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A Framework for Informing Permitting Decisions on Scientific Activities in Marine Protected Areas

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EXECUTIVE REPORT

Marine protected areas (MPAs) and MPA networks are important management tools that often have multiple goals and must balance potentially conflicting activities, one of which is scientific research. MPAs provide unique and important research opportunities because their ecosystems are subject to minimal human disturbance. Moreover, research is essential for evaluating MPA performance, and thus is an integral component of MPA management. However, scientific research may also impact the biota and habitats being studied. Hence, MPA managers must understand and weigh the ecological costs and benefits of proposed research activities to determine whether they can be permitted within MPA boundaries without compromising the effectiveness of the MPA or the integrity of an MPA network.

At the request of the Department of Fish and Wildlife (Department), we propose a quantitative, ecologically-based decision framework to estimate the impacts of scientific research with the goal of facilitating scientific permitting decisions in California's newly established network of MPAs. The framework identifies the ecological consequences of a diversity of scientific research activities and provides an unbiased, transparent, and objective means to make informed permitting decisions. This approach consists of four steps:

1. Exclude projects that don't need to be conducted in MPAs – This "MPA relevance" component considers whether or not an MPA is essential for meeting the objectives of the research project (e.g., does the project require a protected population or community or are non- MPA locations inappropriate for the study). The Department has been employing a similar criterion for reviewing permits since 2008.

2. Quantify ecological impacts of the project – This model-based element uses scientific principles to assess the proportionate impacts within an MPA to: a) the population of any targeted species, b) four major marine ecological assemblages (macrophytes, sessile invertebrates, mobile invertebrates, and fishes), and c) the physical habitat that supports MPA biota. The model quantitatively estimates the ecological impacts of scientific activities, including consideration of the vulnerability of targeted species, assemblages, and habitats, based on their recovery time and the ecological significance of affected biota.

3. Quantify the cumulative impacts to species, assemblages, and habitat affected by the proposed project and all other on-going projects in the MPA – This analysis allows each research project to be evaluated independently while also determining its contribution to the cumulative impacts of all research activities in the MPA.

4. Compare the estimated cumulative impacts of all projects with policy-based acceptable impact thresholds for species, assemblages, and habitats - This outcome will lead to decisions to accept, deny or request modification and resubmittal of proposed projects.

The core of the framework is a suite of quantitative models that estimate the ecological impacts for the many methods commonly used in scientific research projects. Ecological impact is expressed as a proportion of the population, assemblage, and habitat within an MPA that will be affected by the proposed research. The models take into account direct impacts (e.g., activities resulting in immediate mortality or habitat damage),as well as indirect impacts (e.g., activities that generate incidental or unintentional effects on other species, assemblages, or habitat). Impacts are calculated separately for individual species, ecological assemblages, and habitats. These proportionate impacts are then adjusted to account for vulnerability of the species, assemblage or habitat, based on their estimated time for recovery and the ecological significance of the affected biota.

Determining an acceptable level of ecological impact is a policy decision that may vary among species, ecosystems and MPAs. As a starting point, we propose an overall (i.e., cumulative) impact limit of 0.1 to any population, assemblage, or habitat, as a level beyond which the conservation value of an MPA may be compromised. The ecological impacts calculated in the framework are then compared with the impact threshold to determine if any individual project, or the cumulative impact of multiple projects, exceeds the acceptable threshold. The ecological impacts are compared to the acceptable impact thresholds, both individually and cumulatively for each targeted species, each of the four assemblages (macrophytes, sessile invertebrates, mobile invertebrates, and fishes), and the habitat. If any of these exceed the threshold, the approach outlined in the framework indicates that the proposed research should be revised to reduce its impact or permission to proceed should be denied.

While we propose an overall impact threshold of 0.1, we also recommend that allowable impact be linked to the anticipated benefits of the research. The Department should

allow projects with small direct management value to consume only a small fraction of the available impact threshold, leaving room for future research envisioned to be of greater scientific value, or critical to informing MPA management. Moreover, we propose that no individual project should consume more than 1/5th of the available threshold for any population, assemblage, or habitat without the likelihood of generating equivalent benefits as determined by permitting staff.

The proposed approach identifies the ecological impacts of proposed scientific procedures and estimates their effects on species, communities, and habitats within each MPA and compares the individual and cumulative impacts of scientific projects against Department-determined thresholds. This objective and transparent method for making decisions to permit scientific research in MPAs can be consistently applied across staff and over time and facilitate interactions between managers and researchers so that modifications to study designs can be made before or after permit submission. Applicants will benefit because this approach should expedite permitting decisions for most projects. It will also provide managers and researchers with information on the state of species, assemblages and habitats within an MPA targeted for study. An additional advantage of using this framework is that high-impact projects can be readily identified and staff resources can be focused on projects of greatest concern to achieving MPA conservation goals.

Full text:

http://ftp.sccwrp.org/pub/download/DOCUMENTS/TechnicalReports/991_CollectingPermitsInMPAsFramework.pdf