

**Flood Protection Corridor Program
CALFED Bay-Delta ERP Panel Review**

Proposal Number: 151DA

Applicant Organization: *Arundo* Eradication and Coordination – Phase II

Proposal Title: Sonoma Ecology Center - Team *Arundo* del Norte

Recommendation: Continue to consider for directed action

Provide a brief explanation of your rating: The Selection Panel continues to believe this proposal has merit. The Panel also recognizes the long-standing track record of the proposer. The need to address *Arundo donax* as a significant invasive weed problem that severely disrupts ecological function remains a priority. However, this proposal still exhibited several shortcomings that can, with proper technical assistance, be remedied.

The proposal received no excellent, two good, and one poor rating from technical reviewers. The technical reviewers did not feel that the tasks were properly organized (levels 1 through 5) to test the hypotheses presented and to use adaptive management to respond to new information developed. For example, and the Selection panel concurred, the tasks described in Level 3 (experimental design and monitoring) should be the foundation to the entire effort, rather than an option to be added if extra funds are provided. There was insufficient description of the experimental designs to test the stated hypotheses.

The Selection panel would prefer to see a proposal that focuses on fewer watersheds or subwatersheds where an integrated, comprehensive approach to *Arundo* control, eradication and ecological restoration can be designed, tested, monitored, adapted, and documented. All five “levels” of activity should be integrated in each area, rather than applied piecemeal in only some areas. In such an approach, testable hypotheses might include assessing factors that are conducive for *Arundo* stand establishment and the performance of different restoration actions after treatment (e.g. passive or active; the use of different species used in active restoration). It would be useful to present a conceptual model for the spread of *Arundo* in a particular watershed, and validate that model.

The Selection panel further recommends that Team *Arundo* work more closely with its technical advisors, including David Spencer, Ray Carruthers, or Tom Dudley, to revise its proposal in response to the technical reviews, so that the revised proposal more adequately describes conceptual models, testable hypotheses, experimental designs, and data collection and analysis activities.

The proposal should also demonstrate that the applicant knows how it will comply with environmental regulations, especially those controlling the use of herbicides near waterways that harbor anadromous fish.

The Selection panel also expressed some concern over some of the budget items, particularly those in Level 5, as noted in the project’s budget review.

The Selection Panel hopes the above comments are constructive and that the applicant will consider them in revising its proposal to produce an excellent project.

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CALFED Ecosystem Restoration Program External Review Form

Proposal Title: Arundo Eradication and Coordination-Phase II

Review:

1. **Goals.** Are the project's goals and objectives clearly stated and internally consistent? What ecosystem restoration benefits will it provide?

The eradication goals of the project are clearly stated and represent an ongoing successful effort initiated by Team Arundo del Norte. I think it is clear that removal of this weed will facilitate restoration of riparian ecosystems in the State. In addition, I think that this team has a proven track record in building a cooperative effort among agencies and the public in controlling Arundo. However, the scientific goals of this project are much less clearly outlined and less compelling. I would think that by now we already know that herbicide techniques will significantly reduce Arundo infestations; the interesting questions are on how variations in current techniques might increase eradication effectiveness and efficiency. Although this approach is mentioned briefly (e.g. different application times) the rationale and experimental approach is poorly developed. In addition, no consideration is given to potential control techniques other than herbicide and hand-pulling. I know there are other proposed methods out there (e.g. solarization) that need to be tested. Hypotheses on effects of Arundo removal are very simplistic (e.g. native plants will increase after Arundo removal) and do not seem well integrated into the design. For example, perhaps different timing of treatment application may influence the rate of restoration; this could be tested in this project, but as it stands, the design does not address this.

2. **Approach.** Is the approach well designed and appropriate for the project's objectives? Is it justified by prior site studies or other information documented in the proposal? If additional information is needed to adequately plan and design the project, does the proposal include adequate provisions for obtaining it during the project's design and environmental assessment? If not, what additional information should be gathered?

As mentioned above, the eradication efforts seem well coordinated. The problem is with the scope/interest of the scientific hypotheses being tested and the capacity to really test these hypotheses. Limiting eradication treatments to herbicides and hand-pulling is not very innovative; this project is a chance to try different approaches such as solarization. In the experiments testing the eradication effectiveness, the rationale for varying treatment times is not developed. How variation in habitat type or distance from streamside might affect Arundo control is not discussed at all. Given the amount of work required, it does not seem wise to create a large number of additional experimental treatments without some sort of solid justification. In this design it is not clear whether there is proper replication (i.e. the quadrats represent sub-samples within a treatment area, not replicates) and it is not clear how treatment timing, distance from streamside and habitat type

are integrated. It would seem that this is a potentially complex design with crossed and nested factors. There is nothing wrong with this type of factorial experiment, but whether this is really the approach is not clear from the proposal. The restoration hypotheses, in addition to be rather simplistic, are not integrated into the eradication hypotheses. For example, is speed of restoration dependent on the interactive effects of treatment timing and habitat type? This interesting hypothesis could be tested if the experiment was designed properly. However, my reading of the proposal suggests that only treatment effects on restoration are being tested, although exactly how this will be done is not clear. For example, will restoration rates be tested only for plots treated at a particular time (e.g., May)? Finally, the methods to study effects of *Arundo* removal on stream channel capacity are so poorly described as to be useless. Needless to say, the use of a highly technical acronym (HEC-RAS) without even explaining what it stands is not helpful. I have no capacity to judge whether this approach will be useful because I have no idea what it is.

3. **Feasibility.** Is the approach fully documented and technically feasible? Is the scale of the project consistent with its objectives? Does it reflect “best practices” for this type of project? If not, how should the project be revised to reflect “best practices”? Is it likely to attain the ecosystem restoration objectives it seeks?

Expansion of eradication efforts through cooperative team-building and the development of maps of these eradication efforts seem quite feasible. In contrast, for the reasons outlined above, it is not at all clear whether the team will be able to effectively address the scientific hypotheses that they have posed. A much clearer description is needed of how potentially interactive effects of treatment timing, habitat type, restoration treatments, and location along stream gradients will be integrated in both the experimental design and the final interpretation of results.

4. **Capabilities.** What is the applicants’ track record in terms of past projects? Is the project team qualified to efficiently and effectively implement the project? Does the proposal describe how additional expertise and other support necessary to successfully accomplish the project will be obtained? If not, what additional expertise or support is needed?

Applicants have a good track record in coordinating *Arundo* eradication efforts. There is a good description of how subcontracting entities will be involved in the overall project. The applicants should consult with a statistician in order to improve the design of the field experiments.

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

The budget is very complex with all the sub-contracting work, but I could find nothing that seemed really out of line.

Additional comments:

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	Solid eradication program with good track record for developing cooperative ventures. Currently, rationale and experimental designs for testing proposed hypotheses are unclear and incomplete.
Good xxxx	
Poor	

CALFED Ecosystem Restoration Program External Review Form

Proposal Title: Arundo Eradication and Coordination – Phase II

Review:

6. **Goals.** Are the project's goals and objectives clearly stated and internally consistent? What ecosystem restoration benefits will it provide?

The project's goals and objectives are adequately stated but not internally consistent. The applicants are applying for funding at any one of five levels, however, the majority of the objectives are dependent on at least level 3 or 4 funding. With respect to this and other inconsistencies, please see response to the Approach section below.

The applicants state that the project will improve ecosystem health, water supply, and water quality. However, ecosystem health is not defined and measurable indicators of improved ecosystem health are not discussed. The applicants state that native plant and animal populations and water and sediment patterns will be reestablished.

7. **Approach.** Is the approach well designed and appropriate for the project's objectives? Is it justified by prior site studies or other information documented in the proposal? If additional information is needed to adequately plan and design the project, does the proposal include adequate provisions for obtaining it during the project's design and environmental assessment? If not, what additional information should be gathered?

A major weakness of the proposal is that the approach is not well designed and appropriate for the project's objectives. This is because the applicants state that the project can be funded at any of 5 levels, however, full Level 5 funding is necessary to meet all project objectives. Without Level 3-5 funding many of the stated objectives cannot be met. For example, Experimental Design and Monitoring (including scientific testing of hypotheses on the effectiveness of eradication and control efforts) is one objective of the proposed project. However, hypotheses will not be tested without at least Level 3 funding. Another example of lower-level funding activities being dependent on higher levels of funding is seen with respect to testing Hypothesis 1: assessing the efficacy of various eradication methods. If the project permitting section of the proposal is not funded at Level 4, hand control of weeds will be the only method of control allowed and therefore it will not be possible to test Hypothesis 1. These internal inconsistencies weaken the proposal.

Previous reviews noted that a weakness of the previous proposal was that it lacked rigorous experimental testing of eradication methods. This remains a major deficiency in the proposal. For example, with respect to Hypothesis 1: 0.25 m x 0.25 m plots are too small. Arundo donax plants are quite large (up to 10+ feet tall and a few cm in diameter) and few stems would be present within plots this small. Furthermore, the few remaining stems within plots of this size would lodge thereby creating different light and microclimate environments than would be found in a pure Arundo donax stand. An effective plot size would be several meters squared and paired plots selected in a stratified fashion would be more effective than randomly

chosen plots. A GPS unit would not be accurate to relocate the center of a 0.25m x 0.25m plot. Permanent markers would provide an effective means of relocating plots. Applicants need to decide on an adequate number of quadrats per location, use the same number in each location, and decide how frequently plots will be monitored. These specifics are lacking; the applicants have years of experience in Arundo donax control and as experts should be able to design an effective strategy. Eradication treatments are not described.

Additional examples of poor experimental design are seen with respect to Hypotheses 3 and 4. Hypothesis 3 is intended to test whether or not eradication sites will revegetate on their own. This is basically covered under Hypothesis 2. Planting native species has nothing to do with testing Hypothesis 3. Very little information is presented with respect to Hypothesis 4 suggesting that the approach to testing the hypothesis has not been well planned and thought out. For example, the applicants state only that they will “measure stream cross sections in selected stream reaches and obtain other data required to exercise the model.” Specific stream reaches should be identified and the “other data required” should be defined.

With respect to additional information the applicants should discuss the hypotheses that they are interested in testing and the most effective means of testing them with knowledgeable professionals. A simple, but effective, experimental design is all that is needed to answer the scientific questions that the applicants are interested in. It would also be very helpful to have details with respect to all aspects of project implementation, e.g, coordination efforts, training programs, and eradication techniques.

8. **Feasibility.** Is the approach fully documented and technically feasible? Is the scale of the project consistent with its objectives? Does it reflect “best practices” for this type of project? If not, how should the project be revised to reflect “best practices”? Is it likely to attain the ecosystem restoration objectives it seeks?

It is not possible to assess feasibility because the approach is not fully documented.

With respect to “best practices,” no information is given on eradication methods except that hand pulling is mentioned as the only available control method if permits are not obtained and mechanical harvest is described for Level 5 funding.

The ecosystem restoration objectives noted above are to:

- improve ecosystem health, water supply, and water quality, and***
- reestablish native plant and animal populations and water and sediment patterns***

Without a definition of ecosystem health and measurable indicators it is not possible to assess the potential efficacy of the proposed project at meeting the objective of improved ecosystem health. In areas with high Arundo donax densities, it is likely

that water supply will be improved (i.e., increased), however it is difficult to predict whether or not water quality will increase (e.g., eradication may result in increased erosion, at least in the short term).

Native plant communities are likely to reestablish, particularly in planted areas. Reestablishment of native animal species relying on these communities will likely follow. Water and sediment patterns will be more likely to resume previous patterns following removal of Arundo donax and reestablishment of native plant communities.

9. **Capabilities.** What is the applicants' track record in terms of past projects? Is the project team qualified to efficiently and effectively implement the project? Does the proposal describe how additional expertise and other support necessary to successfully accomplish the project will be obtained? If not, what additional expertise or support is needed?

It is difficult to assess whether or not the team is qualified to implement the project efficiently and effectively because the project is poorly designed and described. This would lead a reviewer to infer that the team is not the best qualified for the task, however the applicants prior work on Phase I of the project has been reviewed favorably. The applicants point out that they sought additional expertise in experimental design and hypothesis testing, but, they did not present an effective experimental design to test all 4 hypotheses. A review of the proposal by members of the Team Arundo del Norte Advisory Committee would likely have improved the quality of the proposed project if inconsistencies were noted and addressed.

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

The budget for eradication efforts (services) within Level 1 is reasonable. The funding requested for 2 full time employees for Project Coordination and Data Coordination on a project of this scale is excessive. In addition, the level of funding for these two positions remains constant at all 5 levels of proposed funding, although the workload associated with these positions would increase with each level of funding.

Additional comments:

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	Control and eradication of <u>Arundo donax</u> is an important area of restoration and research. The concept of a coordinated network of individuals working on eradication is a good one. However, the applicants fall short of presenting a well-thought out plan for approaching <u>Arundo donax</u> eradication on a large scale and for testing the efficacy of eradication efforts. Similar problems were noted in the previous version of the proposal and have not been addressed adequately to merit funding.
Good	
Poor XX	

CALFED Ecosystem Restoration Program External Review Form

Proposal Title: ARUNDO ERADICATION AND COORDINATION.

Review:

1. **Goals. Are the project's goals and objectives clearly stated and internally consistent? What ecosystem restoration benefits will it provide?**

The goals and objectives are clearly stated. The various levels of the project, however, appear to separate various components of these objects in a manner that is not consistent internally. For example, aspects of mapping and (thus) monitoring are at a different level than operational eradication (level 1). Although there is clearly a monitoring/assessment mode in level 1, it does not contain the more scientifically defensible components outlined in "level 3- Test Program hypothesis". I believe this organization reflects a concern that CalFed wants priority to "on the ground actions"- thus the indication that level on could be funded (and not the rest) etc. Likewise, level 4- compliance- needs to be an integral part of any expansion (i.e. phase II) and must be done based upon requirements (e.g. CEQA, NEPA, etc.). I also note that only in level 2 are criteria for eradication priorities- this obviously need to be a first-level component. I strongly suggest that the present segregation of levels doesn't realistically provide options for various funding. A better option would be to provide all four levels but at fewer field sites (if necessary). I am not suggestion that full funding not be approved, but that a successful project needs all four levels.

2. **Approach. Is the approach well designed and appropriate for the project's objectives? Is it justified by prior site studies or other information documented in the proposal? If additional information is needed to adequately plan and design the project, does the proposal include adequate provisions for obtaining it during the project's design and environmental assessment? If not, what additional information should be gathered?**

The approaches are generally reasonable, with the exception of the above comments on the "levels". However, I find the discussion and actual methods for utilizing adaptive management to be lacking in the following ways:

- a. What process will be used to annually incorporate new information/ changes for use in subsequent years? Simply having meetings will not ensure that this happens. What criteria will be used to make those changes? Who will make this evaluation (the Advisory Committee?).
- b. What are the criteria for "successful eradication". Note that CDFA and other entities that conduct eradication programs have established criteria and benchmarks. How long does Arundo have to be monitoring for regrowth before one can be certain that none will recur? How will potential upstream (or off-site) re-infestations be prevented? The mapping ("level 2") will certainly provide some assessment of this, but as part of the

hypothesis-testing needs to include a definition of when eradication has been accomplished.

The research aspect is a small portion (i.e. level 3), yet assessing best management for revegetation is crucial. What are the criteria for selecting “beneficial” vegetation to use? In the protocols for comparing “passive” and active revegetation, it would seem that a careful pre-action survey and documentation of adjacent (neighboring) vegetation is needed in order to select comparable sites for comparing these two options. Is recruitment likely to occur from upstream areas or areas immediately adjacent to the prior Arundo site? I suggest that sampling protocol be augmented to account for these differences so that the outcome may be better explained, what ever it.

Regarding the comparison of “urban” and “rural” sites may be interesting, it would seem that more fruitful efforts would be directed toward comparisons based upon hydrologic differences, or difference in adjacent vegetation, in other words, ecological differences. (Perhaps ecological differences can be compared in both the rural and urban settings.) Unless these two settings constitute differences in pathways to reinfestation, or differences in likelihood of restoration (revegetation), then I suggest that comparisons be ecologically based.

- 3 **Feasibility. Is the approach fully documented and technically feasible? Is the scale of the project consistent with its objectives? Does it reflect “best practices” for this type of project? If not, how should the project be revised to reflect “best practices”? Is it likely to attain the ecosystem restoration objectives it seeks?**

This project is feasible. However, a succinct comparison of best management practices does not appear to be included. I suggest that a simple matrix be prepared to identify various approaches (herbicidal, mechanical, restoration options, and monitoring) that link the permit requirements and other costs and risks (including potential non-target effects).

- 4 **Capabilities. What is the applicants’ track record in terms of past projects? Is the project team qualified to efficiently and effectively implement the project? Does the proposal describe how additional expertise and other support necessary to successfully accomplish the project will be obtained? If not, what additional expertise or support is needed?**

The team for the proposed work is solid. I would only suggest that a specialist in hyperspectral imaging be included- or at least included as a consultant.

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

This appears to be a well- budgeted project, with a high value of return on the costs.

There appears to be a very large budget for permits and other compliance. Perhaps this could be reduced by incorporating existing environmental review/compliance documentation (e.g. salt cedar docs) where appropriate.

Additional comments:

If funding is provided for the entire project, then the five levels will be implemented. If however, funding is only awarded for a portion of this, then I suggest that the applicant adjust the project so that appropriate efforts in all levels be implemented but in fewer sites.

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	This project follows a prior effort and is expanded to incorporate a large area and a small effort on research. Most of the “levels” are well justified, but separating them as “funding options” does not make sense. The team is competent to accomplish the goals and objectives; however clear and definitive criteria for “eradication” and restoration is lacking, and is an explanation of the <u>process to be used for adaptive management</u> . These issues can be resolved easily and should be before funding is approved.
Good X	
Poor	

CALFED Bay-Delta 2002 ERP PSP
Administrative Review
Budget Evaluation

Proposal number: 151DA

Proposal title: Arundo Eradication and Coordination– Phase II

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

If no, please explain:

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

The proposal includes a budget for each “Level” of the proposed project; these “levels” should be looked at interrelated and dependent tasks.

If no, please explain:

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

Yes, but the indirect costs are only calculated on salary (usually this is at least calculated on salary & benefits). “Computer services” at \$5,400/year are listed as part of indirect costs, though 3 laptops with service agreements have been budgeted for the project as well. This seems redundant.

If no, please explain:

4. Are appropriate project management costs clearly identified? Yes

If no, please explain:

5. 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).

6. Does the budget justification adequately explain major expenses? No

No travel is proposed for “Mapping” for Years 1 & 2, but travel would seem necessary for this task.

Purchase of a SUV in the amount of \$30,000 for a 75% FTE Geographic Technician seems excessive and unnecessary. Calculating the estimated mileage for this position over the 3 years (\$0.36/mile) is only \$10,800. Mileage reimbursement for the Project Manager and Data Coordinator are already budgeted under travel.

The portable computer and service contract costs (\$2900 x 3), with additional software for Project Coordinator and Data Coordinator (\$1000/each), seem high.

Why are 3 mower attachments (\$75,000 total) necessary? Geographically are 3 attachments needed for adequate coverage at all sites?

I don’t know much about Permitting, but the costs seem high for the number of sites that would be covered. Why are these costs spread out over the full 3 years - aren’t permits needed prior to work, or do the permits need to be renewed each year?

I didn’t see any budget justification for the Services for task 18 “Equipment & Training” so I don’t know what this expense would cover.

Are there other budget issues that warrant consideration? See above.

If yes, please explain:

NOTE: The proposal text, in Form 1, Question 19, lists the USFWS agreement number of its previously-funded Phase I ERP project. The ERP project number for this previously-funded project is **ERP-00-F11**.

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