

CALFED Science Program PSP Grant

Supplement Proposal

Technical Selection Panel Review

Grant Supplement Identification: *Dugdale and Mueller-Solger*

Applicant Organization: San Francisco State University and California Department of Water Resources

Grant Supplement Title: Comparison of Nutrient Sources and Phytoplankton Growth and Species Composition in Two Rivers: Their Roles in Determining Productivity and Foodweb Conditions in Suisun Bay and the Delta

Original Grant (Year): Phytoplankton Communities in the San Francisco Estuary: Monitoring and Management Using a Submersible Spectrofluorometer (Mueller-Solger 2004); Do Low Phytoplankton Growth Rates Signal the "Bad" Habitat Condition (Dugdale 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 research proposed here grows from IEP and CALFED-funded research currently being conducted to understand the role of food limitation in the POD. High levels of ammonium reduce the rate of nitrate uptake by phytoplankton and may be limiting their productivity. WWTPs are a major source of NH₄ to the Sacramento and San Joaquin Rivers and thus to the estuary. The proposed research takes advantage of a change in wastewater treatment in the Stockton WWTP, which will significantly reduce the amount of NH₄ it is adding to the San Joaquin River. It is possible that in the near future limits may also be placed on the Sacramento WWTP, but at present, it is still adding high amounts of NH₄ to the Sacramento River. The proposed study would take advantage of these differences in NH₄ loading in the two rivers to better understand its influence on phytoplankton biomass and species composition, both of which have relevance to the estuarine foodweb.

Background: The study will contribute to exploring potential causes of reduced phytoplankton biomass in the estuary, a possible cause of the POD. It is also of relevance in terms of water management decisions because the differences in NH₄ concentrations in the two rivers could influence the amount of primary productivity in Suisun Bay (particularly during the spring bloom which is important to the rest of the foodweb) depending on the relative contribution of water from the two rivers. These studies are also relevant with respect to the conveyance alternatives currently being considered since it is high NH₄ in Sacramento River water that would be moving in any peripheral canal, depending on its intake location. In addition, the proposed research will impact regulatory decisions on NPDES permits. *Microcystis* is a likely beneficiary of the elevated NH₄ concentrations, so this research is also relevant to understanding drivers of the toxic algae blooms.

Approach: The proposed research will compare monitoring methodology as well as exploring the relationship between NH₄ and phytoplankton. Results from the

Fluoroprobe will be compared with results from the Cytosense and with more traditional microscopic phytoplankton counts. Further development and validation of these more automated techniques are important not only for the questions posed here, but also for the general problem of monitoring in the Delta. The applicants propose to conduct surveys along the Sacramento and SJ Rivers to determine if NH_4 inhibition of NO_3 uptake is occurring; if it is, that has significant consequences for the form of DIN delivered to the estuary. Essentially, they are extending their currently funded research up river to determine the role played by river phytoplankton in nutrient delivery to Suisun Bay. They will also be determining the relative role of N vs. P in stimulating phytoplankton blooms in the estuary.

Feasibility: Both labs are familiar with the instruments and data collection techniques involved. The study is definitely feasible except for the timing of some of the campaigns. It is already early April 2008, when the first campaign was scheduled. Clearly timing will have to be altered.

Budget: The applicants note that they may get funding from Central Valley Water Quality Control Board to use more traditional toxicity testing methods to explore the effect of high NH_4 in the Sacramento effluent. That project will be designed to provide regulatory guidance and be less relevant to questions of foodweb structure. Regardless of whether that project is funded, the research proposed here will be much more useful in considering the effect of high NH_4 on the estuarine foodweb.

Qualifications: The investigators have the instruments and are highly qualified to do the proposed research.

Past performance: This is a highly productive team. They have made reasonable progress in their currently funded projects.

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:

X Superior

_____Above Average
_____Sufficient
_____Inadequate

Explanation of rating and additional comments:

The applicants are very experienced with the techniques proposed. They are exploring a topic that is relevant to the food limitation hypothesis for the POD as well as providing data that will be useful in the discussions of alternative conveyance options. Furthermore, the instrument comparisons will be of value for designing future monitoring effort in the Delta.

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 will further explore the hypothesis that excess NH₄ reduces phytoplankton productivity and alters species composition. It is different from the currently funded research in that it is determining the extent to which processes in the river alter nutrient delivery downstream and thereby influence estuarine foodwebs.

Relevancy: The proposed research is relevant to: (1) POD because it is exploring a potential cause of reduced phytoplankton biomass and productivity (plus if this is a significant causal factor in the POD, then reducing NH₄ inputs from WWTPs is a fairly straightforward response); (2) conveyance alternatives and placement of inputs; (3) design of monitoring programs (because of the instrument comparison); and (4) regulatory issues (WWTP NPDES permit).

Timeliness: The study is timely for two reasons: recent change in effluent characteristics and relevance to conveyance issues.

Approach: One of the real strengths of this proposal is that it is collaborative. The investigators have separate funded CALFED proposals both dealing with phytoplankton in the estuary. It is to their credit that they have decided to combine their efforts and instruments. The result is a much more interesting and valuable proposal.

Products: In addition to peer-reviewed publications, the team will make presentations at state and national meetings as well as incorporating them into the POD debate.

Budget: The fact that this is a supplement that will extend the research of two funded proposals enhances its value.

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 project is timely, feasible, and relevant as described above.

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.

The proposed research addresses an important question. The answer is relevant to POD, conveyance alternatives, and NPDES permitting. The proposed research will also contribute to enhanced monitoring design. The PIs are productive and the research is feasible.

Additional Remarks

The applicants should be in contact with Dr. Lucas, who is doing phytoplankton modeling as part of the USGS CASCaDE project.