Tuolumne River Post Construction Habitat Evaluation

Allison M Boucher

Initial Selection Panel Review

Not Recommended

Amount Sought: **$**353,790

Fund This Amount: $**0**

Brief explanation of rating:

This proposal was really two proposals for monitoring two projects that are at quite different stages and did not rate well with technical reviewers. The "subproposals" basically have good objectives and goals. The "subproposals", although both weak or lacking in well developed conceptual models, hypotheses and details of methods, also had quite different levels of detail in explanation of approach and expectations. The Bobcat Flat "subproposal" lacks so much detail and is weak in explanation or justification of methods that it is unacceptable in it present form. The Grayson River Ranch "subproposal" had sufficient explanation of approach and development of conceptual models, although it is also short in detail and explanation of how models and hypotheses might be tested. If this project is reconsidered in the future, it needs to be put into a regional context that shows how it can coordinate with other projects to develop or use system-wide monitoring protocols.

Technical Panel Review

Technical Review Panel's Overall Evaluation Rating:
Inadequate

Explanation Of Summary Rating

The Technical Panel felt that the methodological shortcomings that were present in the majority of aspects of this proposal (see Approach Section above) prevented a positive rating for this proposal. Nonetheless, the Technical Panel felt that if aspects of the Grayson Ranch sub-proposal were made more explicit then it would rank more highly.

Goals And Justification

This really is two separate proposals, Bobcat Flat and Grayson Ranch and we will treat them as such.

Bobcat Flat: This sub-proposal has some novel aspects such as floodplain lowering to facilitate establishment of riparian vegetation and construction of riffle habitat that will provide new habitat for both steelhead and salmon; however, it has no real conceptual model and few hypotheses that can be clearly tested in either a rigorous management or scientific sense. That is, it is hard to know which specific data would refute or confirm these hypotheses. The stated hypotheses described are generally simple restatements of management goals such as "these riffle designs will increase use by both species for spawning, as well as provide holding water and a transportation corridor for trout movement up and downstream" or "The goal is to establish the locations and water type used by predator fish and the impact salmonid restoration projects may have on predator fish". Although these may be useful goals for Tuolumne River stakeholders, they really are not articulated in a manner that left the Technical Panel or external technical reviewers confident that this monitoring

would accomplish scientifically–valid management objectives. In addition, most technical reviewers also were not of the opinion that the subproposal demonstrated a clear and convincing understanding of the issues involved in the monitoring research. These shortcomings were illustrated by an almost complete lack of citation of scientific papers dealing with subjects such as fish habitat selection, evaluation of habitat improvement projects, or wetland restoration. In addition, the PI's did not appear to be familiar with standard methods used to quantify the fish variables described in the proposal (see comments in the Approach section of this review). Similar problems were present with other aspects of the subproposal and in several cases there is no indication of the specific species that are being studied (e.g., there are at least two "bass" species in the Central Valley, and the riparian vegetation is never identified to species).

In addition, there is no clear justification for adult fish monitoring when it appears that other groups will be measuring juvenile abundance and making redd counts. The latter data can easily be used to assess the real management objectives (i.e., is the artificial riffle actually used as spawning habitat and are more juveniles recruited). This raises another issue, there are several sources of pre–treatment data cited as being utilizable for comparisons, but neither the quality or extent of these data are described in the proposal (i.e., juvenile sampling and redd counts). Consequently, the actual ability of the PI's to quantify true increases in juvenile production cannot be evaluated. Also, why is the GIS necessary? This usually is an expensive technique and unless really necessary should not be undertaken. Another problem with this sub–project is that multiple management actions are being undertaken: 1) aggregate removal from the floodplain, 2) placing the proper spawning gravel in the river channel to enhance salmonid habitat, and 3) aggregate placed in backwater habitats to decrease "bass" habitat, so if there are increases in juvenile abundance, it will be difficult to know which specific management action produced the observed results. Because these management options vary substantially in cost, this is an unfortunate loss of information.

Grayson Ranch:

The restoration actions and goals and justification are clearly and appropriately described for this portion of the proposal (i.e., restoration of riparian forest) and are important from a restoration point of view (i.e., will wildlife use restored riparian habitat). There is no real conceptual model despite the extensive literature on wetland restoration, but the hypotheses, although fairly basic, are clearly stated. It is unclear whether any knowledge gaps are being filled by the project although everyone agrees that the data are worthwhile. We are a bit confused by the management actions taken in this project which consist of creating backwater habitat. In the Bobcat Flat project the PI's are filling in backwater habitat to reduce bass populations. In this portion of the proposal it sounds like the PI's may be creating bass habitat. Perhaps the term backwater is not really appropriate for the habitats in this portion of the proposal. Hopefully, what the PI's are creating is a limited floodplain area where water will not persist long enough to provide bass habitat.

Approach

Bobcat Flat:

The monitoring methods in this portion of the proposal are not described in sufficient detail to allow the reviewers to make a detailed evaluation of the PI's approach. Aspects of the proposal that suffer from this problem are angling and camera data, channel morphology data, redd counts, vegetation sampling, and soil sampling. In most cases the proposal just states that the monitoring will be accomplished with no indication of exactly what data will be collected or how they will be analyzed (e.g., "The physical characteristics of the post-construction floodplain will be described and photographed and compared to the pre-project floodplain"). As another example, just exactly what sort of result would constitute "increased use of the riffle" and how would this be falsified? How will the PI's determine that steelhead use of a habitat actually is increased rather than just representing a

shift in habitat use by the few steelhead in the river with no net increase in reproductive output?

In the fish habitat work both angling and photography are described as the sampling methods of choice but it seems unlikely that these techniques will be the best way to accurately quantify habitat use. Angling is highly selective. Will angling be conducted in areas other than the new riffle? How will the data be compared, catch–per–unit–effort? How will effort be quantified for both angling and the camera work? Where will the cameras be placed in the river? These are all questions that are not addressed in the proposal. We are not completely familiar with this river but is it really impossible to quantify adult steelhead habitat use by direct observation or electrofishing? Many California rivers can be snorkeled or sampled visually using scuba in the sampling time frames described. Even if angling is the only method possible, surely radio–tagging some fish would provide a much better estimate of habitat use than angling alone. The same comments apply to the bass work.

One of the most important aspects of the proposal involves channel alterations to improve spawning habitat and but is not clear how the new habitat will be monitored post–project to determine how long the management action lasts (i.e. what if gravel washes out after a year?). Such monitoring is essential to evaluate the efficacy of the management technique. We do not know if the PI's plan to do this because it is not clearly described in the proposal.

Placing cobble in backwater areas (unless they're filled) may decrease total available habitat but may increase bass recruitment through increased shelter for juveniles and increased visual isolation for nesting adults (may be more adults nesting in habitat with aggregate than in habitat without visual isolation)

There are many aspects of this proposal that could potentially provide useful information but given the current level of description the reviewers can not evaluate that this will occur.

Grayson Ranch:

The sampling design and data collection seem adequate although they also suffer from a lack of explicit description. Once again, we are not really even told the names of the plant species colonizing the habitats or planted. Similarly wildlife frequently is just called wildlife or "riparian birds" although the mammal section occasionally has greater specificity (e.g., shrews). One might conclude that given the PI's doing this work (Point Reyes Bird Observatory &folks from CSU Stanislaus) appropriate methods will be used, but it has to be taken on faith. It is likely that the data will be of local utility, given the lack of specificity of the methods.

Greater specificity is needed in testing hypotheses, for example this section also confuses "habitat use" with an increase in overall habitat which leads to increased population size. To demonstrate habitat increases that actually produce increases in population size one has to document multi−year increases in either abundance or production. These demonstrations are necessary to show that the habitat has not just attracted birds that were already nesting in the areas. How will hypotheses such as "Salmonids utilizing restored floodplain habitat are more robust than those that use the adjacent in−channel habitat" be tested?

Feasibility And Likelihood Of Success

Bobcat Flat: Given the problems identified in the Approach section, the PIs have not convincingly demonstrated that this project is technically feasible or that it has a high likelihood of success. In this case, likelihood of success involves the production of data that will lead to relatively unambiguous rejection or confirmation of the hypotheses.

Grayson Ranch:

This aspect of the proposal is technically feasible and has a reasonable likelihood of success, although we are basing this judgement, at least partially, on the reputations of the investigators involved.

Performance Measures

Bobcat Flat:

Little information is presented on performance measures (i.e., how hypotheses will be confirmed or refuted) as discussed above.

Grayson Ranch:

Same comment as above. However, because the hypotheses are slightly clearer the Technical Panel is more positive about this subproposal.

Products

Yes, reports will be available but not clear that the data will be of sufficiently high quality to withstand peer review. Why aren't publications in the scientific literature identified as products?

Capabilities

It seems likely that many of the problems noted with the Bobcat Flat project are due to the fact that the first two PI's are a trained CPA and someone in the medical field respectively. Although fisheries consultants will be involved in the project, it is hard to assess their capabilities, although they appear familiar with the systems involved. The Grayson Ranch section of the project appears to be staffed with PI's that have greater experience with the terrestrial fauna and flora involved.

Budget

Bobcat Flat: Approximately $202K or 58% of the budget goes for angling and cinematography for steelhead monitoring in the new gravel riffle – this is excessive especially given that these are not standard methods for assessing lotic fish habitat.

Grayson Ranch: appropriate

Regional Review

The regional review was extremely positive with only a few negative comments. In general, the regional review identified almost none of the shortcomings noted by the external reviewers, although the review forms ask slightly different questions. The Regional Panel says that there are pre-project data available for Bobcat Flat and that the project is well linked with relevant external projects. The project doesn't really address cumulative effects except for fish work. The Regional Panel thought that the project was well coordinated. The panel also concluded that important knowledge gaps are being filled because there is no long-term information on farmland conversion to riparian forest in San Joaquin Valley.

Administrative Review

No problems noted

Additional Comments

San Joaquin Regional Review

San Joaquin Regional Panel's Overall Ranking:
High

Summary:

This proposal addresses two separate projects on the Tuolumne River. It includes addressing several species of special concern (steelhead, salmon and some potential birds), riparian habitat and increasing spawning and holding habitat. It is multi-institutional, interdisciplinary (fish, geomorph, riparian habitat and birds, fish predators, small mammals. It is integrated with the Turlock Irrigation District's Tuolumne River monitoring project and includes data sharing and analysis with them.

1. Applicability To ERP Goals And Regional Priorities.

This project does: (1) address the Tuolumne River- a priority area; (2) provides for monitoring two previously implemented projects; (3) is designed to determine success (have preproject data to compare to); (4) will help to determine if the new channel design specifications will work for both steelhead and salmon and if the backwater channel will work (Bobcat and Grayson Ranch, respectively);and (5) should help document if species of concern noted in the Multi-species Conservation Plan occur and if they increase. The Grayson project has some initial monitoring completed; not to continue to validate that data would result in a decrease in value of the original project Monitoring both of these restoration projects should help to determine if the restoration actions are "worth it" and the techniques may be able to be applied to other sections of the River. One needs to be cautious in applying the same techniques to other streams. But if the monitoring project succeeds, it can identify success/failure of actions that would be applicable watershed-wide.

2. Links With Other Restoration Actions.

Links to ongoing restoration activities?

These projects are relying on other River monitoring proposal from Turlock Irrigation District to help; they are both on the same River, and they have the potential to affect fish doubling, groundwater recharge, improve water quality through the reestablishment of vegetation.

Assessment of cumulative actions?

This project is not really designed to assess cumulative actions, with the exception of the fish monitoring, which should help reflect cumulative results regarding fish populations, and the bird monitoring, which may reflect regional population increases over time.

Coordinated with other programs?

The projects are not really coordinated with other CALFED−wide programs, but they are coordinated with other on−stream projects, providing information to be included in others' reports and using others' information in their own reports (Tuolumne River monitoring project (TID)). They also have the possibility to inform the Riparian Joint Venture project and other long−term bird monitoring.

Continue previously funded monitoring?

The Bobcat project has baseline monitoring to which to compare post−project monitoring which is very important. The Grayson project has previous post project monitoring and this additional year's monitoring is important for data validation. In fact, with the elimination of irrigation, even longer term monitoring will be necessary. It took 20 years in New Mexico to determine that almost all irrigated planted species almost completely die out on mined lands (but not non−irrgated species).

Does the project fill an important data gap?

Certainly the monitoring of these projects will fill important data gaps as no long−term data exists for conversion of farmland to riparian forest in the San Joaquin Valley, nor has anyone ever completed a successional old field study on riparian habitat here. Further, the monitoring of the newly described channel construction has never been done here before, and if found to be successful, will have wide−spread applicability to channel design for steelhead and salmon together.

Will it inform planning of nearby restoration?

If they are properly collated and analyzed, and the noted data sharing with other groups occurs in a timely manner, the reports from this project should be illuminating for planning similar types of restoration projects.

Will it create monitoring capacity to assess other regional actions?

Nothing in the site specific monitoring of these projects will asess other regional actions, with the exception that the aquatic monitoring should reflect trends in regional fish species recovery− and perhaps in predator population trends. But that does not diminish the importance of the monitoring planned for these two projects. This monitoring will help evaluate two funded projects on the Tuolumne.

3. Local Circumstances.

Both of these projects have permission for access. The projects are feasible and appear to be appropriate to the projects conducted.

It is important to note that some of the reports and evaluation are dependent upon sharing data from other parties. The outcome of the conclusions will be dependent upon that occuring in a timely manner.

As these projects have already been fully implemented, with the exception of Bobcat, its unlikely local, legal or

political impediments exist.

Re: legal– the installation of piezometers in areas under pervue of the SLC requires their authorization– at least a Letter of Non–objection– and perhaps from the Reclamation Board as well, as they require it on the SJR. This permit is not checked in the proposal.

4. Local Involvement.

A significant amount of inter–project research exchange is provided for. And notably reports will be exchanged and forum presentations will be made. The projects will be cooperating with the Tuolumne River Technical Advisory Committee and the project fills some of the needs of the River restoration plan and TRTAC identified research needs. Reports are noted to be shared with the CDFG and anyone who wants. However, the overall public outreach to the layperson could be improved.

The project states it does not have matching funds. However, the California River Restoration Fund is providing funding to help provide for office space. In addition, data being obtained from other sources is critical to the success of being able to draw conclusions regarding the project, esp. the Bobcat Flats project. So, in fact, that data really is a type of 'in–kind' contribution with significant value.

5. Local Value.

Value of project to regional ecosystem restoration:

The project is important to being able to develop methods to restore steelhead populations and also to ensure long term salmon population improvements. In addition, the information should be helpful to the restoration of dredged, gravel pit, and the conversion of agricultural areas.

Does it synthesize data in a way to help local resource managers?

The data sharing, discussions with CDFG and TRTAC should be

able to assist resource managers making decisions concerning restoration and management actions on the Tuolumne River.

Will it help evaluate restoration success?

Restoration success is at the mercy of numerous variables and can only be determined by complex long term monitoring and correlation with a variety of environmental factors including flows, groundwater levels, water temperature, velocity, local precipitation and remote snowfall, etc. Long term monitoring is essential to being able to make any of these determinations.

Will it help determine if actions goals are being met, if multiple resotration actions are being met?

The montioring is not designed to evaluate multiple actions in particular. It's possible the revegetation would affect the local fish populations, but the scale is likely not large enough to do that. The channel evaluations however, if successful, may contribute to increased potential to meet fish goals if they work.

Will it determine if adjustments to prior restoration actions are needed?

One of the purposes of these two monitoring projects is to determine if changes in the specifications are needed (Bobcat in particular). The Grayson project is older, and longer term monitoring will be needed to make that determination.

Will the monitoring be helpful at different scales? This type of site specific monitoring would be difficult to interpolate to a regional or watershed scale. However, it may be relevant to similar projects on the same or similar streams.

6. Other Comments:

Although the proposal states it will share data locally and regionally, no systematic method for doing that exists.

The page limitation really does not allow the project proponent to answer the listed evaluation crititeria to the full extent really needed to evaluate the projects specifically (not the applicant's issue).

Some significant technical issues appear relevant to this proposal. But even with their existence, these types of projects are needed to ascertain the types and direction of future actions.

The complete lack of reference to monitoring with a level of statistical adequacy is a concern, as without that, conclusions cannot be drawn.

Some reviewers wondered if the Bobcat Flat project would be completed in time to initiate the monitoring there, as it was questioned if the project was yet funded. Funding and timing of implementation, other than a 2005 completion date, were not addressed in the proposal.

External Technical Review #1

Goals And Justification

BOBCAT FLAT: The proposal does adequately describe the restoration actions to be monitored and describes the goals and objectives of these actions. Conceptual models that underlie the restoration actions are brief or absent. The proposal includes a brief statement about the differences in spawning preferences between Chinook and steelhead and very little information on how restoration actions will reduce habitat for non–native predatory fish. The proposal does not clearly explain why it is important to monitor adult fish (e.g. through angling and cameras) and how this provides critical information that cannot be generated by the other monitoring programs that will be co–occurring (e.g. redd counts, juvenile seining). There is a brief reference to needing to know 'how the post–project riffles are used' by steelhead/trout but the case for monitoring adult habitat usage is not elaborated further. Presumably the important information to be gleaned from the angling is the numbers of trout using different types of created habitat (not just the spawning habitat) and how they use this habitat, during what flows and time of the year, etc.

The proposal does include a hypothesis that riffle designs will increase spawning for chinook and trout as well as holding for trout. The vegetation section also has hypotheses. The project can potentially provide information to address knowledge gaps, including the efficacy of creating spawning riffles for both chinook and steelhead and riparian restoration on a newly created (lowered) floodplain surface using dredger tailings.

GRAYSON RANCH: Restoration actions and their goals and objectives are clearly described. Conceptual models are only briefly mentioned and are very simple ("lack of wildlife use…was attributable to impoverished habitat, and that creation of new habitat would produce a substantial increase.") Hypotheses are clearly stated for each of the main components. Hypotheses are essentially that restoration at

this site will result in trends that have been observed and documented elsewhere (e.g species richness of birds will increase after riparian vegetation). The proposal does not describe any general knowledge gaps that will be addressed. However, the monitoring of fish use of floodplain habitats (splittail and chinook) could provide useful information that will complement current research of fish use of floodplains, which has taken place in only a few places (e.g. Yolo Bypass and Cosumnes River Preserve).

Approach

BOBCAT FLAT: In general monitoring methods are not described in detail making the design of the approach difficult to evaluate. The project describes several other monitoring programs that overlap with this proposal, including seining for juvenile fish and redd surveys conducted by CDFG. The proposal does not make clear how the fish monitoring in this proposal will provide critical information not provided by the other monitoring or how these different monitoring sources will be integrated (other than other reports will be incorporated into this project's report). The proposal also states that one of the objectives of lowering the floodplain is to increase spring flows across it, but they describe no technique to monitor whether this occurs (perhaps others are doing this, but this is not clear). Further, the most important component of the restoration project appears to be the placement and stability of the created riffles and other channel features. They note that others will evaluate the number of redds in the added gravel patches (although this too is not clear; the proposal states that McBain and Trush will conduct a pre-project redd survey that includes RM43 and that CDFG has "conducted salmon redd surveys for many years that include RM43…" So will CDFG be responsible for post-project redd surveys? If not, then who?). However, some previous gravel augmentation projects have been washed out relatively quickly – will anyone be monitoring the actual gravel patches to see if they remain in place? Again "pre-project monitoring" is described for "pebble counts, permeability and facies mapping" and McBain and Trush will monitor "as built velocity, slope, etc." but is someone monitoring reach morphology

post−project? The question of whether the gravel remains in place to be used and whether the imposed geomorphology (e.g. the holding areas, the spawning areas, the "transportation corridor") is stable over even a few years seems like the essential question to be monitored in this project, but this proposal doesn't say that they will do this and does not describe who will. The proposal does state (first paragraph, page 5) that "the construction at Rivermile 43 will be monitored by Dennis Hood with support from a local guide…" but this section is essentially about fish monitoring. If they intend to be doing surveys of channel morphology post−project it is not readily apparent from this description.

As described below, it is not clear how they plan on using the angling and camera data to characterize trout usage of the restored habitat. A premise seems to be that this will provide essential information that cannot be provided through redd surveys or juvenile seining. Knowing how trout use the created habitats (holding habitat and transportation corridors) may provide useful information for other projects that intend to improve steelhead habitat.

Although the proposal states that poor soil quality (e.g. large cobbles from dredger tailings) have limited plant growth, in addition to the distance to the water table, they do not describe if or how they will evaluate soil quality post−project (e.g. will soil quality change as flows across the floodplain deposit fine sediment on the new, lowered surface?). Perhaps they intend to do this but, again, it is not clear (one sentence suggests they may do this: "physical characteristics of the post−construction floodplain will be described…"). The proposed monitoring will provide information about survival of planted species and establishment of volunteers on newly created floodplain surface derived from dredger tailings. This information will be useful to other projects proposing to implement riparian restoration in areas with dredger tailings.

GRAYSON RANCH: The approach is well designed, appropriate for the project goals, and builds upon previous monitoring efforts. The proposal does not emphasize how monitoring

results will add to the general knowledge base. However, avian monitoring data will be integrated with other data from the San Joaquin Valley collected by PRBO and, as described above, the fish monitoring may provide further insights about native fish utilization of floodplain habitats.

Technical Feasibility

BOBCAT FLAT: Almost no detail is provided about how the angling or cameras will be used to document fish habitat usage. The proposal provides no references to substantiate that "only angling has been able to study the elusive adult steelhead/trout and native trout." In fact the proposal states that agencies haven't been able to use this technique successfully in the past. The project team will hire a guide who has successfully hooked and landed adult steelhead. They describe that he has been able to catch 2–12 lb. fish, but do not describe whether this approach can effectively sample and provide meaningful inferences about the population of fish within a reach. The proposal text does not describe how frequently angling and cinema photography will be used (other than it will be "intense") or if it will be linked to flow events, peaks in spawning migration, etc. The camera approach seems like it could be used to document utilization of various habitats but there is no description of how cameras will be used, where they will be placed, how the images will be analyzed and used in terms of data/monitoring. The proposal does not reference or summarize other studies that have used cinema photography to monitor fish habitat usage. Thus it is hard to evaluate the technical feasibility of this project.

Riparian monitoring techniques are not described in detail but these are less of a concern as standard techniques are readily available. The scale of the project is consistent with the objectives with the caveat that they don't describe methods to monitor several of the important goals of the restoration (e.g. soil quality, floodplain inundation). The lack of specificity for the angling and camera work, and the lack of supporting information that demonstrates its efficacy, is particularly concerning as these tasks represent almost $202,000 or 58% of the total project budget. For comparison,

the aquatic monitoring at Grayson Ranch calls for $24,000 or just over 10% of the fish monitoring at Bobcat Flat.

GRAYSON RANCH: Methods are described very briefly but appear to be appropriate and technically feasible. The scale of monitoring is appropriate for the objectives. However, monitoring data here should be integrated with monitoring elsewhere on the Tuolomne, particularly for fish, so that the project team can understand how the created backwater habitats in the project site relate to overall fish population dynamics in the river.

Performance Measures

BOBCAT FLAT: Although techniques are not described in detail, the approach should be sufficient for characterizing the success of revegetation (e.g. survivorship, growth) although they don't describe techniques for monitoring soil quality (one of the primary limiting factors they described). Will soil quality improve by removing the cobbles, or will there still be cobbles after removing four feet? If the floodplain is inundated by high flows this could greatly improve soil quality through deposition. As noted above, the methods for angling and cameras aren't described sufficiently to know how they will be used or if they can capture information on fish habitat utilization that is replicable and representative of the populations actually within the reach. In general specific performance measures are not described and more general terms are used, such as that desired species will utilize the reach in greater numbers and bass numbers will be reduced. The monitoring and evaluation plan isn't described here in great detail.

GRAYSON RANCH: The monitoring methods appear adequate to allow the continued evaluation of the restoration site. On page 12 the proposal states that "performance measures for the project were evaluated by field monitoring by consultants" but these performance measures are not elaborated further.

Products

The proposal points out that many current and future restoration projects can benefit from the information generated through the proposed monitoring program. For example, future gravel augmentations may be better able to accommodate the habitat needs of steelhead and trout in addition to chinook. Several riparian restoration projects are commencing in the vicinity of these projects that could benefit from the information regarding floodplain lowering, active vs. passive techniques, the relationship between site characteristics and vegetation response, and the expected response of avian and mammal communities to restored vegetation. The proposal does describe how others will be able to access this information and how the monitoring results will be linked to other regional and valley-wide assessments and analyses. The data handling, storage and dissemination are only briefly described but the proposal describes the projects' teams many relationships and affiliations with groups and organizations working on the Tuolomne, suggesting that this dissemination will occur. It is not clear that all of the monitoring results will be high quality or able to stand up under peer-review. As noted above, there is almost no specificity about the angling and camera techniques for monitoring fish habitat utilization at RM43 even though these tasks account for 58% of the total budget. They do not demonstrate that these techniques will produce replicable useful information and they don't describe any method for how angling and camera raw data will be converted to usable data. The methods are better characterized for Grayson Ranch and it seems more likely that this portion of the project will provide high-quality results. Once concern with Grayson Ranch is the questions they ask regarding the condition and robustness of salmon using the floodplain vs. the river: it may be difficult to capture adequate sample sizes of juvenile fish to answer this question. Additionally, it is not clear how much movement between habitats will be occurring and thus whether one can make the assumption that there are 'floodplain-reared' and 'river-reared' fish.

Capabilities

The project team's qualifications appear to be commensurate with the project, with an appropriate mix of disciplines. I do not have information about the project team's performance record.

Budget

The majority of the budget ($201,850 or 58% of project total) appears to be for angling and cinema photography monitoring of steelhead for Bobcat Flat. A sum that is about half of the angling/camera total ($103,500) will be used for monitoring trees (both active and passive restoration), grasses, small mammals, birds, chinook, steelhead, and splittail at Grayson Ranch. Because there is very little detail about the angling and camera techniques, it is difficult to evaluate the reasonability of this major portion of the overall budget. For example, there is no budget item for either 'supplies' or 'equipment' for the O. mykiss habitat or predator fish habitat monitoring tasks (except for $100 in Year 3) – where will the cameras and film (unless they are digital) come from? Will they be supplied under 'services and consultants?' The other portions of the budget seem reasonable and adequate.

External Technical Review #2

Goals And Justification

This is a follow up to construction projects that is/were already scheduled (as I understand). The applicant wants to do very high resolution monitoring and evaluation of the effectiveness of the projects. Essentially, the methods are well established and should be straightforward to implement exatly as described. Monitoring is more about tenacity than luck.

I was slightly confused to read what appeared to be two proposals. One for "Bobcat Flat" and another for "Grayson River Ranch". They are broken apart and perhaps should have been submitted separately since they involve different types of monitoring in distinct locations. They were also formatted somewhat differently and therefore difficult to quickly compare and find (for example) the stated hypotheses.

Hypotheses in the two parts of the proposals serve as guidelines for conducting the monitoring and will steer the observations that they report. There are no hard and fast "litmus" tests in either project. However, the Grayson project is more explicit and detailed. They could be translated into a statistical test.

Approach

The approach and methods seem fine and will dovetail with other existing projects. Because the Bobcat Flat floodplain lowering project is so novel, it will inform future decisions on such types of restoration. However, it may require further follow up beyond the scope of the monitoring project since river courses are shaped by extreme events (e.g. floods) and channel dynamics can not always be predicted. In the Grayson Ranch project, will the following years represent the range of conditions that the restored area will encounter in the future? I think if these projects are successful, they will lead to future ones that can take advantage of the existing

knowledge base.

Technical Feasibility

Yes. The first year's report will set the precedent of what the group can do and their commitment to quality information for CALFED and the region.

Performance Measures

I think this part of the proposal is its weak point, since it is poorly articulated. The proposal uses terms like more/less, increase/decrease, determine fish composition, and other non−specifics. In truth, detailed tests and preconceived hypotheses are not necessary for good observers and may in fact cloud their vision, but I believe they have chosen the correct focus in any case: attention to the ecological community and not simply the physical structure.

I fully expect that simple hypotheses such as: "... Riffle designs will increase use by both species for spawning..." requires only two well chosen measures but clearly could be articulated more deeply.

Overall, from the proposal, I get the impression that it will succeed in this area.

Products

This (these) monitoring projects are dissociated from the construction project(s) but do seem intricately tied to their purposes. I am left believing that other restoration projects, similar to both of these, are in the works and will be modified in light of the monitoring. I would hope for a detailed report that ties the specific actions performed in the restoreation to the results attained during the monitoring process. Anecdotal evidence of change may simply be documenting the passage of time rather than a process set in motion with retoration, and I do note that some controlled areas are planned.

Capabilities

I believe so. Their credentials appear in order. I believe the group is nearly 10 years old and has taken on large projects before.

Budget

Daily rates for folk in the field vary from $280 – $1000. It appears that overall, the time allotment seems right.

Additional Comments

Overall, the Friends of Tuolumne seem committed to the causes they have undertaken and are excited about these projects and how they can lead the region into the future. They have successfully worked with CBDA before, but I don't know the status of the CBDA's former monitoring efforts that this would continue. I do note that they promise any and all interested parties access to the data and sites––support for which will presumably come from other sources. I would love to get the chance to come down to see it all!

External Technical Review #3

Goals And Justification

These are really two separate projects embedded in one proposal.

1. Bobcat Flat RM−43

Restoration actions: The restoration actions are floodplain lowering and instream gravel augmentation, plus construction of a high flow scour channel and some riparian vegetation restoration (planting). The gravel augmentation will be implemented with an innovative design for providing spawning and holding habitat for both steelhead and Chinook salmon.

The goals and objectives are fairly clear and consistent. These are to reestablish steelhead and salmon spawning and holding habitats, to test the efficacy of an artificial riffle design for providing habitat for both steelhead and salmon, to reduce predatory fish habitat, and to restore riparian vegetation by lowering the floodplain, improving the soil, and planting trees.

The conceptual model justifying instream restoration actions is that spawning habitats (coarse sediments) for steelhead and Chinook salmon on this portion of the Tuolumne are inadequate, in part due to the effects of past gold dredging. Hence, gravel augmentation is presented as a way to significantly increase spawning habitat. A unique aspect to this particular project is that the instream habitat enhancements are being constructed specifically to provide habitat for steelhead and salmon simultaneously. According to the authors, past gravel augmentation projects on the Tuolumne were aimed at salmon, and may have actually decreased steelhead habitat. Predator fish (i.e., bass) are presented as another possible limiting factor for steelhead/salmon reproductive success. A component of the restoration will be to partially fill in backwaters used by bass and other predator species.

The effects of past gold dredging (large cobble cover the floodplain) and dam construction (reduced flood flows) are given as reasons for poor establishment of riparian vegetation. The restoration seeks to improve soil conditions for vegetation establishment by removing the aggregate from a portion of the floodplain and using it for instream gravel augmentation. This action will lower the floodplain by 4 feet, reducing the depth to the water table and increasing flood frequency, potentially improving conditions for riparian vegetation establishment and survival. The conceptual model lacks mechanistic detail, as it does not even mention the species of plants (beyond native trees and forbs), nor their establishment requirements, that the restoration efforts are meant to address.

Hypotheses: The hypotheses for vegetation restoration are that (a) lowering the floodplain and improving soil conditions will increase natural regeneration of native riparian species and (b) planted trees will also be easier to establish because the new floodplain will be closer to the water table. The hypotheses for the effects of instream enhancements are less explicitly stated, but appear to be that this artificial riffle design will improve habitat for both steelhead and salmon and will reduce habitat for predatory fish. The monitoring will attempt to document/test the effect of the constructed riffle design on use by adult steelhead and will also enable study of the combination of physical characteristics that adult steelhead prefer (the depth, velocity, particle size, etc. in the areas being used). Overall, these hypotheses appear to be justified according to existing knowledge, although the conceptual model and hypotheses for the riparian vegetation restoration are not detailed or specific enough to adequately assess.

2. Grayson River Ranch

Restoration actions: The restoration actions identified by the proposal are riparian vegetation reestablishment (planting and natural regeneration) on abandoned farmland and construction of high flow backwater habitats.

Goals and Conceptual Model: The goals and objectives of these restoration actions are fairly clear and consistent. The conceptual model basically is that replanting a riparian forest on abandoned farmland, and creating two backwater areas, will lead to increased biodiversity by providing habitat for bird and mammal species (the forest) and salmon/steelhead/splittail (backwater use by juvenile fish during high flows). Alternatively, the conceptual model could also be that densities, diversity, and species composition of bird and small mammal populations are good indicators of riparian restoration success.

Hypotheses: The main overriding hypothesis is that creating habitat (planting riparian forest and creating backwater areas) will increase populations and diversity of bird, mammal, and fish species and that composition and numbers of birds and mammals will track successional changes in the vegetation. More specific hypotheses occur for each taxa. For vegetation, there are several interesting hypotheses to be tested: (a) the efficacy of horticultural vs. natural recruitment, (b) that growth rates of plants will be higher on these former agricultural lands than on nearby natural sites, and (c) that local site conditions will differentially influence the success of different tree species. The conceptual model(s) for these more specific vegetation hypotheses are not adequately spelled out in the proposal. Overall, however, the hypotheses appear to be justified.

Approach

1. Bobcat Flat RM−43

The approach is a bit difficult to assess because of lack of detail on the monitoring protocol. The authors focus salmonid monitoring on adult steelhead through "angling, cinema photography, and mapping GPS locations." The main goal is to determine how much adult steelhead are using the constructed riffles and which particular parts of the riffles (depth, velocity, sediment size, etc.) are being used. Other relevant information on salmon and steelhead reproduction will be determined through cooperative monitoring efforts being

conducted in this reach and other areas of the Tuolumne by different groups. Unfortunately, little detail is given in this project on the sampling design within which the above survey techniques (angling, GPS, cinema photography) will be used. It also isn't clear whether any comparable pre−project data exist for adult steelhead, against which to determine the impact of the restoration (i.e., how much were they using these areas before). Detail is also scarce on the sampling design for monitoring predatory fish, although comparable pre−project data do appear to be available for this group. Finally, the monitoring design for the vegetation is quite vague, lacking even mention of different species of plants and the methods by which natural regeneration would be sampled and quantified. The monitoring approach overall appears to be more in the mode of description than of hypothesis testing.

In terms of fish monitoring, the project will build upon previous monitoring, as well as current and future monitoring by other groups working on the Tuolumne. This project is being designed as a part of a comprehensive, river−wide salmonid and predatory fish monitoring program. The design of the constructed riffles (to serve as habitat for both steelhead and salmon) is based on lessons learned from other restoration projects on the Stanislaus River. Proper field testing and monitoring could help fine−tune this design for more widespread application. This could be a very useful contribution to restoration of salmon and steelhead spawning habitat on California rivers.

2. Grayson River Ranch

The monitoring at Grayson River Ranch is a continuation of short−term monitoring begun under the original grant that funded the restoration. Again, insufficient detail is provided to enable assessment of the efficacy of the monitoring design. For birds, there is no mention of the sampling protocol (I would assume point counts) that has or will be used. The vegetation monitoring approach also suffers from major gaps in detail. The authors mention that their design is ideal for comparing the efficacy of horticultural vs. natural recruitment, but give no information on their sampling design

to test this hypothesis nor measures by which to determine which is more effective.

If monitoring and evaluation are properly designed, this project could make a valuable contribution. The authors say that this was one of the earliest riparian restoration projects on the river, so continued post−restoration monitoring could be useful for informing new restoration projects in the region. The data on bird and mammal species composition and its changes with vegetation development could add to the knowledge−base of similar data collected on riparian restoration projects throughout California. This appears to be the intention of the authors and the consultants, which include an avian ecologist from PRBO (which has conducted many assessments of bird population trends on riparian restoration sites throughout California) and a small mammal ecologist from the Endangered Species Recovery Program at CSU−Stanislaus. The involvement of these two groups leads me to believe that established protocols and rigorous designs are being used in the bird and mammal monitoring, although the proposal provides little of this information.

Finally, the authors mention the development of a Site Quality Index that links local site conditions with vegetation restoration success. Development of such an index could have great value for planning horticultural and/or natural process restorations of riparian vegetation on other sites. As with the other components of the monitoring approach, however, more detail could be given on how this Index will be developed.

Technical Feasibility

See above. The biggest problem with this proposal is the lack of specificity in the monitoring plans (in both projects). Hence, it is difficult to evaluate technical feasibility. The goals of the project(s) do appear to be technically feasible, but it is difficult to determine the validity of the monitoring approaches (since so little detail is given).

Overall, the scale of the monitoring seems consistent with the objectives, although lack of detail makes this difficult to

ascertain. This lack of detail is particularly striking for the vegetation monitoring at Bobcat Flat. There, details of the monitoring approach are too few and the conceptual model too vague to ascertain whether or not the monitoring can adequately document the effects of the restoration activities on riparian vegetation development.

Another part of the monitoring that made me a little uncomfortable was the expensive ($180,000 for the guide alone) monitoring of steelhead adults at Bobcat Flat. The focus on only adult steelhead could be a bit of a double-edged sword. While it is good that this project will share information with other monitoring efforts on the river, adequate evaluation of steelhead and salmon reproduction (seining of juveniles, surveys of spawning sites) will depend on the availability of data from the other monitoring projects, some of which are also only in the proposal stage. Given the emphasis of this project on one indicator (adult steelhead use of spawning riffles), the authors need to make sure that the monitoring methodology, implementation, and goals are adequately documented. Given the lack of detail in the proposal, it wasn't clear to me how angling or taking video of fish would be applied in systematic fashion to quantify habitat usage.

Performance Measures

Details on monitoring methods, design, and performance measures are insufficient to judge whether restoration success can be adequately evaluated. The biggest weaknesses of the steelhead and predator fish monitoring at Bobcat Flat are (a) too little detail on monitoring/statistical design and (b) overly vague performance measures. The lack of clear performance measures and vague conceptual models permeated the vegetation monitoring approaches for both projects, particularly for Bobcat Flat. Performance measures are a bit better for bird, mammal, and fish monitoring at Grayson River Ranch (increases in diversity and density for birds and mammals, presence for anadromous fish), but could still be made more explicit (e.g., which species are the best indicators of restoration success... what aspects of vegetation change are most critical for avian diversity, etc.)

Products

The project has the potential to yield highly valuable information. For the Bobcat Flat project, proper design and implementation of steelhead monitoring could help determine the efficacy of (and fine−tune the design of) artificial riffles designed to provide habitat for both salmon and steelhead. The project at Grayson Ranch provides the opportunity to evaluate the results of an early riparian vegetation restoration on the Tuolumne that could provide useful information for new restoration projects on the river. In addition, the fish monitoring at Bobcat Flat and the bird, mammal, and vegetation monitoring at Grayson, could contribute to an overall knowledge−base gained from multiple riparian restoration projects in northern California. Lack of specificity in the monitoring design, however, may make it difficult to evaluate the usefulness of the results.

Products of the projects will be reports that will be made available to other restoration partners in the region. Some of the data will be directly incorporated (and vice versa) into larger, more comprehensive monitoring assessments being made on the Tuolumne (salmonid and predator fish monitoring at Bobcat) and rivers throughout the region (bird and mammal monitoring at Grayson).

As I suggest above, the lack of detail on monitoring design leads one to believe that the monitoring results may not stand up to peer review. The vegetation monitoring at Bobcat Flat is particularly weak in this regard. I have reason to believe, however, based on the competencies of the consultants hired to do the work (e.g., PRBO) and the connection of the fish monitoring within a larger, river−wide survey, that much of the monitoring design is sound. Unfortunately, the proposal does not provide adequate documentation by which to evaluate the quality of the monitoring and its results.

Capabilities

The capabilities of the team members appear to be sound, although more documentation could have been provided. Based on

the reputation of PRBO and the ESRP, the bird and small mammal components should be sound. The important disciplines appear to be covered for each taxon (fish, birds, mammals, plants), and the team leaders have been involved with successful restoration projects in the past.

Budget

My biggest concern with the budget is the rather large proportion invested in only the adult steelhead monitoring at Bobcat Flat. Approximately $180,000, or a little more than 50% of the project total, is being spent to hire the fishing guide who will do the angling portion of the monitoring. Although monitoring adult steelhead may be important, the authors need to better (a) document the sampling or statistical design of the monitoring, (b) show that comparable pre−project data are available, and (c) justify their emphasis on documenting the presence and location of adult steelhead. This expense could be a reasonable investment if the authors make a stronger case for it. Otherwise, the budget seems reasonable, although it would still behoove the authors to better document the monitoring designs.

Additional Comments

Overall, if properly designed and executed, these projects could yield valuable information on (a) the efficacy of an innovative artificial riffle design for simultaneous use by steelhead and salmon, (b) the continuing post−restoration response of bird and mammal communities, and (c) the relative benefits of horticultural and natural revegetation. Unfortunately, the proposal as now written does not contain adequate documentation of monitoring protocols, performance measures, or sampling/statistical design to encourage confidence in the results to be gained from the monitoring. Because of the potential value of the monitoring (particularly the riffle design), I would encourage CALFED to consider this proposal for funding, but only after a substantial revision that includes thorough documentation of monitoring/sampling designs.

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.

If no, please explain:

Yes, very good, even the consultants!

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?
No.

If no, please explain:

Local Guides $750/day?

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.

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:

Donate cost of Services – California River Restoration Fund

Cost Sharing – Grantee shall provide information regarding its financial capability and stability as well as it's level of commitment for any proposed cost share funds. A detailed budget of the project's proposed cost share funds should be provided prior to grant funds being awarded. A financial evaluation is recommended for grant agreements that state/claim over 30 % or $250,000 (which ever is less) of matching funds. The evaluation will avoid likelihood of the grantee requesting an amendment to increase project funding due to lack of or miscalculation of matching funds to complete the project.

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:

T's &C's accepted.

8. Are there other budget issues that warrant consideration?
Yes.

If yes, please explain:

Small and new Non–profit Organizations – A financial evaluation of small and Non–profit organizations is recommended to ensure cost share funds are available and the organization has a financial capability to do business with the State.

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.

4. Did the applicant correctly identify if CEQA/NEPA compliance was required?
No.

Comments

Applicant will likely need a Section 2081 permit from DFG and a Section 10 permit (see question below about permits for additional detail). The issuance of those permits may trigger CEQA or NEPA. Applicant must consult with the appropriate agencies on CEQA and NEPA compliance.

5. Did the applicant correctly identify the correct CEQA/NEPA document required for the project?
No.

Comments:

If CEQA or NEPA is required, it would most likely be Categorical Exemption (CEQA) and Categorical Exclusion (NEPA).

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:

Categorical Exemptions and Exclusions do not have lengthy approval processes.

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:

State and Federal ESA permits (Section 2081 and Section 10) are required. This is not indicated on the checklist (only a scientific collection permit is checked). The text of the proposal does state that the contractor will have the necessary collection permits from CDFG and NOAA.

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

Section 2081 (state) and Section 10 (federal)

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.

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

Project Title	Bobcat Flat Acquisition and Restoration Project
CALFED Contract Management Agency	USFWS
Amount Funded	$1,984,320
Date Awarded	2000/01/01
Lead Institution	Friends of the Tuolumne, Inc.
Project Number	114200J100

Project Title	Grayson river Ranch Perpetual conservation Easement and Restoration
CALFED Contract Management Agency	USFWS
Amount Funded	$732,000
Date Awarded	1998/01/01
Project Number	11420−9−J041

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?
N/A