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RE-FAXING May 13th, 2002

To:	Dan Ray	From:	David Marmorek
Organization:	CALFED Bay-Delta Program	ESSA reference:	Bd8122
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cc:			

Mr. Dan Ray,
 CALFED Bay-Delta Program,
 1416 9th Street, Suite 630
 Sacramento CA 95814

Dear Mr. Ray:

RE: PSP Review #68: *Testing Restoration Hypotheses across Multiple Watersheds: Gaining Insights from Past Projects to Improve Future Learning (ESSA Technologies Ltd. and Stillwater Sciences)*

This letter is a response to the above review of ESSA's proposal, addressing the concerns raised by both regional and scientific reviewers. The issues raised by reviewers were excellent, and we greatly appreciate the obvious care with which they reviewed our proposal. In the first section below, we provide some responses to major concerns raised by reviewers. In the second section, we provide some specific suggestions to address all of the major concerns, while still maintaining the overall focus and thrust of the proposal, which all reviewers appeared to endorse. With the recommended improvements, we would like to request that the proposal be reconsidered by CALFED for Direct Action funding. Should this request be accepted, we would submit a revised proposal according to CALFED's schedule, in late summer.

1. Concerns and Responses

The proposal received three positive external scientific reviews (2 "excellent", 1 "good" rating) and an overall "Above Average" rating from the Research and Restoration Technical Panel. However, two of the regional reviews gave only "low" rankings (Delta, Sacramento) and one a "medium" ranking (San Joaquin). We do not re-iterate here the many positive comments in the reviews, but rather focus on specific concerns, which are listed below.

1.1 Scale of the study is too small, reducing regional relevance

The pilot work (Tasks 1 and 2) proposed to focus on the Clear Creek, Tuolumne, and Merced tributaries. A principal concern of the Delta regional panel was the exclusion of Delta and Eastside tributaries, though they did feel that the indicators developed from this work would be relevant to their region. The Sacramento regional review actually suggested a smaller scale approach focusing just on a couple of tributaries. A scientific concern with our proposed approach was the relatively low 'n' (number of replicates and controls) for statistical tests.

Response: There are always tradeoffs between breadth and depth. Back in May 2000, when CALFED staff first requested that ESSA and Stillwater submit our ideas for a multi-watershed approach as a proposal for internal funding, we proposed a broader focus – all of the tributaries in the Sacramento and San Joaquin regions. We thought that this scope was appropriate for a pilot multi-watershed analysis before moving on to the Delta. CALFED did not have sufficient internal funds in FY2001 to fund this project, and so we prepared a PSP proposal in August and September of 2001. When we spoke to CALFED staff about their participation in this project, they recommended that we work with tributaries where the ESSA-Stillwater team already knew the project implementors and could acquire data with relative ease. Hence we settled on using Clear Creek, Tuolumne and Merced tributaries for pilot analyses, where our team has conducted past projects.

We are very open to expanding the scope of the study to include the Sacramento, San Joaquin and Delta/Eastside regions, and increasing the involvement of various project implementors. This is more similar to the scope we had originally envisioned back in May 2000. It would require re-designing the inventory phase of the project to take a much broader look at both the kinds of hypotheses worth testing in different regions and the types of data that are currently available, including potential reference sites. We would be pleased to work with a larger set of project implementors in multiple regions, and have some thoughts in section 2 below on how to do this. For this larger scope to be successful, all participants would need to be willing to share their data with our project team in a joint effort of testing restoration hypotheses.

This larger scope would have the benefit of increasing the number of treated and reference systems ('n'). Of course, regional differences in ecosystems and restoration actions may limit the extent to which some tributaries can be grouped together for hypothesis testing. These differences however may be very illuminating, and help us to deal with the need for "spatially explicit models of habitat and functional needs of the region" (External Scientific Reviewer #3, Miscellaneous Comments)

1.2 Are there enough data on biological responses to test restoration hypotheses? Is the project premature?

External Scientific Reviewer #1 expressed a concern about whether there is sufficient information on biotic responses to tributary restoration to effectively complete the assessment process. External Scientific Reviewer #3 noted that not enough time may have passed since the restorative action occurred to detect an effect, and also that a lack of reference sites and varying sampling protocols will affect hypothesis tests.

We agree that these are all challenges. We recognized these concerns in the proposal (e.g. Objectives 2, 3 and 4; section A.4 Feasibility). Our response to these issues is the same as External Scientific Reviewer #1 noted at the end of his/her review:

"Is this analysis premature, given the state of the results from tributary restoration projects OR is it critical for asking the right questions and formulating what information CALFED should be requiring of ALL projects?"

We believe that the latter is the case – this project can act as a catalyst to CALFED for improving the experimental designs of restoration projects from a large scale multi-watershed perspective. As stated by External Scientific Reviewer #3:

“This type of study is justified relative to existing knowledge both in the CALFED action area, and basically everywhere else. This is the \$64 billion question which we are way behind the curve in addressing for CALFED and anywhere we profess to be conducting ‘ecosystem restoration’.”

We recognized the limitations of existing data, and for that reason proposed a simulation approach to explore what data and multi-watershed experimental designs would be required to test various hypotheses with higher levels of statistical power. External Scientific Reviewer #3 noted: “I was skeptical of the usefulness of simulated data. The more I think about it, the more I believe this may be the only way to test and develop new restoration hypotheses due to predicted weaknesses in existing datasets.”

1.3 Insufficient Coordination and Outreach

Various reviewers recommended increased coordination and outreach, including with CALFED Staff, the Interim Science Board, river Technical Advisory Groups and people doing work on the ground.

The proposal stressed strong interaction with CALFED staff, which is critical for the project’s success. We are aware that CALFED has begun a “Lookback Exercise”, and we are in contact with the people doing this work. We do not believe that our proposal duplicates any of these efforts, but rather extends them into a more detailed and rigorous analysis of hypotheses. Section E of the proposal outlined our approach to Local Involvement. While we still believe that all of our proposed approaches are valuable, we agree with reviewers that they are probably insufficient. In response, we recommend the following:

- *An expanded Core Group that includes a larger set of habitat scientists and restoration program managers;*
- *Use of a workshop approach in the initial scoping of hypotheses and candidate watersheds (Task 1), involving a larger set of habitat scientists, program managers and project implementors;*
- *Presentations of the results of the study (now Tasks 1 and 2) at regional workshops attended by a larger set of habitat scientists, program managers and project implementors.*

These suggestions are outlined in more detail in section 2.

1.4 Costs

There was a general concern about the overall cost of the study, though the External Scientific Reviewers all noted that data handling and database development can use up a lot of time.

There are two ways to reduce the budget – remove tasks, or reduce the time spent per task. We believe that it makes more sense to remove tasks, so that each included task is done well. The Research and Restoration Technical Panel recommended that we first focus on Tasks 1 and 2. In light of this recommendation, we would therefore recommend that CALFED initially fund only Tasks 1 and 2 (i.e. the pilot investigations), though with an expanded set of tributaries that include all three regions (as discussed above in section 1.3), and greater outreach (discussed above in section 1.3). Once these tasks are successfully completed, we could apply for funding for Tasks 3 and 4. In our submitted proposal, Tasks 1 and 2 were about half of the total budget (\$467,593). We would anticipate some increases in this total to deal with the expanded set of tributaries and greater outreach, but the total budget would be much less than originally proposed for all four tasks.

2. Proposed Revisions to Project Design

The review panels' comments, as discussed above, imply some changes in the scope and structure of the project, though not in its overall thrust. Here we summarize some of the ways in which the project could be improved to meet the concerns of reviewers.

2.1 Formulate a Larger Core Group

Based on our existing contacts, and in consultation with the CALFED Interim Science Board and senior CALFED staff, we would create a larger Core Group that includes 8 to 10 people. The Core Group should include two types of habitat experts:

- a) *Habitat scientists*, who have conducted extensive habitat-related field research, are familiar with the technical protocols used to measure habitat and fish population variables, and understand the challenges involved in testing specific restoration hypotheses. We would like four or five of these people in the Core Group. Dr. Dave Hankin of Humboldt State University has expressed an interest in serving in this capacity, and was highly supportive of the project concept. Members of the Adaptive Management Forum Scientific and Technical Panel, who have already conducted detailed reviews of work on Clear Creek, the Merced, and Tuolumne restoration projects, would also be candidate scientists.
- b) *Watershed restoration project managers*, who are familiar with the types of habitat restoration projects that are going on in three CALFED regions (Sacramento, San Joaquin, Delta/Eastside), the kinds of monitoring information that are collected, and the nature and location of databases where project information is compiled. We would also like to have four or five of these managers in the Core Group, representing different regions.

By including both scientists and managers, the project will have a solid grounding in the technical aspects of data collection and analysis as well as the legal, institutional, and economic contexts for individual watershed programs. Working with the Core Group, we would:

- formulate an initial set of habitat-related hypotheses to test in Tasks 1 and 2,
- review a draft set of criteria for selecting candidate watersheds,
- discuss the most promising tributaries and data sets on which to conduct these tests, and
- develop a list of participants for a watershed reconnaissance workshop.

This will ensure that the set of hypotheses that we test in the pilot analyses are both feasible (from a technical and institutional perspective) and relevant to managers who oversee habitat restoration projects and make decisions based on their results.

2.2 Conduct a Watershed Reconnaissance Workshop to finalize hypotheses and watersheds

Once a preliminary set of habitat hypotheses are formulated (Objective 1), we will need to identify a feasible number of candidate watersheds where these hypotheses can be tested in our pilot analyses. Appropriate watersheds will:

- have ongoing habitat restoration projects that are relevant to the hypotheses we wish to test, or be potential reference sites;

- have readily available and relevant data sets;
- share similarities and differences with other test watersheds that allow the development of an overall multi-watershed experimental design; and
- be represented by researchers, managers and project implementors that are supportive of the project concept, and willing to be involved in the pilot analyses.

The candidate watersheds will be selected at a multi-agency workshop attended by 35-40 habitat scientists, program managers and project implementors. This workshop would be facilitated by ESSA, who have 20 years of experience in technical facilitation. Selection of workshop participants will be based on suggestions of the Core Group.

2.3 Expand the scope of the inventory used for the pilot analyses

Once the candidate watersheds have been selected for the pilot analysis, we would proceed with the data inventory, but for a larger number of sites that span the Sacramento, San Joaquin and Delta/Eastside regions. This would include a classification of the restoration actions that were undertaken, the variables being monitored, and the hierarchical spatial/temporal scales at which actions and monitoring are taking place. A large portion of this can be done at the workshop (participants will be asked to bring data and reports with them), but much follow-up and consolidation will be required, using existing databases, phone calls and site visits. The primary output of this objective would be a database of information about the various restoration projects in pilot watersheds. The database would not repeat information in existing databases, but rather would focus on the experimental design of existing projects.

Given the heterogeneity of watersheds, commonly found gaps in before-after data, and the rarity of monitored reference sites, we have fairly low expectations that ideal contrasts will be found. However, we would explore ways of aggregating or standardizing measurements to get common metrics and spatial scales (e.g. Bradford 1994; Bradford and Irvine 2000).

The analysis of these data would then proceed as outlined in our proposal, but we would have a larger data set with which to work.

2.4 Expanded outreach

Our proposal recommended CALFED conference presentations, newsletter audiences, journal articles and a guidance manual. With the project reduced to focus only on Tasks 1 and 2, the deliverables for Tasks 3 and 4 would obviously not be produced. However, there would still be useful products generated out of the first two tasks.

The expanded Core Group and Watershed Reconnaissance Workshop outlined above (section 2.2) would help to expand the outreach of the program. In addition, we would suggest that three regional workshops could be conducted to present the results of our work on the first two tasks. These workshops would be attended by habitat scientists, program managers and project implementors, building on the network of contacts of the people who attended the Watershed Reconnaissance Workshop. This may be a more effective way of reaching local restoration project implementors, who may not be able to attend a CALFED conference presentation.

3. Conclusion

We greatly appreciate the opportunity to respond to the CALFED reviews of our proposal, and thank the reviewers for their time in reading and reflecting on both our original proposal, and this response. We believe that the above responses deal with all of the major concerns raised by reviewers. With the recommended improvements to our proposal, we would like to request that the project be reconsidered by CALFED for Direct Action funding. Should this request be accepted, we would submit a revised proposal according to CALFED's schedule, in late summer.

Yours truly,



David Marmorek
President
ESSA Technologies Ltd.