

Upper Last Chance Restoration Project Monitoring

Leslie H Mink

Initial Selection Panel Review

Not Recommended

Amount Sought: \$473,804

Fund This Amount: \$0

Brief explanation of rating:

The proposed project would continue monitoring in the Last Chance Creek watershed, a tributary to the Feather River above Oroville Dam. Although Last Chance Creek is the site of an ERP-funded restoration project, it is not an area of focused ERP investment. Because restoration in the watershed above major impoundments is not a priority for the ERP, the Selection Panel does not recommend funding this proposal

Technical Panel Review

Technical Review Panel's Overall Evaluation Rating:

Above Average

Explanation Of Summary Rating

Except for the eddy flux towers component, which most of the reviewers found unnecessary and too expensive, the work produced by this project should be solid and yield useful results. The regional review panel was concerned that this is not addressing high-priority issues identified by Calfed. Nevertheless, the issue of meadow restoration is an important one and the technical panel fully expects that the results from this project will be able to be extrapolated to other regions. Because of this, the panel has rated this project as 'above average' even though the guidelines state that a proposal should not be rated above adequate as a result of the 'medium' ranking by the regional panel.

Goals And Justification

This proposal seeks to monitor the results of a nine-mile gully elimination project. The goals of the restoration are clearly identified as being: restoration of hydrologic function and improvement of habitat value. The objectives to meet this goal are equally well explained and include: increasing summer baseflow, reducing flood peaks, and enhancing wetlands. The conceptual model driving the restoration is clear. The proposal clearly states all the hypotheses that will be tested. They are all reasonable and, when tested, will provide important information.

Approach

The approach targets well the project's objectives. The approach is integrative yet 'modular' such that if one aspect

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does not work out, it will have little effect on the others. The project does a good job of building upon previous monitoring. In fact, it is an extension of previous monitoring. Modifications based on previous lessons-learned are not mentioned, however the monitoring techniques are fairly standard and straightforward. The monitoring techniques will provide valuable information regarding the healing of gullies; very little good quality, long duration data exist for this type of work.

The PIs propose to refine the WEHY model with field measurements of sediment transport, turbidity, and nutrients. Who will make these measurements? The proposal does not give any detail to explain how these will be done. It was suggested that the results from the WEHY model be compared with other models (e.g., the VIC-2 model) to expand the interpretation of their results and to more fully understand the strengths and weaknesses of the different models.

With regards to the evapotranspiration measurements with the eddy flux towers, the panel was not convinced that they are justified given their high costs (\$60k each). Scientifically, the results would be interesting but, in practical terms, there is uncertainty over how their results would be used to guide policy.

The results of the monitoring will be simple to understand and can be directly brought to decision-makers with little or no interpretation or massaging. Now, a few negative comments.

Feasibility And Likelihood Of Success

Because this proposal is to fund extensions of existing monitoring programs, the tasks have already been shown to be feasible. The scale of the project is consistent with the objectives. The PIs correctly bring up the problem of climatic variability as a confounding factor when comparing pre and post-project measures, such as discharge. Their technique of normalizing runoff by precipitation may be too simplistic to compare pre and post-project hydrographs - discharge does not scale linearly with precipitation. We would recommend using a

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runoff model (e.g., HEC).

Performance Measures

The data collected will directly address the restoration goals and the conceptual model that framed them. The PIs propose very specific measures to evaluate the restoration and will submit their results to rigorous statistical analysis. Except for a few instances mentioned above, this project will be a solid test for the restoration actions.

Products

The information generated by this project will be useful and accessible to land managers and decision makers with a minimum of interpretation. There will be strong links with UC Davis and Stanford and this project will continue its laudable efforts to educate the public via school field trips and by taking a proactive approach to involving landowners. Data handling, storage, and dissemination will be incorporated into an existing system. All of the monitoring data will be publicly available via the web. The PIs have planned at least 7 presentations and 2 papers submitted to peer-reviewed journals. The CV does not list publications by the authors but the project should produce publishable high-quality results.

The technical panel suggested development of a Powerpoint presentation at the outset of funding. This presentation could frame the problem, illustrate the restoration techniques and demonstration sites, outline the outstanding questions and those already answered by the first phase of monitoring.

Capabilities

The project team is already involved in this work. Their previous research and publication record demonstrates their ability to carry out this work. They have the right mix of people to cover all the aspects of the project.

Technical Panel Review

Budget

As previously explained, the eddy flux towers may not provide the best bang for the buck. Aside from this concern, the budget is reasonable and adequate.

Regional Review

Medium. Primary concerns were that the restoration project was not funded by Calfed and that the proposal does not address a high priority area. The technical panel requests a determination of whether the restoration actions were funded by Calfed before funding is recommended.

Administrative Review

The budget review would like to see more details but did not provide any serious criticisms. Environmental compliance would like more information regarding the eddy flux towers but there are no red flags. There were no red flags from prior phase funding.

Additional Comments

Sacramento Regional Review

Sacramento Regional Panel's Overall Ranking:

Medium

Summary:

This project has useful application to low gradient stream/meadow systems, but does not address milestones, Big R species, or high priority areas. This project may be more appropriate for CALFED's Watershed Program. The project may provide tools and information that could be used to inform restoration actions on low gradient reaches on Mill and Deer Creeks -- which are higher priority for the ERP program.

1. Applicability To ERP Goals And Regional Priorities.

This project primarily addresses CALFED's goal of restoring functional habitat types in watersheds of the Bay-Delta through the monitoring of a large scale meadow complex restoration in the Sierra Nevada. This proposal would provide monitoring in support of the CALFED funded WEHY model.

The proposal does not evaluate areas where CALFED has made greatest investment. The meadow restoration project was not funded by CALFED. Milestones do not apply to the project area. Big R species are not in project area.

The project compares results and utility of different approaches to assessing affects of restoration. These include empirical monitoring and modeling.

2. Links With Other Restoration Actions.

The hypotheses tested here would be common to other restoration actions of this nature. The pond and plug method of restoring gullied streams is a commonly used approach in upper watersheds. Results from this project will help with the design of future projects of this type and predicting their

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benefits. The project incorporates other restoration actions into monitoring, but cumulative response does not appear to be goal. The project area is large scale (4000 acres and 37 miles) so instream flow could be viewed as cumulative response. The project is coordinated with Stanford and UCD efforts. Data will be available via the Feather River CRMP website. The project continues ongoing monitoring at the site. This is especially true of geomorphic and vegetative responses.

3. Local Circumstances.

There are no local constraints that would effect the project's feasibility.

4. Local Involvement.

This project has included, and will continue to include, local students in monitoring through other funds. The project involves public outreach and education through coordinators who are responsible for these activities. Part of the group's mission is to inform public about the importance of properly functioning watersheds

5. Local Value.

The project will report on elements that are key to the success of stream and meadow restoration. The monitoring is focused on objectives that are typical of this type of restoration. There are several restoration actions in the Upper Feather River Watershed to which the modeling products from this project could be applied (e.g., the upper Feather River Watershed which feeds the State Water Project). Knowing the relationship between aquifer storage and surface flow is very important to assessing how the upper watershed's condition impacts water supply. The results of this study will be useful at the local, watershed, and Sierra Nevada/Cascade regional scale. The pond and plug method of restoration is commonly used in upper watersheds to restore channel and floodplain function.

External Technical Review #1

Goals And Justification

Yes the proposal identifies the restoration actions to be monitored. the proposal presents clear and internally consistent statement of the goals and objectives. the conceptual model is also clear as is the underlying basis for the projects. the hypotheses are clearly stated and justified.

Approach

The approach is well thought out, incorporates adaptive management techniques, and will be a significant contribution to the question of incised channel restoration.

Technical Feasibility

yes for both questions

Performance Measures

yes the data collection will allow evaluation of the restoration actions. there seems to be a nice link between the action, parameter identified as important, monitoring, and potential evaluation.

Products

the products will be useful to both the applied and academic fields interested in restoration actions.

Capabilities

the team seems well qualified

Budget

budget seems reasonable for the amount of work.

Additional Comments

this seems to be an important project

External Technical Review #2

Goals And Justification

Most aspects of the proposed monitoring activities appear to be well justified based on the objectives of the Last Chance Creek floodplain meadow restoration objectives. Although the mechanisms of floodplain meadow disturbance are either poorly understood or poorly explained, it seems that gully development, channel incision, and channel straightening have all contributed to dewatering of the floodplain aquifer thus reducing groundwater storage and summer baseflows. The goals of the restoration project were multifold including: raising the channel and water surface elevation through grade control and meander restoration, expansion of wetlands, encouragement of riparian vegetation growth, increasing groundwater storage and summer baseflows, attenuation of peak flows, encouragement of beaver population expansion, and refinement of the WEHY watershed hydrologic model. All but one of the proposed monitoring activities follow logically from these goals and from the stated hypotheses.

The proposed evapotranspiration monitoring, however, is very expensive and seemingly tangential to the project goals. The evapotranspiration investigation is not well explained or defended and is certainly not a necessary component of the restoration monitoring. Comparing evapotranspiration in degraded and restored floodplain meadows may be worthwhile, but it belongs in a separate proposal.

Approach

The proposed project has several distinct components which will be addressed individually below.

1. Monitor and analyze surface water discharges. Project would continue to operate a streamflow gage in the restoration project area. Post-project data will be compared to flows from Red Clover Creek (similar but untreated stream) and to flows measured 10 miles downstream downstream. These data will allow

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inference about the project's effects on peak flows and base flows and will support the development of a water budget for the project area, including estimation of evapotranspiration. It is unfortunate that there are no pre-project flow data without which definitive assessments of flow changes cannot be constructed, but additional post-project flow data should provide insight into the value of this and similar floodplain meadow restoration projects. 2. Measure channel morphology metrics. Channel width, depth, slope, and sinuosity were measured prior to restoration activities. Repeated measurements will reveal whether the project has been successful as determined by aspects of these metrics. For example, successful restoration should lead to higher sinuosity, lower channel slope, and lower depths.

3. Monitor and analyze groundwater levels. One year of pre-project floodplain groundwater data exist. Three years of such data exist for various phases of project completion. Continued monitoring would reveal whether the restoration activities have increased seasonal groundwater levels and increased groundwater storage.

4. Monitor and analyze water temperatures. Altering stream morphology and riparian vegetation will alter the energy balance of the stream and thus change stream temperatures. The project proposes continuous monitoring of stream temperatures in treated and untreated areas to evaluate temperature changes caused by the restoration. Again, the lack of pre-project data for control and treatment areas will make it impossible to definitively determine temperature effects, but the proposed monitoring is inexpensive and will provide inference into the temperature effects of floodplain meadow restoration. The proposal provides few details on how treated and untreated monitoring sites will be selected.

5. Measure riparian vegetation using transects. Pre-project vegetative plot and transect data are available. Repeated measurements will document plant succession following project implementation. Comparison of vegetative transect data with color-infrared aerial photography will allow extrapolation of vegetative data and allow floodplain-scale evaluation of

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vegetative changes. Vegetative data can also be related to groundwater level data and the two can be combined to estimate changes in floodplain wetland area.

6. Search for beaver activity. A pre-project survey of beaver activity exists. A post-project survey would document whether beaver activity has expanded as expected.

7. WEHY model refinement. Post-project water quality data collection and model validation is necessary to determine the efficacy of WEHY for predicting the hydrologic effects of this and similar floodplain restoration projects.

8. Measure Evapotranspiration in degraded and restored meadow habitats. The project proposes to install two eddy flux towers, one on a restored site and one a degraded site, to provide direct evapotranspiration measurements. These data are needed for an existing NSF-funded Stanford University study. The relevance to the floodplain meadow restoration project is not made clear in the proposal as the effectiveness of the restoration project can be determined by the other proposed monitoring activities without any point evapotranspiration measurements. The proposed data will be useful to the Stanford scientific team, but it is not clear that it will provide any short- or medium-term information for decision makers.

Technical Feasibility

With the exception of the proposed evapotranspiration measurements, the other aspects of the monitoring project are technically feasible. The temperature monitoring efforts are feasible but not well documented.

Installation and management of eddy-flux towers is quite difficult and requires considerable expertise. It is not clear that the study team has appropriate personnel to install, maintain, and operate eddy flux towers. Furthermore, without replication, data from the eddy-flux towers will not be very useful.

Performance Measures

If successful, the floodplain meadow restoration should have fairly predictable results: more sinuous streams with lower slopes, higher water tables, increased summer baseflows, attenuated peak flows, altered riparian vegetation, and increased beaver activity. The proposed monitoring objectives are designed to provide either direct or inferential data to determine whether the restoration was successful. The proposal does a good job explaining the selection and use of performance measures related to each of the above expectations.

Again, the performance measures for the proposed evapotranspiration monitoring are not well defended.

Products

The project will demonstrate the benefits and effectiveness of pond and plug techniques for rehabilitating certain types of incised channel systems. This information can be used to estimate likely benefits from similar channel rehabilitation efforts. Much of the data, including channel morphology, riparian vegetation, and beaver activity, will support the development of a refereed journal manuscript in which inferential flow and temperature assessments can be included as support. The flow and water temperature data themselves will not stand up to peer-review due to the lack of pre-project data. There is a good plan for dissemination of results.

Capabilities

The project team appears to be qualified for all aspects of the project with the exception of the proposed evapotranspiration measurements.

Budget

The budget is reasonable and adequate in all areas except for the evapotranspiration measurements. The proposed eddy flux

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towers are very expensive, do not provide information necessary to achieve the objectives, and are unlikely to provide sufficient information to validate the Stanford University evapotranspiration study. Removing the evapotranspiration component of the project will reduce project costs by \$170,000.

Additional Comments

The proposed monitoring is a logical extension of the Last Chance Creek channel renovation project. All aspects but one of the proposed monitoring activities are well-suited for evaluating the effectiveness of this and similar channel renovation actions. The proposed evapotranspiration measurements, however, are very expensive and are not necessary to evaluate the effectiveness of the project. The rest of the project should provide decision makers with useful information about the benefits of channel renovation projects in similar settings.

External Technical Review #3

Goals And Justification

This proposal will continue ongoing monitoring in the Last Chance Creek catchment following nine miles of gully elimination. The monitoring tasks include discharge, channel geomorphology, groundwater elevation, water temperature, vegetation, evapotranspiration (ET), beaver activity, and hydrologic model refinement. Tasks are described for these components of the monitoring project, but clear predictions or testable hypotheses are often not well developed. Stating hydrographs will be "flattened", invoking Rosgen "E" classification without description, and suggesting an undefined "difference" in ET are weak hypotheses. Water quality improvements are suggested as goals of the project, but it is unclear whether such attributes will be measured. The tasks continue some measurements made before, during, and after restoration, and these measurements likely will be useful in assessing restoration outcomes. Much of the newly proposed work, however, is not well justified in the context of this restoration program.

Approach

Many of the approaches continue basic ongoing protocols and build upon existing data. These data will be useful and applicable. Many of the approaches, however, are minimally or inadequately described. For example, it is unclear whether the groundwater sampling is only monthly well beeps or if some of the wells include pressure transducers that provide continuous data on water table elevations. If only monthly measurements are occurring, the groundwater sampling is losing substantive information by not employing dependable and reasonably inexpensive technology. Thermal imagery is not going to provide the necessary information to estimate ET. Multispectral imagery including visible and infrared wavelengths can be used to estimate leaf area indices or vegetation indices that can be correlated with ET. This proposal does not convince me that the team has the

External Technical Review #3

understanding or expertise to measure ET or use remote sensing techniques to accurately estimate ET. These are challenging methods and techniques. The WHEY model refinement also is poorly described. Has the model been described in the peer-reviewed literature? How is the model parameterized? How will the model be validated? A section detailing the model and the refinements to be made are critical before investing considerable resources in this approach.

Technical Feasibility

I think that surface water discharge, channel geomorphology, water temperatures, vegetation surveys, and beaver monitoring are technically feasible. I think that the groundwater monitoring should be upgraded to continuous measurements at key locations. I have serious reservations about the ET monitoring and the application of the refined WHEY model in this catchment.

Performance Measures

Some measures, such as discharge characteristics, temperature changes, stream cross-sections, and vegetation transects, will likely be helpful to evaluate restoration success. It would be nice to see the prior data in an analyzed form to help assess which of these variables are most responsive. Many of the other performance measures (monthly groundwater elevations, ET, and WHEY model refinement) either have no history of application or are not well enough discussed to say whether they will be useful monitoring variables. Performance measures are difficult to assess without previous data summarized and presented.

Products

Tasks are described in detail in the proposal. I doubt if some of the specified products that involve new technology can be delivered. Other products, such as flow data, channel geomorphology, beaver activity, vegetation transects, and water temperature, are likely to be measured adequately. A very disconcerting part of the proposed monitoring program is

External Technical Review #3

that almost a half million dollars is requested with none of the previous data presented for review. There is discussion that a progress report will be delivered at the end of 2004, but it is very hard to evaluate whether to continue this project when none of the earlier data is presented. Results from previous support are generally crucial in deciding on future funding. This information is unavailable in this proposal.

Capabilities

There is limited information on the capabilities of the project personnel. I did not find any CVs for the participating personnel. The lead principal investigator has a M.S. in zoology. Other personnel have on-the-ground experience with restoration or hydrology. There is brief description of the scientists associated with the WEHY model, but little information on the model itself. The personnel to carry out the ET measurements are not identified. These are not trivial methods, and expertise to install, maintain, and service the instrumentation is critical. Such expertise is available at UC - Davis, but such personnel are not identified. I believe the team can carry out the routine monitoring, but I have serious reservations for some of the more sophisticated new measurements that are proposed.

Budget

Personally, I think the budget is excessive for the work that is proposed. Two items in particular stand out as being excessive. First, there is a request for \$133,000 for refinement of the WEHY mode. The model is not well described in the proposal, and the value of this refinement is not clear for the restoration-monitoring program. Without a clearer link between the refined model and the monitoring program, I cannot support spending this kind of money on refining an existing model. Second, the ET monitoring will cost about \$172K over three years. Changes in ET might be useful to document, but the proposal is not compelling that this type of flux measurement is necessary. Our group makes these kinds of ET measurements using three-dimensional eddy covariance

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methodology. I think this is the methodology planned for this project, but the description is very limited. We cost the ET instrumentation at \$27,500 per tower with some additional cost for tower installation. The stature of the vegetation seems to be such that a tower of a few meters high should be adequate. The proposal request for two sites is \$120,000. I think the actual cost would be closer to \$60,000. A budget half the size of the one proposed would seem to be justified for the work proposed.

Additional Comments

I support the need to continue monitoring the impacts of this moderate scale restoration project. A more focused and modest proposal, however, would accomplish these goals effectively. Surface flow, ground water elevations, channel characteristics, temperature, beaver activity, and vegetation characterization (transects and remote sensing) are key variables. If the proposed monitoring efforts were more focused and cost-effective, continuation of this project might be justified.

Budget Review

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

Yes.

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

Yes.

3. Are project management expenses appropriately budgeted?

Yes.

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

Yes.

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

Yes.

6. Are other agencies contributing or likely to contribute a share of the projects costs?

Yes.

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

Services(analysis) - UCD &Stanford

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:

No Objection to Std T's &C's.

8. Are there other budget issues that warrant consideration?

No.

If yes, please explain:

Budget Review

No .

#0070: Upper Last Chance Restoration Project Monitoring

Environmental Compliance Review

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

Yes.

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

Yes.

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

Yes.

Comments

Not enough detail in the proposal, but a Categorical Exemption and Categorical Exclusion are probably appropriate. See comments below under Question 4.

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

No.

Comments

The project lacks sufficient detail with regard to the eddy flux towers to allow a complete analysis of the environmental compliance needs. The applicant identified the need for a Categorical Exclusion to comply with NEPA for the installation of a flux tower in a meadow on federal land. However, the other tower--to be installed in a meadow on private land was not addressed by the applicant. It will probably require CEQA/NEPA and possibly local permits.

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

No.

Comments:

The applicant identified the correct CEQA/NEPA document except for with regard to the eddy flux tower on private land. See

Environmental Compliance Review

comments for Question 4 above.

6. Has the CEQA/NEPA document been completed?

No.

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

Yes.

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

Yes.

Comments:

Funds should be adequate, but additional time may be necessary for eddy flux tower documentation if TES surveys must be delayed until an appropriate time of year.

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

Yes.

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

The proposal is too vague with regard to the eddy flux towers; other permits may be necessary.

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:

Private landowner (Igor Vasey) has apparently formally requested restoration work on his land. A letter specifically permitting eddy flux tower installation on his land must be obtained. Another private landowner (Matley Ranch) and TNC have apparently provided letters, but copies are not attached.

Environmental Compliance Review

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.

Comments:

Although not all requirements were identified, any additional compliance documents are unlikely to need extensive effort and should not affect the project's feasibility.

Prior-Phase Funding Review

List the CALFED or CVPIA funded phases of this project for which your agency manages contracts:

Project Title	Upper Last Chance Creek Restoration
CALFED Contract Management Agency	National Fish and Wildlife Foundation
Amount Funded	\$980,000
Date Awarded	2000/01/01
Lead Institution	Plumas Corporation
Project Number	2000-E01

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

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?

Yes.

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?

Yes.

Other comments:

Prior-Phase Funding Review

NFWF cannot comment on the status of the on-going work being completed by UCD and Stanford; all tasks completed under the Last Chance Creek Watershed Restoration project are complete.