

CALFED Science Program PSP Grant

Supplement Proposal

Technical Selection Panel Review

Grant Supplement Identification: *Parker*

Applicant Organization: San Francisco State University

Grant Supplement Title: Climate Change Impacts on Nitrogen Dynamics in San Francisco Bay-Delta Wetlands

Original Grant (Year): Climate Change Impacts to San Francisco Bay-Delta Wetlands: Links to Pelagic Food Webs and Predictive Responses Based on Landscape Modeling (2006)

Review

The following review form has been broken down into three subsections: (1) technical review criteria, (2) value added review criteria, and (3) funding recommendation. It includes a review and summary rating for each of these subsections using all review criteria. Technical criteria is separated from the value added criteria because these issues will be weighed separately, but with equal importance. No supplement proposals will be funded that are rated inadequate in either criteria.

Subsection 1: Technical Review

Review about the technical merit of the supplement proposal. Criteria for consideration are:

Technical Review Criteria

- ***Purpose:*** *Are the goals, objectives and hypotheses of the supplement proposal clearly stated and internally consistent?*
- ***Background:*** *Is the underlying basis for the supplemental work clearly explained and well documented?*
- ***Approach:*** *Is the approach to the supplemental work well designed and appropriate for meeting the objectives of the supplemental project? Is it clear who will be performing supplemental tasks including management and administration of the project and are resources set aside to do so?*
- ***Feasibility:*** *Is the approach for the supplemental work fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?*
- ***Budget:*** *Is it clear how much each aspect of the supplemental work will cost including each task, salaries, equipment, etc.? Is the budget reasonable and*

- adequate for the work proposed?*
- **Qualifications:** *Is the project staff qualified to efficiently and effectively implement the supplemental project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?*
 - **Past Performance:** *Unless informed otherwise by CALFED staff, reviewers should assume that the applicants have met the commitments indicated on their existing CALFED grant/contract.*

Technical Review Summary

The technical review of this supplement proposal is provided in the space below and addresses each of the technical review criteria (above), including strengths, weaknesses, and specific reasons supporting the evaluation.

Purpose: The currently funded project is evaluating the impacts of climate change on the freshwater wetlands of the Bay-Delta and their potential linkages to pelagic fishes. The current project focuses on carbon. The proposed research would extend this to consideration of the impact of climate change on nitrogen dynamics in these ecosystems. This is of interest because N has been shown to limit plant growth and influence species composition in other wetlands, although little is known of its dynamics in these ecosystems. The hypothesis being tested is that climate change will alter N dynamics by altering salinity and sea level.

Background: In addition to exploring climate change effects, applicants argue that this research will provide a baseline for understanding the impact of wetlands on N inputs to the Bay. The conceptual model for the N studies (Fig 2) is more fully developed than the model that underlies their current research (Fig 1). The form of N (NH_4 vs. NO_3 vs. DON) greatly influences its role in the system, yet throughout the background material only “N” is discussed.

Approach: Using sites that currently differ in salinity (freshwater, brackish, salt tidal marshes), the applicants will determine N budgets (N pools and fluxes among them) and compare budgets among sites to estimate potential future climate impacts. One significant problem in this approach is that these sites probably differ by more than salinity and tidal inundation; in particular, N inputs may be very different. Therefore, there is a problem in using this approach to assess impacts of climate change.

There is considerable merit to studying C and N simultaneously, which is what a supplement would enable them to do. It is not clear why the applicants are not also considering a change in temperature, which is also likely with climate change.

Why are samples for DIN sterilized? Load in incoming water can only be measured if the amount of water entering is also measured; yet it does not appear

that this will be done. DON is a significant component of total N in water, yet neither DON nor particulate N is being assessed. Why are biomass samples being analyzed for both N and P? The measurement of C in soil cores and sediments is presumably already being done as part of the current funding. DON is also produced during decomposition. We are concerned that this proposal has basically ignored DON, yet it is a significant component of N dynamics in aquatic systems.

There appears to be little information about nitrogen dynamics in the Delta. No background information as to the nitrogen budget for the Delta/Bay was presented. Importance of this type of project is high, as it could couple nicely with the original proposal.

Feasibility: The proposed research will result in a number of estimates for N pools and processes at a number of sampling sites within different marshes. But it offers no way to expand these values to the marsh as a whole (take the mean and multiply it by the area? But that ignores spatial variability in the factors causing the differences observed in rates and there are no ancillary measures proposed to assess that). Our greater concern is that any differences in N dynamics detected in these three marshes may be a result of much more than salinity differences; yet it is only these salinity differences that are being considered as consequences of climate change.

Obtaining nitrogen loading is extremely difficult. The value of the information that could be obtained from the project is great. However, this proposal doesn't show that they are ready to execute the project. The problem identified is however very important. However, the methodology doesn't appear to be there.

Budget: The budget is largely providing support for two graduate students and supplies. The budget doesn't seem large enough for the scope of the project presented, if done properly.

Qualifications: The applicants are clearly experts in wetland ecology. Less obvious is their expertise in biogeochemistry and specifically in studies of the N cycle. Their technician apparently has experience in that area, but it does not appear that this proposal will provide support for her. The Panel would be less concerned about this if there were not substantive gaps in the proposed research (especially no mention of DON).

Past performance: They are productive researchers. It is not clear how much has been accomplished under the current funding, although the productivity data in Figure 3 suggests an impact of increasing salinity (although one does not know what other factors are different among these different sites--a continuing problem in the proposed research).

Technical Rating Criteria

Rating of the technical merit of the supplement proposal based on the following scale:

- **Superior:** Outstanding in all respects with no technical concerns. Complete confidence proponents will accomplish the project goals.
- **Above Average:** A very good proposal with no significant technical concerns. Very confident proponents will accomplish the project goals.
- **Sufficient:** A reasonable proposal with some technical deficiencies but nothing critical. Fairly confident proponents will accomplish most of their project goals.
- **Inadequate:** A technically deficient proposal with serious impediments or concerns. Little confidence proponents will accomplish many project goals.

Please **X** the appropriate technical rating:

Superior
 Above Average
 Sufficient
 Inadequate

Explanation of rating and additional comments:

The proposed research will not adequately measure N loading to the sites (ignores DON and particulate N inputs as well as no measure of water volume). The project does not address nitrogen fluxes. The sites likely differ in more than salinity, yet the only variable being considered is salinity. There is merit in combining a study of N dynamics with their current emphasis on C.

Subsection 2: Value Added Review

Review about the value added of the supplement proposal. Criteria for consideration are:

Value Added Review Criteria

- **Purpose:** *Is the new study justified relative to existing knowledge? Are new results likely to add to the base of knowledge? Is the supplemental project likely to generate novel information, methodology, or approaches? Is it clear how the purpose of the supplemental work differs from the work in the existing grant/contract?*
- **Relevancy:** *Is it clear how the supplement proposal evolved from and relates to the existing grant/contract? Does the supplement proposal clearly and directly address one or more of the objectives/priorities in the existing grant/contract? Does the supplement proposal identify new relevancies to CALFED priorities not identified in the existing grant/contract?*
- **Timeliness:** *Does the supplement proposal clearly illustrate the need for immediate funding before the next Science Program PSP cycle (1 to 2 years)?*
- **Approach:** *Is it clear how the approach of the supplemental work differs from and adds to the work in the existing grant/contract?*

- **Products:** *Are products of value likely from the supplemental project that differ from those proposed in the existing grant/contract? Is there a plan for widespread and effective dissemination of information gained from the supplemental project?*
- **Budget:** *Is it clear that supplemental funds are going to new or revised tasks or equipment relative to those proposed in the existing grant/contract? Considering the amount of funding requested in the proposed budget, is there a high value in terms of knowledge gained for the CALFED Program relative to other proposals you are familiar with (i.e. “bang for the buck”)?*

Value Added Review Summary

The value added review of this supplement proposal is provided in the space below and addresses each of the value added criteria (above), including strengths, weaknesses, and specific reasons supporting the evaluation.

Purpose: The proposed research will add to existing knowledge, particularly since little appears to be known about N dynamics in Pacific tidal marshes. The currently funded research is exploring an important link between marshes and the fishes of the Bay-Delta. This supplemental research does not address that linkage.

Relevancy: Climate change is of concern to the program, and the proposed research uses the framework of the existing grant to further explore the impacts of climate change. However, there are problems in asserting that the differences observed among sites are due solely to salinity and therefore to use these differences to infer likely consequences of climate change. We note that similar concerns were raised in the reviews of the currently funded proposal; yet nothing was done in preparing this supplement to show how that shortcoming was being addressed.

Timeliness: Given the multitude of issues facing CALFED, it is not essential that this be done now. The only thing arguing for that is that they are already doing research on C at these sites, and adding N now would be less expensive than doing it later. However, given that there are substantive concerns with the approach being taken in this research, it seems more appropriate that a project like this be submitted as part of the regular CALFED PSP.

Approach: The proposed research adds N to their current work on C.

Products: These are not specifically identified in the proposal, although given the applicants’ track records, one assumes that there will be peer-reviewed publications from this.

Budget: The funds requested will clearly go for new analyses. It would be more efficient to do the N study now (as part of the C work they are already doing) than later.

Value Added Review Rating

Rating of the value added merit of the supplement proposal based on the following scale:

- ***Superior:*** Outstanding scientific value with a pressing need for immediate funding and expected to add substantial new thinking/concepts to our knowledge/understanding on one or more highly relevant CALFED topics for a very reasonable supplemental cost.
- ***Above Average:*** At least high scientific value and a clear need for rapid funding. Expected to add solid basic new thinking/concepts to our knowledge/understanding on one or more highly relevant CALFED priority research topics for a very reasonable supplemental cost.
- ***Sufficient:*** A supplement proposal with a fair amount of scientific value and need for timely funding and expected to add some basic new thinking/concepts to our knowledge/understanding on one or more adequately relevant CALFED topics for a reasonable supplemental cost.
- ***Inadequate:*** A supplement proposal that has little scientific value or need for timely funding. Not expected to add significant new thinking/concepts to our knowledge/understanding on relevant CALFED topics or the supplemental cost is unreasonable for the knowledge gained.

Please select the appropriate rating with an **X**:

- Superior
 Above Average
 Sufficient
 Inadequate

Explanation of rating and additional comments:

The research could expand our understanding of N dynamics in marshes that differ in salinity (and other uncontrolled factors). Although it would be more efficient to do this work while the C work is also occurring, there are substantive concerns with what is being proposed. There is not an urgent need for this information by managers and decision-makers. It is the type of proposal that should be submitted for a regular PSP.

Subsection 3: Funding Recommendation and Justification

Funding recommendation for this supplement proposal and a justification of this recommendation.

Select one of the following three funding recommendations with an **X**:

- Fund in Full
 Fund with modifications
Suggested Funding Amount \$ _____
 Do not fund: Due to technical inadequacies.

Justification to recommendation. If the recommendation is to fund with modifications, modifications the applicants must make in order to receive funds are listed.

There are substantive technical concerns with the proposed research. There is not an urgent need for the information that would result from the work. This is more appropriate for the regular PSP process.