CALFED Bay-Delta 2002 ERP Directed Actions
Selection Panel Review

Proposal Number: 174DA
Applicant Organization: The Water Forum
Proposal Title: Lower American River Temperature Reduction Modeling Project (formerly the Lake Natoma Temperature Curtains Pilot Project)

Recommendation: Fund
Amount: $466,082

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

Provide a brief explanation of your rating: The proposed project would develop models to evaluate potential specified structural improvements to reduce late-summer and fall water temperatures to benefit fall-run Chinook salmon in the lower American River. The original proposal was to install and assess the effectiveness of one potential structural improvement (temperature curtains). Based on review of the original proposal, the Selection Panel echoed concerns raised by technical reviewers regarding a lack of modeling of the potential effects of the curtains prior to implementation. The applicants responded to these concerns by focusing their revised proposal on developing models to evaluate the effects of several potential structural improvements. The Selection Panel recommends that the revised proposal be funded in full, and encourages the applicants to interpret how the modeled temperature changes will benefit fish.

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Research and Restoration External Review Form
CALFED Ecosystem Restoration Program 2002 Proposal Solicitation Package

Proposal Title: Lower American River Temperature Reduction Modeling Project

Review:

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

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? **Yes, it focuses on temperature and specifically pre-spawning temperature, which is a very important environmental driver. Yes the conceptual model is clear. Yes, the revised proposal is much improved and focused on helping to inform future decisions about the potential benefits associated with temperature modification structures and operations.**

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? **Yes to all.**

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? **In general yes, but after reading the proposal I was thinking it would have been helpful to have had an example where these W2 and CFD models had been successfully applied to similar questions elsewhere. However, since they propose to use existing software and source codes, I don't view the lack of a successful example as being critical.**

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, they lay out a process to evaluate potential physical improvements in a cost-effective manner. However, while focused on the hydraulic and hydrology of the project, it wasn't quite as clear to me how the physical improvements will be evaluated biologically, but I think there are ways for others (who have that expertise) to do so outside of this proposal, given the information developed from this modeling exercise.**

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? **Yes**.

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? **Yes**.

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

Miscellaneous comments:

Shifting to a modeling study where potential modifications are evaluated makes a lot of sense and it will narrow the focus to only those improvements that are productive and cost effective.

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**
- XXXExcellent	The authors took a totally different approach to the question and came up with a more informative, cost effective evaluation.
- Good	
- Poor	

Research and Restoration External Review Form
CALFED Ecosystem Restoration Program 2002 Proposal Solicitation Package

Proposal Title: Lower American River Temperature Reduction modeling project

Review:

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?
   The goals are clearly stated to model the effect of a temperature curtain. They are responding to the primary comments from reviews of the previous proposal that a modeling effort was needed to determine the impact of a curtain before a curtain is built. The goal is important in providing a formal analysis to assess to what degree the Lower American River temperature can be controlled with a curtain.

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?
   Yes, the study is justified and explains that modeling is needed as the first step in developing an effective temperature control 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?
   Yes, the general approach is good and uses state-of-the-art numerical models to understand the performance of the screens. The modeling is identified in three stages 1. Lake Natoma model, 2. Folsom Reservoir model 3. Lower American River model. This information will add to the knowledge base of the river's hydraulic the thermal dynamics.
   The information will be useful to determine if a temperature curtain structure will be effective.

   However, missing from the proposal is any analysis of how the temperature will directly impact fish. This question was consistently noted by the initial reviewers: how will the project impact fish. A decision on the value of the temperature curtain is incomplete unless the analysis describes the exposure of fish at various life stages. The analysis should include fish life history information and quantify exposure at each life stage in terms of minimum and maximum temperatures and total degree days affected by the curtain and response of the fish.

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 modeling project will determine the feasibility of the temperature curtain. The modeling techniques are sufficient for the project to quantitatively define the impacts on temperature. However, the project needs to link fish exposure into the modeling effort. In this respect the project is under scale. The fish work needs to be included. However, it appears the three year effort to develop and calibrate the temperature model is over scaled and the work could be done in two years. I suggest the fish work be included and replace the third year of effort with its 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 should include fish including minimum and maximum temperatures degree days, and expected ranges of fish impacts as determined by historical information. Since fish survival spawning time, incubation times and emergence sized can be defined in terms of temperature the performance measures need to include these fish measures.

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 products are the numerical model of temperature and this is critical to determine if a curtain should be build for the system. However, again fish impacts need to be included as a project.

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 water forum has received $250 K and developed a water management plan that is now implemented. This $466 K modeling effort is larger and the $ 2 million follow up construction is larger still. The group does appear to have experience in both physical and numerical modeling in water systems. The infrastructure exists.

   However, the group will need to bring on a quantitative fisheries ecologist for the necessary fisheries component.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?
   The costs are reasonable in particular if the hydraulic work is compressed into two years and the fish analysis is added within the scope of the existing budget.

Miscellaneous comments:

This is valuable project as proposed and addresses some of the original criticisms in the first round of the proposal. This work should be of great value in determining whether or not to go ahead with a temperature curtain. If this is of critical importance to CALFED then the project is worth funding as it stands. However, the initial reviews stressed the need to include a fish aspect which this proposal did not. If the fish component is deemed critical to CALFED staff I imagine it could be included in the existing project and probably within the existing budget.

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 was rated good because it lacks the fisheries component. Otherwise I would rate it excellent.
- Good X	
- Poor	

CALFED Ecosystem Restoration Program
External Review:

Title: *Lower American River Temperature Reduction Modelling Project*

Review:

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

The goals and objectives of this proposal are clearly stated. The central hypotheses (that temperature control can be attained via installation of temperature control curtains in Lake Natoma, by removal of a debris wall, by channel modification, and by modification of power plant operations) are stated but details for testing of these hypotheses is lacking.

2. **Justification:** 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 project is justified on the grounds that temperature reductions at critical times will enhance salmonid production in the Lower American River (LAR). Limited fisheries information and evidence of temperature reduction in other (deeper) systems is given to support the contention. The strongest point of justification is that the modelling team will examine uncertainties in the temperature control actions.

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

There is little information on the LAR/Natoma/Folsom system (morphometry, climate, streamflow) or on the proposed modifications (thermal curtains, channel modification, power plant operations) to allow evaluation. There is no real reason why the CE-QUAL-W2 model was selected, other than the staff at Water Forum appear to have a good deal of experience with this model. The project is not likely to generate truly novel information, but the approach is perhaps the only path available if temperature reductions are critical. Figure 1 does indicate, however, that the modelling effort will be integrated with other operational components of the project.

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?

Again, little information is given regarding the details of the proposed modifications. Of course, as this is a modelling approach it is possible to explore the magnitude of modifications that will be required to obtain significant results. How robust are the proposed measures in the potential wake of climate change? That is, will the results achieved soon be overcome by increased stream temperatures?

5. **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 advocates sensitivity simulations as a performance measure. An additional (and appropriate) performance measure is the degree to which the model is able to capture current conditions. This will require a field data set that is capable of both setting boundary conditions and providing diagnostic comparison. Details of the proposed field program are not given.

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 proposal advances the idea that the modelling Project will result in an Operational Model that will allow optimal engineering design and flow (power) operation. Have other players (engineering companies, the local Power Company) agreed to use such results?

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 Water Forum would appear to have experiences and competent modelers. The literature cited, however, is almost exclusively in the 'gray' category. I am somewhat concerned that the modelling team is somewhat limited in their interaction with the broader limnological community. There is no evidence in the proposal of active participation in state-of-the-art researches (other that the Proceedings and Reports by Vermeyen). I also do not see evidence that the Water Forum Team is experienced in the observation and description of lake and reservoir systems. Suggestion: It might be useful for the Program to enlist one or two outside experts to evaluate progress and direction of both the field and modelling activities.

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

The proposed work appears to be expensive. I am not sure why so much time is required to develop and calibrate the CE-QUAL-W2 model for this system, especially as this is pubic domain software and the Water Forum staff has extensive experience with the model. Also, it is difficult to judge the benefits, as no information is given *viz* the system (e.g. streamflow, power generation, value of the fisheries resource) or the cost of the proposed construction of the curtains and channel modification.

SUMMARY RATING: Good