

**California Bay-Delta Program 2002 ERP Directed Actions
Selection Panel Review**

Proposal Number: 130DA

Applicant Organization: San Francisco Estuary Institute

Proposal Title: *A Pilot Regional Monitoring Program for Mercury in Fish in the Bay-Delta Watershed*

Recommendation: Continue to consider as a directed action

Provide a brief explanation of your rating:

This proposed project would establish a pilot monitoring network for mercury (present mostly as methylmercury) in fish in the Bay-Delta watershed. A monitoring program is needed to assess spatio-temporal patterns in mercury contamination of fishery resources in the ecosystem, to examine the relation of such patterns to ecosystem restoration activities, and to provide information for risk assessment and risk communication related to human exposure to methylmercury.

This proposal received one negative and two favorable appraisals. Reviewer 1 expressed concern that the proposal was not well developed. Reviewer 3, who gave the proposal a summary rating of “excellent,” also expressed concerns about the lack of detail on certain aspects of the proposed project. The Selection Panel agrees with the overall summary comment of Reviewer 1 that “this proposal falls short of a coordinated effort to link with the other projects in the portfolio of CALFED Hg research.”

The Selection Panel considers monitoring of mercury in the Bay-Delta ecosystem to be essential. In addition, the Principal Investigators are considered to be knowledgeable, experienced, and capable of performing such work. The Panel, therefore, recommends the ERP continue to consider the project as a potential directed action, provided the applicants resubmit a revised proposal in early 2004.

The Selection Panel encourages the applicants to carefully consider the following guidance during revision of their proposal.

1. Focus on developing a truly integrated proposal with fewer objectives. The present version of the proposal contains elements of earlier versions submitted for funding to the Ecosystem Restoration Program. These elements have been combined into this single proposal without the desired level of integration among elements. The linkage between monitoring and education and outreach activities should also be strengthened.
2. The linkages to other pertinent activities in the CBDA Bay-Delta Program should be strengthened. In particular, linkages of proposed monitoring efforts to both (i) ecosystem restoration projects that could affect mercury cycling and methylmercury accumulation in

biota and (ii) other funded mercury investigations should be better defined.

3. The revised proposal should build more strongly on, and reference, the substantial body of information obtained on mercury in this and other ecosystems during the last 5 years. For example, the application of statistical analysis to relevant, recent data on mercury in sport fish and potential biosentinel species in this ecosystem should be greatly strengthened in developing a sampling framework for the proposed monitoring program. The applicants should consider including a statistician as a co-investigator on the proposed project.

The Panel questions, for example, whether annual monitoring of mercury in adult, long-lived species of sport fish is necessary and suggests that the applicants consider whether sampling of long-lived sport fish at less frequent intervals (e.g., every 3 years) would be sufficient. Statistical analysis of existing data should be useful for addressing this question.

4. The current proposal focuses strongly on monitoring of mercury in fish species that are expected to accumulate high concentrations of methylmercury. The revised proposal should also include analysis of fishes with low expected concentrations of methylmercury, so that guidance can be provided to the public concerning fish species that can be consumed to lower exposure to methylmercury while taking advantage of the health benefits of wild-caught fish in the diet.
5. The Panel advises that the development of an effective monitoring and public outreach program should focus first on designing a defensible program that is scientifically defensible, statistically sound, and meets the identified needs of end users.

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CALFED Ecosystem Restoration Program External Review Form

Proposal Title: "Pilot Regional Monitoring Program for Mercury in Fish in the Bay-Delta Watershed"

Review:

1. **Goals.** Are the project's goals and objectives clearly stated and internally consistent? What ecosystem restoration benefits will it provide?

The overall goals of this project are generally stated. The project attempts to combine a phased monitoring plan to assess fish contamination in the Delta region. It is followed by a plan for outreach and education on the extent and potential health risks associated with the consumption of Hg-contaminated fish. These particular goals are clearly stated and the importance of the implementation of a monitoring plan is warranted.

This project does not directly address a benefit of restoration, although it is expected that management of Hg contaminated regions in the Delta may result in decreases in fish Hg content. That, in turn will lower the potential risks to the populations that consume fish caught in the region.

2. **Approach.** Is the approach well designed and appropriate for the project's objectives? Is it justified by prior site studies or other information documented in the proposal? If additional information is needed to adequately plan and design the project, does the proposal include adequate provisions for obtaining it during the project's design and environmental assessment? If not, what additional information should be gathered?

This project is well-intentioned, but I find it difficult to conclude that the many and disparate objectives will be met. I have reviewed an earlier version of this proposal and I do not see that there has been a substantial revision to warrant recommendation for funding. I feel that this is due to several reasons:

1. The Steering Committee/stakeholder direction of this project is a commendable approach, but it does not allow the flexibility of a truly scientific approach to monitoring and understanding Hg bioaccumulation in the Delta region. This is a very expensive project that may tend to take a direction that is influenced by local stakeholders, rather than the scientists associated with the project. The steering committee approach might be better used for outreach and education direction of the project.
2. While the reader is given some data on fish Hg levels in the Delta region, the PIs make little effort to summarize the data and show evidence for the need for further directed monitoring. While the authors frequently state the need for monitoring by referencing the Wiener et al. (2003) reference, there is no development of the particular plan presented. The authors note that there is a page limitation, but that is not a reason to omit a true research plan to assess trends in Hg in fish of the Delta. Fish species at specific sites (page 8) for instance, are selected based on their location, yet the goal is to address those species associated with human health risks

elsewhere in the proposal.

3. There are several references to measuring many other levels of the Delta food web, but with no real justification or model to suggest why specific trophic levels will be studied. There are references to clams, invertebrates, etc., but no development of a hypothesis for justification of such sampling. Granted, the space limitations of the proposal precludes detailed discussions, but references to other studies would help justify the inclusion of such species.

4. The outreach and education section is also undeveloped in the proposal. There really are no innovative approaches to informing the public and the affected groups, other than through a list of agency contacts. Couldn't there be some new initiatives suggested – mass media, multi-lingual postings near boat landings, translators at major fishing access points? Perhaps linking with an agency such as California Sea Grant or extension departments and UCal campuses would allow people well-experienced in these approaches to participate.

3. **Feasibility.** Is the approach fully documented and technically feasible? Is the scale of the project consistent with its objectives? Does it reflect “best practices” for this type of project? If not, how should the project be revised to reflect “best practices”? Is it likely to attain the ecosystem restoration objectives it seeks?

Even with the notation that they are limited by page length, the authors could have better documented proven approaches and discuss them in the context of their study. There is very little innovation into the approaches presented here. There are far too many objectives for one project and as such, it would be difficult to complete the objectives. More details of the monitoring program are needed to evaluate whether “best practices” would be used. Restoration objectives are not noted in the proposal.

4. **Capabilities.** What is the applicants' track record in terms of past projects? Is the project team qualified to efficiently and effectively implement the project? Does the proposal describe how additional expertise and other support necessary to successfully accomplish the project will be obtained? If not, what additional expertise or support is needed?

In their own fields, the individual PIs are qualified to participate in a Hg study in the Delta. They note that they will be linked with other studies, but only in the sense that they each receive funding from CALFED. That portion of the project could have definitely been strengthened.

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

This project is far too expensive as a 3-year, \$5 million project. Many of the monitoring needs might be coordinated with other state agencies. Outreach and education might also be partially covered by coordination with other entities.

Additional comments:

This study would serve the CALFED needs better if it were more focused as simply a fish monitoring project or as an outreach/education project. The two phases seem very disjointed in the current version of the project is just not as strong as others that I have reviewed in this category.

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 cannot recommend funding of this project. This is a very expensive project and the proposal is simply a monitoring project and not well developed at that. The site monitoring and supplemental measurements do not appear to be well thought out. Perhaps the monitoring phase of this project should funded at a reduced level. While monitoring in the Delta is essential (Wiener et al. 2003), this proposal falls short of a coordinated effort to link with the other projects in the portfolio of CALFED Hg research. The stakeholder/steering committee approach does not appear to be well suited for this type of project and the education/outreach section was poorly presented.
Good	
Poor X	

CALFED Ecosystem Restoration Program External Review Form

Proposal Title: A Pilot Regional Monitoring Program for Mercury in Fish in the Bay-Delta Watershed

Review:

1. **Goals.** Are the project's goals and objectives clearly stated and internally consistent? What ecosystem restoration benefits will it provide?

The goals and objectives of the project are clearly stated and internally consistent. This large and ambitious project has 11 separate but related objectives. The core activities are to begin to monitor Hg in fish and food chains and to inform sports fishers regarding Hg in fish so that they can make informed decisions regarding Hg intake. An important part of the project is to develop methods to test the effects of ecosystem restorations. The project is truly a pilot program because many of the objectives aim to set up the protocols and administrative structures that will be put in place for longer term monitoring activities. The monitoring of Hg in fish and food chains (and the communication of this information to the public) must be seen as an absolutely essential core component of the Bay-Delta activities. Hg is one of the most important contaminants in the aquatic systems of the Bay-Delta area, as well as being important nationally and internationally. Definition of levels in sport fishes and food chains, and how various ecosystem manipulations affect Hg cycling is essential to defining ecosystem health and to protecting human health.

The project is not aimed directly at providing ecosystem restoration benefits. However a component of the project will develop the methods that will evaluate the effect of various ecosystem manipulations on Hg cycling and Hg concentrations in fish. This component is seen as important to overall Bay-Delta activities because many of these ecosystem activities are predicted to impact Hg cycling. This work will also help to provide some important scientific understanding of the effects of various ecosystem manipulations on Hg cycling.

2. **Approach.** Is the approach well designed and appropriate for the project's objectives? Is it justified by prior site studies or other information documented in the proposal? If additional information is needed to adequately plan and design the project, does the proposal include adequate provisions for obtaining it during the project's design and environmental assessment? If not, what additional information should be gathered?

The approach does appear to be well designed and appropriate for the project's objectives. Because the proposal is for a pilot program, many of the activities are not strictly defined at this point, but rather will be developed under this program. The proposed consultation, expert advice and information gathering seems appropriate to design a longer term program. I particularly support the formation of a panel comprised of experts in fish mercury monitoring, statistical design and outreach. I also strongly support the linkages with other research and monitoring projects in the area and I agree that these linkages should provide insights into mercury cycling and bioaccumulation.

I am concerned about the lack of definition of exactly what samples will be analyzed for methyl mercury (MeHg), as opposed to total Hg. I feel that all samples of invertebrates should be analyzed for MeHg because the proportion of the total Hg that is MeHg can be quite variable in invertebrates.

3. **Feasibility.** Is the approach fully documented and technically feasible? Is the scale of the project consistent with its objectives? Does it reflect “best practices” for this type of project? If not, how should the project be revised to reflect “best practices”? Is it likely to attain the ecosystem restoration objectives it seeks?

The approach is not fully documented, but a process of methods development, stakeholder involvement and technical consultation is proposed that should allow for the development of more definite approaches and methods. The scale of the project is consistent with its objectives. The methods and approaches are appropriate and reflect an excellent approach for this type of project.

Again, there are no specific ecosystem restoration objectives, but rather the project seeks to quantify the impacts on Hg cycling of various other ecosystem restoration projects.

4. **Capabilities.** What is the applicants’ track record in terms of past projects? Is the project team qualified to efficiently and effectively implement the project? Does the proposal describe how additional expertise and other support necessary to successfully accomplish the project will be obtained? If not, what additional expertise or support is needed?

The applicants have been heavily involved in past Bay-Delta projects and performance appears to be good. The qualifications of the study team are excellent and appropriate for the subject area of the proposal. The proposal does describe how additional expertise will be utilized to complete the project objectives.

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

Budget appears to be reasonable for the work proposed. The budget is large, but the area is large and the subject area important.

Additional comments:

I strongly agree with the need to begin sampling in 2004. The limit of three years to this project and the requirement to begin to monitor Hg in fish and food chains to provide information for other aspects of the project (e.g. pre-project information) means that it is essential that sampling not be delayed.

QA/QC procedures seem appropriate.

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 XXX	The monitoring of Hg in fish and food chains in the Bay-Delta area is an essential activity, given the importance of Hg as a contaminant, the importance of sports fishing in the area and the large number of ecosystem manipulation projects that will be carried out in the area and that have the potential to affect Hg cycling. This proposal does an excellent job of beginning the process of long-term monitoring of Hg in fish and food chains in the area. The project is large and expensive, but it is appropriate to the scale of the problem and to the size of the area. The project team appears to be well qualified to carry out the program and the involvement of other agencies is appropriate.
Good	
Poor	

CALFED Ecosystem Restoration Program External Review Form

Proposal Title: A Pilot Regional Monitoring Program for Mercury in Fish in the Bay-Delta Watershed

Review:

1. **Goals.** Are the project's goals and objectives clearly stated and internally consistent? What ecosystem restoration benefits will it provide?

The proposal lists Goals and Objectives as separate items. The difference appears to be a matter of specificity. The Goals are broader and perhaps not 100% achievable within this three year project, but laudable. For instance, Goal 1 is to "Protect human Health by assessing and reducing exposure to methylmercury-contaminated fish." Whereas, corresponding Objectives appear to be 1) Monitor... , 2) Provide information..., 3) Conduct outreach...7) Establish a committee structure..., and so on. To be fair, the proposal notes that it may take centuries to reduce mercury contamination, so the pragmatic approach to reducing exposure to mercury is to develop truly effective fish consumption advisories, which is achievable within the three year project.

All of the Goals and Objectives are clearly stated, and I see a high degree of internal consistency. I do not see how this 3-year study can meet objective 1, "Monitor long term trends..." because 3 years is obviously not long enough to observe long term trends. Either the proposal is too short to document the degree to which benchmark fish concentrations were obtained in the past, or this project establishes those benchmarks. Either alternative is defensible, but it would have been desirable for the proposal to be clearer on how long-term trends will be established. It is mentioned on page 3 of the Narrative that monitoring striped bass is important for a number of reasons, including the existence of historic data. This pilot project, to be funded at 1.4 to 1.8 million dollars per year is probably too expensive to maintain at that level for long term monitoring. However, if this pilot project can identify sites species, and associated protocols, that can serve as cost-effective surrogates for long term monitoring, then this project will have been an excellent investment in the future. You ask, "What ecosystem restoration benefits will it provide?" The information from this project, in particular objectives 9, 10, and 11, does provide a scientific framework so that restoration benefits associated with methylmercury can be assessed. This project does not in itself provide restoration benefits, but without this project, nobody knows what kind of manipulations can produce methylmercury reduction benefits. Page 17 does address this question, noting that this proposal will establish a lasting foundation for an adaptive monitoring program that will last into the future.

2. **Approach.** Is the approach well designed and appropriate for the project's objectives? Is it justified by prior site studies or other information documented in the proposal? If additional information is needed to adequately plan and design the project, does the proposal include adequate provisions for obtaining it during the project's design and environmental assessment? If not, what additional information should be gathered?

The Narrative part of the proposal provides adequate documentation that the approach is appropriate for the project's objectives. It is clear that the managers have included information derived from prior site studies in the development of the proposal. On the other hand, it is clear from the proposal that the project will make final decisions based on input from many stakeholders and new information as it is obtained. It is clear that the proposal has incorporated appropriate recommendations from the prior studies and workgroups, including the 2003 Mercury Strategy for the Bay-Delta System (Wiener et al. 2003). My one concern is that I cannot determine from this proposal alone how other proposed studies will mesh with this one. For instance, this proposal repeatedly refers to the need to quantify mercury bioaccumulation at the various monitoring sites, yet does not propose to collect any water concentration data of total or methylmercury. Presumably water data will be collected by another project, but I would like reassurance on that point.

3. **Feasibility.** Is the approach fully documented and technically feasible? Is the scale of the project consistent with its objectives? Does it reflect "best practices" for this type of project? If not, how should the project be revised to reflect "best practices"? Is it likely to attain the ecosystem restoration objectives it seeks?

The proposed approach is adequately documented and technically feasible. The scale is large, but in proportion to the large objectives. The proposal summarizes a great deal of thought on what approach is appropriate for this set of objectives, and I believe sets a new standard for what constitutes "best practices" for this type of project, although I would be more comfortable if I could know the details of the other projects, listed in Table 2 of the Narrative. Will this project alone attain the ecosystem restoration objectives it seeks? Yes, if the objectives are to establish a lasting foundation for an adaptive monitoring program that will lead to the most effective possible approach for minimizing mercury accumulation in this aquatic system.

4. **Capabilities.** What is the applicants' track record in terms of past projects? Is the project team qualified to efficiently and effectively implement the project? Does the proposal describe how additional expertise and other support necessary to successfully accomplish the project will be obtained? If not, what additional expertise or support is needed?

Although it is an ambitious project, it is appropriately ambitious and the applicants' have the background to implement the project. It is clear that for the project to achieve its full utility the other projects listed in Table 2 need to be carried out in coordination. Therefore, the additional support that is needed to system-wide coordination and cooperation.

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

The budget is reasonable, given the ambitious objectives that are proposed.

Additional comments:

I am favorably impressed at the proportion of the budget devoted to developing and implementing fish consumption information with the populace. This demonstrates that the fish monitoring is not just a scientific pursuit of information for its own sake, but for the development of a trustworthy database that will be used to improve and protect people's health. I don't believe that such an integrated effort between data collection and communication with the public has been developed anywhere else in the world.

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 xx	This proposal capitalizes successfully on a great deal of science and experience from the past few years.
Good	
Poor	