
Translating Data into Meaning: Education in Conservation Biology

CAROL BREWER

Division of Biological Sciences, University of Montana, Missoula, MT 59812, U.S.A., email carol.brewer@umontana.edu

Introduction

Most scientists recognize that species are disappearing at an alarming rate, and many disappear before we can even name them, let alone understand their evolutionary history or role in their ecosystems. The reason for biodiversity losses is largely anthropogenic. As a response to this crisis, professional biologists founded the Society for Conservation Biology (SCB) in 1987 (Soulé 1987). One of six key objectives of SCB (1987) is “the education, at all levels, preparatory and continuing, of the public, of biologists, and of managers in the principles of conservation biology.” What role has education played in the SCB and the journal *Conservation Biology* since their inception, and what opportunities exist for strengthening this critical element within SCB and the field?

Education in the Society for Conservation Biology

On the surface it might appear that education is well integrated into SCB. Many members of SCB have a teaching role at their institution, and education has been a visible theme within SCB throughout much of its history. For example, SCB made a major commitment to education in 1989 when it became one of the few professional scientific societies to regularly publish education articles in its flagship journal. Indeed, an education theme cuts across all sections of the journal from editorials and letters to essays, contributed papers (including research notes), and book reviews. Since 1999, education has been visible in the initiatives of the Education Committee. The committee has sponsored symposia on education at annual meetings and has been active in evaluating the status of conservation biology in the undergraduate curriculum (White et al. 2000) and in defining guidelines for conservation literacy (Trombulak et al. 2004). Paper and poster

sessions also add to the education dialog at SCB annual meetings. A promising trend is the number of graduate students presenting their work both in conservation science and education at the annual meeting.

But a closer look at the actual extent to which education has been infused into our meetings and research reports reveals a more sobering picture. There is still a dichotomy between mainstream research and education. For example, at annual meetings of SCB, science and education are largely separated into different sessions. And few research symposia have included a presentation on how the featured research could be integrated into education programs. This picture is the same in *Conservation Biology*. Roughly 3000 articles have been published in the journal since its founding in 1987. I used the search feature on the Blackwell Synergy Web site (<http://www.blackwell-synergy.com/search/simple>) to conduct a simple content analysis of articles published in *Conservation Biology*.

Five hundred thirty-three contributed papers, letters, editorials, and book reviews mention the words *education* and/or *outreach* (approximately 18%). Of these, 71 were essays or research articles focused on education (mean = 4/year; Fig. 1), whereas only 354 other essays or research contributions mentioned either word.

On the bright side, there has been a nearly steady increase in the number of references to education and outreach over time during the 20-year history of the journal (Fig. 1). But how does the number of references compare with the number of contributions to the journal overall? When you strip away the education papers, book reviews, letters, and editorials, just over 10% of authors make any reference to education or outreach. To the extent that members of SCB are involved in education research and practice, their results are not being published in *Conservation Biology*. A more perplexing implication is that few conservation biologists consider telling the broader readership how the results of their research might be of

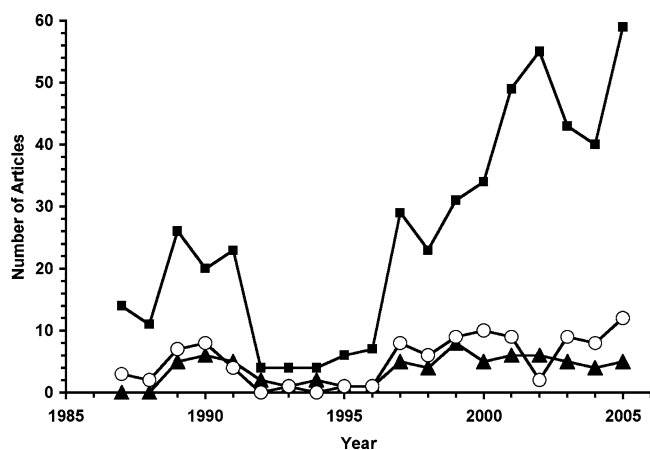


Figure 1. Number of Contributed Papers, Essays, Letters, and Editorials published in *Conservation Biology* from 1987 through 2005 that include the words education and/or outreach (squares), the subset of Contributed Papers and Essays focused solely on education and/or outreach (open circles), and the number of Contributed Papers, Essays, Letters, and Editorials that include the word interdisciplinary (triangles).

educational value. Such insights, direct from researchers, would be of tremendous value to educators at all levels.

Integrating Education throughout SCB and the Field of Conservation Biology

Despite the fact that many members of SCB teach in some capacity, few share the results of their science beyond the ivory tower, journal page, or agency door. Translating the significance of results for a broader audience must be a critical part of the conservation biologist's role in promoting environmental literacy and a more active and prominent pursuit of SCB. The environmentally literate person understands how ecological knowledge is constructed, how values influence this process, and how to safeguard against bias; understands how society, politics, and economics can influence the theories and practice of environmental science; is able to apply or support the application of ecological understanding to social needs and problems; and has an ethical stance concerning responsibility to use their environmental literacy (Berkowitz et al. 2005). The specific approaches to cultivate environmental literacy and create opportunities for learning about science and the environment are varied (and many have been reported in *Conservation Biology*), but all have the same foundation: people learn best through experience, meaningful collaborations, and partnerships. This happens in formal school courses and at museums, parks, and nature centers and during play and leisure experiences.

Conservation biologists must allocate time to reaching out and promoting environmental literacy—even if

it means fewer data points or manuscript pages. A conservation biologist's task is enormous, and there are more opportunities for action than can be described here. But in the spirit of building momentum, here are several areas in which action promises increased integration of education into SCB, improved training for the next generation of conservation biologists, and a broader public constituency for biodiversity.

Increase Prominence of Education in SCB

More journal pages can be devoted to conservation education. Authors can be expected to describe the key education and outreach messages that everyone should know about their research study. In the same vein, meeting organizers can open a slot for a plenary address on education and provide incentives for each symposium, regardless of the topic, to have an education and/or outreach component. The SCB meetings can provide more opportunities for current and future conservation biologists to attend workshops on teaching, communication, and outreach. And recognizing that our reward system reflects what we value, SCB should consider awarding annual prize for excellence in conservation education.

Increase Interdisciplinary Education in Conservation Biology

Evidence of a flourishing field can be seen in the number and growth of undergraduate and graduate programs in conservation, especially in the developed world (e.g., <http://www.conbio.org/SCB/Services/Programs/>). Yet if the frequency of the term *interdisciplinary* in *Conservation Biology* is any indication, interdisciplinary research and partnerships have not been common over the last 20 years (Fig. 1). Wilson (1992) suggests that finding a solution to biodiversity loss "will require cooperation among professionals long separated by academic and practical tradition." Major discoveries and advances, especially those with broad societal implications, are made by teams of researchers with different, but complementary, skills and not by individual specialists. Even though disciplines relevant to conservation biology are segregated into different departments, teaching and learning in conservation biology, and developing environmental literacy in general, requires innovative courses that span disciplinary boundaries. Although developing interdisciplinary courses can be remarkably difficult, we do not have time to wait for administrative solutions to the challenges of offering truly interdisciplinary training in conservation biology. Individuals can make this change happen by knocking on the doors of colleagues across campus, sharing a beverage, and creating and teaching

case studies, modules, and courses that integrate the natural, physical, and social sciences. Then these courses can be assessed and experiences shared in manuscripts and at meetings.

Build a Constituency of People Who Care about Biodiversity

People fight for what they care about, and one aspect of developing a caring attitude is knowledge. Today people have fewer experiences in wild nature, and children spend far less time exploring outdoors than those of previous generations (Louv 2005). Many conservation biologists reminisce about having their interest kindled through early experiences in nature in the company of friends and mentors. From these experiences, many of us found careers that matched our passions for nature and adventure and now provide the opportunity every day to learn about and deepen our appreciation of nature. And because we care and know something about the diversity of life on Earth, we are ready to work for its conservation. Thus, part of our task is remedial—we need to provide opportunities for direct contact with nature for people of all ages (Orr 1989).

One particularly promising strategy to engage new participants in education and conservation of biodiversity is through citizen-science programs. Citizen science connects conservation biologists with members of the public who assist with data collection and monitoring following defined research protocols (e.g., House Finch Disease Survey, Cornell Laboratory of Ornithology). Direct contact with scientists may demystify science and promote a greater appreciation for science as one way of understanding the world around us. Through citizen-science collaborations, participants increase their knowledge of the natural world and the role humans play in shaping the environment. These types of programs may provide new hope for moving toward an environmentally literate public who will fight to protect what they have come to know and care about.

Conclusion

Despite 20 years of intensive research, the biodiversity crisis is deepening. Environmental illiteracy is leading to an ever-greater disparity between what conservation biologists and the public know about issues affecting life on Earth. Now more than ever education must cut across all facets of conservation biology and the SCB. The data we continue to collect and report on in *Conservation Biology* may make no difference in the conservation of the species and places we care about if this information is not translated into meaningful stories that engage the public and inspire them to take action. The SCB, the journal, and every conservation biologist and practitioner has a role to play in education and outreach. This is as important as writing the next manuscript that documents yet another decline in biodiversity. Actually, it is probably the most important thing we can do.

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