Review of four juvenile salmon coded wire tag experiments conducted in the Delta

Patricia Little Brandes

Final Selection Panel Review

Proposal Title

#0299: Review of four juvenile salmon coded wire tag experiments conducted in the Delta

Funding:

Fund
Amount: **$83,100**

The final Selection Panel concurred with its initial findings on this proposal and recommended funding the proposal at the full amount requested.

Public Comments

No public comments were received for this proposal.

Initial Selection Panel Review

Proposal Title

#0299: Review of four juvenile salmon coded wire tag experiments conducted in the Delta

Funding:

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Amount: **$83,100**

Initial Selection Panel (Primary) Review

Topic Areas

- Life Cycle Models And Population Biology Of Key Species
- Environmental Influences On Key Species And Ecosystems
- Relative Stresses On Key Fish Species
- Direct And Indirect Effects Of Diversions On At−risk Species
- Assessment And Monitoring
- Salmonid−related Projects

Please describe the relevance and strategic importance of this proposal in the context of this PSP. How does the proposal address the topic areas identified above? What are the broader CALFED Goals this proposal may meet that are not accounted for in these specific topic areas?

The effects of the CVP and SWP actions on the survival of juvenile salmon as they traverse the Delta has been one of the most contentious issues before CALFED. The four experiments that would be reviewed by the contracted statistician/ biometrician have been scientifically contentious and are at the focal point of evaluations of water project operations in the Delta. The insights into the power and validity of these experiments that would result from successful implementation of this proposal are relevant and important to Delta decision making.

The budgets of proposals submitted in response to this PSP are larger, on average, than those

submitted to CALFED in previous years. The Science Program is committed to getting as much science per dollar as is reasonably possible. With this commitment in mind, can the proposed budget be streamlined? If so, please recommend and clearly justify a new budget total in the space provided.

The relatively low cost and strategic importance of this project to Delta fish issues suggests that this project budget not be trimmed. The Technical Synthesis Panel concluded that the key to the success of this project is the statistical/biometrics consultant. It is important that selection of the contract consultant be resolved prior to funding the proposal.

Evaluation Summary And Rating.

Provide a brief explanation of your summary rating and any additional comments you feel are pertinent.

This economical and important project could strengthen each of the four subject Delta fish experiments, contribute to improved Delta decision making and assist recovery of Central Valley salmon and steelhead populations by increasing juvenile survival through the Delta. The project should increase the statistical rigor of the experiments which in turn could contribute to broader acceptance and reduced conflict over the conclusions of the experiments

Selection Panel (Discussion) Review

fund this amount: $**83,100**
note:
fund

This work proposes to fund statistical analysis of existing coded wire-tag datasets by world-class statistician on a question of clear importance. The Panel was clear about the importance of this work, and the cost-effectiveness for the potential information value. The Panel expressed concern that the statistician was not specified in this proposal, but decided that the PI would solicit appropriate input on that

decision. The Panel suggested that a condition of funding might be working with EWA biologists and the Science Program to help make decisions about how the work should proceed.

Panel Ranking: Fund.

Technical Synthesis Panel Review

Proposal Title

#0299: Review of four juvenile salmon coded wire tag experiments conducted in the Delta

Final Panel Rating
above average

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

The goal of the proposed investigation is to review and reanalyze four coded wire tag (CWT) experiments on juvenile chinook salmon that were implemented by the Stockton USFWS office in the Delta region. The reason for the review is to improve the rigor of monitoring and interpretation of the experiments, which have provided mixed results. The goals of the project are consistent with CALFED's objectives and should provide critical insight to salmon populations. Overall, the goals, objectives, and hypotheses are presently clearly and are internally consistent. Each experiment was implemented to test a specific hypothesis; however, results of the experiments have been challenged by numerous stakeholders. The proposal clearly explains the experiments that have been conducted and the potential problems or issues with each. The main weakness of this proposal is that the approach to reviewing and reanalysis are not well defined. It is clear that there is a problem, but it is unclear exactly what the solution is. This likely occurred because the statistician that will be spearheading this review has not been identified. The proposal could have been improved by incorporating a statistician/biometrician as a PI, which certainly would have clarified some issues. For example, retrospective power analyses are often not meaningful for understanding type II error in experiments (Steidl et al. 1997). Assuming that the

PI hires a strong and interested statistician, the likelihood of success for this project is high. The PI has strong capabilities in the field of fisheries, yet the key to the success of this project is in the statistical consultant. Because this project is primarily a review and potential reanalysis, the budget is quite small relative to other proposed investigations. The primary cost is for hiring a knowledgeable statistician, which is imperative for the success of this project. I agree with the recommendation by one reviewer that a workshop on the topic would be an excellent addition to the project and could act as a springboard for the statistical consultant to review and reanalyze these experiments. The main product listed from the proposal is that a report of the review and results will be generated. In addition to a report, I recommend that I peer−reviewed publication is written. If published, this will provide more credibility to the review, re−analysis, and potential suggestions for future studies. Although many of the details are absent and the statistician is not identified, this is a valuable, inexpensive project that is needed to improve inference in these important experiments. Reviewers agreed that the results of this project could provide important improvements in mark−recapture techniques, future monitoring and experiments designed to evaluate flow/pumping strategies, and understanding how flow rates and pumping influence salmon.

Additional Comments:

The goal of the proposed investigation is to review and reanalyze four coded wire tag (CWT) experiments on juvenile chinook salmon that were implemented by the Stockton USFWS office in the Delta region. The reason for the review is to improve the rigor of monitoring and interpretation of the experiments, which have provided mixed results. The goals of the project are consistent with CALFED’s objectives and should provide critical insight to salmon populations. Overall, the goals, objectives, and hypotheses are presently clearly and are internally consistent. Each experiment was implemented to test a specific hypothesis; however, results of the

experiments have been challenged by numerous stakeholders. The proposal clearly explains the experiments that have been conducted and the potential problems or issues with each. The main weakness of this proposal is that the approach to reviewing and reanalysis are not well defined. It is clear that there is a problem, but it is unclear exactly what the solution is. This likely occurred because the statistician that will be spearheading this review has not been identified. The proposal could have been improved by incorporating a statistician/biometrician as a PI, which certainly would have clarified some issues. For example, retrospective power analyses are often not meaningful for understanding type II error in experiments (Steidl et al. 1997). Assuming that the PI hires a strong and interested statistician, the likelihood of success for this project is high. The PI has strong capabilities in the field of fisheries, yet the key to the success of this project is in the statistical consultant. Because this project is primarily a review and potential reanalysis, the budget is quite small relative to other proposed investigations. The primary cost is for hiring a knowledgeable statistician, which is imperative for the success of this project. I agree with the recommendation by one reviewer that a workshop on the topic would be an excellent addition to the project and could act as a springboard for the statistical consultant to review and reanalyze these experiments. The main product listed from the proposal is that a report of the review and results will be generated. In addition to a report, I recommend that I peer−reviewed publication is written. If published, this will provide more credibility to the review, re−analysis, and potential suggestions for future studies. Although many of the details are absent and the statistician is not identified, this is a valuable, inexpensive project that is needed to improve inference in these important experiments. Reviewers agreed that the results of this project could provide important improvements in mark−recapture techniques, future monitoring and experiments designed to evaluate flow/pumping strategies, and understanding how flow rates and pumping influence salmon.

Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

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The reviewers and panel thought the study was feasible and well designed and agreed that the ranking for this proposal is above average. The proposal addresses a real need to clarify conflicting interpretations of results from four previous CWT studies. Improving analytical precision is a fundamental CALFED objective. The budget is reasonable. The panel did express concern, however, regarding the fact that the biometrician or quantitative fish biologist who would be conducting the analysis was not identified. The success of the project depends entirely on who will be hired. Discussion among the panel members expressed concern regarding why the USFWS did not have their own internal quantitative experts who could do this work. It was recognized that hiring a fish population dynamics expert would probably be better than a biometrician in providing a more biologically relevant analysis.

Final Ranking: Above Average

Technical Review #1

proposal title: Review of four juvenile salmon coded wire tag experiments conducted in the Delta

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	Goals and objectives are clear and orignal hypotheses are given.
Rating	very good

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?

Comments	Conceptual models for ongoing CWT experiments are given. This is proposing an outside critical and indepth review of ongoing research. This appears to be much needed in order to focus efforts toward more scientific rigour.
Rating	very good

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? 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?

Comments	

	Yes, this appears to be needed and is likely to improve ongoing approaches and add to the base of knowledge.
Rating	very good

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 and within the grasp of authors?

Comments	Entirely feasible.
Rating	very good

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	Not relevant to this proposed review but would be the focus of proposed outside indepth evaluation.
Rating	not applicable

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	Products are likely to be of high value.
Rating	excellent

Additional Comments

Comments	This review appears to be much needed.

Capabilities

What is the track record of authors in terms of past performance? 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?

Comments	Difficult to judge. This should be part of the proposed review.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	Budget appears reasonable for proposed outside consultant review.
Rating	very good

Overall

Provide a brief explanation of your summary rating.

Comments	Overall I would judge this a Good to Very Good proposal. As written the proposal makeks the case that critical examination of ongoing CWT experiment is essential. It is obviously needed to focus future CWT experiments.
Rating	very good

Technical Review #2

proposal title: Review of four juvenile salmon coded wire tag experiments conducted in the Delta

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	Of the 5 proposals I have reviewed for CALFED for the 2005 program, this is by far the best one. Ironically, it requires the least amount of funding! The goals of this project are clearly defined and highly relevant to CALFED
Rating	excellent

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?

Comments	This project is well justified. Increasing confidence in hypotheses relating to survival rates of outmigrants is needed. This project will also likely lead to improvements in the current mark recapture programs and in future experiments designed to evaluate the success of various pumping/flow strategies
Rating	excellent

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? 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?

Comments	The proponents do a very good job of outlining the data and hypotheses that will be addressed by this project. This articulation is required to provide a focus for the analyst they plan on hiring. The only weakness of the approach is that they do not describe the analytical framework that will be used. The analyst and the scientific authority will presumably make this decision. I have a few concerns over the emphasis on particular aspects of the work in the proposal. I think traditional power analyses are a bit dated. Power analyses would be used to estimate the probability that two survival rates (e.g. mainstem vs. Delta) are significantly different. Of more relevance is defining probability distributions for each survival rate and the proportions of the outmigrant population that they apply to. With these distributions one could still address the same power-type question, but the results could also be used to address the larger more important issue of what effect these rates would have on returning spawners. The distributions could be integrated into a larger model that looks at the proportion of fish exposed to different survival rates and used to calculate the effect on returns (e.g. as input to Newman and Rice's recent state-space modelling efforts). I think the emphasis on analysis should be on the development of statistical methods, particularly a Bayesian/maximum likelihood approach to estimating movement and survival rates in an open population mark-recapture model. You should be able to hire a world-class authority on this subject at $180/hr for 400 hrs.
Rating	

	very good

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 and within the grasp of authors?

Comments	It is absolutely feasible to condunct an improved analysis of existing CWT data to sharpen the understanding on what regulates outmigrant survival rates and improve subsequent CWT efforts.
Rating	excellent

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	No direct field measurements are proposed, but the analysis, if implemented properly, will provide a lot of useful recommendations for future sampling requirements and experiments.
Rating	excellent

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	Many useful products will be generated from this analysis including a better understanding of the effects of flow manipulation/pump management on survival rates, and specific recommendations for improved design/implementation of CWT recovery programs.
Rating	

	excellent

Additional Comments

Comments	

Capabilities

What is the track record of authors in terms of past performance? 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?

Comments	The proposal is very clearly written and the proponent definitely has an excellent understanding of both the biology and analytical challenges. I consider the authority to be highly capable in this regard. However, the success of this project will be heavily dependent on the analyst that is hired and unfortunately that person is not identified. Given the utility of this project I am not penalizing the proposal very much for this shortcoming. They have allocated sufficient funds to get someone really good. I think a quantitative fisheries analyst, rather than a pure statistician or biometrician should be hired. Two obvious candidates are Carl Walters of UBC or Ray Hilborn of UW. Ken Newman is also a possibility but I am not sure of his background with regards to mark and recapture data.
Rating	very good

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	

	Considering the importance of this work, and the costs of other proposals I have reviewed, this project is an incredible deal for CALFED. For ca. $75,000 they should be able to hire a world-class analyst. They may be able to get someone very competent and dedicated to this project for less than $180/hr, thereby improving the end-product because more time could be spent on the work. The budget could be expanded a bit to begin the project with a small workshop where the data is presented and a range of potential analysts present aalternate ways of addressing the analytical issues.
Rating	excellent

Overall

Provide a brief explanation of your summary rating.

Comments	Absolutely fund this project at the requested, or possibly at an enhanced, level.
Rating	excellent