

## **Building Capacity for Conservation Through Education: The What, How, Why, & Who of the Network of Conservation Educators and Practitioners**

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## Building Capacity for Conservation Through Education: The What, How, Why, & Who of the Network of Conservation Educators and Practitioners

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Sufficient conservation capacity—the ability to set and achieve conservation goals—is critical to meeting the environmental challenges we face globally as individuals, organizations, and societies (e.g., see Fox et al. 2017, Gill et al. 2017). The Network of Conservation Educators and Practitioners (NCEP) seeks to build that capacity for conservation through evidence-based higher education and professional development. By thinking about *what* is taught and *how*, *why* is it effective, as well as *who* is included at the table and in the classroom, we work to improve the teaching and learning of conservation in universities and other professional settings. The works presented in this volume of *Lessons in Conservation* are the product of NCEP Conservation Teaching and Learning Studios and, more broadly, of the NCEP community. Here we share the evolution of NCEP as a program and as a community to outline how we arrived at Studios and the resources presented here, why they matter, and where they are headed in the future.

### What We Teach: The Beginnings of the Network

In the early 1990s, as a doctoral student studying a nocturnal lemur (the aye-aye) in Madagascar, Center for Biodiversity and Conservation (CBC) Jaffe Chief Conservation Scientist Dr. Eleanor Sterling was inspired to learn about how environmental science was taught in the country. Madagascar was and is a widely recognized global hotspot for biodiversity and she was curious about how the next generation of conservation actors was being trained. What she found was that Malagasy educators were limited by a scarcity of resources such as textbooks, and that (when available) these were often out-of-date and irrelevant to the local context. In Madagascar, and elsewhere (e.g., Mendez et al. 2007), there was an urgent need for up-to-date, high-quality resources for teaching and training science. If the scientific community wanted to support conservation into the future, it needed to ask some important questions: What training does the next generation of conservation educators and practitioners need? What skills? Will they be effective?



Dr. Sterling, her CBC colleague Dr. Nora Bynum, and Dr. James Gibbs (of the State University of New York, College of Environmental Science and Forestry) created the Network of Conservation Educators and Practitioners—or NCEP—in 2000 to meet this capacity challenge. With a small team based at the American Museum of Natural History (AMNH), the project began by creating a suite of open and active educational materials on a variety of conservation topics, leveraging the expertise of CBC, AMNH, and other scientists by enlisting them as authors and reviewers. The resulting “modules” each included an explanatory background Synthesis document, a visual Presentation for the classroom with accompanying Teaching Notes, at least one practical Exercise with Solutions for the instructor, and related Case Studies. Following a rigorous peer review process, these modules became freely available online. In tandem, NCEP initiated projects on the ground in countries like Madagascar, Mexico, and Bolivia, where we worked with local project staff and scientists to distribute and adapt these resources to specific contexts (e.g., see Bynum and Porzecanski 2004, Sterling et al. 2005, Porzecanski et al. 2006, Bravo et al. 2017). In Madagascar, for example, we began by putting together a small, locally-based team of conservation professionals to coordinate the development of a suite of modules in French (the country’s primary language of instruction) tailored to the Malagasy context. These topics ranged from *What is Biodiversity?* to *Characteristics of Endangered Species in Madagascar*. Over the span of a decade, our network within the country grew to over 1,300 professionals and educators from conservation institutions across Madagascar. To date, the NCEP program as a whole has developed over 170 modules in eight languages on diverse conservation topics with experts from around the globe and engaged with a community of module users worldwide.

### **How We Teach: The Science of Teaching and Learning**

The needs and feedback of this global community—stretching from AMNH in New York to local partners in regions like the Southern Andes, to global module users worldwide—regularly inform our path forward. Consequently, as the program and module collection grew, our focus expanded to increasingly include not only

*what* we teach but also *how* it is taught. We found many of our colleagues at home and abroad, while experts in their field, had received little or no training in pedagogy yet were being asked to teach hundreds, even thousands, of students over the course of their careers. Valuable skills such as critical thinking, data analysis, collaborative problem solving, and professional communication were regarded as essential for professional conservation practice (e.g., Kroll 2007) but not explicitly addressed in most courses and curricula. Academic preparation in conservation science remains geared towards academic careers, despite the high demand for professionals outside of academia (Lucas et al. 2017).

At the same time, research in science education was clearly showing the effectiveness of ‘active learning,’ or the educational philosophy and set of practical techniques in which teachers actively engage students in the learning process (e.g., Burrowes 2003, Knight and Wood 2005, Freeman et al. 2007). The goal of active learning is to create meaningful contexts that motivate students to learn, to think about their learning, and to apply what they learn, thereby mastering content as well as developing important professional skills. Interested in evaluating our work to date, the NCEP team led experimental research to understand how modules affect learning. With support from the US National Science Foundation, our staff worked with faculty from across our network in the United States and Puerto Rico to measure student learning gains and skill development using modules in the classroom. In terms of content knowledge, faculty observed gains in learning and student confidence—as well as greater interest in the field of biodiversity conservation—following the use of NCEP modules in undergraduate courses (see Hagenbuch et al. 2009). In terms of professional skills, we found that student practice and self-reflection can foster enhanced performance in as little as one term (see Bravo et al. 2016, Sterling et al. 2016). These results are applied in our module collection through exercises that target the development of a specific skill (e.g., see *Lessons in Conservation*, Volume 8; *Student Learning* issue) and in innovative approaches to teaching practiced at our training events.

The need for training in pedagogy in our community prompted NCEP to expand its activities to increasingly



focus on evidence-based teaching techniques centered on active learning. To date, the program has held more than 225 training events on topics in conservation biology and evidence-based teaching methods in 20 countries, reaching at least 4,650 conservation professionals. We continue to offer multiple types of training, from workshops on pedagogy to seminars in course and curriculum development to online learning courses for life-long learners, but our predominant training events are now *Conservation Teaching and Learning Studios*. NCEP Studios bring together teams of conservation educators to exchange teaching strategies, train in evidence-based pedagogical approaches, and practice new techniques. They specifically offer training in pedagogical methods that research has shown to be most effective in developing student knowledge and skills (e.g., Freeman et al. 2014). Topics are determined by the needs of the NCEP community (e.g., proposed by Studio alumni or module users) and are used to demonstrate evidence-based techniques. For example, in 2017 the NCEP Studio focused on strategies for developing and assessing professional skills in conservation students, specifically critical thinking and evaluating evidence, using different classroom interventions and assessment rubrics.

### **Why Studios? Building a Community of Practice**

Our network is about making connections—connecting conservation educators to practitioners, trainers to the latest conservation science, and educators to the latest research on teaching and learning—but NCEP Studios do more. We bring together educators and trainers to create a ‘community of practice,’ defined by Wenger (2011) as “...groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.” At NCEP Studios, conservation educators can share their experiences, learn from one another, and offer each other support into the future. Our most recent Studio, held in June 2018, welcomed 21 university-level conservation science educators from the United States, Peru, Guyana, and Nepal for two and a half days. In addition to training in active teaching approaches and learning about NCEP resources, significant time was spent on practicing evidence-based methods in small groups and on daily activities and presentations led by the participants themselves, where

participants can be both educators and learners. To further support this nascent community of practice, we facilitate regular follow up to address questions raised during the Studio and hold a winter webinar to check in with alumni (for instance, regarding how they are integrating active teaching methods in their classrooms). The next Studio is scheduled for June 2019.

NCEP Studios have also fostered the growth of our original *raison d’être*—the NCEP module collection. As outlined in the Letter from the Editors, the modules included in this volume of *Lessons in Conservation* are the direct products of NCEP Studios. For example, *Genetically Modified Crops and Biological Conservation on Farmlands*, a case study and exercise by Studio alumni Dr. Timothy Leslie and Dr. Randa Jabbour, is the pair’s first formal collaboration with each other on research and writing. Dr. Leslie shared with us that he found this opportunity to collaborate and discuss pedagogy especially valuable because while he and Dr. Jabbour teach similar topics, they do so in very different parts of the United States (in terms of climate, ecosystems, student exposure to agriculture, etc.) and in different university settings. Topics like genetically modified crops and the social and ecological trade-offs encountered in tropical reforestation (also included in this volume) reflect the direction the NCEP program is headed, highlighting topics central to 21<sup>st</sup>-century conservation practice that address the complexity and trade-offs of real-world conservation decisions.

### **Who We Teach: Moving Towards More Inclusive Conservation**

Building on what and how conservation is taught, and mindful of the diverse contexts where conservation is learned, we have focused increasingly on questions of *who* we are teaching when we develop our resources and training events. The CBC includes the conservation of both biological and cultural diversity as part of its mission. We recognize that only a diverse, equitable, inclusive, and culturally vibrant workforce will offer the innovation and diverse solutions required to solve today’s complex conservation challenges. Launched in 2001, the CBC’s Inclusive Conservation Community Initiative ([ICON](#)) seeks to address the barriers that impede the full participation of historically underrepresented groups



in the conservation fields. NCEP works to support this CBC commitment to a more inclusive conservation workforce in multiple ways, from our training events to our resources. For example, the topic of how to teach inclusively has come up at several Studio events and we are working to formally include this in our resource collection. We are interested in experimenting with new formats (e.g., videos and other visual learning aids) for NCEP modules, to better reflect the traditions and learning practices of our many partners. This is one reason why we are increasingly featuring new open educational resources, developed by partners and other carefully vetted sources, alongside our own resources.

NCEP also carefully considers whom we are inviting to our Studios and events, and how we reach them, through targeted communications and outreach. We are particularly interested in reaching educators who serve diverse and underrepresented student bodies. Demand for NCEP Studios continues to be high, reinforcing the vital role of teacher training and idea exchange in the conservation field, and outpaces our ability to fund travel to New York City. As we look ahead, we are interested in bringing these training events to our existing and potential partners, particularly in regions with high biodiversity and demand for more professional development opportunities.

In sum, NCEP believes that investing in evidence-based education and professional development for the next generation of conservation professionals will strengthen their ability to meet the conservation challenges of today and the future. Community and collaboration are central to our program, embodied in its name and integral in our work. By linking teachers in the classroom and trainers in the field with evidence-based pedagogy and practitioner insight, we hope we can bridge the current gaps between academic preparation and professional realities. By offering modifiable materials that can be adapted and improved by our user community, we hope to draw on collective and evolving knowledge to build a more inclusive conservation body of knowledge. And by sharing knowledge and creating spaces for exchange, we hope to create communities of practice dedicated to improving training and teaching in biodiversity conservation. Educators who use NCEP modules or attend a Studio bring these resources and skills back to

their own communities, reaching a growing number of additional learners and their peers over time, thereby improving teaching and learning in conservation science and, ultimately, improving conservation practice. For more information on NCEP or to get involved, please visit [ncep.amnh.org](http://ncep.amnh.org).

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