

**CALFED Bay-Delta 2002 ERP Directed Actions
Selection Panel Review**

Proposal Number: 171DA

Applicant Organization: The Nature Conservancy

Proposal Title: Sacramento River Restoration: Chico Landing Sub-Reach (RM 178-206)

Recommendation: Fund In Part

Amount: \$507,000

Conditions, if any, of approval (if there are no conditions, please put "None"): Provide funds for Task 3 and management of the project.

Provide a brief explanation of your rating: This proposal was modified from the original submittal by adding a new significant element of research in Task 3, which will include both experimental manipulation and field monitoring. The proposed studies in Task 3, detailed in Appendix 1 of the proposal, are responsive to the Selection Panel's original review which called for a strengthened scientific approach, including experimental design. Additional well-qualified expertise was added to the proposal to execute the research in Task 3. The external reviewers also found the proposal improved from the previous version.

The panel believes the sub-tasks in Task 3 successfully provide examples of the "targeted research" and "pilot/demonstration project" steps in an adaptive management framework and recommend these be completed prior to the full scale implementation which would have been carried out in Tasks 1 and 2. Therefore the Selection Panel recommends only partial funding, for Task 3, and a small additional amount for project management.

For future proposals addressing full scale implementation, the Selection Panel urges the applicants to show explicitly how vegetation restoration builds on knowledge gained in previous projects and studies. Rather than continuing to apply standard horticultural techniques to riparian plantings, the applicants are encouraged to find ways to treat full-scale restoration experimentally within an adaptive management framework. Lastly, for future implementation projects, the applicant should identify the likely CEQA and NEPA lead agencies and, in coordination with them, make adequate provisions for assessing environmental affects, consistent with the CALFED ROD.

* * *

Research and Restoration External Review Form
CALFED Ecosystem Restoration Program 2002 Proposal Solicitation Package

Proposal Number: 171DA

Applicant Organization: The Nature Conservancy

Proposal Title: Sacramento River Restoration: Chico Landing Sub-Reach (RM 178-206)

Review:

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

The overall goals and hypotheses were clear. The main goals were to use active horticultural techniques to restore 1056 acres of floodplain plant communities on former agricultural lands and to conduct research and monitoring on new and old restoration sites on topics related to restoration success and practice. More specific objectives and hypotheses were to determine the effectiveness of using cover crops to control non-native invasive species (NIS), to determine the effects of overstory cover and distance to remnant forest on native vegetation establishment, and to determine environmental controls on species distribution in older restored sites. There were some minor inconsistencies and ambiguities in the ways that the hypotheses were stated (e.g., hypothesis #1 is stated in terms of NIS cover in one place and native grass recruitment in another place; both are valid, but should be stated together). The way that hypothesis #4 was presented (i.e., that a statistically significant relationship exists between environmental factors and vegetation development on restored sites) was rather weak. It would be more surprising if there were no significant relationships between environmental factors and plant performance! This part of the study seems to be more exploratory (which is perfectly valid as a way to generate future hypotheses), rather than hypothesis-based. Hypothesis #4 could be made stronger by more explicitly focusing on the environmental variables hypothesized to be of particular importance in structuring restored or natural plant communities.

The project goals – restoration of over 1000 acres of floodplain plant communities and scientific studies designed to inform future restoration activities – were timely and important. The authors appear to have incorporated the suggestions of some earlier reviewers by developing a stronger experimental component to their work and by devising experiments (hypotheses 1 and 2) to test the effectiveness of management alternatives to intensive herbicide use.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The study is justified on the basis of existing knowledge (and on the basis of trying to fill knowledge gaps). A full-scale implementation is justified in that the project proposes to restore large blocks of riparian habitat (1056 acres) that will complement existing remnant and restored habitat in the area, and to conduct experiments to further restoration science and test the effectiveness of past restorations. The use of active, horticultural restoration is justified as a means of rapid rehabilitation of native floodplain vegetation structure that functions as habitat for riparian plant and animal species. The experimental and monitoring components of the project are justified on the basis of testing riparian restoration techniques (alternatives to heavy herbicide use and the importance of an overstory canopy to understory restoration) and examining the influences of landscape context and spatial heterogeneity on restoration success (i.e., establishment and growth of native plant species). Apparently, control of invasive species has been a significant problem in past restorations. The conceptual ecological model was valid, although perhaps a little more complicated than necessary, given the more specific focus of this particular project and set of experiments. Somewhat surprisingly, however, there was no explicit mention of invasive species in the conceptual model diagram. A couple of other things that I found a little puzzling in this section were the reference to “modeling” on p. 4 and the emphasis on landscape effects. I did not find anything in the proposal that I would consider modeling, unless the authors are referring to the exploratory statistical modeling (multivariate methods) used in hypothesis #4. Despite the discussion of the importance of landscape effects and regional variables,

I also did not see much in the experiments that incorporated variables at this scale (except for the effect of distance to remnant forest).

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

The approach for active, horticultural restoration seems well designed, reflecting TNC's use of these techniques on other riparian restoration projects over a 13-year period. This section could have had a little bit more detail on the particular planting strategies used (in particular taking into account site characteristics). These specifics, however, may be the subject of the tract-specific planning portion of the project (Task 1). The experiments sound relatively ambitious and some aspects of their design, implementation, and analysis are unclear. There were some minor discrepancies in the way that the hypotheses and experimental design were presented in different parts of the proposal. The final hypothesis, at least in the way it is stated, is a rather weak one (basically hypothesizes that the environment will have an effect on plant distribution). This hypothesis (#4) and the associated experimental design, could be strengthened by forming more explicit hypotheses related to the environmental gradients of interest (especially gradients of flooding and perhaps restoration age). Positioning of sampling plots could then be stratified in the field to ensure coverage of the full range of conditions along these gradients, thus providing stronger tests of plant-environment relationships. However, all of this notwithstanding, I like the hypotheses and the basic approaches to answering them. In this revised proposal, it appears that the authors been responsive to earlier reviews by strengthening the experimental component of the project. I would, however, ask TNC and its contractors to carefully review the approaches they have outlined and perhaps seek final input from an expert in experimental design and statistics prior to full implementation of the experiments. If properly designed and implemented, these experiments and exploratory analyses could yield valuable information for designing future restoration techniques.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

Given TNC's past record and experience in restoration in the system, I think the likelihood of success of the large-scale restoration is high. Actually, a portion of the monitoring will be devoted to assessing the longer-term success of these restoration approaches. The experiments are a little ambitious in scale, but are probably also feasible, given proper scrutiny to experimental and sampling design and adequate personnel for conducting the field work.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

Performance measures for restoration success are probably adequate (require 80% survival of planted trees, etc.), at least over the short run. These include evaluations of plant survival and growth in three periods: at 30 days after planting, at the end of the growing season, and at the end of the three-year project. Although we are not given many details, these measures and monitoring methods have been field-tested by TNC in earlier projects. Attainment of these minimum standards will be mandatory for the contractors (farmers) conducting the restoration activities. Success of experimental treatments in the research component of the project will be assessed through design and testing of research hypotheses using standard statistical techniques.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

If properly executed, the experiments in this project could yield important and useful findings to inform future restoration projects and to assess the success of present and past projects. Proper design, execution, analysis, and write up of experiments could yield high quality publications within the ecological restoration literature. The most important product of this work will be the restoration of over 1000 acres of riparian habitat from former agricultural lands within the floodplain of the Sacramento River.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

The track records of the applicants appear to be very strong. TNC has extensive experience in nearly all aspects of the project, from planning, legal issues and permitting, large-scale horticultural restoration, and monitoring. TNC staff members have conducted riparian restoration projects in the region for over a decade and appear to have a good track record of project success. TNC's contractors for the horticultural treatments (plant propagation, planting, etc.) also seem to be capable and experienced. The organizational and other infrastructure (e.g., availability of irrigation) appear to be adequate for this large-scale restoration project. TNC's contractors on the experimental component also appear to have sound professional and academic backgrounds and familiarity with the system. I am a little less certain of the capabilities of the applicants in terms of rigorous experimental design and statistical analysis. Prior to the initiation of field experiments, I would recommend that the applicants also consult with a statistician with expertise in experimental design. Although the basic experiments and questions seemed sound, there were a few ambiguities in their descriptions.

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

The project is expensive, but restoration of an additional 1000 acres of riparian habitat and well-designed experiments that inform future restoration may be worth the cost. My only concern is whether adequate resources (in terms of personnel and money) have been allocated to the experimental portion of the work. As an earlier reviewer indicated as well, it would be nice to come up with less intensive, lower cost methods of restoring large blocks of habitat. The outcomes of these experiments may give some clues as to how to do this.

Miscellaneous comments:

I commend the authors for their emphasis on field experiments that inform restoration. Judging from reviewer comments on the earlier draft of this proposal, it appears that the applicants have devoted significant effort to strengthening the hypotheses and experimental component of the project. The questions are good and are relevant to restoration science and the basic experimental approaches seem sound. However, I would ask the applicants to carefully review the experimental design and protocol to make sure that it is adequate to answer all of the questions that are posed. Also, the scale of the experiments is somewhat ambitious and will require sufficient resources for personnel to carry them out (e.g., field technicians, etc.).

Please provide an overall evaluation summary rating: Excellent: outstanding in all respects; Good: quality but some deficiencies; Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
- Excellent	My overall rating is “ Good .” The restoration of another 1000 acres of native plant communities along the Sacramento River would be valuable, particularly in combination with more than 3000 other acres of restored or remnant habitats along this reach. The experimental component of this proposal is also a potential strength. Judging from reviewer comments on an earlier draft of the proposal, this is a greatly improved part of the proposal. Restoration projects with a strong, well-designed experimental component are few and far between. If properly designed and implemented, this project could yield valuable information that could inform restoration science on the Sacramento River and elsewhere. The approaches and questions seem basically sound, although some ambiguities and minor discrepancies occur in their descriptions in the proposal. Prior to field implementation of the experimental, sampling, and statistical protocols, outside review (perhaps of more detailed research proposals for each experiment) from other academic ecologists and statisticians would help to ensure success.
X Good	
- Poor	

Research and Restoration External Review Form
CALFED Ecosystem Restoration Program 2002 Proposal Solicitation Package

Proposal Title: *Sacramento River Restoration: Chico Landing Sub-Reach (RM 178-206)*

Review:

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

The proposal proposes to restore more than 1,000 acres of riparian forest along the Sacramento River. The objectives and hypotheses are clearly identified and the hypothesis generally are testable.

My major concern with the proposal is that it largely uses an active intervention approach with no comparison to restoration through natural processes (i.e., flooding and natural recolonization by riparian species). This proposal includes more hydrologic analysis than many other proposals that call for vegetation manipulation and that is a strength. But it would be exciting to see a rigorous comparison of these more horticultural intervention approaches with natural flood and regeneration processes.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

The proposal presents a justifies the project and relates the proposed actions to on-going restoration in the reach. The conceptual framework is clearly linked to the proposed restoration actions.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

The restoration actions are strengthened by the application to four tracts of floodplain land, which is a simple form of replication that will strengthen the interpretation of the results. I encourage the investigators to refine their design to explicitly examine the influence of the extent of flooding and the effectiveness of natural flood processes for controlling invasive species. The cover crop research is sound, but it is likely to be a self-fulfilling prophesy unless other (and less artificial) actions are thoroughly investigated.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

The project is feasible and the investigators are experienced.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

The measures of performance are clearly related to the objectives and the hypotheses. This proposal provided a reasonably sound experimental design.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

The project will increase the understanding of the Bay Delta Watershed, particularly if TNC is successful in obtaining research funds to track additional responses. I encourage the TNC to consider modification of the design to better examine natural restoration influences of flooding.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Investigators are well prepared to conduct the proposed research and implementation.

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

The budget is large, but that seems to be the nature of CALFED projects. I doubt that it is outside the range of costs per acre of restoration for all proposals being considered.

Miscellaneous comments:

This proposal is technically sound and will increase our understanding of restoration actions. I encourage the investigators to continue to expand their study to better understand natural processes of restoration and vegetation recolonization.

Please provide an overall evaluation summary rating: Excellent: outstanding in all respects; Good: quality but some deficiencies; Poor: serious deficiencies.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
X- Excellent	The research is technically sound. It would be strengthened by more attention to natural processes of restoration in a floodplain river.
- Good	
- Poor	

*CALFED Bay-Delta Directed Action
Administrative Review
Budget Evaluation*

Proposal number: 171

Proposal title: Sacramento River Restoration: Chico Landing Sub-Reach (RM 178-206)

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

If no, please explain:

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

If no, please explain:

Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs? Yes

If no, please explain:

Are appropriate project management costs clearly identified? Yes

If no, please explain:

Do the total funds requested (Form I, Question 17A) equal the combined total annual costs in the budget summary? Yes

If no, please explain (for example, are costs to be reimbursed by cost share funds included in budget summary).

Does the budget justification adequately explain major expenses? Yes

If no, please explain:

Are there other budget issues that warrant consideration? Possibly

If yes, please explain: # 4 Reviewer recommended they use more seeding than potted stock to lower costs. I did not see where TNC did that. In fact, the cost increased by \$60,928 from original proposal.

* * *