinvasions). Their results suggested that there are not strong , consistent associations (either positive or negative) between native and nonindigenous species in the estuary--even in assemblages that are dominated by Potamocorbula. This seems to bear directly on the proposed work.

The conceptual model provided would be better with some added depth. For example, one of the central concepts of the proposal (although not mentioned in the "conceptual model " paragraph) is that Potamocorbula for some reason isn't as abundant in the smaller channels and this provides a refuge from the negative effects of the clam and allows increased numbers of native invertebrates. And it seems to me that part of a complete conceptual model would include some discussion of possible reasons that the clam is not in the shallow channels. This could be as simple as a salinity or elevation effect, or as complex as competition interactions.

The selection of this topic for a research project is appropriate.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

Justification is not given for sampling 36 sites, which contributes a lot to the rather large budget. What are the scales of variability that need to be covered, and how does the sampling design address these needs? Also, for benthos, three replicates seems low given the inherent variances associated with benthic invertebrate data. It would be good for the authors to provide some justification for the replication, i.e., indications of the number of replicates vs. statistical power found with other benthic studies in the estuary. If power is low, then it may be beneficial to decrease the number sites and increase the number of replicates. The same hold true for the zooplankton sampling--justification for the chosen replication and design could be clearer.

A 30-cm plankton net seems inappropriate for sampling adult mysids, which are notorious for net avoidance.

There is no doubt that the study will supply valuable knowledge that could be useful in understanding the basic ecology of the system, and also in designing future wetland restoration projects. This project is strongly leveraged by the past and ongoing studies of fish use of many of the sites being proposed for study, and this represent s an important "value-added" component to the work.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   The type of data collection proposed will be information rich. However, the sampling design from a statistics and numerical analysis point of view is largely undocumented. There is no explanation based on what is known about the scales of variability of the things being measured, about how the scale proposed will adequately meet the study objectives.

   This said, the likelihood of gaining valuable information is high, because little is known about the habitats proposed for study.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   The proposal includes reports and publications as performance indicators, but does not have any detailed performance metrics.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   There is little doubt that the proposed research will result in valuable data about how small channels function biologically. This is the type of information that we need in order to create successful restoration projects.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   The applicants have an excellent track record for conducting and publishing studies on estuarine fishes. However, they have considerabley less experience with invertebrate studies. One area of concern is the high level of taxonomic skill that will be needed to accomplish the project goals. They say that invertebrates will be identified to "the lowest possible taxonomic level" but this could mean anything. To accomplish the goals of the study, i.e., the effect of Potamocorbula on invertebrate assemblage structures, a quite high level of taxonomic identification and expertise is needed. A case in point is the IEP Newsletter article by Toft et al. detailing the documentation of three new exotic crustaceans in the delta during the BREACH studies. The proposal authors indicate that benthic organisms will be sent out to experts for verification, but no money for consulting services is budgeted.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

The budget appears reasonable and adequate for the work proposed. However, the number of sampling stations and samples being gathered may or may not be appropriate to the goals of the study (see above).

Miscellaneous comments:

None

External Scientific: #3

Research and Restoration External Scientific Review Form

Proposal Number: **199**

Applicant Organization: **University of California, Davis**

Proposal Title: **Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**This is an important project in that it will investigate inadequately sampled shallow-water habitat to determine the effects of exotic species on natives. The information will be of use in designing other such projects and should give us a better understanding of why invasive species have been so successful in colonizing the estuary. The project is well designed, uses standard methods that are certain to obtain the needed data, and is headed by an outstanding scientist with a proven track record, who will have adequate support from other experts.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The mysid shrimp fauna of the estuary has undergone radical changes due to the introduction of exotic species. This proposal attempts an inclusive and exhaustive study of native and exotic mysids in a previously undersampled yet important shallow-water habitat. I expect that it will answer many questions regarding why the exotics have been so successful and will provide insights into how restoration activities may be able to alter habitat to favor native species. As such it is a very timely and important study.

The goals, objectives, and the hypothesis are clearly stated and internally consistent.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   Existing knowledge of the macroplankton and benthos of small sloughs is inadequate since the IEP monitoring programs have concentrated on large, deep channels. This study would fill in our knowledge of these small but potentially very important water bodies which may be serving as refugia for native species.

   The conceptual model is clearly stated and adequately explains the basis of the proposal.

   The selection of a research project is fully justified.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The sampling design appears to be well suited to achieving the project's objectives. It should add some very interesting information to our knowledge of mysids and the value of shallow sloughs to native mysids, fishes, and the ecosystem. One never knows what information will be useful to decision-makers, but I can easily imagine them referring to the results of this study when designing projects to enhance native species.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   The methods are fully documented, appear appropriate, and are feasible as they are modifications of existing methods used in monitoring studies. The likelihood of the project's success is very high. I don't see any deficiencies that would impede a successful outcome. The scale of the project is fully consistent with its objectives.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   The quarterly, annual, and final reports should provide adequate measures of the success of the project. Not much detail is provided as to how the performance measures will be quantified, however, the reports would be expected to contain adequate information to measue performance.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   Peer-reviewed papers are certain outcomes of this project. The data, results and understanding of shallow-water ecosystems should also be applicable to other areas and projects.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

To my knowledge Dr. Moyle has been primarily involved in fish studies, in which he has garnered an international reputation. However, he should be fully capable of venturing into the benthos and plankton if he has appropriate help from experts to identify these species. The DFG should be willing to help with zooplankton identification without charge to the project.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The budget appears to be reasonable and adequate.

Miscellaneous comments:

This project also has the capability to examine the summer decline in the copepod Eurytemora affinis which has been occurring system-wide since 1988. There has been speculation that the overbite clam is the cause of the decline, but little work has been done to determine if this is true. The zooplankton samples should be saved after processing and given to the DFG's Neomysis/Zooplankton project for future work on this question.

Size-fractionation of chlorophyll might be done to see if the fraction that is used as food by mysids is affected by the overbite clam. Also, the volume of water sampled by the pump to take microzooplankton should be greater than what is now sampled by the DFG Neomysis/Zooplankton Study. Dr. Moyle should contact DFG to ensure that he takes adequate pump samples.

External Scientific: #4

Research and Restoration External Scientific Review Form

Proposal Number: **199**

Applicant Organization: **University of California, Davis**

Proposal Title: **Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**No question of the high value, feasibility and scientific and Bay-Delta knowledge that would be provided by this study.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   Both goal and objectives are distinctly and simply defined. Although hypotheses are not expressed precisely, the research questions provide an equivalent basis for the research plan. The concept of testing whether relatively natural habitats such as the sloughs and channels of Suisun Marsh support disproportionally more native species is extremely timely and an important issue relative to CALFED?s restoration program.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

This proposal is based on one of the few bodies of comprehensive knowledge about a specific Bay-Delta ecosystem, which is well described in the proposal?s background information, statement of the problem and conceptual model.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The approach is a somewhat routine and tested one. However, the expected results will add considerably to the already impressive base of knowledge about this segment of the system. The project will definitely generate novel information, although the methodologies and approach is relatively standard. Being almost totally descriptive, it may suffer from the lack of a process understanding of ?the complex interrelationships among the native and alien species and the habitats in which they predominate? that requires more process measurements and/or manipulative experiments.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   Especially given the history and knowledge of Suisun Marsh that the research team/institution bring to the proposal questions, this is a highly feasible project, with high likelihood of success. The scale of the project is consistent with the objectives and approach, as well as the budget.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   Performance measures per se are minimal.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   There will be considerable value to the products of this research, from both a basic scientific understanding of the Suisun Marsh and similar systems in the Bay-Delta and the implications to restoration of such ecosystems.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   There is no more appropriate lead scientist, team and institution for such an undertaking.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   Given the level of field effort and sample analyses, the estimated cost ($271,804) of this three-year project is an absolute bargain.

Miscellaneous comments:

External Scientific: #5

Research and Restoration External Scientific Review Form

Proposal Number: **199**

Applicant Organization: **University of California, Davis**

Proposal Title: **Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**This proposal is outstanding in almost all respects. The proposed monitoring program focuses on specific goals that seek to fill an important void in knowledge regarding invasibility of tidal marsh habitats in San Francisco Bay. This has important implications to the extensive restoration efforts in the region, and elsewhere. Furthermore, the work is realistic and appears well-coordinated with other ongoing research programs. Finally, the results of this work will undoubtedly be published and conveyed to regional decision-makers and beyond.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The primary goal of the proposed research is to document and monitor shrimp, plankton, and benthos communities within the diverse tidal marsh habitats of Suisun Marsh to develop a better understanding of abundance and distribution patterns. Specific objectives and research questions (pp 4-5) address the effects of exotic species on the aquatic community and food web, and are clearly stated and internally consistent throughout the proposal. Given the current state of San Francisco Bay aquatic communities, there is no question that the concept of "invasibility" is extremely timely and important, especially when placed

within a restoration context.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   The study justification is very good and cross-references ERP strategic goals liberally. Perhaps one of the most compelling justifications is noted on pp 5-6 of the proposal, where the case is made that there is a current mismatch between existing ecological and biological information focused on large channel and bay habitats, and information needed to better understand the effects of proposed restoration activities in tidal marsh habitats. A conceptual model (Figure 2) is clearly stated in the proposal. This model is based on supporting data collected under the 21-year UCD Suisun Marsh Fish Survey and by other researchers. A number of supporting figures are used to display these data in the proposal.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The approach is a well designed monitoring plan that will be coordinated with IEP sampling programs occurring in other parts of San Francisco Bay. Analysis of the data is not detailed specifically, although the applicant notes some possible approaches. The results of this study will add considerable novel information to the existing base of knowledge and will have utility to decision-makers involved in restoring similar habitats throughout San Francisco Bay. Based on

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   Yes, the approach is fully documented and feasible. The likelihood of success is high and the scale consistent with the objectives.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   Yes, the project outlines performance measures in the form of quarterly, annual, and final reports.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   The applicant has a history of conveying ongoing research to the scientific community through presentations at conferences, participation in regional meetings, and publishing high-quality manuscripts and papers.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

The track record and capabilities of the principle investigator and applicant is excellent. He and his research group have effectively implemented and maintained a similar fish monitoring and research program (UCD Suisun Marsh Fish Survey) for 21 years in the various habitats of Suisun Marsh. These previous/ongoing efforts have resulted an unparalleled monitoring database for the region and yielded numerous publications. The infrastructure and all other aspects of support necessary to accomplish this project are already in place.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   The cost/benefit ratio of this project is very good (i.e. high benefit per unit cost). Although the costs are realistic for a university program, few other organizations could realistically accomplish this research for this dollar amount.

Miscellaneous comments:

Schroeter is noted as a coauthor on header, but not in text of document. Costs of Hydrolab datalogger - 13k?

Prior Performance/Next Phase Funding: #1

New Proposal Number: 199

New Proposal Title: Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species

1. Prior CALFED project numbers, titles, and programs: (*list only projects for which you are the contract manager*)

   ERP 99-N06 - Linked Hydrogeomorphic Ecosystem Models to Support Adaptive Management

2. Prior CVPIA project numbers, titles, and programs: (*list only projects for which you are the contract manager*)

   N/A

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

   -Yes **X**No **-**N/A

   If no, please explain any difficulties:

   The Office of Vice Chancellor for Research at UC Davis has requested numerous and repeated requests for revisions of the standard contract terms. Only a few of these issues were raised in the PSP process. Reconciling these issues has required extensive staff time for CALFED and other State agencies. This repeated negotiation has resulted in a delay of contract execution for up to 2 years.

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

   XYes **-**No **-**N/A

   If no, please explain any inaccuracies:

5. Is the applicant's progress towards these project(s)' milestones and outcomes to date satisfactory?

   XYes **-**No **-**N/A

   If no, please explain deficiencies:

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

   XYes **-**No **-**N/A

If no, please explain deficiencies:

UC Davis has had consistent difficulty communicating internally and externally regarding its fiscal documentation. Reconciling financial issues with UC Davis has proved very problematic. The financial situations raised by UC Davis have proved to be the most difficult within the NFWF managed CALFED contracts.

7. Will the project(s) be ready for next phase funding in 2002, based on its current progress and expenditure rates?

XYes **-**No **-**N/A

If no, please explain:

Other Comments:

The difficulties expressed above are limited to UC Davis campus only. They also do not reflect on the research conducted by the PIs.

Prior Performance/Next Phase Funding: #2

New Proposal Number: 199

New Proposal Title: Distribution, and abundance of shrimp, plankton and benthos in Suisun Marsh: Tidal marsh as a refuge for native species

1. Prior CALFED project numbers, titles, and programs: (*list only projects for which you are the contract manager*)

   00-F08, McCormack-Williamson Tract II Monitoring Program, CALFED ERP

2. Prior CVPIA project numbers, titles, and programs: (*list only projects for which you are the contract manager*)

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

   XYes -No -N/A

   If no, please explain any difficulties:

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

   XYes -No -N/A

   If no, please explain any inaccuracies:

5. Is the applicant's progress towards these project(s)' milestones and outcomes to date satisfactory?

   XYes -No -N/A

   If no, please explain deficiencies:

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

   XYes -No -N/A

   If no, please explain deficiencies:

7. Will the project(s) be ready for next phase funding in 2002, based on its current progress and expenditure rates?

   -Yes -No **X**N/A

   If no, please explain:

Other Comments:

Applicant has performed well in implementing prior contract

Environmental Compliance:

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1. Are the legal or regulatory issues that affect the proposal identified adequately in the proposal?

   -Yes **X**No

   If no, please explain:

   May need 2081 if there is the possibility of take of state-listed species. Project proponents may already have this permit, but it was not checked on the environmental checklist, nor mentioned specifically in the text.

2. Does the project's timeline and budget reflect adequate planning to address legal and regulatory issues that affect the proposal?

   XYes **-**No

   If no, please explain:

3. Do the legal and regulatory issues that affect the proposal significantly impair the project's feasibility?

   -Yes **X**No

   If yes, please explain:

   As long as project proponents have or obtain all necessary permits, this project is feasible.

Other Comments:

Budget:

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

   XYes **-**No

   If no, please explain:

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

   XYes **-**No

   If no, please explain:

3. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs?

   XYes **-**No

   If no, please explain:

4. Are appropriate project management costs clearly identified?

   -Yes **X**No

   If no, please explain:

   None?

5. Do the total funds requested (Form I, Question 17A) equal the combined total annual costs in the budget summary?

   XYes **-**No

   If no, please explain (for example, are costs to be reimbursed by cost share funds included in the budget summary).

6. Does the budget justification adequately explain major expenses?

   XYes **-**No

If no, please explain:

7. Are there other budget issues that warrant consideration?

   -Yes **X**No

   If yes, please explain:

Other Comments: