

CALFED Science Program PSP Grant

Supplement Proposal

Technical Selection Panel Review

Grant Supplement Identification: *May and Moyle*

Applicant Organization: University of California, Davis

Grant Supplement Title: Using Stable Isotopes to Understand Complex Trophic Dynamics of Invasive Hydrozoans and Planktivorous Fishes in the Upper San Francisco Estuary

Original Grant (Year): Predicting the Effects of Invasive Hydrozoa (Jellyfish) on Pelagic Organisms Under Changing Salinity and Temperature Regimes (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 grant is using gut content analyses to study the impact of four invasive hydrozoan species on the pelagic foodweb in Suisun Marsh and the potential competition between these invasives and native fishes as a causal factor in the POD. Although gut analyses provide valuable information on species feeding habits, they are biased toward “structurally robust” species. The research proposed in this supplement request would use stable isotope analyses to overcome that bias and provide a clearer picture of energy flow in the pelagic foodweb.

Approach: The applicants will use natural abundance of ^{13}C and ^{15}N to determine trophic position of the hydrozoans. One advantage of this method is that it provides an estimate of what the organisms have assimilated that is integrated over time, in contrast to gut content analyses, which provide a snapshot in time. Stable isotope signatures of pelagic fishes will be examined before, during and after blooms of hydrozoans to determine if hydrozoans and fishes are competing for the same resources. Inputs to the marsh from wastewater treatment plants will alter the isotope ratios of the food base in different parts of the marsh, which offers further opportunity to explore the dependence of hydrozoan and fish species on microbial vs. phytoplankton food sources. The applicants propose a couple methods to overcome the temporal variability in isotope ratios observed by others in this system: one uses bivalves and the other uses a phytoplanktivorous zooplankton species. Samples for isotope analysis will be collected at the same time as samples are being taken for gut analyses in their funded project. This is both cost effective and may aid in data interpretation.

Feasibility: (1) Depending on the turnover rates of C and N in the fishes and hydrozoans, it may not be possible to detect differences in natural abundance ratios before, during, and after blooms. (2) In most natural abundance studies, stable isotope analyses of the base of the foodweb is a part of the study, but that is not being done here. It may be that these data are available from other sources. If not, it would seem that the investigators would need to get that information if they want to be able to interpret the stable isotope analyses of higher trophic levels. This is particularly true given the potential confounding effects of sewage enrichment (see # 5). (3) The applicants propose suspending bivalves in situ for a month to get their isotope signature to use to correct for temporal variability in

this measure. Some preliminary data are needed to convince the panel that a month is long enough to change isotope signatures. (4) It is not clear why they are using both silver and tin capsules for zooplankton and only tin capsules for hydrozoans, bivalves, and fish. (5) It is hard to know if the likely differences in N signatures in different parts of the marsh will make isotope interpretation even more difficult. Much depends on the extent to which fish and jellyfish move. If they spend different amounts of time in different parts of the marsh, encountering prey with different isotope signatures, the ability to determine trophic position will be greatly compromised.

In general, the panel feels that Carbon and Nitrogen stable isotopes may be insufficient to reveal the detail they are looking for, and the proponents may need a broader range of biomarkers to tease out the trophic structure of this system.

Budget: The budget is for partial support of two graduate students, the PI, miscellaneous travel and supplies, and isotope analyses. In addition funds are requested to dispose of formalin generated during their currently funded research (and apparently not budgeted for in that study). The budget appears reasonable for the work proposed.

Qualifications: The PI does not have experience with stable isotope analysis, but it appears that someone who has that experience will advise him. That aspect of the study is worrisome, since the advisor is not receiving any support from the project. Although Moyle's name is on the title of the proposal, he is not mentioned in it, so it is unclear what his role will be.

Past performance: These are productive scientists, and they appear to be making considerable progress on the currently funded 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
___ **X** ___ Inadequate

Explanation of rating and additional comments:

The research proposed may not enhance the ability of the currently funded project to evaluate the role played by invasive hydrozoans in the POD. There are concerns with the application of the stable isotope technique in this system, and the ability of the applicants to overcome those complexities. Carbon and Nitrogen stable isotopes may be insufficient to reveal the detail they are looking for and the proponents may need a broader range of biomarkers to tease out the trophic structure of this system.

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 research proposed is directly relevant to the POD. It enhances the currently funded research and could provide insight beyond what that project could provide.

Relevancy: The research addresses questions of the role of invasive species and the POD.

Timeliness: This project would cost significantly more if it were funded as part of a regular PSP. By adding isotope analyses to samples that are already being collected, the project is very cost-effective.

Approach: The request for supplemental funds introduces a new technique not being used in the funded research. This new technique should enhance the ability of the researchers to understand the impact of these invasive species on the pelagic foodweb. However, the panel is not convinced that the investigators have the expertise to deal with the complexities inherent in interpretation of the stable isotope analyses.

Products: Peer-reviewed publications and presentations at meetings are likely to come from this research. The research will also help in determining likely causes for the POD.

Budget: The budget is very reasonable (e.g., they are requesting only partial rather than full year support for students)

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 budget is reasonable and this type of research, if technically sufficient, could make a significant contribution to understanding the impacts of invasive species on pelagic foodwebs and help assess their contribution to the POD.

Additionally, not enough people are thinking about hydrozoans in the Bay and more research is needed in this area.

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

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

This study seems premature for this group, and they need to identify a stable isotope expert and detail the involvement of that expert in future proposals. Given the substantive technical concerns, the panel does not feel this proposal should receive funds.