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# How Teaching Institutions Can Help Conservation Biology

GREGORY S. KELLER AND JULIAN D. AVERY

**C**onservation biology is a crisis-oriented science. Of critical concern are population declines, which often occur with little warning, leaving little time to determine their causative agents, magnitude, and extent and to develop management recommendations. Thus, incorporating a larger number of researchers into the field of conservation biology to focus on time-sensitive issues such as population declines allows a more rapid response that could help reverse negative trends. To that end, several biologists have encouraged broadening the circle of conservation researchers, specifically including researchers in tropical locations (Wemmer et al. 1993). Contributors to conservation biology include governmental and nongovernmental organizations, academic research institutions, and partners from an eclectic array of disciplines; however, the potential role of faculty and students from smaller colleges and teaching universities is often overlooked. In this article, we hope to encourage researchers at teaching institutions to take advantage of their numbers and their unique position as educators to propel the advancement of conservation science.

Many topics in conservation biology could benefit from a greater number of researchers. Unfortunately, teaching demands often preclude research at teaching institutions on time-sensitive issues during the typical school year (August–May). For example, surveys for declining populations of breeding amphibians in North America typically occur during March–April and often require broad-scale efforts. Studies of threatened tropical communities may require additional time to overcome logistical constraints, limiting participation by professors with intense (12-credit-hour) teaching loads. The population declines of migratory

songbirds represent a case in which the pace of critical research may be compromised by lack of involvement at teaching institutions. Work on potential causes of bird wintering in the tropics (October–April) has been scant compared with research during the breeding season, probably in part because of the challenges of conducting tropical research and the overlap with teaching assignments. Furthermore, the importance of the migratory period (late August–early October and April–late May) as an influence on migrant declines has been largely neglected, even though birds may exhibit their highest mortality rate during this period (Silllett and Holmes 2002). Of recent (2001–2005) literature published in *Conservation Biology*, *Biological Conservation*, *The Auk*, *The Wilson Bulletin* (now *The Wilson Journal of Ornithology*), *The Condor*, and *Ecology* on the habitat use or population declines of migratory songbirds during the non-breeding season, only 12 percent (7 of 59 papers) was conducted by researchers from teaching institutions. The Carnegie Foundation for the Advancement of Teaching (2000) identifies 1160 master's colleges and universities and baccalaureate colleges in North America, compared with only 261 research universities. We think the involvement of researchers at teaching institutions on topics such as population declines could be greater and could have profound impacts on the pace at which conservation biology is progressing.

At teaching institutions, we believe two changes could improve the potential for seasonal research on population declines: increasing options for research by professors and more strongly emphasizing conservation through education. To increase research options,

potential improvements might include the following:

- Establishing greater flexibility in the presentation of lecture material at teaching institutions. Specifically, team-taught classes could allow instructors to condense responsibilities into a shorter amount of time, thus increasing the time available for seasonal research. In addition, this option could have the benefit of making classes more dynamic, with professors discussing subjects that are more familiar to them and closer to their interests.
- Encouraging greater collaboration among teaching institutions, research universities, and agencies. This approach has proven successful in broadscale studies on the migration of shorebirds (Harrington et al. 2002) and could result in long-term partnerships among institutions.
- Encouraging faculty at teaching institutions to use sabbatical or release time (if available) to conduct seasonal research.

Particularly at smaller teaching institutions with fewer faculty, the possibilities of team teaching and release time may not exist. At these institutions, conservation biologists might make their greatest contribution by educating and training future researchers through

- Increasing study-abroad programs to tropical countries with an intrinsic

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research component for students. In particular, these programs should incorporate an entire semester's worth of transferable credit hours. Although most undergraduate students may not have acquired adequate training to conduct their own research on topics such as declining migratory songbird communities, it should be possible to incorporate students into an established study.

- Creating field ecology courses with the specific goal of having students participate in group projects and publishing their results in peer-reviewed or university journals at the completion of the course. Students may be excited by the intrinsic research component and elect to attend graduate school to continue researching population declines.
- Increasing efforts to teach conservation at the undergraduate level to both majors and nonmajors. The biggest contribution that teaching institutions can make to conservation biology is giving students the knowledge of what loss of species diversity means for ecosystem health and function. Yet many institutions do not offer a course in conservation biology, perhaps because of an emphasis on other sub-disciplines of biology, a lack of qualified faculty, or heavy teaching loads that do not allow additional courses in rotations. When conservation biology classes are offered, they tend to be upper-division courses with prerequisites rather than nonmajor courses at an introductory level.

However, teaching conservation biology issues to nonmajors may be actually be more important than teaching them to biology majors, for two reasons. First, these students are unlikely to be exposed to concepts of conservation biology during their college education. Second, the number of nonmajor students taking biology classes may be considerably larger than the number of majors. The impacts of teaching undergraduate students conservation biology can be impressive. For example, Caro and colleagues (2003) found a significant change in commitment to biodiversity conservation among students after taking a conservation biology course. This solution will not increase research in population declines per se; however, it will improve understanding of species declines among a very large student population.

Moreover, conservation education efforts should be focused on nontraditional groups as well (e.g., community members, college administrators). Although doing so will not educate or train future researchers directly, administrators (e.g., department chairs, deans, presidents) energized by conservation biology may be more receptive to other suggestions and more willing to provide funding or release time for conservation research, particularly on time-sensitive topics. At every institution, faculty must make a concerted effort to communicate with a broader audience about issues in conservation biology, including species declines.

Faculty at teaching institutions have selected this career in large part because of their interest in education and their ability to instill within students an appreciation and understanding of issues in the sciences. However, many of us recognize a need in conservation biology research for greater participation at every level. Our proposed solutions are a means to allow those of us at smaller institutions to make a greater contribution to the field through teaching and research at a critical time in the history of conservation biology.

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