

**Panel Scientific and Technical Review Form**  
(Note: Review comments will be anonymous, but public.)

**Proposal number: 2001-J200**

**Proposal Title: Genetic Identification of Watershed-dependent Species of Special Concern in the Central Valley**

**Summary:** What are the Evolutionary Significant Units for species in the Central Valley? The PIs will use genetic markers in mitochondrial and microsatellite DNA to test whether populations within each of eight species (four birds, two frogs, one turtle, and one salamander) are genetically distinct and therefore in need of individual protection in order to conserve biodiversity within species. Population ecologists from San Francisco State University, the University of California at Davis, and the Point Reyes Bird Observatory will analyze samples from throughout and beyond the Central Valley to test for genetic differentiation over large distances (10-100 km), medium distances (1-10 km) and between adjacent watersheds. This will be a new project, devoted to research, and will result in scientific publications and reports to managers.

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

*Summary of Reviewers comments:*

The objectives are clear, but the hypotheses are not closely linked to management.

*Panel Summary:*

The main goal is "to test competing hypotheses about the relative importance of geographic distance versus geographic barriers in producing population structure, and then to use the resulting genetic information to propose management units for a set of eight watershed-dependent vertebrate species of concern (p2)". The hypotheses are all clear: individuals in the Central Valley form multiple populations; differences between populations increase with distance; populations in different watersheds differ; different species show similar spatial patterns of population structure. The last hypothesis seems unlikely. It is not clear how results will be used to promote management units, nor what is meant by "watershed-dependent." For the herps, it is not clear how connectivity between populations will be measured. For the bird species, use of the demographic data said to be available from the Point Reyes Bird Observatory could provide an independent measure of connectivity.

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

*Summary of Reviewers comments:*

The model explains how the PIs will measure genetic variation but not how measurements will identify the important sub-units of species to preserve. The premise is that managers need to understand how populations are structured in order to decide which populations of a species to protect.

*Panel Summary:*

The model clearly explains the basis for the project: "Because demographically independent populations should be managed as separate units ..., accurate identification of those units is essential .... An alternative, powerful, and efficient method of identifying population structure is to assay genetic markers that vary on both macro- and micro-geographic scales.(p 2)" The panel agreed with the proposition that genetic markers are a good method for identifying population structure but not with the premise that it is always desirable to manage independent populations as separate units.

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

*Summary of Reviewers comments:*

The approach is well designed for determining variation between populations of a species. The combination of mtDNA and microsatellite data is a strong feature.

*Panel Summary:*

The choice of mtDNA and nuclear microsatellite markers seems suitable for measurement of genetic differentiation between populations, though not necessarily for measurement of differentiation that is related to local adaptation or ecological differentiation. It seems very likely that the PIs will be able to test their hypotheses using the sampling and analytic methods proposed, but not clear how the approach will translate into management prescriptions. It is doubtful that all distinct populations of all species of concern in the Central Valley can be managed individually.

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

*Summary of Reviewers comments:*

The use of ERP funds for the project is not well justified, because the research will not help regulators select the best locations for restoration or protection. On the other hand, research is needed, because managers lack sufficient information about population structure to plant projects,

*Panel Summary:*

Since the population structures of most species of concern are little-known, a research project is clearly more appropriate than a pilot or implementation project for conservation of genetic diversity within these species.

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

*Summary of Reviewers comments:*

The project is very likely to generate information for making decisions in the future but not in the immediate future. The project should contribute to regional management of a variety of species. Similar data from Schaffer's lab were used to identify management units for one of the study species in Santa Barbara County.

*Panel Summary:*

The project will generate information about the spatial distribution of genetically distinct populations of a variety of species. This seems basic to conserving genetic diversity within species. Whether that is a primary management goal is beyond the scope of the panel. However, the panel did feel that the type of information to be gathered under this proposal would not be itself suffice to guide selection of areas or populations for conservation.

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

*Summary of Reviewers comments:*

The assessment plans are adequate to reach conclusions about population structure but not about species management. Monitoring is not necessary for this type of project

*Panel Summary:*

Monitoring is not applicable to the project. The PIs should be able to tell whether tests of the hypothesis are conclusive.

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

*Summary of Reviewers comments:*

Data aspects and reporting are sound and adequate, except that proposed analyses will not indicate the usefulness of results. Proposed sampling appears more than adequate to address the objectives.

*Panel Summary:*

For herps, the PIs plan to sample 40 populations per species for tests of large-scale patterns, to sample at 20 sites per species in each of 3 regions for tests of medium-scale patterns, and to sample at 5 sites per species (for a subset of species) in each of 3 watersheds for tests of differences between watersheds. The large- and medium-scale sampling effort seems adequate, but the number of watersheds is small, meaning that the choice of watersheds will be critical. The choice of regions could also determine the outcome of medium-scale results, so it would be useful to have more information about the criteria for these choices. The sampling protocol for birds is more vague, and it is not clear that all the hypotheses will be testable in birds.

The panel could not comment on the suitability of the proposed modified ANOVA analysis (p 9); the proposed use of cluster analysis is standard, but the panel was likewise unfamiliar with the Monte Carlo analysis proposed.

The proposed types of products -- publications, presentations, reports, and data archives accessible to the public -- are appropriate for this project.

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

*Summary of Reviewers comments:*

Yes, the PIs propose to use well established general methods for measuring genetic variation and appropriate specific techniques for these methods. The preliminary data are of high quality and the PIs have a large number of the required samples and the required permits already in hand.

*Panel Summary:*

According to the proposal, the PIs have already extracted and amplified DNA from "close allies" or individuals of 7 of the 8 proposed study species and have initial ideas about which mtDNA regions to use. Schaffer's lab is set up for two rapid screening techniques, use of "single-strand conformation polymorphism" and "outgroup heteroduplex analysis", and has initial results for one of the species using the latter technique. The PIs will contract with a commercial vendor to create microsatellite libraries. They already have the necessary collecting permits for the species and have most of the necessary samples in hand for the herps. The work seems highly likely to be feasible for the herps and reasonably likely to be feasible for the birds.

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

*Summary of Reviewers comments:*

Yes.

*Panel Summary:*

Smith and Schaffer are accomplished, established researchers on the conservation genetics of birds and amphibians respectively and have excellent qualifications for the project. Two postdoctoral workers are identified to work with Smith at SFSU; both are said to be recent Ph.Ds. with a background in avian molecular genetics. Nur appears to have considerable experience in bird demography, and the Point Reyes Bird Observatory is well-respected for its work in this area.

**5)Other comments**

One reviewer questioned whether CALFED resources should be allocated to identifying genetically distinct sub-units of species, because preserving large, contiguous populations is a more important way to ensure the immediate survival of species.

The scientific consensus is probably that, at least in highly transformed habitats, environmental stability and population size are more important determinants of species survival than genetic diversity or demographic stochasticity.

The budget for the proposal, about \$750,000 in direct plus indirect costs depending on funding source, is largely devoted to postdoc support (about 250K in direct costs) and lab costs for the PIs (about 180K in direct costs).

The two individual reviewers rated the proposal as Excellent and fair, respectively.

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<p><b>Overall Evaluation Summary Rating</b></p> <p><input type="checkbox"/> Excellent <input type="checkbox"/> Very Good XX <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor</p>	<p><b>PANEL SUMMARY COMMENTS [include the consensus conclusions by the panel including the strengths and weaknesses of the proposal]</b></p> <p>This is a feasible, scientifically interesting proposal by a team of highly qualified researchers. The main weakness of the proposal is that it is not likely to guide management of the program area in the near future.</p>
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