CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem

James E Cloern

Final Selection Panel Review

Proposal Title

#0084: CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem

Funding:

Fund in part
Amount: **$1,662,870**

The final Selection Panel concurred with its initial findings on this proposal. Due to the reduction in funds available for the Science Program's 2004 PSP, the Selection Panel recommended funding for this proposal be reduced by 10%. Should the California Bay–Delta Authority accept the Selection Panel's recommendation and approve the funding of this proposal, the applicant will be allowed to negotiate which tasks and associated costs will be reduced by 10% as part of the contracting process.

Public Comments

No public comments were received for this proposal.

Initial Selection Panel Review

Proposal Title

#0084: CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem

Funding:

Fund
Amount: **$1,842,870**

Initial Selection Panel (Primary) Review

Topic Areas

- Implications Of Future Change On Regional Hydrology, Water Operations, And Environmental Processes
- Water Management Models For Prediction, Optimization, And Strategic Assessments

Please describe the relevance and strategic importance of this proposal in the context of this PSP. How does the proposal address the topic areas identified above? What are the broader CALFED Goals this proposal may meet that are not accounted for in these specific topic areas?

This proposal (and #0253, RAND) would greatly help in strategic planning. The scenario-generation and modeling components would help in DIP, OCAP, &DRERIP level work in the CF community -- work that is badly needed but lacking robust tools. While the proposal provides for extensive contact with implementing agancies, value would depend upon agency capabilities and resources for collaboration. Compared to #0253, this proposal has stronger experience in the system; but still, the eco-relationships needed for modeling would need input from the agencies. The CBDA has repeatedly asked for long-term strategic planning (especially for the Delta), and these proposals would address that need.

The budgets of proposals submitted in response to this PSP are larger, on average, than those

submitted to CALFED in previous years. The Science Program is committed to getting as much science per dollar as is reasonably possible. With this commitment in mind, can the proposed budget be streamlined? If so, please recommend and clearly justify a new budget total in the space provided.

I can't suggest a reasonable figure, but it might be possible to phase. Need to fund at a level that would ensure USGS funding contribution.

Evaluation Summary And Rating.

Provide a brief explanation of your summary rating and any additional comments you feel are pertinent.

Consider direct link to proposed DWR Delta Risk Management Strategy. If this proposed DRW $6,000,000 study goes forward, it could provide support for the technical work needed to build stronger coefficients of relationship for the models, and also provide realistic management scenarios for evaluation.

Selection Panel (Discussion) Review

fund this amount: $**1,842,870**
note:
fund

The Panel felt the proposed outcomes of this project are vitally important to CBDA's programmatic goals. This proposal will produce a synthetic model composed of several different models. The promised result will be a strategic planning tool for analyzing different management and climate change scenarios and their impact on the Delta. The promised "user-manual" for this tool was considered to be a potentially valuable end-product.

The Panel acknowledged the comments from earlier reviews that the output from lower-level models may not be strong enough to produce reliable results in a higher-level model. This project team has great familiarity with the lower-level models and the

Panel felt this increased the likelihood that the project's outputs would be useful to ecosystem managers and decision-makers. The sub-models are the best available and the project team is very familiar with their strengths and weaknesses.

The Panel recommends funding of this proposal contingent upon proponents' development of specific plans for integrating their efforts with the long-term strategic planning efforts of other CBDA partners. For example, DWR is planning a Delta Risk Management Strategy; if that project goes forward, it will generate physical scenarios for the Delta which could be the grist for this management tool, and in turn, potentially advise the DRMS. The Panel acknowledged that the proponents have a history of collaboration with other researchers and agencies; however, their current proposal does not provide a clear view of how they will collaborate with other agencies and integrate into ongoing and upcoming strategic modeling efforts. Specific plans to integrate this effort with others should be incorporated in the final workplan for this project, prior to funding.

Panel Ranking: Fund

Technical Synthesis Panel Review

Proposal Title

#0084: CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem

Final Panel Rating
superior

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

The investigators propose to develop an ambitious ecological simulation model to predict future states of the Delta ecosystem under scenarios of climate change. The proposal requests $1.8M, out of a total of $3.5M with the balance mostly supported by USGS salary to senior personnel. Funds are requested largely for post-doc positions. The proposed project is very ambitious, linking models of climate, watershed hydrology, Bay-Delta hydrodynamics, sediments and geomorphology, and water quality. The investigators intend to work with CBDA agencies and stakeholders in developing strategic plans based on model forecasts. Such a close interaction is essential for the responsible interpretation and application of simulations from such a large, complex model. The proposal is exceptionally well written. The objectives and relevance are very nicely stated. The very large amount of material needed to explain the different submodels and their interaction is well explained. The proposal received two enthusiastic and nearly unqualified ratings of EXCELLENT: "Well thought out with sufficient resources to achieve the project goals" and "The applicants should be applauded (and hopefully funded) for their vision and insight." "This work would not be possible five years ago. It is possible now, and I recommend proceeding full steam

ahead with full-scale implementation. This is a very exciting project." The third review gave a lower rating of GOOD, primarily because this reviewer believed that credible simulations require a more thorough demonstration of the model's ability to predict the past. This reviewer states that the climate model is deficient in its rendition of hydroclimatic variability and thus unable to reliably drive the downstream and remaining models. This reviewer suggests a "pilot-phase analysis that demonstrates the potential of the advocated strategy and models in delivering useful information; specially, given the size of the requested resources." Thus, the conclusion is that the combined models are not quite ready to provide detailed answers. A rating of SUPERIOR is based on the fact that the model team is experienced and has evidently thought through model connections and their uncertainty with some care. The concerns raised by the one reviewer are likely to be addressed during the course of the project.

Additional Comments:

The investigators propose to develop an ambitious ecological simulation model to predict future states of the Delta ecosystem under scenarios of climate change. The proposal requests $1.8M, out of a total of $3.5M with the balance mostly supported by USGS salary to senior personnel. Funds are requested largely for post-doc positions. The proposed project is very ambitious, linking models of climate, watershed hydrology, Bay-Delta hydrodynamics, sediments and geomorphology, and water quality. The investigators intend to work with CBDA agencies and stakeholders in developing strategic plans based on model forecasts. Such a close interaction is essential for the responsible interpretation and application of simulations from such a large, complex model. The proposal is exceptionally well written. The objectives and relevance are very nicely stated. The very large amount of material needed to explain the different submodels and their interaction is well explained. The proposal received two enthusiastic and nearly unqualified ratings of EXCELLENT: "Well thought out with sufficient

resources to achieve the project goals" and "The applicants should be applauded (and hopefully funded) for their vision and insight." "This work would not be possible five years ago. It is possible now, and I recommend proceeding full steam ahead with full-scale implementation. This is a very exciting project." The third review gave a lower rating of GOOD, primarily because this reviewer believed that credible simulations require a more thorough demonstration of the model's ability to predict the past. This reviewer states that the climate model is deficient in its rendition of hydroclimatic variability and thus unable to reliably drive the downstream and remaining models. This reviewer suggests a "pilot-phase analysis that demonstrates the potential of the advocated strategy and models in delivering useful information; specially, given the size of the requested resources." Thus, the conclusion is that the combined models are not quite ready to provide detailed answers. A rating of SUPERIOR is based on the fact that the model team is experienced and has evidently thought through model connections and their uncertainty with some care. The concerns raised by the one reviewer are likely to be addressed during the course of the project.

Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

This proposal proposes an important and ambitious ecological simulation model. Its success hinges on a very interesting question regarding how to link multiple models together and make them operationally productive. The proposal lays out a good plan for working with Calfed staff and stakeholders. The proposal is exceptionally well written and the investigators are highly qualified. The investigators have a very strong record of producing results from previous funding. Concerns exist because multiple models may be difficult to link. Major issues with application of such complex models concern validation and effectively incorporating uncertainty into the evaluation of the model results. Discussion is needed on how to use models in decision making. The investigators must work on specific validation cases that are definitive and bring the

role of uncertainty closer to the surface. Budget may be high.

Rating is Superior

Technical Review #1

proposal title: CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	The goals, objectives, and hypotheses are clear and consistent. The idea of assessing the impacts to the Delta ecosystem from climatic change is very timely and important. The goals are very ambitious due to the complexity of the problem, but it appears that the applicant has assembled a team of researchers with the skills needed to achieve these goals.
Rating	excellent

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?

Comments	The study is justified as it relates to the existing knowledge base. The conceptual model is expansive (and expensive) and provides a good underlying basis for the project. The ability to quantify all of the links between the different components of the conceptual model may be difficult.
Rating	very good

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? 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?

Comments	**The approach is appropriate for meeting the project's objectives. It is feasible, but is dependent on a high degree of coordination between disciplines. Due to the size and complexity of the project the results should add to the knowledge base and general new information that will be of use to decision makers at both a state and federal level.**
Rating	**very good**

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 and within the grasp of authors?

Comments	**The approach appears to be technically feasible and should have a high likelihood of success. The scale of the project is ambitious and will require a large amount of land use data, which may be difficult to assimilate into the modeling work.**
Rating	**very good**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	**Monitoring does not appear to be a major component of this project.**
Rating	**good**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	The products of this project will help to identify the ecological impacts of climatic change on the Delta system so that the state and the federal agencies can modify and plan their long-term activities and programs to successfully deal with these impacts.
Rating	excellent

Additional Comments

Comments	None.

Capabilities

What is the track record of authors in terms of past performance? 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?

Comments	I am not personally familar with the past performance of the authors, however their list of previous related projects looks to be very comprehensive. This gives every indication that the project team is qualified to efficiently implement the project. As much of the work will be done out of the USGS Menlo Park office it appears that they have the infrastructure and necessary support to accomplish the project goals.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	The budget of $3.48M appears to be reasonable for the project and adequate for the work proposed. The use of postdoctoral associates will increase the actual number of labor hours available to the project.
Rating	excellent

Overall

Provide a brief explanation of your summary rating.

Comments	Overall this project appears to be well thoughtout with sufficient resources to achieve the project goals.
Rating	excellent

Technical Review #2

proposal title: CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**The goals objectives and hypotheses of this study are stated very clearly.** **The thrust of this proposal is timely and extremely important. There has been a significant amount of work on the potential impacts of climate change on water resources, but I have seen no attempts to examine impacts in such a coordinated and integrated framework.**
Rating	**excellent**

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?

Comments	**There is a large amount of previous work, much of it done my the applicants, that justifies the proposed study. The conceptual model is clearly stated.** **This work would not be possible five years ago. It is possible now, and I recommend proceeding full steam ahead with full−scale implementation. This is a very exciting project.**
Rating	

	excellent

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? 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?

Comments	The project is very well designed. The applicants have clearly put a significant amount of thought into the project, and must have met as a group on several occassions to submit such a well-coordinated proposal. The project is certainly feasible. Each of the individual work elements will add to the base of knowledge. The main appeal of this project is it interdisciplinary character. The applicants have a very strong track record in interdisciplinary research, and I have no doubt that they can work together effectively to produce an integrated assessment that is of use to decision makers. The results of this study will be groundbreaking and will likely help inform the design and implementation of other integrated modeling efforts.
Rating	excellent

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 and within the grasp of authors?

Comments	Although I am most familiar with the climate and hydrology aspects of this work, all work elements appear to be technically feasible. The applicants have

	a strong track record and the likelihood of success is very high. Project management is a key consideration in an integrated proposal such as this one. Many of the work elements are inter−dependent, and some work elements may be delayed if one group does not complete their work in a timely manner. Nevertheless, I think the project will be very successful. The lead scientist (Cloern) is senior (PhD 1976), and likely has the stature to keep the work progressing forward. The applicants have a long history of working together effectively, and evident by the large number of co−authored publications. Finally the proposal itself is very well organized and integrated. I have a great deal of confidence that the project will proceed smoothly.
Rating	excellent

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	
Rating	not applicable

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	The main product of this proposal is an assessment of future changes in the hydrology and ecology of the Bay−Delta system. This product will be of immense value to CALFED agencies.
Rating	

	excellent

Additional Comments

Comments

Capabilities

What is the track record of authors in terms of past performance? 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?

Comments	As noted above, the applicants have a very strong track record in integrated research. I have no doubt that they can effectively complete the proposed project.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	The budget is quite reasonable for such a large project. Note that there is a 47% cost share with USGS.
Rating	excellent

Overall

Provide a brief explanation of your summary rating.

Comments	The proposed project seeks to provide an integrated assessment of potential hydrological and ecological changes in the Bay–Delta system. It is a very ambitious undertaking, and is only possible because of the previous research done by the applicants. The applicants have a strong track record in

	interdisciplinary research, and I am very confident this project will be successful. The applicants should be applauded (and hopefully funded) for their vision and insight.
Rating	excellent

Technical Review #3

proposal title: CASCaDE: Computational Assessments of Scenarios of Change for the Delta Ecosystem

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	The proposal seeks to develop a model−based, long−term ecological forecasting system for the San Francisco Bay−Delta−River−Watershed system; as the system evolves in response to both external (global warming, land−use change) and internally (habitat change) generated perturbations. Communication of findings (scenarios) to resource manangers is also an important goal.
Rating	excellent

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?

Comments	Yes and No. The study is well designed: A cascading suite of models will carry the large−scale climate influence downstream; into the bay, delta, and habitat models. The component models are, perhaps, reasonable; the climate models, about which this reviewer knows best, are state−of−the−art. But is that good enough? Can these model simulate

	hydroclimate variability encountered in the 20th century? If not, what will be the credibility of the obtained projections? Shouldn't there be a pilot-phase effort, first, that ascertains the climate and downstream models' potential in simulating observed climate and ecosystem variability over the past 50 years; to the extent, permitted by observational data sets. REALISTIC projections of 21st century ecological conditions will surely require a suite of interactive bay, delta, and habitat models; with all the attendant complexities. But projections will be credible only if the models are realistic; an issue not adequately addressed in the proposal. I would be somewhat reluctant to support full-scale implementation at this point. A pilot phase demonstration is warranted, specially, in view of the million-plus dollar price tag. The PIs know well that probability-multiplication is at work here; the probability of accurately forecasting a future habitat state is thus quite small (less than 50%) even if the component models produced accurate projections 80% of the time.
Rating	good

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? 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?

Comments	The approach is well designed but the obtained findings will likely be of limited use; since it is unclear if the component models can generate realistic variability in present-day climate conditions. I know that the climate model is deficient in its rendition of hydroclimate variability, which drives the

	downstream models. The PIs are surely aware of such deficiencies, but apparently, not concerned enough to recognize and address the consequences in the proposal. The proposal addresses very relevant questions, but that by itself, does not justify undertaking the study since the tools (models) are not quite ready to provide detailed answers. Exercising models can be quite helpful, but in a context that also includes model development activities; not the case, here.
Rating	**good**

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 and within the grasp of authors?

Comments	The approach is technically feasible, but the quality of outcome is uncertain. This is in no way a reflection on the investigative team, which is first−rate. All the lead PIs are competent and productive.
Rating	**good**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	Not applicable
Rating	**good**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the

project?

Comments	First question: Perhaps; for reasons stated above.
Rating	good

Additional Comments

Comments	

Capabilities

What is the track record of authors in terms of past performance? 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?

Comments	Very good
Rating	very good

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	The budget is quite significant, but perhaps justifiable. It would be less of a concern if the models were proven; through successful simulations of 20th century climate variability.
Rating	good

Overall

Provide a brief explanation of your summary rating.

Comments	The PIs have targeted challenging regional climate and ecosystem change issues, which are critial for societal sustenance. The PIs are competent, first-rate researchers who will use state-of-the-art models to seek answers. There is however an obligation to

	conduct pilot-phase analysis that demonstrates the potential of the advocated strategy and models in delivering useful information; specially, given the size of the requested resources.
Rating	**good**