

Murphy Creek Restoration Monitoring Project

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Initial Selection Panel Review

Not Recommended

Amount Sought: \$583,054

Fund This Amount: \$0

Brief explanation of rating:

The proposal requests funding to monitor the outcome of restoration efforts funded by the CALFED Watershed Program. The Technical Panel noted a number of technical deficiencies in the proposal and rated it inadequate. The Regional Panel indicated a high degree of local value to this type of monitoring and recognized the strong local support for the project and restoration efforts. The Regional Panel however questioned whether the proposal's hypotheses and the type and level of monitoring can determine the effectiveness of the restoration. The Selection Panel agrees with both the previous reviews that the monitoring effort is unlikely to be able to sort out which of the restoration efforts were successful. In addition, Murphy Creek is not an area in which the ERP has focused funding. The Selection Panel does not recommend funding from the ERP but does recognize the tremendous effort to include a wide variety of stakeholders in this project and the involvement of landholders in the restoration efforts.

Technical Panel Review

Technical Review Panel's Overall Evaluation Rating:

Inadequate

Explanation Of Summary Rating

The reasons for the inadequate rating from the technical panel is that both the external reviewers and the technical panel believe that the methodological shortcomings of the proposal are sufficiently extensive to render it unlikely that the stated goals will be met.

Goals And Justification

The goals of this project are within the CALFED scope and are somewhat well justified. There really isn't a conceptual model presented in the proposal which is unfortunate given that dam removal is a topic of interest to many management agencies. This reflects a general problem in the proposal - it is poorly linked to the scientific literature in every aspect (although it seems reasonably up to date on the "regulatory agency" literature such as rapid bioassessment protocols). Consequently, there is little conceptual rationale for the restoration efforts undertaken (i.e., dam removal, cattle fencing, invasive vegetation removal, etc.), although one could argue that the justification is intuitive given what we know about the deleterious effects of the factors they are mitigating. The hypotheses are clearly stated and eminently testable albeit one-sided (i.e., they do not include the possibility that conditions have worsened), and they do not address any knowledge gaps outside of Murphy's Creek. This is problematical. In addition, there is little evidence presented that there are sufficient pre-treatment data to perform a successful evaluation of the restoration techniques employed.

Technical Panel Review

On a positive note, the authors are to be congratulated for their attempt to include a wide variety of stakeholders in this project and their encouragement of landholder involvement in restoration efforts.

Approach

The external technical reviewers have identified a large number of methodological shortcomings in this proposal that ultimately will limit the abilities of the investigators to assess the restoration techniques. We will list them in bullet form here to aid the proposers in understanding the technical panel's overall recommendation.

1) Multiple restoration techniques were employed (dam removal, cattle fencing, removal of non-native vegetation), so we have no way of knowing which techniques produced the results that potentially will be observed. This is an important problem, because these techniques vary tremendously in their political and logistical difficulty and it would be nice to know if the easiest or the most difficult was the one necessary to produce desired results.

2) As one external reviewer noted, this study should have been set up as a BACI (Before-After, Control-Intervention) design. There is no real control in the study despite the investigators' stated goal of using pre-treatment data. Unfortunately, there is no assessment of the quality or adequacy of those data for comparison with proposal data, so we are unable to ascertain whether the investigators are likely to accomplish their stated objectives.

3) The spatial and temporal scales of sampling are not adequate. Sampling should occur more than once in a season (quantify within season), representative reaches should not be used because of their arbitrary nature (see external reviewers comments), and more than one sampling site per reach should be employed to quantify within-reach variation.

4) There is inadequate description of the methods used to make many of the biotic assessments. There has been much debate in

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the stream fish literature regarding the assessment of assemblage stability and comparisons of assemblage similarity (see Grossman et al. 1990 Environ. Manage.) yet none of this has been addressed in the proposal. The reliance on an RBP metric simply is inadequate for comparisons such as those described in the proposal. Finally, comparisons of assemblage structure based on presence/absence data are almost useless for the purposes described in the proposal. Once again, this has been extensively discussed in the scientific literature, yet no mention of this is present in the proposal.

5) The assessment of salmonid recruit production can be done via electrofishing, or snorkeling, rather than a fyke net. The latter is likely to cause substantial mortality and should be dropped as a sampling method.

6) There are a variety of improvements in sampling methodology especially relating to water quality that are listed in the technical reviews.

7) Water quality measurements should be made on a weekly basis and at least some measurements should be timed to coincide with storm events to determine runoff effects. It is unlikely that the stated schedule of water chemistry measurements will be able to detect "true" improvement or degradation because these values can change rapidly with precipitation in agriculturally affected drainages.

8) Apparently there is an extensive regional fish data base collected by EBMUD which could be better utilized by the PI's.

9) The study reaches described in the proposal are not well justified and there is little justification for the use of reach 3. It is highly likely that the "control" site also has been significantly affected by the dam, cattle grazing, etc. and hence really cannot serve as a control.

10) The GIS work is insufficiently justified and should be eliminated.

11) The methods for substratum assessment are not those

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typically used by stream fish ecologists to quantify substratum composition. The authors should consult stream fish habitat studies published in peer-reviewed scientific journals to obtain better methodologies. In addition, the comments regarding effects on large woody debris are not well supported because the time scale for LWD recruitment is beyond the sampling time span of the project.

12) The PI's should see the external reviews for further suggestions.

Feasibility And Likelihood Of Success

The questions raised in the previous sections all raise doubts as to the likelihood of success for this project.

Feasibility-wise, the PI's will be able to conduct the sampling described but it is questionable if the data really can be used to assess the stated objectives. As previously mentioned, the spatial and temporal scales of the proposed sampling probably are inadequate to address the objectives.

Performance Measures

If improvements in the performance measures (i.e. stated hypotheses) are detected it will be impossible to determine which, if any, of the several restoration techniques are responsible. In addition, see previous comments about lack of control sites and uncertain status of pre-treatment data necessary for a successful evaluation of performance.

Products

The data products should be made accessible to the general public via reports or the web. In addition, the PI's should try and publish their results. Significant issues raised in previous portions of this review suggest that publication is unlikely and all that may result are descriptive data that may or may not adequately characterize the restoration efforts.

Capabilities

Based on descriptions in the text, the PI's appear to be well qualified to undertake the research described. Nonetheless, the proposal showed a rather marked lack of attention to relevant scientific literature, current methodologies and experimental design. These problems raise substantial doubts regarding the ability of the investigators to successfully complete their stated goals.

Budget

Several technical reviewers commented on the excessive nature of the budget, some to the point of calculating out the person hours that are going to be charged. The technical panel's assessment is that the budget certainly is excessive.

Regional Review

The regional panel gave this project an overall rating of high. Although the regional reviews dealt with slightly different questions than the external reviews. In contrast to the latter, the regional review identified virtually no shortcomings in the study. The regional panel sees a main benefit of this study as providing baseline data for future improvements in the basin, but that is not the purpose of the study and usage for that purpose is confounded by improvements already in place. In addition, the regional panel believes that this project will contribute useful information on dam removal, but that information is confounded with the other restoration efforts completed.

Administrative Review

No problems noted.

Additional Comments

Delta Regional Review

Delta Regional Panel's Overall Ranking:

High

Summary:

The Regional Panel believed the monitoring proposal ranked high because of strong local support and, although the project is small, it has high importance to CALFED goals. The monitoring project in this watershed is somewhat of a microcosm for evaluations of restoration activities to improve watershed conditions for anadromous salmonids that may have significant value to restoration actions elsewhere.

1. Applicability To ERP Goals And Regional Priorities.

The Murphy Creek restoration project monitoring is intended to determine the extent that recent restoration projects in the watershed have measurably increased or improved: anadromous salmonid (fall-run Chinook and steelhead) spawning and rearing habitats, production of anadromous salmonids, relative proportion of native fish fauna, and water quality. Removal of Sparrowk Dam on Murphy Creek, a small tributary to the Mokelumne River in the eastern Delta, funded by the CALFED Watershed Program, was implemented in 2003. This dam removal potentially increased the range and habitats for salmonids by 0.8 miles. Additionally, some riparian fencing to exclude cattle and replanting native vegetation has also been implemented. As described by the project proponents, the monitoring program would assess the effectiveness of a restoration action. A secondary goal of the proposed monitoring is to identify additional factors that may limit salmonid production in the creek; this portion of the proposal may be considered more research-oriented instead of monitoring restoration actions. The project would provide useful information on how the recent restoration projects are contributing toward improvements in fall-run Chinook and steelhead populations and the habitat processes and the

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stressors that affect them. The monitoring project could be important to CALFED and ERP goals because it would assess potential expansion of anadromous salmonid habitats in the eastern Delta.

2. Links With Other Restoration Actions.

The proposed monitoring project is primarily linked to ongoing restoration and monitoring activities in the lower Mokelumne River. Because EBMUD is part of the proposed monitoring effort and because the agency has extensive experience in the Mokelumne River, the linkage with Mokelumne watershed programs seems assured. The project will build upon past monitoring conducted by EBMUD in the lower-most portion of the creek downstream of Sparrowk Dam. One of the principal benefits of the monitoring project would be the collection of baseline information to use for comparisons with conditions after future anticipated restoration activities occur in the drainage. The project would also provide information on the status and trends of habitat and fish in Murphy Creek. Data collected from the proposed project will be available for others to compare to other drainages and other restoration activities. The secondary objective of the monitoring project would be valuable in developing future restoration opportunities by identifying potential limiting factors for anadromous salmonid production.

3. Local Circumstances.

There are no local constraints on the project's ability to move forward in a timely manner. There are no environmental permitting issues associated with the project. The project proponents have the support of landowners in the watershed. However, it may be too early to evaluate the effects of some actions (e.g., recovery of riparian canopy) on salmonid habitat quality. Also, native resident fish assemblages and anadromous salmonids are unlikely to have responded so rapidly since restoration actions were implemented.

4. Local Involvement.

There is strong local support from landowners in Murphy Creek for restoration and monitoring activities. Riparian landowners have provided written permission for access to their land for implementation of the monitoring project. The project proponents have proposed a good public outreach program. The project is likely to create local partnerships that are likely to endure beyond the term of an ERP grant because it will be capable of attracting funding from multiple sources over time.

5. Local Value.

There is a high degree of local value to the proposed monitoring project. Recent restoration actions have been focused on expanding and improving anadromous salmonid habitats and the monitoring is directed toward monitoring the effectiveness of those actions. However, the Regional Panel suggests that the Technical Panel examine the proposal's hypotheses and the type and level of effort for the monitoring because it may not be sufficient to quantify the effectiveness of restoration. For example, because the monitoring is limited in scope (e.g., only two times/year and limited transect data), there may not be sufficient information developed to make resource management decisions. Also, the relatively simple measurements proposed may not meet the goal of determining the success of restoration efforts (e.g., spawning habitat quality may not be determined). Therefore, the project may not help managers understand how well restoration actions are attaining their objectives, how Murphy Creek is responding to multiple restoration actions, or if adjustments to prior restoration actions are needed to better achieve their objectives. If technical issues are resolved, the project and the information it produces have high regional value.

6. Other Comments:

Use of fyke nets to sample outmigrant salmonids during December through April will likely cause very high fish mortality. The Fishery Foundation is included in several proposals as the primary field team and holder of collector's

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permits.

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Goals And Justification

The proposal will monitor the outcome of the Sparrowk Dam removal on Murphy Creek.

The proposal is clear and internally consistent.

The basis for restoration is clear, to improve the anadromous fishery within Murphy Creek.

Five hypotheses are stated. They are essentially descriptive hypotheses rather than experimental hypotheses. They are warranted because existing information on Murphy Creek is in need of being compiled and synthesized and new information must be collected and compared to the existing data.

Approach

The approach is comprehensive and uses standard techniques appropriately and includes additional approaches to target items of concern such as the effects of cattle on water quality.

This project will lay the groundwork for all activities by both compiling and synthesizing existing data and establishing a comprehensive study that will provide an even more solid baseline for the future.

The large amount of quantitative data proposed will greatly increase knowledge of physical conditions and their associated biota in Murphy Creek. The same protocols could be used in future studies to assess change over time.

General natural history information is not scientifically glamorous but is essential for understanding the ecology of a system. Quantification of the distribution and abundance of fishes and invertebrates eliminates future speculation.

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In the same way, geomorphological monitoring is essential. Quantified data on stream channel conditions and substrate composition allow for meaningful comparisons in the future and again, eliminate speculation.

Technical Feasibility

The project is certainly feasible as documented and the scale is consistent with the objectives. The project is properly focused on physical habitat including the riparian zone as the primary objective, because habitat is the independent variable in ecology and the biological communities such as fish and invertebrates are dependent variables.

I would like to see a better description of how physical habitat transects will be placed. This is a key feature of a habitat study and depending on the study intent, different decisions should be made. Will one transect be placed in each habitat unit for the entire 40 bankfull widths? What about ecotones, i.e., transitions between habitat units? These are sometimes important for fishes and invertebrates.

Similarly, how will points along each transect be placed? If the intent is to compare sites to each other, then a fixed number of points regardless of flow conditions is suitable. However, if the intent is to compare habitat available at different times or under different conditions then a standard spacing interval is more appropriate because more measurements are taken when more habitat is present, i.e., at higher discharge. This is important when evaluating habitat availability because habitat that is present in the middle of the channel at low flow may still be present along channel margins at high flow, but if only a few measurements are taken along each transect it may be overlooked or underestimated.

Performance Measures

The data will allow evaluation of restoration actions and will be invaluable for assessing future restoration actions.

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Specific performance measures were not proposed but presumably correspond with the five hypotheses. That is, successful restoration will increase anadromous salmonid spawning and rearing habitat, the relative proportion of native fish species, the relative abundance of anadromous salmonids, and decrease water temperature while improving water quality.

The rationale for these hypotheses is straightforward and intuitive.

The data and performance measures will allow evaluation of the success of the dam removal.

The plan provides suitable detail to assess performance of the dam removal but is dependent on the quality and similarity of data from previous studies.

Products

The products will be useful to anyone interested in the effects of dam removal and relations between instream habitat and biota. The data will be available through reports, the internet, public presentation, and peer-reviewed articles. Data handling and storage will be adequate. The results should be suitable for several publications.

The streamflow gage may be the most valuable task in the entire project. Gage data are extremely useful. The gage should be established whether this project is funded or not and should be maintained in perpetuity.

Capabilities

Based on the quality of the proposal and the described capabilities, the team appears to be qualified. Experience in publishing peer reviewed articles is not described and it would be very desirable to have several published products from this work. The performance record is also a little vague but based on the years of experience and level of public support it seems likely that the team will successfully complete the project.

Budget

The budget seems reasonable and adequate.

Additional Comments

I recommend that all fish, not just salmonids, be measured. Knowing the size of each individual fish provides much more information than simply a count. This information would be useful for detecting the status of all fish species. Are reproducing populations present? Is the same population structure present in all three reaches in both seasons? In my opinion it would be worth additional funds to have such data.

Similarly, I don't know what taxonomic level the invertebrates will be identified to but I recommend having them identified to species by taxonomic experts. This information provides much greater resolution and understanding than identifications at the family or genus level. I believe this would also be worth the additional expenditure. Imagine the amount of information that would be lost if fish were identified only to the family or genus level.

In this regard, I can envision a series of publications as outcomes of this study including simple accounts of the fish and invertebrate communities in relation to habitat conditions. These sorts of papers are perhaps the most valuable because they report actual data on physical habitat and biota rather than conceptual data based on paradigms, statistical models, and assumptions.

External Technical Review #2

Goals And Justification

1) Does the proposal identify the restoration actions whose outcomes will be monitored?

Yes, the proposal clearly identifies the restoration of Murphy Creek, and the basis of the measured outcomes.

2) Does the proposal present a clear and internally consistent statement of the goals and objectives of these restoration actions?

Yes, the proposal is internally consistent, although in later sections I will describe what I believe are serious deficiencies in scope and technique.

3) Does the proposal present a clear conceptual model that adequately explains the underlying basis for the restoration actions?

No, the conceptual model is rather simple and narrowly presented, and is insufficient in spatial and temporal context. There is no discussion of a realistic time scale upon which outcomes can be expected to be realized, nor is there any discussion of the consequences of dam removal for stream habitat at a reach or basin scale.

4) Does the proposal clearly state the hypotheses that the proposed monitoring will test?

Yes, five hypotheses are clearly stated.

5) Are these hypotheses justified relative to the existing knowledge and knowledge gaps?

No, they lack a realistic spatial and temporal context for our current understanding of the processes controlling stream and riparian habitat recovery.

Approach

1) Is the approach well-designed and appropriate to meet the projects objectives?

No, the approach has a number of serious flaws: i) The measurement of stream fish populations and habitat is based on a representative reach approach consisting of only three survey reaches "of at least 40 times the bankfull channel width". Rather, it should be based on a whole-basin analysis as is now the common practice. A representative reach approach lacks statistical rigor to adequately document existing conditions, and also has the potential to be severely bias, and depends upon the subjective selection of index sites. A whole-basin approach, sensu Hankin and Reeves (1988, CJFAS), is needed to provide a sufficiently level of detail and rigor to address the stated goals. ii) A ratio of native vs. non-native fishes is a rather crude measuring stick by which to compare fish communities, a more sophisticated and proven metric, such as Karr's Index of Biotic Integrity (IBI), would likely yield better results. iii) Again, it is impossible to adequately describe a stream fish community based on only three sample sites. There will be no way to determine different distribution limits of individual fishes, nor to assess what habitat and water quality conditions are associated with the distribution of different species, which is usually one of the clearest signals available in studies of stream fishes and habitat. iv) I am not sure what is trying to be accomplished by anadromous salmonid juvenile emigration surveys. The objectives are stated as documenting the occurrence of juveniles with fyke nets. This information is redundant to that which could potentially be obtained via electrofishing and somewhat through the redd surveys. The emigration of juveniles is without mark-recapture calibration of efficiency, which could be used to produce a statistically valid estimate of juvenile salmon production upstream of the removed dam. If this was included then this study could address what could be argued is the most important research question: what is the production of juvenile salmon that is being realized from the removal of Sparrowk dam? v) As above, monitoring temperature at only a few (four?) sites is

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inadequate for a whole stream study. The doubling up of thermistors could be relaxed, as Stowaway units are now very reliable, and the increased information from more monitoring sites would likely outweigh the risk of failure or theft (the latter a more common enemy of temperature studies). vi) This study will commence 1.5 yrs after dam removal and continue for 3 yrs. This is not an adequate time to realize and real change in stream channel and riparian conditions that will likely matter to the processes involved. At best this study will provide a first data point (or second if there is any pre-dam removal data) that will likely document an unrecovered state. A follow-up study at year 10+ would be needed to start to document real and significant change in stream habitat and riparian conditions.

2) Does the project adequately build upon previous monitoring, including appropriate modifications to respond to lessons-learned during the prior monitoring?

The proposal is curiously vague in this area, and seem to be operating under the premise that data might exist, and if it does it will be used to its fullest extent to provide the basis for the core objective of this study, which is to document change in conditions following dam removal. If there is no such data, it would seem to invalidate most of the potential success of the project. Given that this is such an important aspect of the study, I would have expected to see a detailed listing and synopsis of existing data by the project PI's. The fact that they do not provide this level of detail raises concern that this study may well lack the basis to provide any measurable analysis of changed conditions.

3) Are the monitoring and evaluation activities described in the proposal likely to make significant contributions to our knowledge-base?

No, given all of previous concerns for lack of scale and potentially pre-removal data, this proposal has low probability for improving our knowledge base to a significant extent.

Technical Feasibility

1) Is the project fully documented and technically feasible?

Yes, as far as it goes, the references were complete. However, I would have liked to have seen a table listing ALL measured variables for the stream survey.

2) Is the scale of the project consistent with the objectives?

No, it needs a whole-basin approach, and needs to consider decadal-long context in recovery of stream and riparian habitats.

Performance Measures

1) Will the data collected by the proposed monitoring allow evaluation of the restoration actions that are being monitored?

No, the study needs to be addressed at a basin scale, not just by three index sites. The question of restoration needs to be put in a context of the change in available habitat at a basin level, with statistical estimates of habitat area, fish populations, and juvenile emigrant production for the entire basin.

2) Are specific performance measures proposed for evaluating these restoration actions?

Yes, but they are weak and inadequate.

3) Is the rationale for the performance measures clearly demonstrated?

No they are not, there is no basis given as to why some measures will be used. For instance, why is the ratio of native to non-native fish important? Is this a cause or effect? Do non-natives out-compete juvenile salmon, or are they there because the habitat is degraded and poor for juvenile salmon anyway.

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4) Will these data and performance measures allow evaluation of the conceptual models underlying the previous restoration actions?

No, not unless they can be expanded to a basin context and shown how they relate to total habitat and fish production.

5) Is the monitoring and evaluation plan explicit and detailed enough to assess the performance of the restoration actions?

No, I saw no real evaluation plan in the proposal.

Products

1) Will the project lead to information that is useful to resource managers, other decision makers, and/or scientists?

The project will lead to some useful information.

2) Does the project explicitly describe how others will be able to access the data produced by this monitoring effort?

Yes.

3) Are data handling, storage, and dissemination measures adequate to allow resource managers, other decision makers, and scientists to access and use the project's results?

Yes.

4) Is the project designed to produce high-quality results that are likely to stand up under peer-review?

No, in my judgement the results will be of only moderate quality and will not be adequate for a peer-reviewed publication.

Capabilities

1) Are the project team's qualifications commensurate with the project?

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Yes, they appear sufficiently qualified.

2) Is the mix of disciplines appropriate to the project as described?

Yes.

3) Does the project team's performance record indicate that they have the ability to complete the project?

Yes, it appears they have considerable experience in this area.

Budget

Yes, the budget appears adequate and reasonable. If my comments were taken into consideration and this work was expanded towards a basin level perspective, then a revised budget would likely see an increase in habitat assessment by about five-fold. But there would be overlap with the fish community work. I suggest that there could be an increase in the number of temperature monitoring stations, which could be via eliminating redundancy, or doubling the cost of Stowaways.

Additional Comments

The proposed work needs to be elevated to a basin level perspective that addresses total stream habitat and fish populations for the entire basin. The use of three index sites is simply not sufficient to provide rigorous monitoring of stream habitat and riparian recovery. These are methods and protocol that have been widely used for over a decade, and it would not be much trouble to expand this proposal to a basin level.

External Technical Review #3

Goals And Justification

The Murphy Creek Restoration Monitoring Program proposal identifies a 3 year monitoring plan for restoration effects of the recently removed dam Sparrowk Dam on 0.8 miles of Murphy Creek. The proposal reviews anticipated environmental benefits of dam removal, and then argues that these benefits should be studied to evaluate restoration success. A series of hypotheses are given for dam removal responses but these are simple restatements of expected environmental improvements. A monitoring plan and set of methods are described although several questions are raised by the approach, design, and expected benefits.

Approach

The proposal describes a series of established hydrologic, physicochemical, and biological parameters to be measured commonly at twice annual intervals for three years. The methods used are very common techniques and indicators used in California and other agency programs in the US. They are mostly very direct and easy to accomplish. Thus it is highly likely the monitoring will be conducted as described. Concerns on the project approach come from larger design issues. Normally the BACI (before-after control-impacted) design is used for this kind of project, and the proposal covers this in a vague manner. BEFORE data is promised to be obtained by a search of sources meaning it is unknown how well BEFORE conditions were documented. This raises suspicion on feasibility and effectiveness in drawing useful conclusions on dam removal benefits. The CONTROL area is the most downstream segment of the creek so it is one that has likely been effected by the dam removal immediately upstream. Then a short 0.8 mile previously impounded stream section serves as the IMPACTED section. It is very small and immediately downstream of another dam and reservoir not described in the proposal. Effects of this dam could heavily shape the IMPACTED area today. Finally, a third stream section is included in the

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study that is upstream of a dam and partially impounded. I cannot see why this section is in the proposed project and it is not discussed much at all. Therefore, I am concerned about what conclusions could be developed on a dam restoration case by this project other than what we know now: 0.8 miles of new stream habitat were created from a pond. I also wonder why a pre-removal assessment did not provide a better starting place for this project - the lack of this PRE information just seems odd and limiting in the use of this case for evaluation and monitoring.

Technical Feasibility

As described under APPROACH, very common and easily employed methods will be used so the promised data are highly likely to be obtained. Interpreting these data may be very limited and the scale of the project in time (PRE/POST) and space (stream segments) brings this concern out.

Performance Measures

Although I raised significant issues with the project design above, there are some other project elements described for restoration evaluation. A GIS system is planned and would be a project product. What use this will serve and why it will help is not given. The restored area is less than 1 mile of stream. Monitoring data will be used with Habitat Suitability Index models of the US Fish and Wildlife Service. This may not be very informative because these models are mainly used for estimating impacts and mitigation gains rather than post project comparative analyses.

Products

The proposal briefly indicates some project data and products will be web accessible. I would like to see full public reporting of all project data in raw and summarized form via the web. The data from this project would likely be very useful when combined with a series of other similar restoration cases. There are many dam removals being done in the US and a series of data sets would be a good way to assess

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the environmental gains actually realized. Other products are routine and would be expected for a project like the one proposed.

Capabilities

The project team is experienced and capable of doing the monitoring activities described. A lack of expertise on data analysis and impact assessment project design is clear. I recommend this team add substantial involvement in one or two researchers with this experience and use them in the study design phase, final analysis work, and reporting.

Budget

This appears as a low cost project relative to many in the ERP program. However it still sums to more than a half million dollars. This seems somewhat high because the frequency, number, and routine nature of the sampling. The project as it is described should not need much administration work and time.

External Technical Review #4

Goals And Justification

DOES THE PROPOSAL IDENTIFY THE RESTORATION ACTIONS WHOSE OUTCOMES WILL BE MONITORED? Yes.

DOES THE PROPOSAL PRESENT A CLEAR AND INTERNALLY CONSISTENT STATEMENT OF THE GOALS AND OBJECTIVES OF THESE RESTORATION ACTIONS? The goals and objectives of the restoration are clearly stated in the introduction and fairly consistently referred to throughout the proposal. However, the goals and objectives of the restoration were only implied in the executive summary from the monitoring goals and objectives.

DOES THE PROPOSAL PRESENT A CLEAR CONCEPTUAL MODEL THAT ADEQUATELY EXPLAINS THE UNDERLYING BASIS FOR THE RESTORATION ACTIONS? In the background section, a very limited explanation of the underlying basis for restoration actions is described. The proposal does not craft this into a clear conceptual model. In fairness to the applicants, I am not sure a conceptual model is necessary to explain the fairly simple basis for the restoration actions. Due to the lack of detail on the underlying basis for restoration actions, the reviewer is left to assume that the initial restoration may not have been as well planned or thought out as their proposed monitoring campaign. This assumption seems supported by the apparent lack of continuity between the composition of the pre project monitoring team, the restoration team and the project team in this proposal.

DOES THE PROPOSAL CLEARLY STATE THE HYPOTHESIS(ES) THAT THE PROPOSED MONITORING WILL TEST? Yes, on page 5 of the proposal (page 15 of PDF), five hypotheses are clearly stated. Although most of the hypotheses will be generally easy to test as worded (e.g. water temperatures decreased measurably after restoration), I don't see how the applicant's will insure that these observed differences are the result of the restoration actions. Recall that the applicant's objective is to demonstrate the extent to which restoration actions produced measurable improvements in physical habitat. The applicants

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need to do a better job of explaining how they will determine that an observed decrease in water temperature is indeed the result or partial result of the restoration, for example. This observed difference could be the result of many factors they have failed to mention or consider.

ARE THESE HYPOTHESES JUSTIFIED RELATIVE TO EXISTING KNOWLEDGE AND KNOWLEDGE GAPS? No. As alluded to above, the hypotheses are creatively crafted in order to be testable from data that is easy to acquire from rather standard monitoring protocols. The only knowledge gaps they have specifically identified are rather specific to Murphy Creek. There are a plethora of knowledge gaps that could be identified within the context of the proposed monitoring work that would be transferable to the other CALFED projects and the wider scientific community. The applicants have not adequately demonstrated what these hypotheses will do to help bridge these existing knowledge gaps.

Approach

IS THE APPROACH WELL-DESIGNED AND APPROPRIATE TO MEET THE PROJECT'S OBJECTIVES? The monitoring program is reasonably designed in that their approach seems to follow standard protocols. However, the stated objective rather boldly claims that they will show the extent to which the restoration actions "have resulted in measurable increases and/or improvements." This clearly assumes that the restoration has actually resulted in an improvement; whereas it is certainly possible the restoration actions might have resulted in degradation. These are rather general statements to throw around carelessly. Again, to the applicant's credit this is typical among many in the restoration community inclusive of practitioners and scientists. None-the-less, I would say the approach is not well-designed in that has no provisions for what to do if their monitoring data do not show a measurable improvement. Furthermore, a measurable improvement implies that the data they are collecting can be directly compared to comparable pre-project or baseline data. The applicants vaguely refer to some such pre-project baseline data, but then later (section 1.4) say that this data is generally

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qualitative in nature. The quality of data collected under this monitoring program certainly has the potential to be of high quality. However, as proposed, I do not see how that high quality data helps achieve the stated project objectives.

DOES THE PROJECT ADEQUATELY BUILD UPON PREVIOUS MONITORING, INCLUDING APPROPRIATE MODIFICATIONS TO RESPOND TO LESSONS-LEARNED DURING THE PRIOR MONITORING? In my opinion, no. Part of the project is to collect and analyze the previous pre project monitoring data on this project. This reviewer is aware of data that was collected from a variety of investigators at the University of California at Davis, in collaboration with East Bay Municipal Utility District. I found no mention of this data in the proposal and can only assume this included as part of this project? East Bay Municipal Utility District has collected a plethora of data and commissioned numerous studies of a similar nature on the Mokelumne River, which Murphy Creek flows into. There is little to no mention of this impressive database and how the applicants will capitalize on the knowledge base of East Bay Municipal Utility District employees and previous investigators.

ARE THE MONITORING AND EVALUATION ACTIVITIES DESCRIBED IN THE PROPOSAL LIKELY TO MAKE SIGNIFICANT CONTRIBUTIONS TO OUR KNOWLEDGE-BASE? There is potential for significant contributions to the knowledge base. However, the proposal reads like a standard, run-of-the-mill, monitoring program. That is, the project is rather narrowly focused on a small reach of Murphy Creek and fails to link the significance of this work to the Mokelumne or the Bay-Delta system. The proposed monitoring and evaluation activities are likely to produce some interesting results. However, I would like to see how the applicants will use these results to expand not just the knowledge base of Murphy Creek, but for the larger CALFED community.

IF SO, PLEASE DESCRIBE THE CONTRIBUTIONS AND THEIR SIGNIFICANCE. WILL THESE CONTRIBUTIONS BE USEFUL TO DECISION-MAKERS? N.A.

Technical Feasibility

IS THE PROJECT FULLY DOCUMENTED AND TECHNICALLY FEASIBLE? The documentation is generally adequate given the simplicity of what is proposed. This is primarily because the monitoring techniques rely on basic standard protocols. The project is generally weakly documented with a virtually non-existent review of the relevant scientific literature.

IS THE SCALE OF THE PROJECT CONSISTENT WITH THE OBJECTIVES? Insofar as poor or vague objectives give rise to greater uncertainty and large projects, the scale of the project is consistent with the objectives. However, neither the scale of the project nor the objectives are adequately rationalized. See also comments on budget.

Performance Measures

WILL THE DATA COLLECTED BY THE PROPOSED MONITORING ALLOW EVALUATION OF THE RESTORATION ACTIONS THAT ARE BEING MONITORED? It is unclear to me from this proposal why the data being collected are appropriate to evaluate the restoration actions. They seem logical, but there is practically no review of the relevant literature to explain why and how this information could be used to evaluate the restoration actions.

ARE SPECIFIC PERFORMANCE MEASURES PROPOSED FOR EVALUATING THESE RESTORATION ACTIONS? Very specific performance measures are proposed to evaluate these restoration actions. As stated elsewhere, I am not convinced they are appropriate or inappropriate.

IS THE RATIONALE FOR THE PERFORMANCE MEASURES CLEARLY DEMONSTRATED? No (see comments in previous sections).

WILL THESE DATA AND PERFORMANCE MEASURES ALLOW EVALUATION OF THE CONCEPTUAL MODELS UNDERLYING THE PREVIOUS RESTORATION ACTIONS? Not applicable (no conceptual model proposed).

IS THE MONITORING AND EVALUATION PLAN EXPLICIT AND DETAILED ENOUGH TO ASSESS THE PERFORMANCE OF THE RESTORATION ACTIONS?

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No. The monitoring and evaluation plan rely on a number assumptions including a basic premise that the restoration did indeed produce an improvement. The purpose of any monitoring program should not be to show that the project was a success (as the applicant suggested in several instances), but to objectively assess whether it was a success or failure. There is no provision in this application to deal with the potential that the project might be a failure. Although the monitoring and evaluation plan is fairly explicit and detailed, it fails to address more fundamental underlying questions or the appropriateness of the restoration objectives in the first place.

Products

WILL THE PROJECT LEAD TO INFORMATION THAT IS USEFUL TO RESOURCE MANAGERS, OTHER DECISION MAKERS, AND/OR SCIENTISTS? See previous comments. It has the potential to produce information that is useful to other resource managers, decision makers and/or scientists. However, the only thing useful and transferable to others that the applicants highlighted is this data could be compared to other similar projects (section 2.2). The applicants are not proposing to do this comparison with other similar projects, and have made little or no attempt to demonstrate that their data will be comparable. Given that they are using standard protocols, it is likely that the data would be comparable. However, similar to many other CALFED projects and proposals, the burden is on someone else to eventually do this comparison.

DOES THE PROJECT EXPLICITLY DESCRIBE HOW OTHERS WILL BE ABLE TO ACCESS THE DATA PRODUCED BY THIS MONITORING EFFORT? Sections 1.8 and 1.9 hint at the limited plans the applicants have to make information available to others. This primarily appears to take the form of a web site (presumably <http://www.sjcrd.org/programs/murphy.asp>). The applicants only propose putting basic information about the project and its objectives on the web site and do not address whether data will be made available. If the applicants do intend to make data available for others to use, they have not explicitly describe how they intend to do it.

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ARE DATA HANDLING, STORAGE, AND DISSEMINATION MEASURES ADEQUATE TO ALLOW RESOURCE MANAGERS, OTHER DECISION MAKERS, AND SCIENTISTS TO ACCESS AND USE THE PROJECT'S RESULTS? No.

IS THE PROJECT DESIGNED TO PRODUCE HIGH-QUALITY RESULTS THAT ARE LIKELY TO STAND UP UNDER PEER-REVIEW? This project appears designed to produce a monitoring report that meets or exceeds the standards of practice within the consulting community. On the basis of what is proposed and the applicant's track record, there is no reason to believe that the results would not stand up to peer-review. However, I see little in this application that suggests scientific originality. Thus, it might be difficult to convert the project results into something that would be pass peer-review for publication in a scientific journal.

Capabilities

ARE THE PROJECT TEAM'S QUALIFICATIONS COMMENSURATE WITH THE PROJECT? Yes. The project team's qualifications are more than adequate to carry out the project as proposed.

IS THE MIX OF DISCIPLINES APPROPRIATE TO THE PROJECT AS DESCRIBED? Yes.

DOES THE PROJECT TEAM'S PERFORMANCE RECORD INDICATE THAT THEY HAVE THE ABILITY TO COMPLETE THE PROJECT? Yes, as proposed.

Budget

IS THE BUDGET REASONABLE AND ADEQUATE FOR THE WORK PROPOSED? If scale is meant to refer to costs, I think \$583,000 is a fairly stiff price tag to accomplish some very basic monitoring. As stated earlier, the objectives are poorly crafted. Thus, insofar as poor objectives generally result in higher costs, perhaps the scale is consistent. East Bay Municipal Utility District has funded and been awarded funding for an impressive array of restoration and monitoring projects on the Moklumne River that have produced more than this project proposes at a fraction of the cost. Admittedly, many of those studies relied on cheaper student labor. This project

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relies primarily on consultant labour, which although more by the hour, has the benefit of generally less overhead than University projects. However, the applicants have proposed just over \$500,000 in consulting fees. Even at an hourly rate of \$100/ hour, this equates to over 5000 man hours or 125 weeks of labor. Thus, even a full-time, two person crew could be employed exclusively on monitoring and interpreting data for 62 continuous weeks on an arguably insignificant 1.5 miles of Murphy Creek. It might be that Murphy Creek is very significant to the overall Sacramento/San Joaquin Watershed and Bay Delta. However, there is little in this application to help a reviewer establish this. For the outputs being proposed, the budget seems excessive. Having said that, I am it is conceivable that this application could be revised to justify over \$580,000 or the same outputs could be produced for at least half the price.

It is worth noting that the Murphy Creek Restoration Project itself only cost \$285,000

(http://calwater.ca.gov/Programs/Watershed/Proposals/Project_Summaries/89)

Although it may be appropriate for long-term monitoring to cost more than the actual restoration, this point is not addressed or justified in any way in the application. Particularly, if there is some real scientific value in the work, over \$580,000 may be appropriate. The three years of monitoring proposed would not qualify as long-term monitoring and is really only the beginning of a real long-term monitoring program. I have seen lesser projects with higher price tags, but this does not justify the costs.

Additional Comments

The Murphy Creek Restoration Project is probably worth monitoring. However, in this reviewer's opinion, most restoration projects are worth monitoring. Similarly, it is probable that some interesting scientific contributions could come out of Murphy Creek. Yet, there is little in this application to insure that useful science or management lessons will come out of 3 years of monitoring and over half a million dollars. It is not difficult to envisage how this proposal could be modified to address the concerns I have

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highlighted. As written, I would consider this proposal fair to good. It is good in that the monitoring effort is likely to produce some interesting information. It is only fair in that there is little scientific originality in the proposal and the price for that information seems relatively expensive. A number of small typographic errors detract from the otherwise reasonable quality of this application.

Budget Review

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

Yes.

If no, please explain:

Yes, it is explained.

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

No.

If no, please explain:

In this proposal \$504,610 of the grant total of \$583,054 is services and consultants which are are not defined. No labor rates, no time duration amounts.

Subcontracting - Proposals for work to be performed by subcontractors or other entities in excess of the 25% of the total project dollars the grantee is required to provide a justification for subcontracting services. If subcontractors are pre-selected and identified in the proposals as part of the project team, the grantee should provide a justification on how each subcontractor was selected. Grantee shall identify labor rates and indirect costs rates paid to each identified subcontractor to ensure that labor rates are comparable to State rates.

The Subcontracted work should be identified with a rate and hours and attributed to each task and deliverable for each year. A performance evaluation is also recommended for subcontractors that receive more than 50% of the grant funds. If the subcontractor has not been identified, a position description complete with education level, experience, and abilities be submitted and the rate and hour associated with that position will be attributed to a task, and deliverable. The grantee must also comply with the State competitive bidding process as stated in the PSP.

Budget Review

The Grantee should charge a reduced indirect cost rate to the state for services that will be subcontracted by the grantee. (Researching SCM Section 3.06 B).

3. Are project management expenses appropriately budgeted?

No.

If no, please explain

10 hrs per month for PM labor? This estimate seems a little low.

4. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs? Are indirect rates, if used, appropriately applied?

No.

If no, please explain

Rates are not stated for consultants, the only stated rate is a small direct labor amount for the PM of \$65/hr.

Budget Detail/Administrative Overhead Fees - Budget detail combines the labor rates with the direct overhead rate. The labor rate, benefits and indirect rate should be itemized in the format provided by the PSP to enable reviewers to better evaluate and ensure that proposed labor rates are comparable to state rates.

If proposal is funded, a detailed list of items included in the indirect cost rate should be provided by the grantee. Grantee must provide itemized and detailed information included and charged as part of Indirect Rates (IDC) charges.

Note: No overhead or indirect rate charges on the equipment purchases should be allowed as part of the budget that shall be funded as a result of this PSP.

5. Does the budget justification adequately explain major expenses? Are the labor rates and other charges proposed reasonable in relation to current state rates?

No.

Budget Review

If no, please explain:

No explanation of most of the rates.

Task and Deliverables - Grantee must provide detailed information for all work including subcontractor work for each specific task, services, and work to be performed with the appropriate and corresponding deliverable or end product for each task(s) and/or sub-task(s). Costs associated with each task and deliverable should be evaluated based on what is considered to be reasonable costs for performing similar services.

Major Expenses - If the grantee is awarded a detailed list of equipment purchases should be provided by the grantee so reviewers can better evaluate whether it is more cost effective for the state to purchase large dollar equipment items through the state procurement process. If the equipment list is available within the State inventory or stock, then purchase of some or all of the listed items may be provided, loaned, or leased by the state to the grantee. In the event, that the equipment is purchased by the grantee, the grantee shall maintain an inventory of major equipment for auditing purposes and potential use for future projects. Grantee shall follow State Contracting Manual [SCM] Section 7.61 thru 7.62 rules pertinent to equipment purchase, lease, etc.

6. Are other agencies contributing or likely to contribute a share of the projects costs?
No.

If yes, when sufficient information is available, please sum the amount of matching funds likely to be provided:

No cost share is identified.

7. Does the applicant take exception to the standard grant agreement's terms and conditions? If yes, are the approaches the applicant proposes to address these issues a reasonable starting point for negotiating a grant agreement?
No.

If no, please explain:

Budget Review

There is no statement of agreement or disagreement with the standard grant agreements T &C's.

Contract Language Exceptions - Proposals submitted by grantees which identify exceptions to State of California's standard contract language provisions as provided in the 2004 PSP; and/or submit alternative contract language in lieu of the State's standard contract language should be carefully reviewed prior to awarding grant funds. Review will initially be conducted by the funding agency's contract office and referred to the legal department as needed.

8. Are there other budget issues that warrant consideration?

Yes.

If yes, please explain:

It would be good to know which people will be doing the site sampling, how long it will take them to do it each visit, how many visits, etc. And it would also be good to have a conference with this group earlier in the time schedule rather than waiting 34 months to see their report. Maybe ask for some preliminary conclusions in the first year, and so on.

Having had previous grants; this applicant may have previously purchased equipment with CALFED grant money that can also be used for this project.

Other comments:

Access to the study area has not been secured.

Environmental Compliance Review

1. Is compliance with California Environmental Quality Act (CEQA) required for this project?

No.

2. Is compliance with National Environmental Policy Act (NEPA) required for this project?

No.

3. Does this project qualify for an Exemption or Exclusion under CEQA and NEPA, respectively?

Does not apply.

4. Did the applicant correctly identify if CEQA/NEPA compliance was required?

Yes.

5. Did the applicant correctly identify the correct CEQA/NEPA document required for the project?

Does not apply.

6. Has the CEQA/NEPA document been completed?

Does not apply.

7. If the document has not been completed, did the applicant allot enough time to complete the document before the project start date?

Does not apply.

8. If the document has not been completed, did the applicant allot enough funds to complete it?

Does not apply.

9. Did the applicant adequately identify other legal or regulatory compliance issues (Incidental Take permits, Scientific Collecting permits, etc.) that may affect the project?

No.

Comments:

Page 14 of the description states that Robertson-Bryan, Inc. and Fisheries Foundation currently hold all necessary sampling permits for collection of fish and benthic macroinvertebrates in California waters. However, the Environmental Compliance

Environmental Compliance Review

Worksheet does not have any permits checked off; those which are required or obtained. This proposed project is the monitoring component of a CALFED Granted project to conduct a restoration project on Murphy Creek so it is likely that all required permits have been obtained as stated on page 14.

Identify those additional permits that may be needed by this project:

The applicant will need scientific collecting permits from the State specific to the reach of creek they will be working on as well as a Section 10 permit from the federal government. If these permits have not been obtained, please consult with the Dept. of Fish and Game and NOAA Fisheries.

10. Does the proposal include written permission from the owners of any private property on which project activities are proposed or, if specific locations for project activities are not yet determined, is it likely that permission for access can be obtained?

Yes.

Comments:

Letters of permission to conduct study along Murphy Creek were obtained for work under a previous grant. These letters are in the process of being renewed for this proposed project.

11. Do any of these issues affect the project's feasibility due to significant deficiencies in planning and/or budgeting for legal and regulatory compliance or access to property?

No.

Prior-Phase Funding Review

List the other CALFED or CVPIA grants received by this applicant for which your agency manages contracts:

Project Title	Restoration and Monitoring of Riparian Habitat Corridors Along the Lower Mokelumne River
CALFED Contract Management Agency	GCAP Services
Amount Funded	859,405
Date Awarded	2003/01/01
Project Number	ERP-02-P20

3. Have negotiations about contracts or contract amendments with this organization proceeded smoothly, without persistent difficulties related to standard contract terms and conditions?

Yes.

4. Are the status, progress, and accomplishments of the organization's current CALFED or CVPIA project(s) accurately stated in the proposal?

N/A

5. Has this organization made adequate progress towards these project(s)' milestones and outcomes, without unreasonable divergences from project schedules or poor-quality deliverables?

Yes.

6. Is the applicant's reporting, record keeping, and financial management of these projects satisfactory?

Yes.

7. If this application is for a next phase of a project whose contract your agency currently manages, will the project(s) be ready for next-phase funding to monitor and evaluate project outcomes in fiscal year 2005/6, based on its current progress and expenditure rates?

N/A

Other comments:

It took longer than anticipated for grantee to obtain permits

Prior-Phase Funding Review

from State Reclamation Board, which caused a late start to restoration activities. Grantee is confident project will be completed on schedule.