Selection Panel Review Summary

Proposal Number: 013
Proposal Title: Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project
Principal Investigator: Western Shasta Resource Conservation District
Amount Requested: $2,759,566.00
Recommended Amount: To be determined

Summary: The objectives of the Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project are to remove the long-term impacts of mercury contamination in the project area, while creating a cost-effective 20-year supply of spawning gravel from dredger tailings for use in Lower Clear Creek to enhance listed salmon/steelhead species populations, and to create 5.72 acres of new wetlands.

Assessment: The proposal includes good linkages between project and CALFED goals. There are multiple benefits including creation of spawning gravel, creation of wetland habitat, and mercury removal from the system. The project team is experienced and the project builds on previous work. The proposal lacks hypotheses and the project may not produce new information. Hypotheses could certainly be generated, and would guide the work in a more scientifically valuable manner. The Selection Panel indicated that other necessary additions are a monitoring plan (for mercury in the stream and in biota, and for spawning success, before and after the modifications are done) and a performance evaluation plan and thought that the project team should include expertise in natural sciences. Panel members felt that the gravels should be tested for mercury prior to putting it back in the stream or show how this has already been done safely in previous restoration projects that have utilized onsite materials.

CALFED Ecosystem Restoration Program

External Scientific Review Form

Proposal Number: 013

Proposal Title: Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project

Reviewer: #1

Conflict of Interest Statements:

I have no financial interest in this proposal (please mark correct response).

- Correct

General Review Questions:

Along with your written observations in response to the questions below, please rate each using the following criteria:

Excellent: Outstanding in all respects
Very Good: High quality in nearly all aspects
Good: Quality work, but with some deficiencies
Fair: Lacking in one or more critical aspects
Poor: Serious deficiencies

1. **Problem/Goals.** Is the problem that the project is designed to address adequately described? Are the goals, objectives, and hypotheses clearly stated and internally consistent? Does the proposal describe the ecosystem goals it is designed to address (link to ERP goals)?

   Comments:

The PIs propose to remediate an area with known mercury contamination and both create habitat at the remediated site and provide material to improve fish reproduction habitat offsite. It is a creative approach to restoration and it appears that site selection was based on an intense planning effort that involved multiple stakeholders. Their linking of project goals to those established by CALFED is commendable and the ability to "restore" in a number of aspects is the key to this project.

The goal of rehabilitating and protecting spawning grounds for at-risk species is a high-profile issue in the Bay-Delta watershed and this study site is high up in the watershed. It makes sense to start at the top of the watershed and work down, even if it is in small steps, to address restoration. If a site like this continues to be a source for Hg contamination, it would make little sense to restore downstream, if downstream restoration projects lead to enhanced bioaccumulation of contaminants.

The habitat goal of this project is different from other proposals that I have reviewed. This study includes a 5.72 acre wetland, in addition to providing enhanced riparian spawning

grounds. There is very little presented about the design of the wetland and the fill material. In this as in other restoration projects, one must be wary of enhancing methylation in a newly created wetland. The fines from the area that contain higher Hg levels will not be used, but if soils are transported from offsite, they too, may enhance methylation due to the "reservoir effect". Unless more data is shown, it is difficult to assess potential success of Goals 3 and 4 (below).

The downstream water and sediment quality is obviously positively affected by remediation, but it is unclear how much this site presently contributes relative to the overall creek input of Hg. It appears that the Hg mass in the remediated site has not been calculated, although there is an adjacent site with higher levels and is considered a "hot spot". Given that unknown, it may be difficult to achieve the goal of reducing loadings from this particular site. A bit more assessment data should have been included.

Rating**: Good**

2. **Approach.** Does the proposal clearly describe its approach (including study design and methods, if appropriate)? Is the approach well designed and appropriate for meeting the objectives of the project as described in the proposal? Will the proposal contribute to our knowledge base?

   Comments:

Based on my background, it is difficult for me to address the details of the construction and engineering related issues at this site. However, I am quite impressed by the overall approach used to both select and remediate the site. The site selection process appears to be guided by stakeholders. Habitat restoration decisions are likely a consequence of new lengths of stream access created by recent dam removal in downstream reaches. The approach of reusing removed gravel for supplementing spawning habitat is also commendable.

I am not aware of other studies that may be related to this one, but I was a little surprised that there was no monitoring effort described. It would be pretty straightforward to add a mercury mass balance component to this study. Simply monitoring upstream and downstream of the site would suffice. Samples would then need to be taken during processing of dredged materials. It would be of great interest for this project to identify the mass of Hg removed and the mass that may have been released to the stream during dredging. This study should be a model for future remediation and lessons learned will be quite valuable.

Rating: **Very Good**

3. **Feasibility.** Is the proposed project's approach fully documented and technically feasible? Can the project be completed within reasonably foreseeable constraints (e.g., acquiring permits, construction, weather, etc…)? Does the proposal thoroughly address requirements such as environmental compliance and permitting? Is the scale of the project consistent with the objectives?

   Comments:

It looks like this team has done their homework in both identifying the site characteristics and developing a reasonable executable plan. It's great that 98% of the watershed is in public ownership. The proper permitting complexities have been investigated and a sound construction plan, including a river crossing has been described. The added benefit of cost recovery by providing cheaper gravel for restoration is also a plus.

Rating: **Excellent**

4. **Conceptual Model.** Does the proposal provide a conceptual model that describes the interconnections among the key ecosystem components relevant to the action(s) being proposed? Does the conceptual model clearly explain the hypotheses it is testing?

Comments:

It appears that this group has spent a significant amount of planning time using models to predict outcomes from the project. The model appears to have guided the site selection. The investigators have done this work at the front end, but it would have been more interesting if they would have presented a model for effect post-remediation. They seem to have thought about possible methylation in the wetland, for instance, but what scenarios could they have used to lessen the effects? Is merely rerouting a seasonal stream the only approach? What is the design of the wetland that best reaches ecological outcomes? It is difficult to ask those types of questions in a short proposal that is construction/remediation-based but I hope that others would see the value in monitoring and developing ecological models as a project like this progresses.

Rating: **Good**

5. **Performance Evaluation Plan (Monitoring Plan and Performance Measures).** Does the proposal include a plan for project performance evaluation (monitoring to assess results and evaluate assumptions and hypotheses)? Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Will future studies or restoration projects be able to incorporate the information from this project?

Comments:

While the study may have been designed as an outcome-based project, very little space is devoted to measures of success. I encourage the project leaders to develop these. For instance, the decrease in Hg loading by XX% would be an obvious performance measure, but we have little information to start to develop a measure. Increase in spawning females in riparian zones of the remediated area, or even in areas where gravel has been amended, would also be good measures. This is a difficult aspect of a study like this, but is critical for measuring success – especially for a project with such a large budget.

Rating: **Good**

6. **Expected Products/Outcomes.** Are products of value likely from the project? Are products of value also likely from the individual components of the project? Will the results of this study be readily accessible?

Comments:

Similar to the performance measure discussion above, there really needs to be a discussion of outcomes beyond the general description of low-cost gravel and the fact that a wetland was created. What about the functional outcomes? There has to be a change in biological function of the area. Biological indices? What about chemistry? Can there be improvement here? How can one assess the micro-topography that simulates pre-dam conditions? These would be keys for a project whose goals are to affect at-risk species and improve ecological function. The goals need to be discussed and further developed throughout the proposal.

Rating: **Good**

7. **Previous Related Work.** Does the proposed project continue past work or include any work that could be considered a duplication of work previously done or currently being done by others?

Comments:

This project appears to be a continuum from earlier projects with stakeholder involvement. This group has also developed watershed plans, instituted ecosystem improvements and run monitoring projects with CALFED funding. It is up to the program officer to determine how successful those projects were, but based on the impressive list, I have confidence in this group.

Rating: **Excellent**

8. **Qualifications.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project? Do they have working knowledge of California streams and rivers?

Comments:

Again, I am not an expert in construction and engineering aspects of this study. The authors appear well-qualified, but it would have been a complete proposal had they added experts for biological and chemical assessment of success. Who will provide a feedback loop during remediation? A better explanation of the roles of the people involved, especially the natural scientists, is more than warranted.

Rating: **Very Good**

9. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed? If the budget is considered to be excessive or inadequate for the work proposed, please highlight areas of the budget that may be of concern.

Comments:

This is an extremely expensive project and the savings in gravel costs and wetland creation cannot be the only measures of benefit. A resource economist would be great for this project. The ability to have a functioning wetland from a chemical and biological viewpoint would add value.

Rating: **Good**

Additional comments:

None.

Overall Evaluation Summary Rating

In the space below, please provide an overall rating of the proposal using one of the following categories:

- **Superior:** Outstanding in all respects with superior technical and scientific value and no significant concerns. Expected to add substantial new thinking/concepts to our knowledge/understanding of the topic proposed.
- **Above Average:** A very good proposal with at least high technical and scientific value and no significant concerns. Will add solid basic knowledge/understanding of the topic proposed.
- **Adequate:** A reasonable proposal without serious technical deficiencies and at least adequate value scientifically. Will add some useful knowledge to the topic proposed.
- **Inadequate:** A technically deficient proposal and/or one with low value, serious impediments or concerns. Will not likely change our basic knowledge/understanding of the topic proposed.

Rating: **Above Average**

This is an interesting study and one that only fell short of "superior" because it did not include a monitoring and assessment component. Perhaps CALFED should consider decreasing the construction/remediation project costs a bit and adding a monitoring component. I would hate to see such a good project be classified as a "case study." This is an opportunity to combine contaminant removal with extensive habitat restoration. It could guide many future efforts in the Bay-Delta and beyond. Any ability to provide quantifiable measures of success will allow greater transferability. This project will add basic knowledge in its current design. Bring in a few researchers and it will add substantially to our understanding of remediation and restoration.

CALFED Ecosystem Restoration Program

External Scientific Review Form

Proposal Number: 013

Proposal Title: Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project

Reviewer: #2

Conflict of Interest Statements:

I have no financial interest in this proposal (please mark correct response).

X Correct
- Incorrect

General Review Questions:

Along with your written observations in response to the questions below, please rate each using the following criteria:

Excellent: Outstanding in all respects
Very Good: High quality in nearly all aspects
Good: Quality work, but with some deficiencies
Fair: Lacking in one or more critical aspects
Poor: Serious deficiencies

1. **Problem/Goals.** Is the problem that the project is designed to address adequately described? Are the goals, objectives, and hypotheses clearly stated and internally consistent? Does the proposal describe the ecosystem goals it is designed to address (link to ERP goals)?

   Comments:

   The problem is described in Section 6 under a discussion of issues addressed by the project. The overall goal of the Lower Clear Creek Project is clearly stated as are the multiple objectives and both are linked to the problem. Hypotheses, however, are not provided explicitly although they can be inferred from the discussion of objectives and design of the project. Without a clear statement of hypotheses, it is difficult to see how the project will be evaluated.

   The proposal effectively describes the ecosystem goals (including ERP goals) that will be addressed.

   Note that the proposed project is on federal land (owned by Bureau of Land Management) and is a companion project to the Lower Clear Creek Mercury Abatement Project, which is located on state land (owned by California Department of Fish and Game). As such, they should be considered together for funding. Because there is overlap between the two proposals, I have made similar comments on each.

   Rating: Very Good.

2. **Approach.** Does the proposal clearly describe its approach (including study design and methods, if appropriate)? Is the approach well designed and appropriate for meeting the objectives of the project as described in the proposal? Will the proposal contribute to our knowledge base?

   Comments:

Implementation of the mine tailings removal, transport, and storage is clearly described, as is the grading of areas for creation of a freshwater emergent wetland. Other aspects of the project (e.g., monitoring of mercury in the removal process) are not described in enough detail. Mercury is generally known to be associated with "fines" but I would have liked to see more documentation of the separation process in order to be convinced that the spawning gravel will end up with inconsequential concentrations of mercury, the water used in the process will not recontaminate Clear Creek, and the final disposition of fines in an upland disposal area is appropriate. If this work was done previously, results should be summarized in the proposal.

While it is conceptually clear how the approach will address the objectives, there is no explicit link between the study design and the project objectives. The objectives are listed below with my comments.

1) Remove long-term impacts of mercury contamination in the Project area

Comment – While one can assume that removing mercury-contaminated mine tailings will remove impacts in the Project area, the project does not appear to involve any monitoring of mercury in Clear Creek to ascertain the effect of the project. The companion project, Lower Clear Creek Mercury Abatement Project, includes mercury monitoring, although additional detail is required.

2) Create cost-effective supply of spawning gravel from dredge tailings for threatened and endangered anadromous fish

Comment – This is the strongest aspect of the proposal and the project is appropriate for meeting this objective.

3) Create wetlands to improve aquatic and terrestrial habitats in the Lower Clear Creek watershed

Comment – The project will create wetlands in the area from which tailings are being removed. Follow up monitoring to document improvement of aquatic and terrestrial habitats is not apparent.

Multiple objectives are also listed under general categories of goals (e.g., habitats, water and sediment quality) in Section 6. These objectives include statements such as "Maintain the abundance and distribution of the following species, California red-legged frog and western pond turtle." The study design does not include a means of assessing achievement of most of these objectives.

The greatest contribution to our knowledge base is how to cost effectively produce spawning gravel.

Rating: Good.

3. **Feasibility.** Is the proposed project's approach fully documented and technically feasible? Can the project be completed within reasonably foreseeable constraints (e.g., acquiring permits, construction, weather, etc…)? Does the proposal thoroughly address requirements such as environmental compliance and permitting? Is the scale of the project consistent with the objectives?

Comments:

With the exception of detail on performance evaluation and monitoring, the proposed approach is documented and technically feasible. The team has direct experience with successfully implementing the approach. The schedule is consistent with the project plan, and the plan identifies the numerous requirements, including environmental compliance and permitting, that need to be met.

The scale of the project is consistent with the three primary objectives, with the possible exception of monitoring. While the project is conceptually consistent with the additional objective of reducing mercury loading to the Sacramento River and Delta, it is hard to imagine that this would be measurable.

Rating: Very Good.

4. **Conceptual Model.** Does the proposal provide a conceptual model that describes the interconnections among the key ecosystem components relevant to the action(s) being proposed? Does the conceptual model clearly explain the hypotheses it is testing?

Comments:

The proposal references a conceptual model that describes Lower Clear Creek and how restoration actions (such as those proposed) will lead to increases in diversity and productivity of the ecosystem. A summary of the effects of mercury contamination is also provided. While the summary and the referenced conceptual model are the product of considerable work, the description in the proposal is brief, no figures are included to illustrate the processes, and the "interconnections among key ecosystem components relevant to the action(s) being proposed" are not explained. Conceptually, even with the brief treatment of the conceptual model in the proposal, the proposed work makes sense but further detail would be preferable so that actions can be linked to key components. As stated previously, the proposal does not present hypotheses.

Rating: Good.

5. **Performance Evaluation Plan (Monitoring Plan and Performance Measures).** Does the proposal include a plan for project performance evaluation (monitoring to assess results and evaluate assumptions and hypotheses)? Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Will future studies or restoration projects be able to incorporate the information from this project?

Comments:

The project does not present a plan for performance evaluation. Clearly, the amount of gravel processed and stored will be recorded, as well as the operating costs to do so. Otherwise, the treatment of performance evaluation in the proposal is insufficient.

A monitoring plan is referenced in Section 6, Part 2b and a monitoring report is referenced in Section 6, Part 4 but there is no detail given and no plan for project performance evaluation. The current proposal does not discuss hypotheses or performance measures to document achievement

of project goals and objectives. The mercury monitoring referenced in the proposal for the Clear Creek Mercury Abatement Project may help to fill this gap, but insufficient detail is provided so it is difficult to assess.

Future restoration projects will be able to incorporate information regarding gravel extraction and separation (e.g., cost, logistics); however, without a monitoring plan, it is unclear how the extent of restoration effectiveness and impacts on mercury transport will be evaluated and reported.

Rating: Poor.

6. **Expected Products/Outcomes.** Are products of value likely from the project? Are products of value also likely from the individual components of the project? Will the results of this study be readily accessible?

Comments:

The project will likely yield the following products of value: removal of mercury from dredger tailings in the Project area, creation of enough spawning gravel for 20 years of habitat restoration work in the area, and creation of 5.72 acres of freshwater emergent wetlands.

Results of the study will be accessible in a series of reports. Public outreach will include press releases, public meetings, and educational brochures.

Rating: Very Good.

7. **Previous Related Work.** Does the proposed project continue past work or include any work that could be considered a duplication of work previously done or currently being done by others?

Comments:

The proposal builds on work done previously by the team on habitat restoration in the area. Specific to this project area, numerous activities have already taken place (i.e., completion of site surveys, data collection to ascertain particle size distribution of the gravels and annual groundwater levels as well as the distribution of inorganic mercury and methylmercury; a feasibility analysis of using dredge-mined tailings for spawning gravel supplementation including the best location or use for the remaining size fractions, and preparation of a conceptual design with criteria for restoring the floodplain at the site) and, therefore, the proposed work is an efficient and cost-effective application of resources. It is not a duplication of work that was previously done; it is a continuation of a successful restoration program. The proposed project is on federal land and is a companion project to the Lower Clear Creek Mercury Abatement Project, which is located on state land.

Rating: Excellent.

8. **Qualifications.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project? Do they have working knowledge of California streams and rivers?

Comments:

The project team is clearly qualified to efficiently and effectively implement the proposed project. The fact that the team involves a partnership of federal, state, and local partners is particularly impressive. The gravel contractor has direct experience with the process and has fine-tuned his equipment to optimize performance. The team was intimate working knowledge of Clear Creek.

I do not have direct knowledge of their track record in terms of past projects but they have clearly worked on this issue for several years.

Rating: Excellent.

9. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed? If the budget is considered to be excessive or inadequate for the work proposed, please highlight areas of the budget that may be of concern.

Comments:

The budget is reasonable and adequate for the work proposed. In fact, the proposal states exactly how much savings will be realized by using the selected gravel contractor, based on previous work to optimize the process.

Rating: Excellent.

Additional comments:

The execution of the project is clearly well thought out, the team is experienced, the proposed work makes sense, and it is conceptually consistent with overall goals and objectives. Unfortunately, the lack of hypotheses and a performance evaluation plan (especially with respect to monitoring restoration effectiveness and impacts on mercury cycling) will limit a complete understanding of the outcome with respect to habitat restoration and mercury.

Overall Evaluation Summary Rating

In the space below, please provide an overall rating of the proposal using one of the following categories:

- **Superior:** Outstanding in all respects with superior technical and scientific value and no significant concerns. Expected to add substantial new thinking/concepts to our knowledge/understanding of the topic proposed.
- **Above Average:** A very good proposal with at least high technical and scientific value and no significant concerns. Will add solid basic knowledge/understanding of the topic proposed.
- **Adequate:** A reasonable proposal without serious technical deficiencies and at least adequate value scientifically. Will add some useful knowledge to the topic proposed.

- **Inadequate:** A technically deficient proposal and/or one with low value, serious impediments or concerns. Will not likely change our basic knowledge/understanding of the topic proposed.

Rating: Adequate.

Please provide a brief explanation of your summary rating:

While the proposal is solid, the lack of a performance evaluation plan is a serious deficiency. It is possible that performance evaluation is planned but not covered in this proposal. If this is the case, then a description of the evaluation should be provided. The performance evaluation of the companion proposal, Lower Clear Creek Mercury Abatement Project, is also deficient.

CALFED Ecosystem Restoration Program

External Scientific Review Form

Proposal Number: 013

Proposal Title: Lower Clear Creek Aquatic Habitat and Waste Discharge Improvement Project

Reviewer: #3

Conflict of Interest Statements:

I have no financial interest in this proposal (please mark correct response).

- Correct X
- Incorrect

General Review Questions:

Along with your written observations in response to the questions below, please rate each using the following criteria:

Excellent: Outstanding in all respects
Very Good: High quality in nearly all aspects
Good: Quality work, but with some deficiencies
Fair: Lacking in one or more critical aspects
Poor: Serious deficiencies

1. **Problem/Goals.** Is the problem that the project is designed to address adequately described? Are the goals, objectives, and hypotheses clearly stated and internally consistent? Does the proposal describe the ecosystem goals it is designed to address (link to ERP goals)?

Comments:

Goals and objectives are clear, and relevance to CALFED ERP goals is addressed in detail, point by point. Hypotheses and assumptions, however, are not clearly stated.

Rating**:** Good

2. **Approach.** Does the proposal clearly describe its approach (including study design and methods, if appropriate)? Is the approach well designed and appropriate for meeting the objectives of the project as described in the proposal? Will the proposal contribute to our knowledge base?

Comments:

The approach is appropriate and the project is generally well designed. How the project develops in detail depends upon some decisions that will be made based on various criteria. These criteria are not always clearly defined and their application and possible impact on costs is not always clearly explained. The project should provide valuable experience in utilizing dredge tailings and restoring ecological function in mining-impacted fluvial environments.

Rating: Very Good

3. **Feasibility.** Is the proposed project's approach fully documented and technically feasible? Can the project be completed within reasonably foreseeable constraints (e.g., acquiring permits, construction, weather, etc…)? Does the proposal thoroughly address requirements such as environmental compliance and permitting? Is the scale of the project consistent with the objectives?

Comments:

The project is technically feasible, appropriately scaled, and adequately documented, with no foreseeable constraints that could prove critical. Environmental compliance and permitting issues are not addressed in detail, but the proposing organization has extensive experience with requirements for this type of project, local condition, and local contracting.

Rating: Excellent

4. **Conceptual Model.** Does the proposal provide a conceptual model that describes the interconnections among the key ecosystem components relevant to the action(s) being proposed? Does the conceptual model clearly explain the hypotheses it is testing?

Comments:

This section of the proposal is weak. It can be assumed that readers have some knowledge of applicable models, so detailed descriptions of basic models aren't necessary, but sources of models used should be explained and important modifications described and referenced. The proposal refers new models "based on" CALFED EWP models, but isn't clear what this means, since there are no specific references given (and most of the links on the EWP web site don't work.) Has experience derived from a decade of channel and flood-plain modifications, gravel injection, and geomorphic monitoring informed the sediment transport model that is behind this effort? Models that attempt to describe mercury speciation, transport, and cycling can include numerous factors and interactions of varying (and uncertain) importance (e.g. Wiener and others, 2003, Ecotoxicology of mercury (chapter in Handbook of Ecotoxicology); Alpers and others, USGS Fact Sheet 2005-3014), but there are several local investigations that can help define a

more specific working model for Clear Creek (Slowey and others, Environ. Sci. Technol. 2006, 1547-1554; Ashley & Rytuba, USGS Open-file Report 2008-1122; Tetra Tech, 2005).

Rating: Fair

5. **Performance Evaluation Plan (Monitoring Plan and Performance Measures).** Does the proposal include a plan for project performance evaluation (monitoring to assess results and evaluate assumptions and hypotheses)? Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Will future studies or restoration projects be able to incorporate the information from this project?

Comments:

The proposal mentions monitoring of several types that are appropriate to evaluating performance, but does not present a monitoring plan as such. Some detail is needed on geomorphic, vegetation, and aquatic habitat monitoring: location, frequency, and scope of surveys. Regarding mercury, removing mercury-bearing fines from the material to be processed is a goal of the project, and the amount actually removed can presumably be quantified, but trying to confirm that the project has reduced the amount of mercury in floodplain materials that could be transported (at some time) is an ill-defined monitoring objective. A more critical measure of performance is to monitor the loadings of mercury to Clear Creek, as proposed in the Tetra Tech report.

Rating: Good overall (excluding mercury)

6. **Expected Products/Outcomes.** Are products of value likely from the project? Are products of value also likely from the individual components of the project? Will the results of this study be readily accessible?

Comments:

Pursuing the goals of this project will almost certainly result in beneficial outcomes, including augmenting and improving aquatic and off-stream habitats, reducing mercury inventory and exposures, and reducing future restoration costs. However, outcomes are difficult to assess in detail and in quantitative terms because they depend upon the total amount of material to be processed, the amounts expected in each size category, and how material in each category will be used, stored for future use, or disposed of. Numbers are scattered through the proposal in several places, presented with a seemingly random mix of units (cubic yards and tons), and appear to be inconsistent, although this may be only because it is not clear exactly what they refer to. It is not stated whether swell factors have been applied in determining product volumes, thus it is difficult to judge whether storage areas are appropriately scaled. Definitions and size criteria are buried in Attachment 2, without no reference in the main body of the proposal. All this information should be pulled together in one place. The pertinent numbers, including estimates of total tailings volume, total volume to be processed, amounts in each important size category and proportions of the total, and distribution of processed materials, should be summarized clearly. To do this concisely, a table and/or a flow chart would help. Primary units should be the same throughout, in this case preferably cubic yards.

Regarding the fines, how will "contaminated" material be defined and recognized? The TEL for mercury is mentioned, so presumably a concentration of 174 ng/g will be considered significant, but more explanation of sampling and analytical procedures, and criteria is needed.

Rating: Good

7. **Previous Related Work.** Does the proposed project continue past work or include any work that could be considered a duplication of work previously done or currently being done by others?

Comments:

The proposed project adheres to the restoration program conceived more than a decade ago, and is a logical next step. It takes advantage of knowledge obtained in previous work.

Rating: Excellent

8. **Qualifications.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project? Do they have working knowledge of California streams and rivers?

Comments:

WSRCD, the lead organization, has long experience in projects of this type. Although project management has changed, as expected in a long-term program, the technical team and scientific contributors should provide ample experience and guidance.

Rating: Excellent

9. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed? If the budget is considered to be excessive or inadequate for the work proposed, please highlight areas of the budget that may be of concern.

Comments:

WSRCD's experience with local contractors gives assurance that cost estimates are reasonable for the anticipated work. The budget should be adequate unless unexpected conditions force changes in the scope of work. Contingency funds are included for more extensive mercury testing if needed. It is difficult to discern whether there are other areas in which cost over-runs could occur, owing to the shortcomings described in Question 6 comments, above. Also, there is no discussion of the character of the dredge tailings deposit and whether there are any indications that it varies within the project area. As the project is described, it seems unlikely that sluice sands will be encountered, but this is an important question, as unexpected sluice sands will increase the amount of mercury-contaminated fine material to be managed, and decrease the useable material. It is also useful to determine, if possible, whether the dredge that produced the tailings operated in-stream or off-channel, and what proportion of the deposit was emplaced above water level. This information can help give an idea of overall mercury concentration levels and variability.

Rating: Very Good

Additional comments:

None.

Overall Evaluation Summary Rating

In the space below, please provide an overall rating of the proposal using one of the following categories:

- **Superior:** Outstanding in all respects with superior technical and scientific value and no significant concerns. Expected to add substantial new thinking/concepts to our knowledge/understanding of the topic proposed.
- **Above Average:** A very good proposal with at least high technical and scientific value and no significant concerns. Will add solid basic knowledge/understanding of the topic proposed.
- **Adequate:** A reasonable proposal without serious technical deficiencies and at least adequate value scientifically. Will add some useful knowledge to the topic proposed.
- **Inadequate:** A technically deficient proposal and/or one with low value, serious impediments or concerns. Will not likely change our basic knowledge/understanding of the topic proposed.

Rating: Adequate

Please provide a brief explanation of your summary rating:

The project is worthwhile because it provides a cost-effective increment to a long-term ecosystem restoration program, and positive results are reasonably assured. Some practical experience in handling and utilizing dredge tailings and remediating tailings tracts will surely accrue; however, I see little evidence that significant new basic knowledge will result. In many ways the proposal is better than "adequate," but I can only rate it "adequate" in light of the scientific value and contributions to knowledge/understanding criteria.