

To: All Department of Fish and Wildlife Scientific Staff

Subject: Department of Fish and Wildlife Scientific Integrity Policy

POLICY STATEMENT

It is the policy of the Department of Fish and Wildlife (Department) to improve the integrity of the scientific work we conduct or which is conducted on our behalf. In order to guide the scientific work by the Department and pursuant to Fish and Game Code Section 715(d), the Department adopts this scientific integrity policy, to ensure integrity and public confidence in our scientific work.

I. Background and Purpose

This Scientific Integrity Policy (Policy) affirms the standards for high quality and ethical scientific inquiry within the Department. Given the vital role of science in the management of natural resources, the Department endeavors to maintain and strengthen its commitment to scientific information that is developed and used according to the highest professional standards. These efforts are essential to maintaining the confidence of the public and other stakeholders, and to enhance the reputation of the Department's scientific programs, policies and staff. Furthermore, the Department is committed to providing an environment that encourages and supports the conduct, communication, and transparency of excellent science. In support of the above, this Policy is to be considered as the collective guiding principles for all scientific endeavors within the Department.

The purposes of this Policy are:

- To foster the development and use of high quality scientific work that is used to inform policy and management within the Department as well as decisions of the Fish and Game Commission.
- To ensure that the public and decision makers have access to the scientific methodology and analyses behind the Department's policy positions.

This Policy is intended to provide overarching guidance through the standards and protocols listed below. Guidance documents may be added, changed or removed from the list by the Director (or designee), as needed to remain current and relevant. Note that at the time of release of this policy, some of the guidelines below are in progress, to be added at a later date:

- Quality in Science (below)
- Standards of Scientific Conduct (below)
- Key Elements of Scientific Work (below)
- Scientific Project Workplan Guidelines (Appendix 1)
- Policy on Animal Welfare (Appendix 2; In progress)
- Procedural Guidelines for *Ad Hoc* Independent Scientific Advisory Committees (Appendix 3; revision pending)
- Communication of Scientific Work (Appendix 4; In progress)

II. Scope

This Policy applies to Department employees who conduct, supervise, manage, or apply science in the course of their work. This Policy also applies to external entities conducting scientific work that is funded by the Department and external entities conducting scientific work on behalf of, or in collaboration with the Department.

For the purposes of this Policy, science and scientific work includes monitoring, inventorying, experimentation, research, modeling and any other type of scientific assessment including social-economic and human-dimension work.

This Policy is not meant to supersede existing conflict of interest laws and policies or administrative rules applying to the working conduct of Department employees. Further, this Policy does not supplant or diminish the rights of employees under existing law. This Policy is intended as a guideline for scientific work but is not a condition of employment.

III. Quality in Science

Creating scientifically robust and credible internal programs and products requires a Department-wide commitment to best practices that foster quality in scientific work, including:

1. Establishment of clear scientific priorities and objectives such that scientific efforts are relevant from an immediate and a longer-term perspective, and facilitate identification and assessment of emerging policy issues.
2. Development of Departmental policies and guidelines pertaining to scientific ethics and standards, and communication of these to employees, contractors and other Department affiliates involved with the production or use of scientific work.
3. Providing support and resources for scientific staff:
 - a. Investment in the institutional resources needed to attract, develop and support scientists in the performance of excellent work.

- b. Support of the use of resources to build or enhance scientific capacity within the Department.
 - c. Encouragement of innovation and continuous learning.
 - d. Fostering partnerships, collaboration and internal integration to expand the value and reach of the Department's scientific programs.
 - e. Recognition that present-day facilities, equipment and networks are required to carry out meaningful scientific endeavors. A modern scientific infrastructure forms the basis of the Department's ability to uphold the integrity of current science programs and to study emerging challenges.
4. Ensuring the free flow of accurate scientific information, both internally and externally, while maintaining consistency with proprietary and confidentiality requirements.

IV. Standards of Scientific Conduct

Employees and entities that receive funding through the Department, when generating or applying scientific information, should:

1. Strive to create high quality scientific information that is relevant to Department priorities and mandates.
2. Be objective, rigorous and accountable in the collection, analysis, interpretation, reporting and use of data, and adhere to appropriate quality assurance and quality control standards.
3. Acknowledge and describe sources of uncertainty and error in measurements, analyses, interpretations and use of scientific information.
4. Seek peer review at all appropriate stages of scientific work and be responsive to constructive criticisms and suggestions (Appendix 3).
5. Ensure that scientific information is communicated objectively, clearly, honestly and in a timely manner to decision-makers, the scientific community and the public.
6. Explicitly distinguish facts, hypotheses, assumptions, professional judgment, and personal opinions in all reports and other communications on scientific findings.
7. Ensure that the ideas and/or intellectual property rights of others are properly acknowledged and be diligent to avoid misrepresentation.
8. Be responsible for the appropriate documentation, preservation and maintenance of data, data analyses, and specimen collections.

9. Ensure that any scientific projects involving live animals adhere to appropriate professional guidelines regarding animal handling and welfare.

V. Key Elements of Scientific Work

Scientific work carried out by the Department, whether implemented internally or by external entities, should adhere to these key elements (see Appendix 1):

1. Scientific Proposals should:

- Be based on a formal written proposal that receives appropriate peer review and Regional approval (see Scientific Peer Review below).
- Provide the rationale for the work and linkage to the Strategic Plan, the State Wildlife Action Plan, and other approved internal long-range planning documents, considering both resource management data needs and available scientific information.
- Describe the research and/or natural resource management objectives of the work, linking objectives to the research questions and hypotheses, as well as expected result(s) and utility of the completed work, including potential relevance of the results to natural resource management priorities.
- Include a description of study methods, including: 1) sample sizes and locations; 2) field and laboratory methods, including quality assurance/quality control procedures and survey design (if applicable); 3) data analysis, including statistical test(s); 4) modeling algorithms, assumptions and parameters and 5) applicable literature references.
- Address project feasibility, including staffing level, duration, funding, schedule of program assessments and progress reports, permits and other regulatory considerations, health and safety, animal welfare considerations (Appendix 2), and staff qualifications. If appropriate, collaborators or technical consultants with additional expertise should be identified.

2. Results

- Scientific data generated within the Department should be maintained and archived using appropriate media/storage technology, and supported by the appropriate meta-data.
- Scientific work and findings conducted within the Department should at a minimum be documented in written reports and, as feasible, scientific publications. Written reports should be made available to all Department staff via whatever methods or media is considered most appropriate by the researchers and program managers responsible for the work.

3. Scientific Peer Review

- When written proposals, reports, data sets, and manuscripts (for submittal to a scientific journal) receive peer review by Department scientists or Department-selected professionals, they should possess an education and experience background commensurate with the proposal or work under review.
- High profile proposals or work that has a substantial scientific or management impact or large expenditure of funds or is especially controversial in nature should be subject to formal independent peer review (Appendix 3).

4. Research Partnerships

- Staff proposing scientific work should seek opportunities for collaboration within the Department as well as with other sectors of the scientific community, natural resource agencies, non-profit institutes and philanthropic foundations, universities, and citizen-science volunteers.

5. Dissemination

- To the greatest extent practicable, the results of scientific investigations, including the methods used to obtain them, should be communicated to the public and other stakeholders via the department's website and other means (Appendix 4).

Signed original on file

Charlton H. Bonham
Director

Attachments: Appendix 1. Scientific Project Workplan Guidelines
Appendix 2. Policy on Animal Welfare (In progress)
Appendix 3. Procedural Guidelines for Ad Hoc Independent
Scientific Advisory Committees (Appendix 3; revision
pending)
Appendix 4. Communication of Scientific Work (In progress)

APPENDIX 1

SCIENTIFIC PROJECT WORKPLAN GUIDELINES

These guidelines are provided to staff of the Department of Fish and Wildlife (Department) as a means to review scientific project plans so that the project produces defensible data and results. The guidelines assume that managers have approved the study, the goals of the study are defined, and staff selected to oversee the study are qualified and knowledgeable in the area of study. Not all in this document will apply to every study; it is intended to be of a scope useful for a wide array of projects. Large and/or long-term projects where the results are used in management are the primary target.

Project Title:

Region/ Branch/Division:

Principal Investigator(s):

Contact Information of Principal Investigator(s):

Proposed Staff:

County(ies) affected by Project :

I. Project Management

A. Project Description

1. History or Background
 - a. Describe the evolution of the project.
 - b. How has the project become a priority?
 - c. Identify and analyze any previous similar studies.
 - d. Identify similar or complementary ongoing projects in the same geographical area
 - e. Is there potential support or opposition for this project among our constituents?
2. Project purpose
 - a. Statement of project goals.
 - b. List the objectives of the project.
 - c. Describe project milestones. Identify products and timelines.
 - d. Project Approach (describe conceptual approach to study and include uncertainties)
3. What management issue or problem will this project address? Are there management or policy implications?

B. Project Organization and Responsibilities

1. Person(s) responsible (names, title, phone numbers, addresses, e-mail) and role, including statement of qualifications.
2. Chain of command (if appropriate).
3. Collaborators (agencies, NGOs, academia, etc.) and contact persons:
Is an MOU already established with the collaborator(s)? If yes, has this MOU been reviewed by Department legal staff?

C. Study Design

1. List the specific *research questions* to be answered by this study, including methodology:
 - a. If the study includes sampling, describe the sampling design and measurement variables. Be specific: describe the sampling unit, independent variables, dependent variables, and tests or techniques to be used. Explain how bias will be avoided in selection of sampling units. For hypothesis tests, state the null hypothesis and alternative hypotheses.
 - b. Describe the experimental design and necessary sample sizes.
For manipulative experiments, describe the table of treatments and number of replicates, and how experimental units will be grouped or blocked.
 - c. Describe biological detection capability. For field observational studies, describe the variation in measurement variables necessary to detect.
(Historical data often can be used to predict the kind and quantity of data that will be required to achieve a stated resolution, or to estimate the resolution of a stated study design. If historical data pertinent to this question are available, apply power analyses).
 - d. In an iterative study design approach, is an augmentation or reduction of previous sampling effort appropriate (i.e. can the data be collected with less field effort and still achieve the same level of significance)? After data become available, estimate the power of the existing sampling effort.
 - e. Describe the contingency plans to assure the question is resolved: (Depending on the question being addressed, such plans may include (a) planned routine collection of more than the minimum data required at each regular interval, (b) logistical contingency plans to make up for missed field observations, or repeat incomplete manipulative experiments, or (c) alternate statistical methods if not all data are obtained. Use of alternate statistical methods will likely weaken the power of the study to answer the question or force redefinition of the question, and should be a last resort.

2. How will sampling bias(es) from different samplers or methods (e.g. training, standardized protocols) be minimized?

D. Project Resource Needs

1. Detailed budget
2. Personnel needs
 - a. Field activities
 - b. Laboratory and office activities
 - c. Travel (in-state and out of state)
 - d. Temporary help (estimated number of hours)
 - e. Training needs
3. Equipment needs
 - a. Boats/vehicles/major sampling equipment - what is necessary and for what period?
 - b. What major equipment (>\$1000) is necessary (purchased, borrowed, or leased)?
4. Coordination needs
 - a. If another project or agency is participating in collection of samples, is there a coordination plan, including funding, already in place?
 - b. Will outside contractors be needed for analytical or laboratory assistance? How will they be chosen and what is the funding source?
 - c. Has access to study site(s) been arranged?
 - d. Will special approval or permitting be needed to collect samples? What concerns might there be with sampling/collection in certain areas (e.g., MPAs)?

E. Compliance Considerations

1. Will project result in, or have the possibility of, take of federally or state listed threatened, endangered or species of special concern?
2. If so, estimate the number by species/race that will be taken and the estimated mortality.
3. Will the "take" or capture of any state or federally listed species be covered by an existing Biological Opinion?
4. If no BO exists, how will compliance be achieved?

F. Invasive Species: What measures will be taken to ensure field staff does not spread invasive plants or animals to new sites during the project?

G. Due Dates and Products

1. Describe the timeline for the project, with due dates for deliverables, including drafts (this should relate to section I.A.2.c).
2. Consult the Data Technology Division if a new database is needed for the project.
3. If the data is to be uploaded to a Department server, by what date will this be completed?
4. If product includes a report, does it need to meet Rehabilitation Act, section 805 requirements (e.g. if the final document is made available on the internet)?
5. Will spatial data be submitted to BIOS? If so, submission must be in accordance with current meta-data standards.
(<http://www.dfg.ca.gov/biogeodata/bios/metadata.asp>)

II. Project Measurement and Data Acquisition

A. Sample Site Selection

1. Description of study area and sample sites, with map.
2. Statistical and scientific rationale for choosing sites.
3. Sample site - parameter matrix (what parameters will be measured at each site).

B. Sampling Procedure (Standard Operating Procedures, SOPs)

1. Parameters to be measured with units defined
 - a. Frequency that each parameter will be measured
 - b. Will replicate samples be taken?
2. Methodology (with references)
 - a. Sample preservation, transportation, storage and disposal
 - b. Preparation of equipment: cleaning, reagents, supplies
 - c. Sample and data collection
 - d. Sample and data acceptability
3. Personnel training
4. Personnel safety, in both field and laboratory

C. Sample Custody for Field and Laboratory

1. Identify custodians and site for long term storage (if appropriate)
2. Tracking forms (if appropriate)
3. Sample records (if appropriate)

D. Calibration Procedures and Frequency

1. Instrument and sample calibration (referenced).
2. Frequency and timing of calibration: analytical system, instruments, devices, etc. (SOP).
3. Documentation of calibration checks.
4. Instrument, equipment and supplies inspection and maintenance, including periodicity.

E. Sample Processing and Analysis

1. Reference standard methods and appropriateness for measurements
2. Describe non-standard methods and validation procedures
3. Describe SOPs

F. Data Reduction, Analysis and Reporting

1. Who will conduct the data reduction and analysis?
2. What quality control procedures will be used to assure the validity of statistical results?
3. Who is responsible for preparing peer-reviewed articles and/or reports?
4. Will the data be archived in a central repository?

III. DATA ASSESSMENT AND OVERSIGHT

A. Quality Control data checks

1. With regards to the raw and final data:
 - a. What procedure will be used for data checks?
 - b. What criteria will be used to check data?
 - c. Who will conduct the data checks and how will the results be documented?
2. Describe the limitations of the data, such as periodicity, seasonality, etc.

B. Field and laboratory performance and systems audit

1. How will the audit be conducted?
2. What criteria will be used?
3. Who will conduct the audit and how will the results be documented?

C. Corrective action

1. If errors are encountered in items A and B above, who will determine and implement corrective action(s)?

IV. PROJECT FEEDBACK TO MANAGEMENT

1. Periodic review by a designated Department of Fish and Wildlife science advisory panel or individual; could be part of the reporting milestones at set times.
2. Integration of feedback to project design and methodologies.
3. Project completion and reporting (publication).
Report or presentation to management/leadership by deadline (if applicable).

REVIEW AND APPROVAL:

Project Title:

<u>Workplan Review</u>	
_____	_____
Review Team member	Date
_____	_____
Review Team member	Date
_____	_____
Review Team member	Date

Management Review	
_____	_____
Program Coordinator	Date

Regional Approval	
_____	_____
Regional Manager	Date

APPENDIX 2

Policy on Animal Welfare (In progress)

APPENDIX 3

Procedural Guidelines for *Ad Hoc* Independent Scientific Advisory Committees

Note: This is an update of Appendix 3, which was originally distributed June 13, 2017. This update fully replaces Appendix 3 with Departmental Bulletin 2017-03, "Guidelines for Conducting Peer Review and Convening *ad hoc* Independent Scientific Advisory Committees" issued October 16, 2017.

Departmental Bulletin 2017-03 appears on the Department's intranet, here:
<http://dfgintranet/Portal/LinkClick.aspx?fileticket=mYRw2VYyq%2bs%3d&tabid=802>

A reprint of Departmental Bulletin 2017-03 appears on the following pages of this document:

To: All Department of Fish and Wildlife Scientific Managers and Scientific Staff

Subject: Guidelines for Conducting Peer Review and Convening *ad hoc* Independent Scientific Advisory Committees

POLICY STATEMENT

Per Fish and Game Code Section 715, the California Department of Fish and Wildlife (Department), through support from the [Science Institute](#), is responsible for obtaining independent scientific review to help inform its scientific work. To this end, and to ensure that the Department's management of trust natural resources is guided by the best available science, the Department will use, as appropriate, peer review to provide objective evaluation of the scientific information used to inform resource management decisions.

Given the considerable breadth of scientific disciplines and issues that concern the Department, the level of formality of a peer review for any given product or project will vary.

These guidelines describe the range of peer review formality that may be needed, the criteria and process for conducting internal and external peer reviews, and the recommendations for soliciting and compensating experts for external peer review when needed

BACKGROUND

Defining Peer Review in the Department

As it relates to the Department's work, peer review can be defined as, "the analysis of a scientific report by persons of the scientific/academic community commonly acknowledged to be experts on the subject under consideration, possessing the knowledge and expertise to critique the scientific validity of the report." (14 CCR § 670.1(f)(2))

The Department may solicit varying levels of peer review for scientific work products; however all such reviews shall adhere to the above definition regarding the implied intent and scientific integrity sought in a peer review process.

Levels of Peer Review

In general, the level of formality of peer review for a Department work product should be appropriate for the product's complexity and potential significance to policy formation or

management decisions as well as the impact or importance of those policies and decisions. The more influential and impactful the product may be, the more rigorous the corresponding peer review. Federal guidelines on the peer review of scientific documents also consider the complexity and novelty of the work product, the extent of prior peer reviews, as well as cost-benefit considerations, in determining appropriate levels of peer review ([Final Information Quality Bulletin for Peer Review](#), Office of Management and Budget, Executive Office of the President, M-05-03, 2004). Within the Department, the appropriate program manager, branch chief, or regional manager should determine the level of peer review needed for a given work product consistent with existing law. Depending on the sensitivity and influential nature of the work product, executive input or decision may be appropriate.

Informal feedback from professional colleagues can play an important role in supporting and enhancing the scientific quality of a project or activity, at the beginning, middle or end of completion, but is not a substitute for formal peer review.

Internal Peer Review

Internal peer review is solicited from one or more independent individuals within the Department, who possess appropriate technical expertise, have not been involved in the development of the subject work product, and are otherwise free of conflict of interest. Selection of the reviewers, development of the charge questions, and preparation of review materials (e.g., review document and pertinent background materials) may be accomplished by program staff and managers responsible for the work product/document(s). The program overseeing a given peer review should maintain an adequate administrative record of the peer review process, including reviewer selection process, instructions to reviewers, reviewer comments/products, and author responses to comments. The Science Institute may facilitate internal peer review for some work products.

External Peer Review

Several programs and activities within the Department already use an external review process, including:

- Interagency Ecological Program
- Ecosystem Restoration Program
- Marine Life Management Act
- Marine Life Protection Act
- Species status review related to listing petitions

External peer reviews may be conducted by individuals or panels, depending on the nature of the review. One means of conducting panel reviews is through the formation of *ad hoc* Scientific Advisory Committees (SACs) (see below). In addition to the programs outlined above, the department currently utilizes a variety of peer review

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groups to assist with evaluating grants, policy documents, management plans, and other documents that are predicated on sound science and policy. A SAC, for purposes of this Bulletin, can be an existing committee or group tasked with a specific charge of scientific peer review, or a new ad hoc group convened for a specific science process. In either case, the SAC described in this Bulletin are not intended to replace, supplant, or in any way modify the purpose and charge of existing ad hoc or standing committees. As with internal peer reviews, Department programs should maintain an adequate administrative record of the external peer review process.

Individual reviewers may be used for smaller, focused projects where formation of a committee is not needed. As with internal peer reviews, the Science Institute may provide support with respect to administration of external peer reviews, including development of charge questions and selection of reviewers. Whether individual or panel format is used, reviewers must meet the following minimum criteria to achieve the objective of conducting independent and expert technical assessments:

- Demonstrated expertise in subject area(s) relevant to the review
- No financial or other conflict of interest with the outcome or implications of the peer reviewed product

Where the Department has formal stakeholder processes for complex management planning efforts, suggestions for scientific peer reviewers may be solicited from the various stakeholder interests, to be considered along with Department-proposed ad hoc reviewers.

ad hoc Scientific Advisory Committees

Temporary *ad hoc* independent Science Advisory Committees are convened to provide formal review of significant scientific endeavors and publications not otherwise subject to peer review. Given the considerable breadth of scientific disciplines and issues relevant to the Department, SACs allow for “tailoring” the committee membership to ensure that appropriate scientific expertise is directed at a specific topic or issue. SAC recommendations will not limit the authority of the Department or the Fish and Game Commission to adopt regulations, policies or plans, but will enhance confidence in, and transparency of, the scientific considerations behind decisions made by these entities.

I. Terms of Reference

1. SACs are established by the Director, or designee, upon recommendation by internal program management.
2. SACs shall provide objective scientific review and recommendations to the Department concerning scientific reports and other documents produced by or for the Department, and any other tasks assigned by the Department. Convening of

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SAC's or tasks charged by the Department to a SAC should be evaluated to determine requirements, if any, under the Bagley-Keene Open Meeting Act.

3. SACs are responsible for collecting and reviewing the necessary information for providing scientific advice. SAC's will determine where and how this information is to be obtained and may consult Department scientific staff as needed.

4. SACs shall ensure that recommendations are based on the best available scientific information.

II. Membership

1. For each SAC, the Department may identify an external, independent appointing agent, to which the Department may specify required areas of scientific expertise among SAC members. The appointing agent will identify such experts and have final appointing authority for SAC members.

2. SAC members will be selected based on scientific expertise in relevant discipline(s), and ability to fully participate in SAC activities. Potential SAC members must comply with the Department's Conflict of Interest Code and other reporting requirements.

3. SACs shall identify from amongst its members a Chair and a Vice-Chair.

4. The Director of the Department or his/her designee(s) may be *ex officio* non-voting members of SACs.

III. Organization and Meetings

1. Each SAC Chair shall be responsible for ensuring that SAC activities are consistent with, and relevant to, the charges assigned to it by the Department.

2. SACs may establish subcommittees on specific topics related to the development of scientific recommendations to the Department.

3. As described above, the meeting purpose and conduct should be evaluated for consistency with Bagley-Keene Open Meeting Act requirements.

IV. Reporting

1. SACs will provide updates and a final report of findings in writing to the Department according to mutually agreed upon deadlines. All final reports or findings of the SAC shall be made available to the public via the Department's website.

2. SACs will meet with the Department upon request to discuss SAC findings and determine whether further work is required or whether a SAC can be dissolved.

External Peer Review Costs

The Department recognizes the time and effort that peer review requires of outside independent scientists. External peer reviewers may receive nominal compensation by the Department and be eligible for per diem, subject to State of California travel limits and based on availability of funding. Prior to initiating an external peer review, the Department will determine the level and capability to provide such compensation and discuss that capability with the SAC. Compensation of external peer reviewers may require adherence to open contracting requirements.

Other anticipated resource needs associated with external peer review may include contract funding for independent appointing agents that will establish SAC's on behalf of the Department, and positions or staff time to help administer the contracts and reviews.

Signed original on file.

Kevin Hunting
Chief Deputy Director

APPENDIX 4

Communication of Scientific Work (In progress)