CALFED Science Program PSP Grant

Supplement Proposal

Technical Selection Panel Review

Grant Supplement Identification: *Dunne*

Applicant Organization: University of California, Santa Barbara

Grant Supplement Title: How Abiotic Processes, Biotic Processes and Their Interactions Sustain Habitat Characteristics and Functions in River Channels and Their Floodplains: An Investigation of How a Reach of the Merced River Responds to Restoration.

Original Grant (Year): How Abiotic Processes, Biotic Processes, and Their Interactions Sustain Habitat Characteristics and Functions in River Channels and Their Floodplains: An Investigation of the Response of a Gravel-Bed Reach of the Merced River to Restoration (2004)

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.*

Purpose: The supplemental funds would be used to conduct a LIDAR survey of the valley floor and four biological experiments on the response of fishes, invertebrates, and floodplain vegetation to the altered physical conditions resulting from river restoration. The four experiments are: (1) adding woody debris, (2) augmenting gravel, (3) effects of coarse spawning gravel on Chinook eggs, and (4) irrigation and planting to accelerate recruitment of native floodplain vegetation.

Background: The funded project is studying how a common river restoration practice alters physical processes in the channel and floodplain, and how in turn these altered physical conditions affect fishes and floodplain vegetation.

Approach: The woody debris experiment will examine the effects of addition of different densities of woody debris on invertebrates, cryptic fishes, and juvenile Chinook salmon. Response of juvenile salmon to the treatment will be followed for 60 days, which strikes this panel as a relatively short time in the life of a juvenile salmon. One strong aspect of the proposed research is the detailed analysis of the flow fields created by the woody debris, but it is not clear how a manager would use this information. The applicants dismiss abundant previous research on manipulation of woody debris in streams without citing any of it. It is not clear that these experiments will add significantly to the understanding of the role of woody debris in streams or improve the implementation of this technique by managers. In particular, the applicants note that it will require negotiations with several agencies to get the permits necessary to put the structures in the channel, and that the structures will be removed during the flood season. It seems highly unlikely that managers would use such structures if the structures have to be removed each year. Furthermore, structures used in that manner would simply be creating habitat for organisms and potentially attracting them to that habitat, which would be eliminated when the structures are removed. This could pose real problems if the species attracted to the structures were endangered. It also may be that structures like these are particularly beneficial during high flow events, and the applicants would miss that completely.

The gravel augmentation study has considerable merit. It builds on studies conducted in flumes, it is a practice widely used in CALFED river-restoration activities, and the study is well designed with both physical and biological measures proposed (although we were a bit concerned that a Surber sampler is called a *server* sampler – suggesting inadequate editing by the person responsible for invertebrate studies). Interpreting the biotic responses to the gravel wave will

be somewhat difficult in that the wave will pass different sections of the reach in different seasons, which will have different biotic assemblages. The Panel is not convinced that the statistical design will enable the researchers to separate the effects of location and season on invertebrate response to the gravel wave.

The experiment on the effectiveness of coarse gravel in Chinook egg-to-alevin survival could be relevant to management decisions being made to enhance salmon stocks, but the design makes it less so. It is not at all clear why unfertilized eggs are being used. We presume they are proposing to count the number of eggs remaining in sites with versus without predator access. But that says nothing about whether the eggs would actually hatch and the alevins survive. This experiment will probably result in a peer-reviewed journal article but be of questionable value to a manager. The third hypothesis (that the combined effects of agitation and predation best explain egg survival) is not being tested. Without a third experiment using fertilized eggs and following their survival, this hypothesis is not being tested. This experiment lacks a level of detail necessary to really evaluate the effectiveness of this experiment. They are starting with unfertilized eggs and then go to Teflon balls (which is a neat idea but the panel is unsure of the adequacy of results).

The experiment using planting and irrigation to enhance establishment of native floodplain vegetation builds on previous work showing the overriding importance of soil moisture in this process. They propose a factorial experiment using timed irrigation, weed removal, and seeding to explore the role of these in vegetation establishment. One very positive feature of this aspect of the research is the involvement of a high school ecological restoration class in the effort. It will clearly be a learning experience for those students (and probably their parents and friends as well). The LIDAR survey would be used to design the experiment, model soil moisture, and flow on the floodplain, and enhance understanding of existing patterns of floodplain vegetation. The results of this experiment will clearly be of value to managers attempting floodplain restoration.

Feasibility: There are a couple concerns with feasibility. One is acquiring permits for the woody debris addition. The second is whether the irrigation system can be made operational—and at what cost (we are not clear how that is figured in the budget). Other than that, the methods proposed are feasible, although there are substantive questions about the experimental design as elaborated on above.

Budget: The budget is primarily salaries for the individuals engaged in the research.

Qualifications: The team is highly productive and certainly well qualified to do the research.

Past Performance: Productivity on previous grants and progress on current grant suggests that the proposed research will be accomplished.

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
__**X**__ Above Average
_____ Sufficient
_____ Inadequate

Explanation of rating and additional comments:

The rating differs for different parts of the proposal, so the ranking given is really an average of the different parts. Superior rating for: LIDAR (clearly that is needed to understand and model patterns of moisture and flow on the floodplain) and floodplain vegetation experiment (well designed and relevant to restoration practitioners); Above Average for: gravel augmentation (concern about statistical design for invertebrate studies); Sufficient (but really needs a treatment with fertilized eggs) for coarse gravel study; Inadequate for woody debris experiment (for reasons elaborated above).

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")?*

Purpose: Some of the experiments proposed will significantly add to existing knowledge and could improve river restoration practices. The proposed research clearly builds on and enhances but does not apparently duplicate what is being done in the currently funded project.

Relevancy: Aspects of the proposed research would be directly relevant to river restoration practices.

Timeliness: The proposed research clearly benefits from the current work on the Merced, but it could be part of a proposal submitted during the regular PSP process. There is considerable interest at present in Chinook salmon, so in that respect aspects of the proposed research are timely.

Approach: The experiments proposed here are different from what is being done in the funded project and builds upon what is being done as part of that project.

Products: Given the track records of the investigators, there will clearly be peer-reviewed publications from this research. Aspects of the research will be of value to river restoration practitioners. The engagement of a high school class in the restoration effort is excellent outreach.

Budget: Most of the budget is salary for the investigators, students, and post-docs. Presumably, this is in addition to what is already being covered in the current funding. One would think that the apartment rental would already be covered under the current grant. The funding for the floodplain vegetation, LIDAR, and gravel augmentation experiments do offer considerable bang for the buck. However, we are less convinced of the value of the woody debris and coarse gravel experiments.

Overall the panel likes the mix of disciplines and measurements.

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
__**X**___Sufficient
_____Inadequate

Explanation of rating and additional comments:

In many respects, this is an above-average proposal because aspects will clearly contribute both to scientific understanding and restoration practice. However, we ranked it as sufficient because it did not indicate a clear need for rapid funding.

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
__X___Fund with modifications
Suggested Funding Amount: $150,000
_____Do not fund

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

Aspects of this proposal have considerable merit scientifically and could enhance river restoration practice. In particular, the floodplain, LIDAR, and gravel augmentation experiments should be funded. The additions of the woody debris and coarse gravel experiments have sufficient technical concerns that they should not be funded at this time. The value suggested above reflects the

recommendation that two of the four experiments should be eliminated. However, the remaining two should be funded.