Conserving Biodiversity in the Real World: Professional Practice Using a Policy Orientation

by

Tim W. Clark, Peter Schuyler, Tim Donnay, Peyton Curlee, Timothy Sullivan, Margaret Cymerys, Lili Sheeline, Richard Reading, Richard Wallace, Ted Kennedy, Jr., Arnald Marcer-Batlle, and Yance De Fretes

The unifying goal of conservation biology is the preservation of biological diversity through the maintenance of viable ecosystems. Even though there is general agreement about the paramount goal, there is debate among its practitioners as to the scope of acceptable professional practice. We believe that a "policy orientation" can complement rigorous scientific methods and is essential for achieving many conservation aims. Furthermore, scientific professionalism need not be sacrificed. We briefly examine the elements of the biodiversity conservation challenge and how professionals can better meet this challenge with a "policy orientation" that we introduce. Unfortunately, most university programs provide few opportunities for future professionals to learn what a "policy orientation" is, much less how to apply it responsibly and practically to benefit biodiversity conservation efforts.

The Biodiversity Conservation Challenge

Conservation biology is a "mission-oriented crisis discipline" (Soulé 1986:3) that exists to address the challenge posed by the loss of biological diversity. Few would debate the ultimate aims of conservation biology, but what is less clear to professional conservation biologists is their specific role in meeting this challenge. The loss of biological diversity has multiple causes and efforts to redress losses will require contributions from many disciplines. One approach conservation biologists have adopted is to use scientific methods to provide information useful to natural resource managers or decision-makers. This approach uses tools such as field surveys, population viability assessments, and analyses of preserve design and management. Some conservation biologists are apt to accept the view that production of useful biological knowledge is the only goal of their profession. While we accept that good science must remain at the core of conservation biology and that there should be limits to the sort of advocacy a scientist pursues, it is a practical mistake to limit the training and experience of conservation biologists to scientific fields only.

Few would deny that the ultimate causes of biological impoverishment are social, political, and economic in nature. Conservation biology, however, should not be about directly changing the social forces that are causing our environmental problems. Murphy (1990) is right when he concluded that conservation biology should be about providing the scientific information necessary to correct the problems leading to the loss of biological diversity. But we need to recognize that the process of correcting biological problems takes place in the same social and political arena as the processes that are driving environmental degradation in the first place. If conservation biologists are to be effective in promoting solutions to environmental problems, they must understand the non-biological factors behind environmental change and be willing and able to participate effectively and offer solutions in the arenas where social change occurs. Providing the scientific information to guide policy, and not "just provoke it" (Pool 1990:673), is necessary for real conservation actions. Hales (1987:81) identified one aspect of the problem in noting that the "trained, analytical approach of the biologist, or any other disciplinarian, often seems to lead to fragmented problem definitions and unimaginative solutions, the success of which, over time, is not particularly impressive."

An alternative, and we argue more effective, way for conservation biologists to approach the challenge posed by the loss of biological diversity is to understand the policy process well enough to maximize opportunities so that science based recommendations are applied. It is at this level that a policy orientation to conservation biology, particularly when the policy sciences are taught along with the biological sciences in a comprehensive university training program, can be most helpful. In discussing the weaknesses of endangered species recovery programs, Clark (1989:3) states:

> Most descriptions of endangered species recovery focus only on the biology of the species, thus creating the unrealistic view that conservation and recovery are strictly technical, biological tasks. In fact, numerous non-biological factors and forces have direct, immediate and paramount significance to endangered species recovery, and if the conservation movement is to be effective, it must explicitly recognize the interactive impacts and contributions of all the various dimensions.

For conservation biologists to be successful, they must become more proficient at understanding the processes that drive environmental degradation and at providing remedial strategies and tactics. Accepting this premise still leaves some questions as to the scope of acceptable professional practice for conservation biologists. Conservation biologists are and must remain above all else scien-

tists; applying scientific methods to conservation questions. Systematic, rational, fact-theory driven, experimental, and "objective" science is a must. However, if experience or knowledge of the policy process makes conservation biologists more effective, how much farther should they go? As Orr (1990:9) asked, "how should those calling themselves conservation biologists deal with politics and the question of management in their research, writing and teaching?" If knowledge of the policy process is valuable, how should it be incorporated into training programs for conservation biologists?

The Professional Challenge: A Problem of Definition?

The limitations of traditional wildlife management programs and "normal science" (see Kuhn 1970) that promote narrow, "technical," "fix-it" approaches, and their failure to encompass the biodiversity conservation challenge, have been outlined by Clark (1986, 1988), Norton (1988), Orr (1990, 1991) and others. More recently, Soulé (1990:1) observed that "solutions to environmental problems have as much to do with politics and perceptions as with biological fact...when it comes to influencing public policy, we will need political as well as research skills." Yet, the question remains, where should the science of conservation biology end and the advocacy of other constituencies begin? Should conservation biology assume itself to be a "value-free" science, merely providing information to resource and political managers? Or do conservation biologists have an obligation to "participate with the public in a debate regarding the very nature of ecological health, even while trying to protect it?" (Norton 1988:238).

A growing number of authors have suggested that conservation biologists need to become more proficient at understanding, participating in, and anticipating policy processes. Firstly, Noss (1989) concluded that effective conservation biologists must walk the narrow line between science and policy-making and address concerns raised by both. Secondly, Carr (1987:86) observed that good conservation biologists should be "willing to use their training and analytical skills beyond the confines of biology, reaching out to examine the cultural or sociological factors that bear on the survival of their favorite species." Thirdly, Maguire (1990:125) recently presented a scheme to guide conservation biologists towards responsible advocacy, by using risk analysis to assess management options and illuminate "the consequences of silence and inaction" should traditional scientific conservatism prevail.

Can conservation biologists actually play an effective role beyond the confines of biology without sacrificing their effectiveness and credibility as scientists? Can both capabilities exist in the same individual professional? We believe the answer is "yes" — a professional can be expert in scientific pursuits and at the same time possess an explicit orientation to the policy process.

How Can a Policy Orientation Help Professional Conservation Biologists?

We all know of instances where good scientific knowledge has been ignored, dismissed, misapplied, or only partially used by decision and policy makers (see, for example, Snyder 1986). If conservation biologists are to make greater conservation gains, they must facilitate the integration of decision and policy processes with reliable information. The way a scientist presents data and interacts with decision makers and the public may very well make the difference between the success or failure of a conservation program. The stakes are high when extinction of species or the loss of biological communities can result from inappropriate decisions and policies. Conservation biologists, therefore, must produce reliable knowledge through research and participate in the socio-political context in which that knowledge is used.

The term "policy orientation" was coined by Harold Lasswell (1951). "Policy" is a broad strategic intent to accomplish a goal (Brewer and deLeon 1983); the aim here being the conservation of biodiversity. "Orientation" reflects a direction or the relationship of an idea or concept to the dynamic policy process. Having a policy orientation means having knowledge that is directly useful *in* the policy process as well as having knowledge *of* the process itself (Lasswell 1971). Therefore, conservation biologists must have two kinds of knowledge. First, the biological skills to generate basic and applied knowledge; and second, the social science skills to encourage the wise use of scientific knowledge by policy makers.

The policy sciences study decision and policy processes, using both experimental hard science and observations or experience in order to determine how these processes work independent of their reliance upon technical knowledge (see Lasswell 1971). The term policy sciences

> is not another way of talking about the 'social sciences' as a whole, or of the 'social and psychological sciences.' Nor are the 'policy sciences' identical with 'applied social sciences' or 'applied social and psychological sciences'... Nor are the 'policy sciences' to be thought of as largely identical with what is studied by the 'political scientists' (Lasswell 1951:3).

Policy scientists are problem-oriented, focused on defining and solving real-world problems (Brewer and deLeon 1983). They use a variety of tools to understand the context of a problem as completely as possible; examining its history and trends, explaining the trends, projecting the trends into the future, evaluating the trends, and inventing and selecting alternative solutions. Policy scientists' problem-solving approaches are not reductionistic or "positivistic" (see Brunner 1988, Norton 1988, Clark In Press), in the sense that discipline-based biological science and even much of conservation biology tends to be. It is beyond the scope of this small paper to develop this observation and contrast the problem-solving approaches of the policy and conservation sciences. The policy sciences are a fundamentally different way of thinking in contrast to traditional science; they are a way of thinking, in the sense that logic is a way of thinking . Norton (1988) adequately outlined the limitations and failures of scientific

positivism as a philosophy for problem-solving and the need for a new post-positivistic philosophy. Even if a conservation biologist possesses only a little policy science knowledge or a few of its problem-solving skills, it might make a considerable difference in constructively influencing the pertinent decision and policy processes.

Having a useful "map" of the policy process is essential for a policy orientation. Just as there are models of ecological systems, there are also models of policy processes. These models can aid in practical applied conservation by revealing the many aspects of a problem's setting and useful paths of action. The models can direct one's intellectual attention and highlight areas where information is lacking (Brewer and deLeon 1983). People adept in the policy process have been likened to expert, general problem solvers (Lasswell 1971, Buffington 1989). A conservation biologist, expert in science, can also be expert in general problem solving without compromising his or her scientific standing. The practitioners' primary interest may be conservation science, for example, but they should also have an interest in the decision and policy processes that use their science. If such biologists are viewed to be outside the bounds of accepted professional practice, then perhaps the bounds need to be redefined.

The best model of the policy processes that we know of was developed by Brewer and deLeon (1983), based on Lasswell (1971), and describes the six phases through which nearly all policies or programs pass. They are: problem identification (initiation); expert analysis and technical considerations (estimation); policy formulation, debate, and authorization (selection); specification and application (implementation); ex-post appraisal (evaluation); and discontinuation or revision of the policy or program (termination). Each of these phases can be very complex, but there are recurring characteristics and weaknesses in each phase regardless of the specifics of the case (Ascher and Healy 1990). Examples of weaknesses in several phases of conservation programs have been described in Kohm (1991). If a conservation biologist is knowledgeable about these phases and what is likely to happen in each, then he or she is in a position to influence outcomes of decisions and policies and aid biodiversity conservation. We readily acknowledge, however, that not all decision and policy processes are accessible for improvements.

The Brewer and deLeon (1983) policy process model was modified and expanded in 1988 (Clark and Kellert 1988, Kellert and Clark 1991) to fit more explicitly the needs of people interested in the conservation of biodiversity and management of wildlife resources. This modified model employs the same six phases and identifies four classes of "factors or forces" that make up the policy dynamic: biophysical (physical properties of the resource), valuational (human values about the resource), social-structural (property rights and access to the resource), and institutional-regulatory (organizations and their directives).

More conservation biologists now recognize the need for a policy orientation in their professional practice, but not all authors refer to it by that label. Three illustrations of this point follow. Lovejoy (1989:329) noted that "An awareness of this public role [of conservation biologists], whether sought by ourselves or thrust upon us uninvited, is essential. We do not help either science or society by evading our social responsibility as experts." Deskmukh (1989:321) concluded that: "As conservation biologists we can help decide what to conserve and where, within a policy framework that we should help to formulate." Lastly, Clark and Kellert (1988:7) noted that if the field of conservation science

> is to contribute fully and adequately to the critical societal decisions affecting the future abundance and well-being of our nation's flora and fauna, then it seems essential that young wildlife professionals be sufficiently educated in the complexities, subtleties and techniques of the policy process.

The training programs for conservation biologists could benefit from broadening the scope of what they teach to incorporate a policy orientation to conservation.

Professionals and the Future

In addition to the obvious need for good science education, there is growing recognition that university conservation biology programs should teach an explicit policy orientation. Professional conservation biologists educated with a policy orientation can be expected to be more effective in achieving conservation aims.

A policy orientation can be introduced at an undergraduate level, but is most effective in Master's and Ph.D. programs, after students have had some "real" world working experience. Beissinger (1990:457) calls for an expanded course requirement for conservation biologists to incorporate disciplines outside the traditional departments, and recommends that "Conservation biology may best be taught at the master's level, where breadth of knowledge, scientific methodology, and problem-solving skills can be emphasized..." We assert here that an essential problem-solving skill that should be taught is a policy orientation involving explicit, practical, applied knowledge of the policy sciences. With a policy orientation as introduced above, conservation biologists should be able to communicate and participate within the public policy dynamic with enhanced creativity and leverage applied to our common goal of preserving biodiversity.

Space precludes a complete description of a sample course that teaches a policy orientation. Our experience in a graduate-level course at Yale University's School of Forestry and Environmental Studies offers one example. Our course was titled: "Species and ecosystem conservation: developing and applying a policy orientation." It sought to educate conservation biology students about the professional, institutional, and policy settings in which they are likely to work. The course surveyed a range of policy and organizational theories, techniques, and contexts using exercises and national and international case studies. It examined the policy sciences, as well as the conservation sciences, in some detail and applied its problem-solving concepts and tools to various species and ecosystem con-

servation challenges. It included a survey of techniques, such as population viability assessment and geographic inventory systems, and how these are used in decision and policy processes. Perhaps the greatest value of the course came from examining cases where good traditional science had failed to lead to effective conservation actions. By explicitly recognizing the limits of science to produce desired results, students were forced to explore and learn about other skills and perspectives that promise to make future biodiversity management efforts more effective.

Our course at Yale is just one example of how a policy orientation can be incorporated into a training program for scientists. We encourage students and faculty associated with similar programs to reach out to colleagues in other disciplines, notably economics, sociology, and political science which share similar interests in conservation and wise management of natural resources. They should collaborate with them in transdisciplinary efforts to examine how conservation biology can be made more effective.

Conclusions

Given the urgent threats to biodiversity, it is crucial that conservation scientists, managers, administrators, policymakers, and others be as effective as possible. As "the relationship between people and the biological resources upon which their welfare depends" changes (McNeely et al. 1990:16), new methods of addressing conservation issues are required. This changing relationship and its consequences are being appreciated in various ways. For example, Gorbachev (1990:33) said: the "greening of politics is an affirmation of the priority of values common to humanity...and [the development of] a new and contemporary attitude toward nature." An example, on a modest scale, is the origin of the profession of conservation biology. The leadership and professional activities of conservation biologists have much to offer in these uncertain times of extraordinary global environmental change. Nevertheless, we should constantly question how professional conservation biologists can be most effective in meeting the overall biodiversity conservation challenge and bringing about Gorbachev's "new contemporary attitude toward nature." We are convinced that knowledge of how to apply a policy orientation can significantly improve professional effectiveness.

Acknowledgments

Steve Beissinger, Steve Kellert, Dennis Murphy, and three anonymous reviewers critically reviewed the manuscript.

Literature Cited

Ascher, W., and R. Healy. 1990. Natural resource policymaking in developing countries: environmental, economic growth, and income distribution. Duke Univ. Press, Durham, NC. 223 pp.

Beissinger, S. R. 1990. On the limits and directions of conservation biology. BioScience 40:456-457.

Brewer, G. D., and P. deLeon. 1983. The foundations of policy analysis. The Dorsey Press, Homewood, Il.

Brunner, R. D. 1988. Conceptual tools for policy analysis. Center for Public Policy Research, University of Colorado, Boulder, CO. 23 pp.

Buffington, P. W. 1989. No problem! SKY 18:93-95, 97.

Carr, A. C. III. 1987. Letter (Diversity). Conservation Biology 1:80, 86.

Clark, T. W. 1986. Professional excellence in wildlife and natural resource organizations. Renewable Resource Journal 4, Winter:8-13.

Clark, T. W. 1988. The identity and images of wildlife professionals. Renewable Resources Journal 6, Summer:12-16.

Clark, T .W. 1989. Conservation biology of the black-footed ferret. Wildlife Preservation Trust International Special Scientific Rept. No. 3.

Clark, T. W. In Press. Creating and using knowledge for species and ecosystem conservation: science, organizations, and policy. Perspectives in Biology and Medicine.

Clark, T. W., and S. R. Kellert. 1988. Toward a policy paradigm of the wildlife sciences. Renewable Resources Journal, 6, Winter:7-16.

Deskmukh, I. 1989. On the limited role of biologists in biological conservation. Conservation Biology 3:321.

Gorbachev, M. S. 1990. Two world leaders on global environmental policy: remarks by George Bush and Mikhail S. Gorbachev. Environment 32 (3):12-15, 32-35.

Hales, D. F. 1987. Letter (Diversity). Conservation Biology 1:81, 86.

Kellert, S. R., and T. W. Clark. 1991. The theory and application of a wildlife policy framework. in Mangun, W. R. ed. Public policy Issues in Wildlife Management. Greenwood Press, New York.

Kohm, K. A., ed. 1991. Balancing on the brink of extinction: the Endangered Species Act and lessons for the future. Island Press, Washington, D.C.

Kuhn, T. S. 1970. The structure of scientific revolutions. Univ. Chicago Press, Illinois.

Lasswell, H. D. 1951. The policy orientation. Pages 3-15 in D. Lerner, and H. D. Lasswell, eds. The policy sciences. Stanford University Press, Stanford, California.

Lasswell, H. D. 1971. A pre-view of the policy sciences. American Elsevier Publ., New York.

Lovejoy, T. 1989. The obligations of a biologist. Conservation Biology 3:329-330.

Maguire, L. A. 1990. Risk analysis for conservation biologists. Conservation Biology 5:123-125.

McNeely, J. A., K. R. Miller, W. V. Reid, R. A. Mittermeier, and T. B. Werner. 1990. Strategies for conserving biodiversity. Environment 32:16-20, 36-40.

Murphy, D. 1990. Conservation biology and scientific method. Conservation Biology 4:203-204.

Norton, B. G. 1988. What is a conservation biologist? Conservation Biology 2:237-238.

Noss, R. F. 1989. Who will speak for biodiversity? Conservation Biology 3:202-203.

Orr, D. 1990. The question of management. Conservation Biology 4:8-9.

Orr, D. 1991. Politics, conservation, and public education. Conservation Biology 5:10-12.

Pool, R. 1990. Struggling to do science for society. Science 248:672-673.

Snyder, N. F. R. 1986. California condor recovery program. Pages 56-71 in S. E. Senner, C. M. White, and J. R. Parrish, eds. Raptor conservation in the next 50 years. Raptor Research Report No. 5, Raptor Research Foundation, Hasting, Minnesota.

Soulé, M. E. 1986. Conservation Biology. Sinauer Associates, Sunderland, MA.

Soulé, M. E. 1990. Editorial. Tropinet. Association for Tropical Biology and the Organization for Tropical Studies, Durham, North Carolina. 5:1.

Tim W. Clark is President of the Northern Rockies Conservation Cooperative and Adjunct Professor at the Yale School of Forestry and Environmental Studies, New Haven, CT 06511. The remaining authors participated in the Yale experimental course on conservation biology with a policy orientation described in this article.