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Toward a more effective conservation biology: including social equity in the formulation of scientific questions and management options

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Introduction

The goal of conservation biology is to provide the knowledge and tools needed to maintain biological systems, including taxonomic and ecological systems at a multitude of scales (Western 1989). Accordingly, conservation biologists have begun to establish methods aimed at achieving this goal. It is now, at this early stage in the field's development, that we have the greatest opportunity to examine, debate, and modify our methods to serve our purpose most effectively. Thus, we offer a critical analysis of conservation biology with the purpose of identifying problems inherent in the current operational definition of conservation biology and to propose a prescription for the further development of the discipline.

We refer to "conservation biology" as the field represented most prominently by the Society for Conservation Biology, as expressed by its journal, and by papers presented at its annual conference. The mission statement of the Society for Conservation Biology asserts: "[o]ur goal is to help develop the scientific and technical means for the protection, maintenance, and restoration of life on this planet — its species, its ecological and evolutionary processes, and its particular and total environment". The journal emphasizes habitat loss/fragmentation, introduction of exotics, overexploitation, pollution, and global change as the immediate threats to biological systems (With 1997). The discipline recognizes the following underlying causes of these threats: overpopulation, lack of resources at local scales, economic and political uncertainty, anthropocentrism, and rapid social change (e.g., Soulé 1991). Yet we argue that the tactics often promoted by conservation biologists, such as *ex situ* reserves, restoration projects, and the design and establishment of protected areas which minimize human impact, often fail to account for some of the basal, underlying causes of environmental degradation. We suggest that this incongruence between the recognition that environmental problems are social in origin and the solutions offered is a central problem for conservation biology, and we believe there are several reasons why this incongruence is maintained within the discipline.

Conservation biology is dominated by academic scientists, and the lack of effective solutions to conservation problems results in part from the pressures to succeed in academia. Just as biologists are often accused of 'physics-envy' (frequently by themselves) – the desire for generalizable principles using models and sophisticated mathematical approaches – conservation biologists tend toward 'rigor-envy', focusing heavily on theory as they seek to secure their place in traditional biology and ecology programs. Conservation biologists often worry that their work will be dismissed as too narrow, ideological, and activist in spirit, and that the journal will become just another conservation magazine (Tracy & Brussard 1996). Thus, much research in conservation biology only appears to be 'applied' in nature, using a positivistic lens to focus on a standard litany of work: extinction rates, reserve design, fragmentation and patch size, edge effects, and metapopulation dynamics. While this work continues to yield important contributions, it is difficult to distinguish it from the work of ecology in general. Without an understanding of the political and economic contexts which shape conservation dilemmas, we risk creating an increasingly narrow definition of what conservation biologists do — both by neglecting a rich array of possible approaches to conserving biological systems and by reducing the distinction between conservation biology and basic ecology.

However, the major failure we discuss here is found well beyond the academic world; the incongruence between conservation problems and the solutions explored by conservation biologists is maintained by a general failure to acknowledge that social inequalities among people are often (although not always) the basal causes of environmental degradation. As a result, we produce research, educational programs, and technical tools that are inadequate for conserving biodiversity. We argue, therefore, that effective scientific and socio-economic studies designed to maintain biological diversity would benefit from addressing how their work influences cultural, political, and economic inequalities related to environmental issues.

In describing one vision of a different kind of conservation biology, we outline below (1) the potential benefits of acknowledging social inequality as a fundamental cause of environmental problems, and (2) the barriers that prevent conservation biologists from incorporating this acknowledgement in their work. The effectiveness of conservation biologists will be increased, we suggest, when we ask ourselves whether or not our science tends to resolve social inequalities that degrade the environment. This analysis should be used to guide scientific inquiry, and when combined with rigorous scientific techniques, should not be easily co-opted by those seeking to justify poor resource practices.

The Impact of Acknowledging Social Inequality

In general, the formal recognition that many conservation problems are rooted in social inequalities should result in a broader range of questions that can be legitimately asked by conservation biologists. While more conventional questions concerning, for example, population viability analysis, reserve design, and invasive species should be considered valid areas of inquisition, the exploration of other questions should be supported. Such questions might include: What relationship exists between the loss of biodiversity and political and economic structures? How can those structures be changed, eliminated, or mitigated? What barriers prevent their elimination? Are recommended conservation measures socially and economically feasible? Are the solutions conservation biology provides useful to the people most dependent and responsible for preservation of an ecosystem?

We suggest that conservation biologists should generate valid questions using four principles that Levins and Lewontin (1985) outlined as the 'dialectical approach' to biology. These include: (1) *Historicity* – every conservation problem has multiple histories, each deemed credible and useful by different cultural groups; (2) *Universal interconnection* – because cultural systems are connected with ecosystems, conservation biologists need to cross disciplinary boundaries to see that NAFTA, the Zapatista insurrection, and the World Bank are as relevant to conservation of the tropical rainforest as is the jaguar; (3) *Heterogeneity* – an ecosystem is not just the additive result of all the species and abiotic parts which compose it, but also the processes which result from the interaction of the parts, including people and their defining values of the system; (4) *Interpenetration of opposites* or *the interchangeability of cause and effect* – recognition of nature's constant state of change should lead us to focus on processes and on complexity rather than on a static and idealized conceptualization of nature. It is the responsibility of conservationists to study these complexities and discover the interconnection between them. We add a fifth principle, (5) *Power* – all human relationships include a political component. Power differentials underlie the development and behavior of social systems and consequently problems resulting from such systems.

Conservation biologists should integrate these five principles to create effective solutions to environmental problems, and this will require methods that are currently not part of the standard training a conservation biologist receives. These methods include advocacy, participatory research, and coalition-building. Unfortunately, the arguments against using these approaches are the same arguments usually offered to counter any exploration of relationships between sociological, political, and conservation/scientific issues: First, as evidenced by earlier debates within the Society for Conservation Biology, some conservation biologists contend that scientists cannot advocate political positions without compromising the rigor of their research (Brown & McDonald 1995; Brussard et al. 1994). Second, most conservation biologists are not formally trained to consider cultural, political, and economic questions, to work with local communities, or to build coalitions with advocates (Noss 1997). Third, the current ecological questions which conservation biologists address may be considered difficult enough without examining social factors. Fourth, conservation biologists may also feel they do not need to consider these issues since social scientists are already doing so. Finally, because of the division of labor between natural and social scientists, there is a shortage of funding and institutional support for biologists to study social issues as they pertain to ecological systems. Below we describe the three methodologies listed above, further explore why they meet resistance in the field of conservation biology, and argue that they are, in fact, essential tools for conservation biologists.

Science, Values, and Advocacy

In introducing a special issue of *Conservation Biology* on rangeland conservation, Noss (1994) instigated a storm of letter writing by suggesting that scientists build coalitions with activists and advocate for grazing policy reform. The respondents' concerns centered on the idea that through advocacy and coalition-building conservation biologists would lose (or be perceived by the public as losing) scientific objectivity and rigor.

The then President of the Society wrote: "[o]ur organization differs from environmental groups because it promotes science rather than any partisan agenda (Brussard et al. 1994)." Striking a chord, the ensuing commotion led to a flurry of letters and contentious sessions at annual meetings. The lead article in a subsequent dialogue sparked by this debate argued that the formal inclusion of normative values set conservation biology apart from other applied biological disciplines and further suggested that this inclusion required conservation biologists to be explicit regarding these values (Barry & Oelschlaeger 1996).

Those participating in this dialogue acknowledged that science, like any human endeavor, is value-laden and that rigor is determined by the questions asked, the experimental design, and the research process. Indeed, Meine and Meffe (1996) counter that there is already broad acceptance that values guide the work of conservation biologists which when successful is "a necessary mixture of verifiable, reliable scientific knowledge, cultural values, and civic responsibility." Advocacy is what we *do* with research results. Advocates can (and do) use sloppy science to further their political positions. However, advocacy does not imply sloppy science. The crux of the grazing debate was how research questions are formulated and how the results are presented to managers and policy makers. Judging from the relative calm and reduced debate in the journal, the subsequent dialogue spurred by Barry and Oelschlaeger (1996) seems to have fostered a greater acceptance of advocacy within the discipline (Roebuck & Phifer 1999).

It should be noted, however, that not all value judgements and social influences are good ones (Shrader-Frechette 1996). The normative foundation of conservation biology (e.g., biodiversity is good) can easily be construed as misanthropic in that values related to people have not been made explicit except perhaps that human population growth is bad (Meffe et al. 1993; Gehrt 1996). Thus, a broader discussion is needed to formulate values related to people as an integral part of the problems we seek to solve. Connecting the underlying values of our work with broader cultural values and expressing these connections publicly may be critical for effective policy implementation and is certainly part of our civic responsibility.

In sum, conservation biologists acknowledge that to do science using poor experimental designs is improper. We argue further that to ask only questions concerning proximal causes and to ignore the fundamental political and economic mechanisms that reduce biological diversity results in an improper and superficial analysis. Indeed, greater self-reflection about the values underlying our research should argue for the inclusion of additional normative values regarding social equity. Quite simply, we believe that addressing more basal causes of any problem results in a higher probability of solving that problem. Thus, advocacy for specific solutions to conservation issues and related social problems is a useful tool for reaching the goals put forth by conservation biology.

Participatory Research

One of the concrete ways conservation biologists can address the fundamental causes of environmental degradation is to work more closely with local communities using participatory research. Historically, participatory research grew out of attempts by social scientists in both the developing world and the developed world to understand and address the inequalities between groups (e.g., elites vs. poor people; researchers vs. research subjects; Whyte 1991). Increasingly, applied natural scientists are beginning to use participatory methods for environmental monitoring (e.g., Christie & White 1997). Participatory research is a cyclic, iterative process through which formally-trained researchers and local people work together to analyze the social and economic structures which exploit and oppress people (Freire 1993). While necessarily tailored to a particular situation, participatory research usually passes through four distinct phases, all of which involve outside researchers and local people: problem identification, data collection, action taking and evaluation. Distinct from most positivistic scientific research, action taking is considered a natural and enriching component of the applied research process. In participatory research, each research participant brings unique talents and skills to the task, thus resulting in a perspective which includes the academic's general theoretical knowledge and the local people's specific experiential knowledge (Maguire 1987; Fals-Borda & Rahman 1991).

While not a panacea for conservation problems, participatory approaches to forestry and agricultural research have provided local acceptance of new management strategies (Hoskins 1991; Nelson 1993; Christie 1999), and both social scientists and conservation biologists are increasingly utilizing participatory methods to examine environmental problems (FAO 1990).

The combination of local and scientific knowledge of the environment has resulted in creative, culturally appropriate solutions to complex problems (Thrupp 1989; Nelson 1993). In addition to providing unique solutions, the process itself empowers both local people and scientists as they gain new skills and perspectives that may be employed beyond the scope of a single project.

Participatory research faces many barriers to acceptance as a legitimate approach, both because of difficulties inherent in participatory research itself and because of academia's emphasis on positivistic, quantitative research. For example, oppressed people do not frequently form groups (or perceive their problems as subjects for research), therefore initiating participatory research projects can be challenging. Also, establishing an equitable, trusting relationship between researchers and local people requires more time than many researchers are willing or able to spend in the field. Finally, since most local people are not trained to employ a positivistic method of investigation, inductive, descriptive means of inquiry usually replace deductive, hypothesis-oriented approaches to research. When inductive, descriptive research is inadequate, a "two-leveled" research approach can be used, in which researchers involved themselves in the inductive participatory process while simultaneously controlling a deductive research program (e.g., Cancian 1993).

Building Coalitions with Advocacy Groups

As scientists, we tend to work independently, thereby reducing opportunities for coalition-building with organizations and people in and outside the academic community. This is partly due to the nature of academic reward systems, which focus on individual productivity and creativity. Graduate students are usually encouraged to do independent theses rather than to participate in group projects because the former enhance career development (Noss 1997). Collaboration usually only occurs with other scientific colleagues, and conservation biologists often miss the opportunity to work at their field sites with members of rural communities and relevant advocacy organizations. This may result from conservation biologists receiving little formal training in coalition-building and their failure to realize the benefits from such endeavors. When the research is concluded, an article is published in a peer-reviewed journal and the biologist moves on to the next interesting question. Often, little has been done to raise the awareness of local people or to enhance their ability and motivation to exercise sustainable and wise management of the natural resources in their area. While including social concerns may not always yield new conservation insights, we should recognize that community activism and development will be needed as alternative conservation solutions are proposed and implemented (e.g., park preservation vs. agroforestry restoration). Working more closely with advocacy groups can improve the quality and authority of their efforts while simultaneously providing a contextual framework for conservation biology research questions and solutions.

Discussion

Conservation Biology is a young discipline, emerging over the past thirty years from a mixed-bag of sciences and social concerns. Its practitioners must now evaluate the last three decades of work and examine their effectiveness at solving conservation's basic dilemmas. Today, we see many of the same problems present thirty years ago, and in some cases they have worsened. On the other hand, we have made undeniable progress. Conservation biologists have developed biological frameworks for understanding the loss of biodiversity, and have educated the public to the extent that many non-biologists appreciate the ecological value of protected areas for preserving species. Yet the forces which destroy ecological systems remain unhindered. If our goal is to conserve biological systems and the diversity they support, we will learn from our failures, and benefit from employing a broader range of strategies.

Particular conservation challenges, each with their own set of causal factors, can be addressed by integrating social sciences, participatory research, and advocacy with the conventional tools of conservation biology: ecology, population genetics, and modeling. While biologists cannot become experts in all of these areas, they should recognize their importance in successful conservation efforts and should actively pursue collaborations with experts who do possess these skills. Rather than debating science vs. advocacy, conservation biologists should be exploring the dilemmas that become apparent when the social context is included as part of their analysis. Specifically, conservation biologists can begin by educating themselves on the history of their study regions, the economic forces that govern local communities, the political pressures on resource users and environmental activists, and the cultural meaning of the natural environment in which

people live and interact in these regions. Teachers of conservation biology should train their students to contextualize their research problems in this manner, and challenge their institutions to include analyses of social inequalities in conservation biology programs.

Many will consider our suggestions to be common sense and already the work of conservation biology. However, while we agree that much good work is in progress, generally this work has not been presented in an explicit manner. Our primary objective is to present the first steps toward that broader and more explicit framework. Clearly, problems frequently arise when we attempt to prevent or correct environmental degradation using a science devoid of social analysis. If conservation biologists are to find long-term solutions to conservation problems they must look at the constellation of factors that cause situations in which resources are abused. We cannot isolate biological factors from cultural, political, and economic factors.

As stated before, we see many promising trends. The science vs. advocacy debate has led to a further examination of the role of values in science. Sustainability has risen to the forefront as a yardstick for gauging success when attempting to use or preserve natural resources. International conservation and development projects, in some cases, are providing a model for addressing many of the concerns of social equity that we have discussed (Alpert 1996). Agriculture and other managed landscapes are receiving more scrutiny for their conservation potential (Perfecto et al. 1996; Vandermeer & Perfecto 1997; Jules & Dietsch 1997). Domestically, often bitter conflicts over endangered species and land use management have motivated more interdisciplinary approaches such as ecosystem management, which in addition to developing new ecological methods for conservation biology also incorporate socio-political factors by using adaptive management and alternative conflict resolution methods (Yaffee et al. 1996; Yaffee 1999). While these efforts are ongoing and many are still skeptical of their sincerity and ability to enhance conservation, they do represent a more sophisticated response to conflicts among people about how to interact with our natural world.

Conservation biology has been driven by two tenets: 1) an ethical tenet that holds certain ecological states to be good and worthy of protection (e.g. high biodiversity, ecological complexity, etc.), and 2) a methodological tenet that suggests that the application of biological knowledge is the means to this goal. We argue for a more formal inclusion of a third tenet, that of social equity, which acknowledges that addressing the cultural, political, and economic needs of people is vital for the long-term persistence of natural areas and ecosystems, especially those areas with people whose livelihoods depend on the land and natural resources being conserved. Inclusion of this tenet should contribute toward setting conservation biology apart from other ecological disciplines in providing unique and effective solutions to conservation problems. As well, these tenets offer a finer resolution of the problems to be overcome and the tools at our disposal for reaching the goals of conservation biology.

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Literature Cited

ALPERT, P.: *"Integrated conservation and development projects: Examples from Africa"*. **BioScience**, 46:845-855, 1996.
BARRY, D. and M. OELSCHLAEGER: *"A science for survival: Values and conservation biology"*. **Conservation Biology,** 10:905-911, 1996.
BROWN, J.H. and W. MCDONALD: "Livestock grazing and conservation on southwestern rangeland". **Conservation Biology**, 9:1644-1647, 1995.
BRUSSARD, P.F.; D.D. MURPHY, and C.R. TRACY:. *"Cattle and conservation biology — another view"*. **Conservation Biology,** 8:919-922, 1994.
CANCIAN, F.M.: *"Conflicts between activist research and academic success: participatory research and alternative strategies"*. **American Sociologist,** 24:92-106, 1993.
CHRISTIE, P. ans A.T. WHITE: *"Trends in development of coastal area management in tropical countries: from central to community orientation"*. **Coastal Management**, 25:155-181, 1997.
CHRISTIE, P: **"In a Country Without Forest, No Life is Good": Participatory action research in the neo-liberal context of Nicaragua.** Ph.D. dissertation. The University of Michigan, Ann Arbor, Michigan, 1999.
FALS-BORDA, O. and R.A. RAHMAN: **Action and Knowledge: Breaking the monopoly with participatory action-research.** Apex Press, New York, 1991.
FAO; **The community's toolbox. The idea, methods and tools for participatory assessment, monitoring and evaluation in community forestry. Community Forestry Field Manual 2.** Rome, 1990.
FREIRE, P.: **Pedagogy of the oppressed, second edition.** Continuum Press, New York, 1993.
GERHT, S. D.: *"The human population problem: educating and changing behavior"*. **Conservation Biology,** 10:900-903, 1996.
HOSKINS, M.H.: *"There to hear what's next in the revolution"*. **The Rural Sociologist,** Fall:46-49, 1991.
JULES, E.S. and T.V. DIETSCH: *"Dangers in dividing conservation biology and agroecology"*. **Conservation Biology,** 11:1272-1273, 1997.
LEVINS, R. and R. C. LEWONTIN: **The dialectical biologist.** Harvard University Press, Cambridge, Massachusetts, 1985.
MAGUIRE, P.: **Doing Participatory Research: A Feminist Approach.** Center for International education, University. of Massachusetts, Amherst, Massachusetts, 1987.
MEFFE, G. K.; A. H. EHRLICH; and D. EHRENFELD: *"Human population control: the missing agenda"*. **Conservation Biology,** 7:1-3, 1993.
MEINE, C. and G. K. MEFFE: *"Conservation values, conservation science: A healthy tension"*. **Conservation Biology,** 10:916-917, 1996.
NELSON, K. C.: **Participation and Empowerment, a Comparative Study of IPM Technology Generation in Nicaragua.** Ph.D. Dissertation. University of Michigan, Ann Arbor, Michigan, 1993.
NOSS, R.: *"Cows and Conservation Biology"*. **Conservation Biology,** 8:613-616, 1994.
NOSS, R.: *"The failure of universities to produce conservation biologists"*. **Conservation Biology,** 11:1267-1269, 1997.
PERFECTO, I.; R. A. RICE; R. GREENBERG and M. E. VAN DER VOORT: *"Shade coffee: a disappearing refuge for biodiversity"*. **BioScience**, 46:598-608, 1996.
ROEBUCK, P. and PHIFER, P.: *"The persistence of positivism in conservation biology"*. **Conservation Biology,** 13:444-446, 1999.
SHRADER-FRECHETTE, K.: *"Throwing out the bathwater of positivism, keeping the baby of objectivity: Relativism and advocacy in conservation biology"*. **Conservation Biology**, 10:912-914, 1996.
SOULÉ, M.E.: *"What is conservation biology?"*. **BioScience**, 35:727-734, 1985.
SOULÉ, M.E.: *"Conservation: tactics for a constant crisis"*. **Science**, 253:744-761, 1991.
TRACY, C.R. and P.F. BRUSSARD: *"The importance of science in conservation biology"*. **Conservation Biology,** 10:918-919, 1996.
THRUPP, L. A.: *"Legitimizing local knowledge: from displacement to empowerment for third world people"*. **Agriculture and Human Values,** Summer:13-24, 1989.
VANDERMEER J. and I. PERFECTO: *"The agroecosystem: a need for the conservation biologist's lens"*. **Conservation Biology,** 11:591-592, 1997.
WESTERN, D.: *"Conservation biology"*, in D. Western and M. Pearl (editors) **Conservation for the twenty-first century.** Oxford University Press, New York, 1989.
WITH, K. A.: *"The theory of conservation biology"*. **Conservation Biology,** 11:1436-1440, 1997.
WHYTE, W.F. (Ed.): **Participatory Action Research.** Sage, Newbury Park, California, 1991.

YAFFEE, S. L.; A. F. PHILLIPS; I. C. FRENTZ; P. W. HARDY; S. M. MALEKI; and B. E. THORPE: **Ecosystem management in the United States: An assessment of current experience.** Island Press, Boulder, Colorado, 1996.
YAFFEE, S.L.: *"Three faces of ecosystem management".* **Conservation Biology,** 13:713-725, 1999.