Proposal Reviews

#186: Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries

University of California, Berkeley

Initial Selection Panel Review	
Research and Restoration Technical Panel Review	
Delta Regional Review	
San Joaquin Regional Review	
External Scientific Review	#1 #2 #3
Environmental Compliance	
Budget	

Initial Selection Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Initial Selection Panel Review

Proposal Number: 186

Applicant Organization: University of California, Berkeley

Proposal Title: Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries

Please provide an overall evaluation rating.

Explanation of Recommendation Categories: Fund

- **As Is** (a proposal recommended for funding as proposed)
- **In Part** (a proposal for which partial funding is recommended for selected project phases or components)
- **With Conditions** (a proposal for which funds are recommended if the applicant contractually agrees to meet the specified conditions)

Consider as Directed Action in Annual Workplan (a proposal addressing a high priority action that requires some revision followed by additional review prior to being recommended for funding)
Not Recommended (a proposal not currently recommended for funding-after revision may be considered in the future)

Note on "Amount":

For proposals recommended as Fund As Is, Fund In Part or Fund With Conditions, the dollar amount is the amount recommended by the Selection Panel.

For proposals recommended as Consider as Directed Action in Annual Workplan, the dollar amount is the amount requested by the applicant(s).

Fund	
As Is	**-**
In Part	**-**
With Conditions	**-**
Consider as Directed Action	**-**
Not Recommended	**X**

Amount: **$0**

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

None.

Provide a brief explanation of your rating:

The selection panel agrees with other reviewers that the applicant needs to show how this project will assist agencies in water planning. A proposal that shows partnering with agencies might be favorably considered in future funding cycles.

Research and Restoration Technical Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Research and Restoration Technical Panel Review Form

Proposal Number: 186

Applicant Organization: University of California, Berkeley

Proposal Title: Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries

Review:

Please provide an overall evaluation summary rating:

Superior: outstanding in all respects;
Above Average: Quality proposal, medium or high regional value, and no significant administrative concerns;
Adequate: No serious deficiencies, no significant regional impediments, and no significant administrative concerns;
Not Recommended: Serious deficiencies, significant regional impediments or significant administrative concerns.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Superior	**This is an interesting proposal that will provide useful knowledge, but it is unclear if the PIs will succeed in their ultimate objective of developing an integrated modeling system that is used by decision makers. This proposal would be more worthwhile if the PIs could articulate a clear plan for partnering with water management agencies. Obviously, if the enhanced decision support system is not closely tied to the needs of water resource agencies, they are unlikely to use it.** **The panel also notes that Georgakakos et al. have submitted a proposal to CalFed (85 INFORM) to optimize water management through improved use of climate forecasts [Georgakakos et al. are focusing on the four reservoir system of Folsom, Oroville, Shasta, and Trinitythree of which are to be examined in the water supply forecasting component of this proposal]. If both the Georgakakos and this proposal are funded, the PIs MUST develop a plan for very close coordination between these two efforts.**
-Above average	
XAdequate	
-Not recommended	

1. **Goals and Justification.** Does the proposal present a clear statement of goals, objectives and hypotheses? Does the proposal present a clear justification and conceptual model for the project?

   The goals are well presented, and the justification for the project is clear: there is a need for a decision support system, which adequately accounts for anticipated future climate variability, that can assist state and federal agencies in their planning efforts.

2. **Likelihood of Success (Approach, Feasibility, Capabilities and Performance Measures).** Is the project likely to succeed based on the approach, feasibility and project team capabilities? Are the proposed performance measures adequate for measuring the project's success?

   The success of this project depends on the extent to which the decision support system (DSS) is used by decision makers. The panel has confidence in the project because the core of the DSS is being developed by the water management agencies who will ultimately use the system. However, the panel expresses concern that (1) there was no clear plan for partnering with water management agencies to identify (and work on) ways the DSS system will be used when the additional components have been included, or even a plan to educate water management agencies on the use of the enhanced system, (2) the water management agencies may not have the computing resources that are necessary to run (or use output from) the atmospheric modeling components of the system, and (3) by only examining the San Joaquin, the system will have limited use for planning purposes. For these reasons, the project may only have a moderate probability of success.

3. **Outcomes and Products.** Will the project advance the state of scientific knowledge in general and/or make an important contribution to the state of knowledge of the Bay-Delta Watershed? For restoration proposals, is the project likely to contribute to ecosystem restoration or species recoveries in a significant way? Will the project produce products useful to decision-makers and scientists?

   The project will certainly advance the state of scientific knowledge. The ultimate product (the modeling system) may not be useful to decision-makers for the reasons outlined in Section 2.

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

   The budget is reasonable to complete the tasks listed in the proposal. However, the budget may need to be increased to ensure the success of the project. More funds are required to include the Sacramento River in the modeling system, and more funds are required to enhance the plans for technology transfer.

5. **Regional Review.** How did the regional panel(s) rank the proposal (High, Medium, Low)? Did the regional panel(s) identify significant benefits (regional priorities, linkages with other activities, local involvement) or impediments (local constraints, conflicts with other activities, lack of local involvement) to this proposal? What were they?

   The proposal was rated "Medium" by both the San Joaquin and Delta regional reviews. The Delta regional review stated that the modeling system could be useful if it was technically sound. Their concern was that the usefulness or application of this model and its products does not appear to have been discussed with those who may utilize such a model.

6. **Administrative Review.** Were there significant concerns about the proposal with regard to the prior performance, environmental compliance and budget administrative reviews? What were they?

   Budget - no work schedule provided in the proposal.

Miscellaneous comments:

None.

Delta Regional Review:

Proposal Number: 186

Proposal Title: Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries

Overall Ranking: **-**Low **X**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

If this application is technically sound, it could be useful.

1. Is the project feasible based on local constraints?

   -Yes **X**No

   How?

   Some potential limitations: CALSIM calibration needs to be completed in order to predict available water supply. Status of DWR-DSM2 development unknown.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   #8 Understand the implications for Delta water issues of climate and hydrologic variability This may be the beginning of a product may be eventually be relatively useful in anticipating climate trends which, in combination with many other tools, could help in planning future water operations. However, in terms of management decisions, how do we determine the reliability of a model that has such a large predictive component?

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   -Yes **X**No

   How?

   It consists of merging of a series of existing models utilizing statistical downscaling techniques, implying a close working relationship with the developers of current models of the Central Valley/Delta system. However, the usefulness or application of this model and its products does not appear to have been discussed with those who may utilize such a tool. Consequently, there is concern about the applicability of the product.

4. Does the project adequately involve local people and institutions?

XYes **-**No

How?

The project proposes utilizing existing models. It utilizes interviews of State and Federal resources managers and operators to discuss current models however there was no discussions of interviews with potential users of the model products.

Other Comments:

x

San Joaquin Regional Review:

Proposal Number: 186

Applicant Organization: University of California, Berkeley

Proposal Title: Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries

Overall Ranking: **-**Low **X**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

Needs more discussion of relationships with other projects. Proposal does not explain linkages or how this project will ensure restoration action implementation success per the PSP priority.

1. Is the project feasible based on local constraints?

   -Yes **X**No

   How?

   The proposal claims that the project is feasible based on previous research that has occurred over the past two years under an EPA-STAR grant. Howver, there is no information provided on that research and how it relates to this project.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   This proposal was noted to be related to the Bay-Delta Multi-regional priority No.4 relative to the sustainability of restoration actions under future climatic conditions. However, it is not clear how this project will help enhance such sustainability.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   XYes **-**No

   How?

   Linked to a new DWR requirement to address climate issues in Bulletin 160. The proposal states it would enhance two other existing DWR modeling tools, but doesnt' say what they are.

4. Does the project adequately involve local people and institutions?

XYes **-**No

How?

The project involves local agency and scientific representatives (DWR and Lawrence Livermore Laboratories). No local landowners or stakeholders are involved however.

Other Comments:

External Scientific: #1

Research and Restoration External Scientific Review Form

Proposal Number: **186**

Applicant Organization: **University of California, Berkeley**

Proposal Title: **Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None.

Review:

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	**I like several aspects of the proposal, especially the PIs plans to account for the large variability in different projections of future climate. My main concern is that the PIs are developing a very complex modeling system that will be difficult for decision-makers to use. Nevertheless, the knowledge gained from this project will be quite useful, and finding is justified on this aspect alone.**
XGood	
-Poor	

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

   The objectives of this proposal are clearly stated and justified. The PIs plan to "assess the impacts of climate change on water quality and habitat resources in the San Joajuin basin and to develop a decision support system that will assist state and federal agencies mitigation planning efforts." The concept has obvious importance in that it provides a mechanism to assess the impacts of management actions under different climate conditions.

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?

The approach builds upon the existing body of knowledge. The PIs provide a clear conceptual model that nicely accounts for the uncertainty in projections of future climate. I have a few concerns (outlined in the next section), but I do think the project is justified.

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?

   I'm concerned with several aspects of the approach.

   1. Use of the modeling system by decision makers may be problematic because of the large data storage and computing requirements that are needed to run Regional Climate Models (RCMs) and store output from RCMs and General Circulation Models (GCMs). Do the water management agencies in the region have this capability?

   2. It appears that the PIs are planning on just handing off the model without educating water management agencies on its use. If this is true, then the model will receive little use. The aspect of technology transfer should not be under-estimated.

   3. I am also concerned that there appears to be no strong plan for model validation. I'm sure the PIs plan to do this, but I'd have more confidence in the proposal if they outlined which data sources they plan to use, and if data is lacking to validate different components of their modeling system.

   I do like the approach of using output from different GCMs, using different downscaling procedures (statistical and dynamical), and using a suite of different hydrologic models. This will nicely characterize the range of hydro-climate variability in future climate projections. A fairly minor point, but the PIs do not present a plan to compare the range of climate variability in projections of future climate to the range of climate variability in the instrumental record and paleo-climate reconstructions. For example, is the recurrence interval of severe, sustained drought in future climate projections greater or lesser than it is in the paleo-record? If the answer is less, do we have reason to believe that increased greenhouse gasses will force the climate system into a different mode of variability such that damaging droughts are less frequent (probably not). The instrumental and paleo-records shed useful insights on the character of future climate, and thus probably should be included in this proposal to more fully characterize the range of anticipated future climate variability.

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 approach is fully documented. I am fairly sure that the PIs will be successful in developing the modeling system. However, the PIs may be unsuccessful in meeting their ultimate objective of water management agencies USING the modeling system (see the previous section for reasons why).

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?

Permormance in this project is measured both in terms of information output information output in the form of peer-reviewed publications (Section E, page 18) and in terms of the degree of technology transfer to water management agencies (Section A.4.5, page 14) . I hope that the "degree of technology transfer" is measured in terms of the degree that the modeling system is used, and not whether or not water management agencies have access to the system. This performance measure may be difficult to evaluate during the course of this project, but should be used to the extent possible.

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 knowledge gained from this project will be extremely valuable. The modeling system will be valuable to research scientists, but the value to decision makers really depends on their computing capabilities.

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?

   This is an excellent team of researchers. They should have little problem in effectively developing this integrated modeling system, and gaining new knowledge on climate change impacts.

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

   The budget is reasonable. If the PIs hope that decision-makers will use their modeling system, then they need to increase their budget and include a plan for technology transfer that includes educating decision makers on the use of the modeling system.

Miscellaneous comments:

None.

External Scientific: #2

Research and Restoration External Scientific Review Form

Proposal Number: **186**

Applicant Organization: **University of California, Berkeley**

Proposal Title: **Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

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 work is quite a ways outside of any expertise that I have, but it appears to address a serious issue, and I saw no obvious flaws in the approach. Other reviewers feel that this group has a high chance to be successful, leading me to rank it on the high end of the 'good' scale. Absent superior competing proposals, it appears to warrant some level of funding.**
XGood	
-Poor	

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

   The proposal clearly states its goals and objectives. Certainly the issue of predicting scenarios of water quantity and quality in the face of climate change is crucial to management of water supplies in the CALFED region.

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 need to conduct long range estimations of impacts of climate change on the water budgets within the region is clearly justified, albeit a daunting task.

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?

   This is tough to evaluate without more expertise in modeling and simulations. Definitely the results will add to the knowledge base, but just how 'accessible' the results will be to decision-makers is less certain.

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 overall project and approach seems well documented, and feasible.

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 are adequate.

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 will be useful to other researchers, and the range of scenarios to be generated should be of great interest to long range planners trying to accommodate growth and environmental quality.

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 proponents appear to be very highly qualified in this field.

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

   The budget is reasonable, as far as I could tell.

Miscellaneous comments:

External Scientific: #3

Research and Restoration External Scientific Review Form

Proposal Number: **186**

Applicant Organization: **University of California, Berkeley**

Proposal Title: **Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

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	**The success of this project hinges on the ability of the applicants to effectively link the components that the state, in part, is developing. That uncertainty is the only significant deficiency in this proposal. Ironically, though, it is that reliance on other state-developed components that gives the DSS proposed by the applicants any real chance to be embraced by the water management agencies. Were the applicants from out-of-state or not as well connected as these, the proposal would likewise be given a "poor" rating. Given the difficulty of the problem at hand, the skill and talents of these applicants give this project a better-than-average probability of success - a probability of success that very few applicants could hope to achieve.** **Concerns about a San Joaquin-only DSS have been addressed above, and were considered in assessing a "good" rating, as well.**
XGood	
-Poor	

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

The goals, objectives, and hypotheses are clearly stated and consistent throughout the proposal.

Investigation of the impacts of climate change on water resources in and around the San Joaquin River is very important to the future of water management in California.

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?

   Similar work has and is being done, at various degrees of resolution, both in the Central Valley (by the University of Washington, Pacific Northwest National Laboratory, Scripps, and UC San Diego) and in other parts of the country (e.g., Columbia River Basin, Portland region, New Jersey, and Georgia). What is known and what will be known in the near future justify what is proposed here.

   Conceptual models, most of which are in various stages of development by assorted California agencies, are generally explained well. What is not explained to a satisfactory level of detail is that which makes this project special: the development of the Data Integration Architecture (MMS-OUI), which comprises the backbone of the DSS. If the MMS-OUI development is not done well, the core objectives of the proposal will not be satisfied.

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?

   For a challenge such as the researchers have proposed, the approach is as well-designed as it could be to meet the project objectives.

   The Central Valley System is so complicated and prone to severe operating policy shifts that the success of this project would undoubtedly assist in the development of means by which to plan for uncertain water resources futures. As such, the methodology used and information generated will be both novel and very likely useful to researchers and decision-makers. However, given that performance measures and other metrics are not discussed in the proposal, it is difficult to say exactly how useful the information will be to decision-makers.

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 approach is feasible, insomuch as the various components that are currently in development (by other CA agencies) and required for the proposed DSS, are completed in a timely fashion. Should these components be incomplete or otherwise lacking in efficacy, I can't see how this proposed project could be successfully completed. For the DSS to be a truly integrated-resources model (IRP), with the stated intent that it be used for policy-planning, the components that comprise the IRP must be excellent. In addition, the MMS-OUI, which links all of the models, must be flexible enough to allow for ever-changing inputs.

   Probability of success = 0.60, given that a "successful" project will result in a product that is actively used by decision-makers IN PLACE OF the models that it intends to incorporate (e.g., CALSIM II, APSIDE, etc.), rather than alongside them.

It is understandable that the researchers would want to start with the San Joaquin River Basin, as its economic importance to the State, vis-a-vis agriculture, is significant. However, the Sacramento River Basin has inputs into the Sacramento-San Joaquin Delta that are at least as important as those from the San Joaquin Basin. In addition, the Sacramento River Basin is responsible for a significant percentage of the State's hydropower production. Since the GCMs will be downscaled to RCMs for the entire region, and since the proposed budget of $1M is large, one can't help but wonder why the DSS will not be developed to include the northern Central Valley, as well? The reality is that decision-makers will not truly embrace a tool that only characterizes half of the CV system. (In fact, this was a key motivation behind the DWR and Burea's joint development of CALSIM II, which replaced single-agency models that, in essence, independently characterized the northern (DWRSIM) and southern (SANJASM) portions of the Central Valley.)

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?

   The project does not include any performance measures, saying that it depends on the degree to which the water management agencies to implement the integrated DSS that is developed.

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 project does not include any expected products or outcomes, saying that it depends on the degree to which the water management agencies to implement the integrated DSS that is developed.

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 applicants are very well known in water resources management and hydrology circles, and are regarded as competent and productive researchers.

   One of the key challenges to this product is the coordination of all of the information and components available in the State. To that end, only a "connected" group of highly regarded in-State project participants could have any chance of successfully completing this project. There is not doubt in my mind that the combined resources of Dracup, Quinn (both UC Berkeley), and Miller (Lawrence Livermore National Labs) are sufficient to meet the infrastructural needs of the project.

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

   The budget is reasonable and adequate.

   Again, I would reiterate the proposition that the Sacramento River Basin be included (at a nominal increase in proposed budget) in the DSS proposed for development. The stated objective of this project is to develop a tool used in policy-planning. That objective could be best achieved if the entire Central Valley System (Sacramento and San Joaquin River Basins and the Sacramento-San Joaquin Delta) is included in the DSS. If it is not included in this project (at a

nominal cost) and this San Joaquin-only project is funded, it is likely that a project of a proposed budget similar to this one, but for the Sacramento River Basin, is looming in the very near future.

Miscellaneous comments:

A minor concern that should be addressed is in regards to the timeline of tasks to be completed during the proposed 3-year project period (roughly laid out in the Budget Summary). As described in the Budget Summary, each of the 6 tasks to be completed in the project will be repeated each year with precisely the same allocation of labor hours. A more realistic timeline would have, for example, tasks A and B worked on in year 1; tasks B, C, and D in year 2; and E and F in year 3. Certainly, there is an iterative process at work here, but, for a $1M 3-year project, a more realistic timeline is necessary, both to anticipate the timing of needs and the scheduling of outcomes.

Environmental Compliance:

Proposal Number: 186

Applicant Organization: University of California, Berkeley

Proposal Title: Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries

1. Are the legal or regulatory issues that affect the proposal identified adequately in the proposal?

   XYes **-**No

   If no, please explain:

2. Does the project's timeline and budget reflect adequate planning to address legal and regulatory issues that affect the proposal?

   XYes **-**No

   If no, please explain:

3. Do the legal and regulatory issues that affect the proposal significantly impair the project's feasibility?

   -Yes **X**No

   If yes, please explain:

Other Comments:

Budget:

Proposal Number: 186

Applicant Organization: University of California, Berkeley

Proposal Title: Adaptive Management of Climate Change Impacts on Water Quality and Environmental Resources of the San Joaquin River and its Major Tributaries

1. Does the proposal include a detailed budget for each year of requested support?

   XYes **-**No

   If no, please explain:

2. Does the proposal include a detailed budget for each task identified?

   -Yes **X**No

   If no, please explain:

   No Work Schedule provided in Proposal.

3. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs?

   XYes **-**No

   If no, please explain:

4. Are appropriate project management costs clearly identified?

   -Yes **X**No

   If no, please explain:

   No PM task. UCB supports this cost as a teaching/research campus.

5. Do the total funds requested (Form I, Question 17A) equal the combined total annual costs in the budget summary?

   XYes **-**No

   If no, please explain (for example, are costs to be reimbursed by cost share funds included in the budget summary).

   Federal funds.

6. Does the budget justification adequately explain major expenses?

   XYes **-**No

   If no, please explain:

7. Are there other budget issues that warrant consideration?

   -Yes **X**No

   If yes, please explain:

Other Comments: