Conservation in Practice: Overcoming Obstacles to Implementation

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Research in conservation biology should be aimed at the development of a sound scientific basis for the preservation, management, and restoration of biotic diversity. Tests of both specific and general hypotheses are necessary to inform conservation planning. Because conservation biology is partly a crisis discipline, some research projects focus on the viability of a particular population, species, or ecosystem. Others address the long-term conservation goal of the ecologically sustainable coexistence of human beings with other species by investigating pertinent broad ecological patterns or processes. Regardless of their research emphasis, conservation biologists inevitably grapple with the challenge of integrating their science into public policy. Communication between academics and practitioners undeniably is key to incorporating knowledge gained from research into conservation planning and land management (Meffe 1998). Does the academic’s research orientation itself also bear upon his or her ability to transform conservation science into policy?

In the wake of recent calls for cohesion between “basic” and “applied” science (Orians 1997) and between academics and practitioners (Meffe 1998), our research group at the Center for Conservation Biology asked whether the motivation for initiating various conservation projects affected the projects’ likelihood of success. Our group includes more than 20 conservation scientists whose individual and team research over the past 15 years has been driven both by pressing conservation situations and by less immediate but equally germane issues in conservation biology. Recognizing that no single objective applies to all conservation efforts, we examined how success was defined at the inception of a project and which projects met their own definition of success. We identified several pervasive impediments to success and sought to distill lessons on how conservation biologists might overcome these obstacles in the future.

We began by categorizing our research along a continuum. Roughly 20 projects at various stages of completion were examined explicitly. At one end of the continuum fell projects designed to address a relatively specific management problem, such as development of a conservation plan for California tiger salamanders (Ambystoma californiense), a candidate for listing under the U.S. Endangered Species Act, on lands owned by Stanford University. These projects were designed according to standard scientific methods and followed a hypothetico-deductive approach. In addition, frequent interaction between academics and practitioners often was integral to these investigations (Kremen et al. 1998). In fact, practitioners, both governmental and nongovernmental, often proposed these studies and helped secure funding and contacts.

At the other end of the spectrum lay projects, usually investigator-initiated, that tested hypotheses potentially generalizable to a wide range of conservation situations but that might not have an immediate, case-specific management application (e.g., population dynamics and life history of butterflies in response to environmental stress; Boggs, in press). We emphasize that classification of conservation projects is merely a convenience; the ends of our research continuum are not mutually exclusive. Many conservation projects that are motivated by a particular dilemma either can be applied to other situations or can elucidate more general principles of conservation biology. Similarly, some general conservation research, including modeling, may be useful for solving discrete management problems.

Scientific objectivity and, to the greatest extent practicable, adherence to fundamental principles of experimental design were common to all definitions of project success. Whether implementation into policy also was stipulated as an element of project success, however, varied along the continuum. The primary goal of projects driven by a distinct management challenge generally was

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implementation (i.e., to solve the specific problem). Translating research results into a more general ecological context was a clear but often secondary goal of these projects. Projects motivated by the desire to explain broader ecological patterns or processes tended to have the same two objectives, but in the reverse order. Thus, although researchers conducting the latter projects frequently disseminated their results to local land managers (whether in the form of published papers or more informally in letters or discussions), they usually did not regard implementation by practitioners as requisite to success.

What types of conservation projects were most likely to meet with success, by their own definitions? Conservation biologists oriented toward fairly focused management issues tended to be satisfied with the scientific quality of their research but often were frustrated by the extent to which their findings were implemented into policy. The level of difficulty often experienced at the implementation stage was surprising in light of the involvement of practitioners at all stages of these projects. Studies of conservation biology that did not explicitly define implementation as a goal, by contrast, generally were evaluated as successful. Biologists conducting the latter projects regularly found practitioners and decision makers receptive to the implications of their research, although it often was too early to gauge whether their results ultimately would be incorporated into policy. Consideration admittedly does not equate with action. Regardless, positive attention is encouraging given the frequency with which the conclusions and recommendations of conservation research are met with a lack of interest if not outright hostility from various stakeholders.

Perceptions of success also may be affected by peer recognition. For many scientists, particularly those in academia, publication in peer-reviewed journals is both an explicit performance objective and a personally rewarding form of peer validation. But just as significant p values tend to be published more frequently than “negative results,” it can be easier to disseminate the results of more traditional ecological research than those of management-oriented projects. Because conservation biology addresses general scientific themes, it tends to appeal to high-profile journals. It can be more difficult for management-based research to transcend a narrow geographic or taxonomic focus and reach a broad audience. In the scientific community, therefore, failure to publish can exacerbate perceptions that a given project (or subdiscipline) has been a poor investment. On the other hand, circulation of data and experiences in peer-reviewed publications may serve as an incentive to continue management-based research, even if implementation remains elusive. We urge the scientific community to consider alternatives to publication that will reward and encourage sound management-oriented research.

In the face of these deterrents, we need to consider how conservation biologists might increase the probability that their implementation-oriented projects will be successful. What prevents implementation of conservation recommendations, even those developed with a full awareness of the constraints faced by practitioners? Researchers suggested that roadblocks to implementation commonly fall under the loose umbrellas of organizational psychology, administrative structure, individual personalities, and politics. Bureaucracies do not tend to reward innovation. Practitioners, especially at a junior level, rarely have the power to modify policy and may be hesitant even to advocate policy changes, particularly when research suggests that past management activities have been detrimental.

Administrative structure can impede implementation in several ways. For instance, the planning horizons for many organizations are considerably shorter than those needed for effective adaptive management or monitoring programs. Furthermore, the practitioners most actively associated with conservation researchers may not have the authority to allocate the resources necessary for implementation. Another factor that affects implementation is the administrative motive for collaborating with conservation biologists. Regulations may require biological consultation, but provide few incentives or support structures for actual implementation. An additional dilemma faced by some practitioners is that they are expected both to collaborate with and to police stakeholders. In many remote areas of the United States, for example, federal land managers live in the same communities with permitted users of public lands. Friendships between managers and stakeholders are inevitable and in fact are encouraged by administrative supervisors. Enforcement of management regulations in these situations can jeopardize both professional and personal trust.

Individual personalities certainly are a major factor in whether or not research is translated into policy. There are innumerable examples of conservation programs either eliminated, stalled, or catapulted into action because of a turnover in personnel. Finally, local and regional politics inevitably affect whether conservation research influences decision making. Politicians rarely have the power to allocate funds for conservation within their district. As a result, they may not view enabling environmental legislation or regulation as a likely source of public support and may assign conservation issues a low priority.

Daunting as these obstacles are, conservation biologists can take certain actions as individuals and as a community to increase the chances that their science will be integrated into policy. Because extrinsic factors can shift the motivation for a conservation project suddenly and dramatically, it is vital to examine one’s research from a variety of perspectives and scales. For example, the listing of the Bay checkerspot butterfly (Euphydryas editha bayensis) as threatened under the U.S. Endangered Species Act transformed one of our projects from a relatively academic investigation of population dynamics to a pow-
erful tool for regional conservation planning (Ehrlich & Murphy 1987; Murphy et al. 1990). This butterfly occurs as several metapopulations in the San Francisco Bay area of California; patches of habitat are distributed across the geographic region, and many are periodically extirpated and recolonized. Because various developers sought biological consultation for small patches of habitat at different times, evaluating our research in a broad spatial and temporal context was critical to maintaining the long-term viability of the metapopulations.

Knowledge of the context in which one is working should increase the probability that conservation research will be put to use. Researchers must consider the situation-specific constraints faced by practitioners, including the timetable for making management decisions, available funds, and potential action alternatives. Conservation biologists also can increase their effectiveness by considering the motivations of those soliciting their research assistance. Are recommendations likely to be implemented, or are they being requested merely as a regulatory formality? Similarly, it is helpful to target one’s results not only to those who appear most interested in the policy applications but also to individuals with the power to achieve implementation. The latter include not only resource managers but also the media and politicians.

Finally, we suggest that conservation biologists can increase their ability to transform conservation science by empirically researching the role that natural systems play in maintaining human society. With this knowledge, scientists can intelligently promote biologically diverse, properly functioning ecosystems as a desirable civil “infrastructure” much like roads, basic sanitation, and other public works. This orientation should create a positive political climate for support and implementation of conservation research. National, regional, and local constituencies that are aware of their reliance upon public works or services like those listed above tend to create institutional arrangements for ensuring their maintenance and collective provision. Planning for public works and services typically is proactive: future public demands cannot be met, nor can unpredictable catastrophes be weathered, without advance consideration. Thus, public works and services are budgeted, constructed, operated, and maintained as part of the flow of daily life.

Similar management of the ecosystem infrastructure would enable conservation policy to move far beyond its historic origin as a response to damaged natural systems. We believe that conservation scientists along the full spectrum of research orientations can pursue projects that not only can be intellectually satisfying and successful in a narrow sense but also can lead to the creation of a society that regards the integrity of natural systems as an essential, noncontroversial public service.

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Literature Cited


