An Isotopic Baseline Assessment Study of the South Yuba River Watershed

#0017

Technical Panel Review

Proposal Name: An Isotopic Baseline Assessment Study of the South Yuba River Watershed

Applicant Organization: California State University, Fresno

Principal Lead Investigator(s):
Ingraham, Neil
Suen, John

Amount Requested: $472,648

TSP Panel Summary of Findings:

In total, although a technically sound proposal, the work seems inadequate to support the needs of CALFED. While the science itself is certainly worthwhile in examining water sources within the particular watershed, the proposal has not made a clear connection to how it will provide management assistance to the Delta. Water from this watershed undergoes a great deal of change before getting to the Delta. Additionally, data sampling under 'event' conditions is not simple and the distance is going to make it even more difficult. Collecting the data proposed without also collecting water quality data would be a missed opportunity. Additional problems include lack of a demonstrated conceptual model; lack of coordination to ongoing work or an interdisciplinary approach; and lack of detail beyond the sampling regime.

Relevance to PSP Topic Areas:

Very Low

TSP Technical Rating:
Sufficient

TSP Funding Recommendation:
Do Not Fund

TSP Amount Recommended: $**0**

Technical Panel Review

Conditions:

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External Technical Review #1

Proposal Title: An Isotopic Baseline Assessment Study of the South Yuba River Watershed

Proposal Number: 0017

Proposal Applicant: California State University, Fresno

Purpose

Comments	**According to the executive summary, “The study will fill significant identified gaps in existing knowledge of the hydrology of the South Yuba River and the associated watershed. We plan to employ the use of light stable isotopes of hydrogen and oxygen found naturally occurring in water. Differences in the stable isotopic ratios of water result from small variations in the fluxes and temperatures in the hydrologic cycle, allowing determination of the origin and meteoric history of different waters. An understanding of the different sources, fluxes and meteoric history of water in the watershed may be used as a predictive tool such that future sampling schemes for dissolved minerals, organic substances and pollutants may be designed more economically." "In addition the proposed research will include three ancillary studies to 1) determining the hydrologic effects of presumed increased interception, 2) determining the source of water to sustaining pools, or refugia, and 3) determining the susceptibility of high elevation lakes to acid precipitation." The goals, objectives and hypotheses are stated and internally consistent. This study will improve understanding of the existing hydrology of the South Yuba River area that is being studied. The study will likely add to the base knowledge of the**

	river system being investigated. However, it is questionalble whether or not this project will generate novel information, methodolgy or approaches. The three ancillary studies will add useful information for understanding the hydrology of the area.
Rating	Sufficient

Background

Comments	With respect to the proposal's presenting a conceptual model, none is presented.
Rating	Inadequate

Approach

Comments	The approach is appropriate for meeting the limited objectives of the project? The project management tasks and administration of the project and are resources are adequate. The primary problem with the proposed project is that it is a stand alone project devoted to providing some information on the origin of water at selected times and selected locations for part of the South Yuba River. While the investigators assert that this information will be of value to other studies of water quality, the proposal fails to provide adequate information on how this link will be made. As such the results of this project are likely to be of limited value to the overall management of the South Yuba River water resources. The investigators plan to follow conventional approaches for dissemination of project results at conferences, publications in journal articles, etc.

	Are contributions to larger data management systems relevant and considered? Limited information is presented on how this project will contribute to a larger data managment system.
Rating	Inadequate

Feasibility

Comments	The proposed approach is somewhat documented and appears to be technically feasible. What is the likelihood of success? While the project will develop some information on selected aspects of part of the South Yuba River hydrology, it is questionable that it will contribute information that is needed as part of the development of a South Yuba River water resource/quality managment program. A stand-alone project on hydrology will not likely contribute significantly to the overall needed information. Is the scale of the project consistent with the objectives and within the grasp of authors? Yes to a limited extent.
Rating	Inadequate

Budget

Comments	There are a number of issues on the budget that are questionable. Why is there need for support of two senior-level investigators? What equipment will be purchased with the requested funds. Why is there need to pay the university to conduct the isotope analysis?
Rating	Inadequate

Relevance To CALFED

Comments	No information is provided in the proposal that discusses how the proposed project addresses CALFED priorities. The information developed from this

	project will likely be of limited value to CALFED resource managers.
Rating	Inadequate

Qualifications

Comments	The investigators appear to be qualified to undertake the use of stable isotope analysis to gain some inference on the origin of water in the samples analyzed. It is unclear that they are qualified to integrate this information into a resource management program.
Rating	Sufficient

Overall Evaluation Summary Rating

Comments	Overall, I do not recommend support of this proposed project as a stand-alone project solely devoted to selected aspects of part of the South Yuba River hydrology. To spend over $400,000 studying hydrology without concurrent measurment of appropriate quality parameters of the waters and other issues, will likley prove to be of limited value in developing the information needed to formulate a comprehensive management plan for the river. A project of this type should be integrated into a large, comprehensive study of the system.
Rating	Inadequate

External Technical Review #2

Proposal Title: An Isotopic Baseline Assessment Study of the South Yuba River Watershed

Proposal Number: 0017

Proposal Applicant: California State University, Fresno

Purpose

Comments	**The scientific purpose of the proposal is clearly stated in terms of overall goals and specific objectives. No formal hypotheses are provided, but the questions from which hypotheses may be gleaned are presented. I found that the scientific goals of the proposal were very interesting to me as a scientist. Although the proposal does not clarify what basic science advances it might contribute, it is clear that if they could really nail down the different sources of the water, then that would provide insights into the hydrological processes of water movement to the Yuba River. That is the centerpiece of the applied research proposal. With regard to the ancillary questions, the ones about refugia water and lake acidity were better posed than the one regarding interception. I have read many interception studies, and I would be very surprised if the average annual interception rate for this basin was more than 25%. Of course, that depends a lot on a variety of hydrological and ecological factors, of which they only name a few. Nevertheless, the underlying premise that interception represents a "loss" is problematic. This idea of "loss" stems from a time when all water was viewed as inherently belonging to humans and every drop that was left uncaptured was "lost". In this proposal downstream ecological functions are viewed as a desirable extension of societal interests, but what about the role of intercepted water in serving the ecology of the forest itself where the water is captured? I found the proposal unclear on the extent**

	of invasive species in this basin and unclear about the on-going forest management practices related to interception, so I was not convinced of the importance of this aspect of the proposal, even though i would find research on interception processes of interest as a basic scientist.
Rating	Above Average

Background

Comments	The majority of the proposal is devoted to the background, so I think it is clear about the underpinnings of what it wants to do. I think the proposal does not use a format in which the central feature is a conceptual model for the hydrological processes in the South Yuba watershed. You can glean out the conceptual model, but it isn't presented in a simple diagram. A lot of repetitive text related to the concepts is presented, leaving insufficient room for other important proposal components.
Rating	Above Average

Approach

Comments	The proposal does not provide a specific and clear experimental design. To me, this is a sign that the PIs have not invested the time yet to really figure out how to do their study. It is clear what kinds of measurements will be taken. The details of specific sampling sites are not provided. What is the interface with existing DWR snow courses, rain gages, and other manual and automated systems in that area? Most importantly, the proposal lacks any information on the part of the work between obtaining isotopic results from samples and dissemination of papers. How exactly will the data be analyzed? What numerical analyses will be used? What statistical test can be performed? What is the QA/QC procedure? What metrics will tell you whether your project is going according to plan?

	How will you address spatial and temporal scaling challenges? Approach is the weakest aspect of the proposal.
Rating	Inadequate

Feasibility

Comments	Although stated that graduate students will travel 750 miles (~ 6 hours) from Fresno to Yuba once a month plus on an event-basis, I doubt the feasibility of this sampling strategy. Field equipment placed in the Sierra mountains fails on a regular basis. Many roads are inaccessible for months out of each year due to downed trees and heavy snows. In January 2006 we had one point when there was ~6" of rain in one day in the Yuba basin. Peak flow occurred over the Christmas and New Years holidays. You can't see that coming, and by the time you get up there, if the roads are even passable, it is too late. How will you address interception and throughfall of snow?
Rating	Sufficient

Budget

Comments	Without knowing the exact sampling locations, it is more difficult to assess the budget, but overall it seems fine.
Rating	Above Average

Relevance To CALFED

Comments	Another major concern I have about the proposal is that it doesn't address how it relates to CALFED's Science program. The only specific management issue it presents relates to contamination of water supply in a localized area. Other CALFED proposals I have reviewed in the past have clearly identified the PSP priorities they aim to address and then make sure to show the broader impacts of the potential findings. I did not see indications of other PSP priorities, such as use

	of existing information (e.g. DWR sites and CDEC), modeling, multiple disciplines, or broad synthesis.
Rating	Inadequate

Qualifications

Comments	The PI has strong track record associated with research performed at DRI. I think this person is capable of doing the project, but it seems like the proposal needs to be fleshed out more before it is ready. I encourage subsequent submission to the NSF hydrology program for funding if the proposal can be made to serve more basic science needs related to watershed water flux processes.
Rating	Above Average

Overall Evaluation Summary Rating

Comments	Overall, I found a kernel of interesting science in the proposal, but too much of the text was devoted to redundant background topics. The proposal was successful in presenting the potential value of isotopic analysis, but then fell short in presenting a clear experimental design for sampling in space and time. Almost no presentation was made of how isotopic data collected at individual locations would be used to construct a broader conceptual model and hydrologic budget related to the central scientific questions. Even if those questions were answered, no presentation is made as to how the work would be fed into the management process and provide broad impacts.
Rating	Sufficient

External Technical Review #3

Proposal Title: An Isotopic Baseline Assessment Study of the South Yuba River Watershed

Proposal Number: 0017

Proposal Applicant: California State University, Fresno

Purpose

Comments	**Goals, objectives, and hypotheses are not clearly stated. The project is novel in the sense that it uses proven methods applied to a new geographical area. The project will provide a different suite of information (as opposed to information from a more "standard" hydrological investigation) vis-a-vis streamflow generation and related processes in the Sierra Nevada. A full-scale implementation is justified, as the techniques employed - use of D and O-18 - are well-established.**
Rating	**Above Average**

Background

Comments	**The conceptual model is stated relatively clearly and provides a basis for the work. It is well-documented.**
Rating	**Above Average**

Approach

Comments	**The approach is adequately designed and can meet project objectives, insofar as they are stated. Division of tasks is established and the resources are adequate to accomplish the tasks. Project results will provide useful information. The information dissemination plan is routine and perfunctory - providing reports, making conference presentations, and preparing journal articles. Not much effort**

	was expended to develop something innovative. Contributions to larger data management systems are not discussed in detail.
Rating	Sufficient

Feasibility

Comments	The approach is documented and technically feasible with a good likelihood of success. The scale is consistent with the objectives and within the grasp of the authors. Neil Ingraham is well-known and well-respected in the field of environmental isotope hydrology and has done innovative work. John Suen is less well-known and not nearly as strong as N. Ingraham. Of his listed publications, all but one are abstracts and the one that is not an abstract is from the gray literature. But Ingraham can carry this work by himself.
Rating	Sufficient

Budget

Comments	Yes, it is clear what each aspect of the work will cost. The budget is reasonable.
Rating	Sufficient

Relevance To CALFED

Comments	My objection to this work is that the authors do not make much of an effort to relate this to CALFED's priorities and do not spend much time explaining how this relates to the CALFED mission and how it will be useful to CALFED resource managers. This is potentially good work, but does not seem especially relevant.
Rating	Inadequate

Qualifications

Comments	As stated above, Neil Ingraham has an excellent reputation in this particular field and can execute the work. John Suen's credentials are considerably weaker. The infrastructure and support do exist.
Rating	Above Average

Overall Evaluation Summary Rating

Comments	My "inadequate" rating is predicated mainly on the lack of project relevance to the CALFED mission. It may in fact be relevant, but the authors do not make a strong case – certainly not compared to the other proposals I reviewed.
Rating	Inadequate