**Independent Review**

**Proposal number:__2001-K204-1 Short Proposal Title: Chinook salmon genetics_**

**1a) Are the objectives and hypotheses clearly stated?**

The six objectives of the proposed project are very clear. All are related to refining estimates of effective population sizes of hatchery and natural stocks of winter-run Chinook salmon in various parts of the Sacramento River system. The underlying goals are also clear: to evaluate the success of attempts to improve effective population size of winter-run salmon through hatchery supplementation and to improve future efforts through more precise pedigree information.

The actual hypotheses associated with these objectives are less clear. This section of the proposal was actually used to support the choice of objectives rather than to present distinct hypotheses. I suppose this is partly understandable since the project is presented as monitoring and assessment rather than research per se. However, implicit hypotheses still remain and could have been addressed, such as the hypothesis that hatcheries have (or have not) enhanced the effective size of the winter-run population.

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

The conceptual model is clearly articulated and appropriate to the proposed work. The proposed work is based on the standard genetic concept of 'effective population size'. Conservation genetics theory suggests that the effective size of populations must be maintained above some minimal level to ensure that genetic variation is not lost too quickly and fitness is maintained. Recent methodological developments allow the total effective size to be decomposed into components due to natural and artificial (hatchery) spawning. This is among the first projects that will implement the new methodologies.

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

The approach utilizes state-of-the-art genetic techniques (microsatellite assays) for assigning individuals to stock and family. The additional work to develop MHC markers will further aid in providing discriminatory ability. The applicant's laboratory has already published computer programs to aid in determining genetic relationships, and apparently is currently working on additional programs. Therefore, the approach is likely to allow the applicants to meet the stated objectives.

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

The applicants have justified the project as both an assessment and monitoring project, which would fall under the domain of research. The state of knowledge of Chinook salmon genetics is insufficient for a pilot or demonstration project or for full-scale implementation project.

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

Outcomes of the project are highly likely to inform future decision-making. Generated information will determine the level of protection to be afforded to Chinook salmon runs in Battle Creek. The information will be of extreme importance in gauging the impact of hatchery programs and in guiding future hatchery management practices.

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

Data management, monitoring, quality control and reporting plans are acceptable but not inspired. Standard reporting options are described (quarterly status reports, oral research updates, scientific journal articles and presentations). In addition, there apparently will be ongoing fax communication with USFWS during the run season to communicate the results of the DNA analyses of potential spawners. Still, the intermediate and final products will allow a general assessment of the success of the project.

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

See 2a

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

The project is likely to be technically feasible. Success of the proposed project is dependent on the ability of the team to develop a suite of highly informative genetic markers. The applicants have previously demonstrated an ability to develop microsatellite and MHC markers for salmonids so there is no reason to doubt that they will be able to produce additional genetic markers. The applicants are well qualified to analyze genetic data to discriminate stocks and assess effective population sizes. The applicant will also be working closely with USFWS, which will help to ensure that adequate samples (adult salmon carcasses, juvenile tissue samples) are recovered.

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

The project team includes leading researchers in the field of salmonid genetics. In addition, they are extremely knowledgeable and well respected in the scientific community for their insights into the theory and estimation of effective population size. They are very well qualified to implement the proposed project.

**Miscellaneous comments**

It would have been helpful if the proposal indicated exactly how many new markers (with some minimum level of polymorphism) will need to be developed. This could be calculated based on previous genetic marker data. Without this information it will be difficult to gauge the success of this phase of the project until after the markers are used to try to identify genetic relationships.

The rationale for assignment of individuals to the winter-run stock via the LOD score analysis is not clear to me. Specifically, the proposal does not explain why a LOD score of 2 (100 to 1 odds) is minimally acceptable when based on five loci but a LOD score of 1 (10 to 1 odds) is acceptable when based on seven loci. Why does the standard change based on the number of loci used? The proposal suggests that the Genetics Subcommittee agreed upon this standard so I defer to their greater knowledge of the subject area.

| **Overall Evaluation Summary Rating** | **Provide a brief explanation of your summary rating** |
|---|---|
| ■ Excellent<br>☐ Very Good<br>☐ Good<br>☐ Fair<br>☐ Poor | Overall, the proposed project is well designed and fills a critical data gap in the management of endangered Chinook salmon stocks. The project has potential to provide solid evidence to help resolve the continuing debate regarding the proper role of hatcheries in the management of salmonid stocks. The applicants are well qualified to perform the proposed research and have demonstrated an ability to pull off similar projects in the past. |