Proposal Reviews

#200: Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer

University of California, Davis

Research and Restoration Technical Panel Review	
Bay Regional Review	
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Research and Restoration Technical Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Research and Restoration Technical Panel Review Form

Proposal Number: 200

Applicant Organization: University of California, Davis

Proposal Title: Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer

Review:

Please provide an overall evaluation summary rating:

Superior: outstanding in all respects;
Above Average: Quality proposal, medium or high regional value, and no significant administrative concerns;
Adequate: No serious deficiencies, no significant regional impediments, and no significant administrative concerns;
Not Recommended: Serious deficiencies, significant regional impediments or significant administrative concerns.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
-Superior	**Three of the four scientific reviews were highly critical of this proposal. In particular a lack of description of the modeling to be done and the lack of information as to if/how the modeling would be validated were considered to be serious deficiencies.**
-Above average	
-Adequate	
XNot recommended	

1. **Goals and Justification.** Does the proposal present a clear statement of goals, objectives and hypotheses? Does the proposal present a clear justification and conceptual model for the project?

   The goal of this project is to assess the ecological and ecosystem protectiveness of the Pb, Cd, and As human health risk-based concentrations (RBCs) in fertilizer. The RBCs will be input into a terrestrial and ecosystem risk assessment model. There are no hypotheses explicitly stated that will be tested. Implicit is the (null) hypothesis that the human health based RBCs are protective for ecological systems. There are a number of inconsistencies in the proposal and very little detail on the exposure and effects modeling processes.

   The scale of the project involves two phases (with a third phase presumably the subject of a future proposal). In Phase I a scoping assessment will be performed to examine whether the RBCs could impact terrestrial and aquatic systems at the individual farm level. Phase II looks at regional level impacts. Phase III (not covered in present proposal) will look at whole Bay-Delta level impacts.

2. **Likelihood of Success (Approach, Feasibility, Capabilities and Performance Measures).** Is the project likely to succeed based on the approach, feasibility and project team capabilities? Are the proposed performance measures adequate for measuring the project's success?

   The overall approach draws heavily on the USEPAs risk assessment framework and contains problem formulation, exposure assessment, effects assessment and risk characterization steps.

   Though one reviewer rated the proposal as excellent, three reviewers were uniformly critical. Particular problems identified were that the exposure assessment is not described in detail and the proposal seems to indicate that the model choice has not yet been made. There is no mention of how the best model from those available will be chosen or indeed if a new model will be developed and no indication of if/how the chosen model will be validated for use in this project.

   One very important deficiency identified by all four reviewers is a total lack of detail on the probabilistic elements of the modeling despite that this is intended to be an important output of the project.

   One reviewer referred to the excellent reputations of the applicants for their ability to conduct ecological risk assessments. Another reviewer questioned the ecological strengths of the team (largely on the basis of the project description).

3. **Outcomes and Products.** Will the project advance the state of scientific knowledge in general and/or make an important contribution to the state of knowledge of the Bay-Delta Watershed? For restoration proposals, is the project likely to contribute to ecosystem restoration or species recoveries in a significant way? Will the project produce products useful to decision-makers and scientists?

   The main products will be information to revise regulatory metal standards and further scientific understanding of fate and transport modeling.

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

   This 2 year project has a total budget of $812,199. No major budgetary concerns were identified by the reviewers. One of the reviewers familiar with similar ERAs assessed the budget to be in line with other ERAs of comparable scope and scale.

5. **Regional Review.** How did the regional panel(s) rank the proposal (High, Medium, Low)? Did the regional panel(s) identify significant benefits (regional priorities, linkages with other activities, local involvement) or impediments (local constraints, conflicts with other activities, lack of local involvement) to this proposal? What were they?

   Bay Regional Review ranked this project low because Pb, Cd and As are not limiting factors or region-wide concerns for environmental restoration projects in the region. They ask whether these metals are also used in commercial and landscape applications (greater relevance) and if there are any indications of water quality problems from these contaminants.

   Delta Regional Review ranked this project low because it did not see immediate benefit from it to Delta water quality. Noted that since the models have not been chosen feasibility cannot be assessed.

San Joaquin Regional Review ranked this project low since no problem with metals in fertilizers has been demonstrated to date.

Sacramento Regional Review ranked the project as low because it did not seem to be well tied to current CALFED priorities.

6. **Administrative Review.** Were there significant concerns about the proposal with regard to the prior performance, environmental compliance and budget administrative reviews? What were they?

   No problems re: environmental compliance. Re: Budget applicant confuses Phases of Work with Tasks. Tasks for each phase should have been identified. There is a discrepancy with question 17a.

Miscellaneous comments:

None

Bay Regional Review:

Proposal Number: 200

Applicant Organization: University of California, Davis

Proposal Title: Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer

Overall Ranking: **X**Low **-**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

The Bay/Suisun regional panel found this to be a low priority for our geographic region because lead, cadmium and arsenic, are not limiting factors or region-wide concerns for environmental restoration projects in the Bay Region. This low is without prejudice for other regions.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   N/A to this type of project (scientific project)

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   Yes wildlife friendly agriculture and restoration not threatened by degraded environmental water quality

   No what toxicity has been shown by lead, cadmium and arsenic which threatens restoration by degrading the environmental water quality in the Bay Region?

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   -Yes **X**No

   How?

   No the target Prop 65 heavy metals to be addressed by this risk assessment, lead, cadmium and arsenic, are not limiting factors or region-wide concerns for environmental restoration projects in the Bay Region.

4. Does the project adequately involve local people and institutions?

XYes **-**No

How?

Yes the applicants are a local institution (UC Davis) and local firm (MWH Sacramento)

Other Comments:

Questions to the applicants: are fertilizers with concentrations of arsenic, cadmium, and lead also used for commercial and landscape applications? If so, this would be a more direct connection to the Bay Region. And if so, do the water quality monitoring data from existing programs indicate a water quality issue from these contaminants? The Bay Region review panel believes that these are not limiting factors or region-wide concerns for environmental restoration projects in the Bay Region. If we are incorrect, please make the case and re-apply.

Delta Regional Review:

Proposal Number: 200

Proposal Title: Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer

Overall Ranking: **X**Low **-**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

Committee did not see immediate benefit of this project to delta water quality.

We note that there are no 303d waterbodies listed for these metals in the Delta region.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   Much of the necessary data appears to have already been collected.

   We note that the models are not chosen, so we can't determine their feasibility.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   Addresses PSP priority MR-2 to develop programs for wildlife-friendly agriculture and conduct studies to better understand relationships between farming and wildlife habitat.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   XYes **-**No

   How?

   PIs are involved in several restoratio-related projects in the Delta involving assessment of sediment and pesticide toxicity.

4. Does the project adequately involve local people and institutions?

   XYes **-**No

   How?

PIs are local and work with local agencies including SFEI, SWRCB, and the CVRWQCB.

Other Comments:

None.

San Joaquin Regional Review:

Proposal Number: 200

Applicant Organization: University of California, Davis

Proposal Title: Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer

Overall Ranking: **X**Low **-**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

Potentially good work that is not appropriate for this funding. No problem demonstrated to date; recent rule on contaminants in fertilizers have taken care of worst past problems.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   Basically a large modelling effort based on existing literature.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   Marginally: is relevant to PSP priority MR-2 in the broad sense of better understanding relations between farming and wildlife habitat BUT there has been no demonstrable negative effect of metals from fertilizer to date.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   -Yes **X**No

   How?

   It is relevant to critical activities, but not directly to CALFED proiorites and restoration activities.

4. Does the project adequately involve local people and institutions?

   -Yes **X**No

   How?

No evidence of this.

Other Comments:

None.

Sacramento Regional Review:

Proposal Number: 200

Applicant Organization: University of California, Davis

Proposal Title: Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer

Overall Ranking: **X**Low **-**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

The proposal does not seem to be well tied into the current CALFED priorities.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   The literature search and probablistic assesment proposed are feasible.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   The proposal suports the pesticide studies under PSP restoration priority 7 for the Sacramento region and 5 for the multi region.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   XYes **-**No

   How?

   It is linked to Prop 65 HRA work that was done earlier and is due to be reviewed in a few years.

4. Does the project adequately involve local people and institutions?

   -Yes **X**No

   How?

There is no local involvment however there is a letter of suport from the California Fertilizer Inspection Advisory Board.

Other Comments:

While this might be very worthwhile work it does not seem well tied into current CALFED priorities. It should pursue other sources of funding.

External Scientific: #1

Research and Restoration External Scientific Review Form

Proposal Number: **200**

Applicant Organization: **University of California, Davis**

Proposal Title: **Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

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	**There are serious deficiencies in the conceptual approach and a lack of detail provided on the modeling methods to be used and how their outputs will be evaluated with regard to actual the ecological systems that are the targets of the risk assessment.**
-Good	
XPoor	

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

   The goal of this project is to assess the ecological and ecosystem protectiveness of the Pb, Cd, and As human health risk-based concentrations in fertilizer. The RBCs will be input into a terrestrial and ecosystem risk assessment model. There are no hypotheses explicitly stated that will be tested. Implicit is the (null) hypothesis that the human health based RBCs are protective for ecological systems. There are a number of inconsistencies in the proposal and very little detail on the exposure and effects modeling 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 basis for the study is that previous RBCs were based on human health criteria and the question is whether these are sufficiently protective for ecological syystms and Bay-Delta water qualtiy.

The scale of the project involves two phases (with a third phase presumably the subject of a future proposal). In Phase I a scoping assessment will be performed to examine whether the RBCs could impact terrestrial and aquatic systems at the individual farm level. Phase II looks at regional level impacts. Phase III (not covered in present proposal) will look at whole Bay-Delta level impacts.

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 overall approach draws heavily on the USEPA's risk assessment framework and contains problem formulation, exposure assessment, effects assessment and risk characterization steps.

   The project will make use of information on fertilizer products and scenarios obtained from an earlier human health risk assessment and this should save some effort.

   The effects assessment will apparently be based on a collection of laboratory-derived toxicity reference values for a variety of species that will subsequently be fit to a probability density function. There are a number of potentially serious problems with such an approach related to sampling bias, mixing of different endpoints in the same distribution, endpoint measured vs. likelihood of population-level impacts, etc. It appears that a probability-density function will be constructed separately for each species from all of the endpoints available from the literature search.

   The exposure assessment is not described in detail and the proposal seems to indicate that the model choice has not yet been made. There is no mention of how the 'best' model from those available will be chosen or indeed if a new model will be developed and no indication of if/how the chosen model will be validated for use in this project. I do not feel that the results of this study as described will be able to determine whether the regulatory RBCs for Pb, Cd and As in commercial, inorganic fertilizers are protective of terrestrial and aquatic ecosystems, and Bay-Delta water and sediment quality.

   There is no discussion at all about how 'water quality' will be assessed (which appears to be a separate issue than the ecological effects).

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?

   No, the approach is not sufficiently documented and I have serious concerns that the estimate of risk that comes out of the modeling efforts will be realistic. There are no field studies being proposed and it is difficult to see how the model outputs will be evaluated.

   It is not sufficiently explained how the modeling of Phase I and Phase II will differ.

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 applicants do not appear to have a stringent time plan. They are requesting 2 years of funding but on p. 8 of the proposal state that 'completion of the study within two to three years is a reasonable expectation. Performance measures indicated by the applicants have not yet been specified but will be developed in a project plan in the beginning of the project. Likewise a data management plan is not yet in place but will be developed as part of the project.

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 main products will be information to revise regulatory metal standards and further scientific understanding of fate and transport modeling.

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?

   From the project description as well as the titles of the participants my impression is that the group is strong on the tox-side but very weak on the eco-side. It is difficult to see who in the group is the exposure-modeler and whether the expertise is available.

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

   This 2 year project has a total budget of $812,199; 1 applicant plus 5 subcontractors; applying in equipment for 3 computers.

Miscellaneous comments:

Unclear whether 'receptor' refers to habitat or species - seems to be used to mean both in different places. Not described how an 'acceptable dosage for each representative receptor' will be defined.

Will the study only focus on vertebrates or will invertebrates and plants be included?

I disagree very strongly that the probabilistic approach used here will 'provide a significant scientific advancement in understanding of the toxicology on terrestrial and aquatic ecosystems'.

Since these metals are entering the environment in fertilizers isn't the issue of nutrient-metal interactions relevant in some way? Not mentioned at all.

External Scientific: #2

Research and Restoration External Scientific Review Form

Proposal Number: **200**

Applicant Organization: **University of California, Davis**

Proposal Title: **Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

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**
XExcellent	**The project is well designed (in phases) to build on existing work (HRA) to address ecological risk. By bringing together models and data that are already available, the project will generate three useful products: (a) an evaluation of the health-based RBC for ecological protection; (b) a characterization of ecological risk from metals in fertilizers in the Sacramento and San Joaquin Valleys; and (c) a framework for probabilistic ERA of non-point-source pollutants.**
-Good	
-Poor	

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

   This project is well designed to address a specific risk management question (i.e., are the RBCs ecologically protective?) while advancing the state of the art of ecological risk assessment (especially through derivation of probability density functions for ecological benchmarks). The proposed work builds on the exposure analysis conducted previously in the HRA. The results of the proposed ERA will be available in time to be useful in the 2006 review of the RBCs.

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 proposed study will integrate two major bodies of information: (a) the pathways by which metals from inorganic fertilizers move through the aquatic and terrestrial environments of the Central Valley, and (b) the toxicity of arsenic, cadmium, and lead to aquatic and terrestrial organisms. The conceptual model is a useful framework for aquiring and organizing this information, assessing the uncertainties in the analysis, and characterizing the ecological risk. The framework has been used successfully in other risk assessments involving agricultural contamination (e.g., pesticides).

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 plan for conducting the ERA in phases is well conceived--starting at a site level, progressing to a watershed, and concluding with the region. Phase I provides an opportunity to build the core of the risk assessment: a set of deterministic transport models for a single location. The elements of these models are already available (from the HRA and other studies). Applying these models to identify potential receptors (the "Scoping Assessment" in Task 1) leads logically to the TRV analysis in Task 2 of Phase I. Proceeding from this local ERA to a watershed scale (San Joaquin and Sacramento Valleys) is also logical. The information at each of the levels will be useful to decision makers in several ways: (a) support a re-evaluation of the RBCs for the three metals; (b) characterize the risks from metals in inorganic fertilizers to aquatic and terrestrial species in the Central Valley; (c) indicate areas of uncertainty where further data collection, experimentation, and analysis are warranted; (d) establish an ERA framework that can be applied to other agriculturally-derived non-point-source pollutants.

   The proposal lacks detail on the probabilistic elements of the ERA. A probability density function of TRVs is mentioned several times as one of the most important products of the study (and I agree that it would be), but the aspects of uncertainty and variability reflected in the PDF are not specified. Will the PDF incorporate the estimation error inherent in deriving a TRV from a single study? The variability among TRVs derived from different studies? The uncertainty in extrapolating from a different species? The variation among TRVs derived from different measurement endpoints? Will the exposure analysis be probabilistic? If so, what sources of variability and uncertainty will be addressed?

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 proposed project is similar in scope and scale to other successful ERAs. The previous experience of the subcontractor (MWH) will be a great asset, and adds to the confidence that the project will meet its objectives. The proposal includes a good balance between application of existing tools and data to address specific management questions, and on the other hand development and extension of tools and concepts that will be useful for future ERAs.

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 outline of the ERA is specific enough to allow reliable evaluation of performance. Both the goals of the project, and the strategy for reaching the goals, are clearly presented (with the exception of the questions about what the probabilistic analysis will include, as discussed in Item 3).

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?

   As mentioned above, there are three potential products from this work: (a) evaluation of the protectiveness of the RBCs for arsenic, cadmium, and lead; (b) assessment of risk from metals in fertilizers to aquatic and terrestrial species; and (c) a multi-scale framework for ERA of non-point-source pollutants.

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?

   Both the PI and the subcontractor have excellent reputations for their ability to conduct ecological risk assessments. The success of the subcontractor in the human-health-based RBC development is a good indication of their qualifications for data compilation, analysis, and reporting.

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

   The budget is in line with other ERAs of comparable scope and scale conducted by academic and private organizations. The experience and data from the previous HRA will be of great benefit in this work, and result in a good return on investment.

Miscellaneous comments:

External Scientific: #3

Research and Restoration External Scientific Review Form

Proposal Number: **200**

Applicant Organization: **University of California, Davis**

Proposal Title: **Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

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	**The proposed research places too much faith in untested, still to be developed models with no validation proposed.**
-Good	
XPoor	

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

   The goal of this project is to determine if ecosystem health is protected by risk-based concentrations of Pb, Cd, As in fertilizers derived from considerations of human health effects. This will be accomplished through modeling.

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 seeks to answer an important question -- how well do risk assessments based on human health protect ecosystem health. The project is based on several conceptual models that are clearly described in the proposal. What is not adequately considered is the larger context in which the question is being asked. What are the other sources of these metals in the basin? How significant are fertilizer sources? Clearly this larger context is necessary to evaluate ecological risk and to determine if this proposed research is needed.

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 team places considerable reliance on modeling. In fact, the proposed research is entirely literature review and modeling. A "state of the art terrestrial and aquatic ecosystem model" is mentioned, but it appears that this is not yet developed and would be developed as part of this project. That is a large endeavor, and there does not appear to be any attempt at model validation. The ecological endpoints appear to be direct toxicological endpoints and it is not clear how indirect and synergistic effects would be included. It does not seem likely that novel methodology or approaches will result.

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?

   It is not clear what model will be used to assess fate and transport. It appears that fairly sophisticated fate and transport models are available, but the approach to ecological receptors seems exceptionally naive. The focus appears to be on direct effects on threatened or endangered species; but what about the food web that supports them? What about more common species (e.g. fishes used as food by subsistence fishers) that may accumulate high concentrations of these metals and suffer declines? In terms of habitat identification, the problem with contamination is often not for species living on the farm, but for those downwind and downstream.

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?

   Reports appear to be the main performance measure. I am very concerned about how the proposed models will be validated. There is no indication of how model performance will be assessed.

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 the project could accomplish its goal, that product would clearly be of value. I am skeptical that the goal would be accomplished for reasons outlined above.

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 researchers clearly have experience with human-health based risk assessments and are using the same methods for this research. Experience with ecological risk assessment seems more limited.

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

   Budget is okay.

Miscellaneous comments:

Environmental Compliance:

Proposal Number: 200

Applicant Organization: University of California, Davis

Proposal Title: Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer

1. Are the legal or regulatory issues that affect the proposal identified adequately in the proposal?

   XYes **-**No

   If no, please explain:

   Modeling only, no permits or environmental documentation necessary.

2. Does the project's timeline and budget reflect adequate planning to address legal and regulatory issues that affect the proposal?

   XYes **-**No

   If no, please explain:

   N/A

3. Do the legal and regulatory issues that affect the proposal significantly impair the project's feasibility?

   -Yes **X**No

   If yes, please explain:

Other Comments:

Budget:

Proposal Number: 200

Applicant Organization: University of California, Davis

Proposal Title: Ecological Risk Assessment for Heavy Metals in Commercial, Inorganic Fertilizer

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

   XYes **-**No

   If no, please explain:

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

   -Yes **X**No

   If no, please explain:

   Applicant confuses Phases of Work with Tasks, Tasks for each Phase should have been identified.

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

   XYes **-**No

   If no, please explain:

4. Are appropriate project management costs clearly identified?

   XYes **-**No

   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 **X**No

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

   Question 17a. = $79,364, and Budget Summary = $812,199.

6. Does the budget justification adequately explain major expenses?

   XYes **-**No

If no, please explain:

7. Are there other budget issues that warrant consideration?

   -Yes **X**No

   If yes, please explain:

Other Comments: