Individual Review Form

Proposal number:_2001-F209-1____ Short Proposal Title:_Evaluation of Biological Assimilatory Capacity for Selenium

1a) Are the objectives and hypotheses clearly stated?

Yes. The proponents will attempt to determine the toxic effects of selenium on fish and the form of selenium causing the toxicity. They will also try to develop a tool that can be readily applied to assess the biological assimilatory capacity of selenium.

1b1) Does the conceptual model clearly explain the underlying basis for the proposed work?

Yes. The model describes the generally understood mechanisms involved in selenium transformation. It is clear from the conceptual model that one of the key steps is the transformation of inorganic selenium to organic selenium by lower trophic level organisms.

1b2) Is the approach well designed and appropriate for meeting the objectives of the project?

The approach is very well designed in that it includes both laboratory feeding studies combined with feeding studies based on actual field samples of lower trophic level organisms. The use of actual higher trophic level organisms found in the watershed, splittail and blue gill should make the results of these studies more relevant. The in depth examination of selenium species and their effect at the celluar level of fish provides the type of information needed to meet the objectives. The combination with field sample collection of blue gill and splittail at key sites is also appropriate in determining whether the BAC approach is appropriate, although, as the authors point out, there may be synergistic effects on fish due to other contaminants which could confound any attempt to validate lab research with field results. It should also be pointed out that waterfowl are extremely sensitive to selenium and similar studies for waterfowl may need to be developed before the BAC approach is used. In other words, the BAC for fish may not be exceeded, but for waterfowl it may be.

1c1) Has the applicant justified the selection of research, pilot or demonstration project, or a full-scale implementation project?

Yes. A research project is appropriate, since a significant data gap is being filled.

1c2) Is the project likely to generate information that can be used to inform future decision making?

It could be extremely valuable should the research be successful. The proponents correctly point out that current regulatory indicators, such as water column concentrations of selenium, are surrogates for ecosystem impacts. The more refined the indicator (i.e. the closer it is to monitoring actual impacts), the more informed our decision making will be for selenium control.

2a) Are the monitoring and information assessment plans adequate to assess the outcome of the project?

The proponents state that there is not a monitoring plan, but field samples are collected to complement the laboratory work. The number of samples to be collected was not indicated and the exact sites for sample collection are not described, although the general locations are. The type of data being collected for the lab studies appears to be appropriate.

2b) Are data collection, data management, data analysis, and reporting plans well-described, scientifically sound and adequate to meet the proposed objectives?

The use of peer reviewed journals for review and publication of results is appropriate. It is not entirely clear how data will be handled (e.g. a single database), although it appears a process for backing data up is in place. There is a statement that "emphasis throughout the study will be on accuracy of the trends, and not on the precision of the data". This may imply that further research will be needed, since precision will be necessary should the concept of BAC be applied to make management decisions.

3) Is the proposed work likely to be technically feasible?

Yes. The team appears to be applying tools that have been used previously. Since it is a research project, the feasibility of applying the concept of the BAC will not be known until the results of the study are complete.

4) Is the proposed project team qualified to efficiently and effectively implement the proposed project?

Yes. The team is involved in many aspects of selenium research and appears to have the facilities to rear the fish used in the experiments.

Miscellaneous comments

Provide a brief explanation of your summary rating

The project proponents have put together a very solid research effort that should yield extremely useful results for the management of selenium in the Delta. A relatively new concept (the "biological assimilative capacity") is being applied as a more direct way of determining selenium impacts. The tools being used are familiar to the researchers. One potential weakness of the proposal is that although it does develop important information on fish species, it is not clear that the concept would be directly applicable to waterfowl without further research.

Overall Evaluation Summary Rating

- ☐ Excellent
- xxx☐xxx Very Good
- ☐ Good
- ☐ Fair
- ☐ Poor