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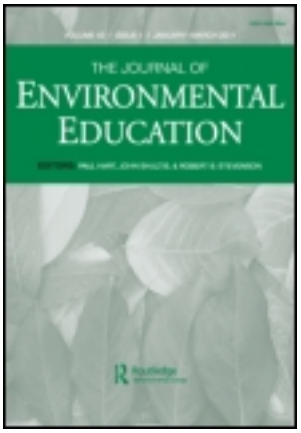

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Views From the Field: Conservation Educators' and Practitioners' Perceptions of Education as a Strategy for Achieving Conservation Outcomes

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Views From the Field: Conservation Educators' and Practitioners' Perceptions of Education as a Strategy for Achieving Conservation Outcomes

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This article presents data from a mixed-methods study that collected data through surveys ($n = 656$), interviews ($n = 15$), and discussion groups ($n = 75$) to explore the use of social strategies such as education and outreach by non-governmental organizations and government agencies to reach outcomes related to biodiversity conservation and resource management. We examine and juxtapose perceptions of conservation practitioners with those of conservation educators regarding the efficacy of education to reach conservation or resource management goals. We explore how to facilitate integration among policy, science, and education efforts, and we suggest theoretical augmentations for conceptions of education and social strategies within conservation organizations.

Keywords *conservation education, mixed-method studies, natural resources, professional development*

INTRODUCTION

Conservation organizations and government agencies are often driven by strict and ambitious biological targets, attempting to protect a certain number of species or hectares, and those metrics are used as measures of success (Jenks, Vaughn, & Butler, 2010; Salafsky, Margoluis, Redford, & Robinson, 2001). Strategies employed to achieve direct conservation results include habitat restoration, scientific studies of biodiversity threats, and political and legal actions that protect wild species and spaces (Salafsky et al., 2001). At the same time, social strategies such as education, communications, and outreach can engage people and communities in conservation in ways that are "authentic, empowering, and effective" (Braus 2009, p. 89). Dietz and Stern (2002) suggest that education is a critical and complementary approach to command-and-control and market-based structures, representing important opportunities to involve individuals in decision-making processes that affect their families and communities in the short and long term.

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Many policy analysts, resource managers, and conservation scientists have argued that social strategies that focus on enhancing people's connection with nature, building environmental literacy, and encouraging stewardship behavior can and should play a more central role in conservation (Jacobson & McDuff, 1998; Mascia et al., 2003). They argue that building a caring and educated population that can holistically address environmental threats and connect people with nature is critical to the success of future conservation efforts (Balmford & Cowling, 2006).

Fien, Scott, and Tilbury (2001) describe a continuum of social strategies for conservation: a nested structure of information, communication, education, and capacity building. Monroe, Andrews, and Biedenweg (2007) describe the aims of each as follows:

- Information: increase awareness and understanding (usually in informal settings);
- Communication: establish a dialogue between audiences and a provider, such as a nongovernmental organization (NGO) or an agency (usually in informal settings);
- Education: promote knowledge, understanding, concern, motivation, and capacity to work collaboratively (formal and informal settings); and
- Capacity building: build capacity of civil society to support and work toward environmental conservation (informal settings).

Scott and Gough (2003) revised this continuum into a dynamic and comprehensive educational model focused on learners as engaged agents interacting in a social context, suggesting that each level indicates greater levels of engagement and commitment, incorporating principles and structures from the prior. Drawing on Scott and Gough (2003), Monroe et al. (2007) suggest four categories of interventions based on the intended objectives: in particular, whether the objectives are to develop the learner's skills or to address a particular issue or, in the case of this article, attain improvement directly related to a specific conservation outcome. The aim of interventions described by Monroe et al. (2007) include convey information; build understanding; improve skills; and enable sustainable actions.

One of the key questions raised, then, is how to most effectively leverage the benefits and potential of social strategies for achieving conservation results as a complement to science and policy endeavors (Braus, 2009; Heimlich, 2010). Of particular need is information regarding how education and communication strategies can and do directly impact the environment in terms of the mission focus of the organization (Horr, 2007). Thus it is initially important to understand how and to what extent social strategies, such as education and communications, are currently being employed and gauge the perceived effectiveness of those initiatives. These baseline data can help design professional development materials and other supports to enhance how education is used in consort with protection, management, law, and policy to achieve biodiversity conservation (Dietz & Stern, 2002; Salfsky et al., 2001).

To this end, the EPA-funded Environmental Education and Training Partnership (EETAP) convened a consortium of NGOs and government agencies to explore the use of education in support of conservation outcomes.[1] Among other activities, the consortium worked to build the capacity of nonformal educators and conservation practitioners (such as scientists, program officers, and policy experts, among others) to better integrate education into conservation efforts.

To inform the development of this capacity-building project, the authors conducted a mixed-methods study to: (a) develop an understanding of how education, communications, and outreach are employed by environmental NGOs as well as state and national government agencies;

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(b) gather educators', practitioners', and decision makers' perspectives on the effectiveness of those endeavors; and (c) explore what tools practitioners, nonformal educators, and decision makers believed might be helpful in bridging the education–science–practitioner gap, thus enhancing the contribution of social strategies to conservation goals and outcomes.

METHODS

The study employed three principal research methods: semi-structured telephone interviews, an online survey, and in-person discussion groups. This methodological triangulation, which collected data from a diversity of respondents in a range of conservation-related positions, helped decrease the likelihood that the data reflected the biases of a particular data-collection method (Maxwell & Loomis, 2002). Each of the methods is described in more detail in the following section.

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Survey

Two versions of the survey instrument were developed: one for conservation educators (27 items) and another for conservation practitioners (26 items). The instruments were structurally similar, including six subscales that used rankings related to importance of activities to the organization; organizational use of management strategies (including education); barriers to education and communications; target audiences; understanding of current educational research; and relative importance of resources (such as financial and staffing, for example). The additional item on the educators' survey was related to familiarity with various aspects of educational and learning theory. The questionnaire was pre-tested with conservation education and practitioner colleagues to ensure clarity and flow and to confirm timing. (The final survey required approximately 20 minutes to complete.) For sample questions, see Table 1.

Items were drawn from the frameworks used for this study (i.e., Monroe et al., 2007, Fien et al., 2001, Scott & Gough, 2003) and from the program planning and evaluation literature in environmental education (Heimlich, 2010). Items were evaluated for content using a panel of experts ($n = 5$) representing academics, conservation practitioners, and conservation educators. Face validity was assumed as language items were taken from applied literature, and the questionnaires were conducted online. Using KR21 for post hoc reliability measures, the reliability of the scales was .73 for the extent to which activities help achieve conservation goals, .80 for effective use of strategies, .82 on the scale of importance of strategies in meeting conservation goals, .86 on strategies employed, .85 on the importance of elements, and .92 with familiarity with topics.

To develop the study frame, contacts within conservation organizations and agencies were asked to forward e-mail requests for participation. The e-mail—which included a link to Zoomerang, the online site from which the survey was administered—was distributed through a range of networks, including electronic mailing lists managed by the American Zoo and Aquarium Association (AZA), Disney's Wild Animal Kingdom, the North American Association for Environmental Education (NAAEE), Project Learning Tree, the Society for Conservation Biology, and the U.S. Fish and Wildlife Service, among others. Because there was no ability to

TABLE 1
Sample Items Asked of Both Conservation Educators and Practitioners

Sample item	*Response options*
Rate each of the following activities on how important it is in your organization. (Scale of 1 to 7, where 1 = *not at all important*; 7 = *very important*)	• Influencing local policy • Influencing national policy • Conducting scientific policy & field work • Conducting research on how to meaningfully involve more people in conservation work
To what extent does each of the following programs or activities help achieve your organization's conservation goals? (Scale of 1 to 7, where 1 = *not well at all*; 7 = *extremely well*)	• Restoring habitat • Using media and outreach to promote your organization's work • Involving local communities in stewardship and resource management • Implementing communication strategies to engage key audiences • Designing and implementing education programs to engage key audiences • Providing opportunities for individuals to get involved in conservation actions • Influencing beliefs and attitudes and encouraging environmentally responsible behaviors • Conducting ongoing evaluations of programs and activities • Raising funds for conservation programs • Science activities and scientific research programs • Communications activities • Policy activities • Activities that engage community in hands-on conservation • Education activities • Natural resource management activities
What are the major barriers to incorporating education into your organization's conservation work? (Select all that apply.)	• Lack of resources (e.g., money, time, and so on) • Unclear connection to the organization's or agency's mission • Lack of expertise within organization • Lack of commitment to education within organization • Difficulty of measuring effectiveness of education activities • No barriers (education is the mission of the organization) • Other (please specify)

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randomize and there was no larger frame for the study, the findings can only appropriately be generalized to those responding to the survey requests.

The survey was open from August 1, 2006 to September 22, 2006, during which time 423 conservation educators and 233 conservation practitioners responded. The survey indicated that respondents should categorize themselves as "conservation educators" or "conservation practitioners"; their response to this question then directed them to one of the two versions of the survey.

The following language was provided to help clarify the intended difference: "(1) conservation educators who work for nonprofit organizations (including nature centers, zoos, and other nonformal sites) or state/federal agencies; and (2) conservation practitioners who conduct on-the-ground work (such as scientific research, habitat restoration, endangered species conservation, and so on)." Although these distinctions were artificial in some cases (with some jobs including both elements), respondents were asked to select the option that represented the category on which they spent the majority of their work time.

Of those who completed the "Conservation Educators" version of the survey, 92% confirmed that their professional roles were primarily related to education. Because of the ability to select multiple responses, one-third of educators also identified training and/or communications as part of their position and expertise. Nearly half (42%) of the practitioners identified their position as natural resource management, with 34% noting their role as "science" and "scientific research." A third (33%) of those responding to the "Conservation Practitioners" version also described their position or expertise as education, and another third (30%) indicated that communications were part of their position. Respondents, then, tended to be either educators or practitioners who also conduct educational and communications activities. The educators were slightly more likely to work for state or local agencies; practitioners were slightly more likely to work for conservation NGOs.

Data were analyzed using SPSS 15.0. Statistical tests included frequencies, central tendencies, *t*-tests for between-group significance, and rank analysis. In presentation of survey findings, when the data provided are frequencies, we report the median because it represents the true middle of the distribution and is a more accurate statistic to use in nonparametric analysis. On a 7-point scale, 4 is neutral; 1 to 3 represent negative responses, and 5 to 7 represent positive responses.

Interviews

We conducted semi-structured interviews with 15 decision makers in state and federal government agencies, conservation NGOs, and zoos and aquariums around the United States.[2] We defined "decision makers" as people in management positions with the opportunity to influence strategic as well as operational decisions related to the implementation of conservation education. Depending on the organization or agency, these individuals may or may not have previous experience as field-based conservation scientists or conservation educators.

To select interviewees, we worked with an advisory group to identify key federal and state agencies, conservation groups, and museological institutions that incorporated both conservation science and conservation education in their programming. We also selected decision makers at sites that were perceived by conservation professionals as being influential in the practice of conservation education. We used the "most different" approach (Yin, 1994) and, thus, created a matrix of types of organizations and agencies crossed with geographical location to ensure that we reached people and institutions representing a range of different perspectives. In these organizations, we attempted to reach the highest-level people, including agency and organization directors/CEOs.

This portion of the study was intended to gather perspectives from individuals whose roles allow them to dictate the direction of funding, strategic planning, and programming within

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their organizations and agencies. Understanding decision makers' thoughts on education as a biodiversity conservation tool is critical when contemplating how to improve the effectiveness of educational strategies.

Taking place between July and October 2006, the interviews were conducted by the two researchers, and the response rate was 71.0% (15 individuals out of a total of 21 contacted). The interviews explored the relationship between education and conservation, as well as perceptions of what tools could help strengthen the connection between conservation education activities and conservation outcomes. The interview schedule covered topics such as: the most significant resource or conservation issues addressed by the organization or agency; the key audiences and whether those audiences understand the organization's or agency's key priority issues; the decision makers' definition, as well as the organization's or agency's definition, of *education*, and how education compares or contrasts with communications and outreach; and the potential benefits that the decision makers think education could bring to helping the organization or agency achieve conservation goals. The interview was pre-tested to ensure clarity of wording and that the series of questions addressed concepts of interest to this study.

Lasting between 30 minutes and 1 hour, the interviews were conducted by telephone and the interviewers recorded notes immediately following each call. The interviews were analyzed thematically, using a constant-comparison method to search for similarities, differences, and emergent concepts to help illuminate answers to the research questions (Boeije, 2002).

Discussion Groups

The researchers held six data discussion groups,[3] five of which were for educators (including some educators who had previously worked as field conservation scientists) and one of which was a dedicated conservation practitioner group. The total number of discussion group participants was 75, with 67 self-identifying as "conservation educators" and 8 self-identifying as "conservation practitioners" (following the same guidelines for classification as given in the survey; see explanation above). The discussions were held at the AZA and NAAEE annual conferences; the International Zoo Educators' biannual conference; the National Conservation Training Center; and the offices of the National Audubon Society. All discussion groups were conducted in September and October 2006.

We recruited participants to the discussion groups with the intention of diversifying across types of organizations (federal and state agencies, informal science and environmental education providers, museological institutions, and so on) as well as geographic perspectives. In addition, we included participants from organizations that ranged in size from several employees to thousands of employees, thus reflecting differing scales of access to decision makers and overall planning within the organization or agency.

The question route for educator and practitioner discussion groups was nearly identical. The only exception occurred with reversing wording on a question that probed what each group (educators and practitioners) thought was most needed for the other group to understand and make use of the link between education strategies and conservation outcomes. First, participants were asked to share their perceptions about the role of education in achieving conservation outcomes in their organization or agency. Second, they were asked to discuss resource needs for

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educators related to communication, policy, and conservation science. In addition, researchers encouraged discussion on what would help conservation practitioners and/or decision makers enhance or expand educational efforts. The discussion groups closed by having participants react to a series of elements being considered for inclusion in a conservation education toolkit being designed by the consortium leading the project.

The researcher and steering committee members conducting the discussion groups recorded comments on flip charts; the researchers analyzed the content thematically based on the structure of the research and discussion questions. These qualitative data are presented concurrent with the survey data to elucidate concepts derived from the statistical analyses. The qualitative data also inform the overall recommendations and discussion in the final portion of this article.

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FINDINGS

The results are grouped thematically, concurrently presenting data gathered through all three methods (interviews, surveys, and discussion groups). Themes are structured around our research questions. Quantitative data are presented to ground each section; qualitative data are provided when appropriate to further exemplify themes and, in the case of decision makers, to present alternative perspectives.

Current Efforts and Activities in Conservation Education

The majority of interview, survey, and discussion group respondents indicated that their organization or agency uses educational strategies or pursues education-related initiatives as part of their routine work in resource management or biodiversity conservation. Indeed, the mission statements of the majority of organizations and agencies sampled in the interviews include education as a primary goal or strategy. Even when the word *education* was not used explicitly, the description of the activities they conduct (e.g., engaging the public, promoting responsible conservation, and so on) incorporate education or leverage educational activities. One decision maker noted that, although their agency's mission is not education *per se,* "education is a tool that we use. . . . [The agency] does work to create an informed public that is capable of making wise decisions about stewardship."

Education Versus Communications and Other Social Strategies

Not surprisingly, this study illuminated a wide range of views on the definition of "education," particularly when compared with communications, social marketing, and public relations. Several interviewees combined education and communications without clearly distinguishing between the two:

> [Education, outreach, and information] kind of come together at some point—for example, Project WILD is a pretty strict educational program. [. . .] Our publications are educational efforts, too. Our website's focus is to educate and inform people, and our radio and TV outreach programs are there to educate and inform, too.

Others observed that the activities that some call conservation education might more appropriately be called social marketing. One decision maker observed "we're trying to change the behavior . . . in a socially constructed manner. That's more of a social marketing challenge than . . . an educator's perspective on how to present more information." Although this comment draws a commonly agreed-upon distinction between education and social marketing (Ardoin, 2009a; Monroe, 2003; Monroe et al., 2007), it also highlights a common misperception that education is equivalent to information.

Based on these kinds of beliefs, some discussion group participants expressed concern that scientists and practitioners need to develop a clearer understanding of what education is and is not. They stressed, "It's not arts and crafts," and "it's not all children." One discussant emphasized that, "education through our organizations should be encouraging civil discourse—apply facts to what is being discussed. Talking about this stuff is important." Several decision makers concurred, with one describing education as a "process that involves awareness, knowledge, and action."

In this vein, some decision makers we interviewed displayed a more nuanced and multi-faceted understanding of education. A zoo administrator described the difference as such: "Communications is about building awareness. Education is about really and truly imparting some knowledge, skills, or abilities." And many of the practitioners and educators distinguished more clearly between education and other social strategies, emphasizing the time element, with education representing a longer-term commitment than communications.

The distinction between education and communications did not detract from an espoused recognition of the importance of communications, however. In the surveys, educators and practitioners had mean scores of 5.46 (on a 7-point scale) when queried about the belief that communication is important in achieving conservation goals. Interestingly, the mean score for whether communications were used effectively was slightly lower, indicating that although communication represents an important strategy, respondents perceived that its practice may not achieve its potential.

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Perception of Importance of Education as a Strategy for Environmental Conservation

On the survey, when educators and practitioners ranked which activities were most important to their organization's or agency's work, the two groups' responses were quite similar. (See Table 2 for mean scores, and an indication of significant differences between mean score responses from the two groups.)

Overall, the survey items with the top five mean scores (which were the same for educators and practitioners) were related to education and communications activities. Those premier items were:

1. Influencing beliefs and attitudes and encouraging environmentally responsible behaviors,
2. Designing and implementing education programs to engage key audiences,
3. Using media and outreach to promote organization's work,
4. Implementing communication strategies to engage key audiences, and
5. Involving local communities in stewardship and resource management.

TABLE 2
Conservation Practitioners' and Educators' Perception of Importance of Activities in Their Organization or Agency

Item	*Overall mean*	*Educators*		*Practitioners*		
		Mean	*Rank*	*Mean*	*Rank*	*Sig.*
Influencing beliefs and attitudes and encouraging environmentally responsible behaviors	5.83	5.96	2	5.61	1	.003*
Designing and implementing education programs to engage key audiences	5.81	6.15	1	5.21	5	.000**
Using media and outreach to promote organization's work	5.48	5.55	3	5.36	3	.134
Implementing communication strategies to engage key audiences	5.39	5.43	4	5.33	4	.437
Involving local communities in stewardship and resource management	5.36	5.31	5	5.45	2	.292
Providing opportunities for individuals to get involved in conservation actions	5.18	5.23	6	5.09	6	.277
Conducting ongoing evaluations of programs and activities	5.06	5.15	7	4.90	8	.061
Restoring habitat	4.76	4.72	8	4.83	9	.516
Conducting scientific research and field work	4.75	4.62	9	4.98	7	.030*
Influencing local policy	4.45	4.28	10	4.76	10	.001**
Raising funds for conservation programs	4.35	4.22	11	4.60	11	.028*
Influencing national policy	3.94	3.63	13	4.50	12	.000**
Conducting research on how to meaningfully involve more people in conservation	3.90	3.83	12	4.01	13	.243

*significant at $p < .05$; ** = significant at $p < .001$.

Notably, educators' responses demonstrated more of a range with "influencing national policy" being of negative importance, while "designing education programs" was of great importance. The range of means for practitioners was far less diverse.

Explanations for this discrepancy can be postulated. First, some participating educators reported working for organizations with no policy or field science efforts; rather, their organizations focus solely on educational endeavors. This organizational emphasis on education, coupled with the lack of policy or science activities, would understandably create a negative pull on the non-educational activities. Second, educators' responses may reflect the tension in the field of EE between education and advocacy (see, for example, discussions in Hug, 2001; Disinger, 2005; Hart, Jickling, & Kool, 1999). The field has grappled with the education/advocacy relationship, and influencing policy may seem dangerously close to advocacy for some environmental educators (Jickling, 2003). Third, the educators' responses may also be reflective of the defensiveness sometimes expressed, observed, or experienced when emphasizing the importance of education in comparison with other strategies or potential outcomes. By contrast, the lack of variability among conservation practitioner responses may reflect a perceived consistency in importance of the strategies or it may suggest that they have a less nuanced understanding of the differentiation among the intended or potential outcomes of these social strategies.

That educators, practitioners, and decision makers from a range of organizations and agencies recognize education as an important element of conservation is notable. However, a commitment

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to education in word does not ensure that education is used effectively in achieving conservation outcomes. The next section explores perceptions of effectiveness of conservation education.

Perceived Efficacy of Education as a Strategy for Reaching Conservation Goals

Through surveys, interviews, and discussion groups, we asked educators, practitioners, and decision makers about their perceptions of the efficacy of different strategies in reaching conservation or resource management goals. Survey responses indicate that educators and practitioners are closely aligned on the beliefs that science and research are important in achieving conservation goals: On a 7-point scale (used for differentiation), medians were 6 for both with mean scores of 5.57 educators and 5.72 practitioners (not a statistically significant difference). In terms of effectiveness, both groups were somewhat lower in their perception that their organization/agency is successful in their scientific and research efforts, with respective mean scores of 4.96 and 5.01 (again, not a statistically significant difference) and medians of 5 for both.

In terms of education being important in achieving conservation goals, no significant difference existed between the two groups in terms of beliefs within the organization (mean of 5.70 for educators and 5.49 practitioners; medians of 6 for both). There was a significant difference ($p < .05$) in how effectively education is used as perceived by the two groups, however; educators had a mean of 5.21 while practitioners had a lower mean of 4.52. During the interviews, several of the decision makers commented on the role that education plays, particularly as a tool for awareness. One said, "The benefit to education is that it helps people develop a deeper understanding of an issue.... If [my organization] wants to encourage people to take a specific action around an issue, if people are already up-to-speed on it—they're knowledgeable about it, they care about it—it makes [my organization's] work easier."

Similarly, educators and practitioners both had mean scores of 5.46 on the belief that communication is important in achieving conservation goals, but educators felt communications were more effectively used with a mean of 4.66 to practitioners' mean score of 4.45, although this difference was not statistically significant. Clearly, for education and communications, both groups feel their organizations or agencies have a stronger belief in these social strategies than effective use to meet their conservation goals.

Policy interventions were the only item that had a negative mean score from both groups. Although there were slightly positive means of belief in importance (4.53 and 4.85 respectively), educators' rankings of the effectiveness of policy had a mean of 3.51, which was only slightly lower than the practitioners' mean score of 3.85. Both pairs were statistically significantly different, which again may support the assertion that some educators view policy interventions as advocacy or not as part of their organizations' work.

When asked to what extent each of a list of clusters of activities or programs helped their organization/agency achieve its conservation goals, not surprisingly educators expressed a significantly stronger belief in the efficacy of education. (See Table 3.) Policy as a tool elicited the reverse response: practitioners rated policy as an effective tool with a median score of 5 (mean of 4.49), while educators rated it with a median of 4 (mean of 3.94).

During the interviews, most decision makers responded positively to questions about education's role in achieving conservation goals, stressing that education is an important strategy, particularly when used in consort with policy and science. One decision maker articulated the benefit of education as being that it "can paint visual pictures, capture hearts and minds, and be

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TABLE 3
Activities Essential to Achieving Conservation Goals

Activity	*Educators*	*Practitioners*
Science activities and research programs	5.08	5.30
Communications activities	4.52	4.68
Engaging communities in hands-on conservation	4.78	4.62
Natural resource management	4.86	4.99

*Values are on a 1-to-7 scale, with 1 being negative and 7 being positive.

the catalyst for change." An agency representative said that education is "a way to ensure positive, voluntary compliance and positive, voluntary involvement in our conservation mission."

The discussion group participants displayed similar perspectives. Many talked of education's ability to raise awareness of conservation issues and increase public knowledge around ecology and the related sciences and disciplines. The educators in these sessions also discussed behavioral outcomes as part of the role of education: "Education is the route to training people in conservation practices . . . taking broader concepts and teaching transferable skills about conservation" and "inspiring people to act—donating money, time, support, doing field research."

Target Audiences for Conservation Education Efforts

Survey respondents were asked to indicate key audiences for their organizations or agencies. Table 4 provides rankings comparing educators and practitioners regarding on which audiences their organizations or agencies focus.

The discussion groups were used to probe which audiences were perceived to be the most appropriate and effective to target with educational messaging and programming. Discussion group participants expressed a need to address misconceptions about audiences for conservation education efforts. One common misconception is that education is only for youth and, more specifically, school groups. There was a strong feeling among discussants that the range of audiences must include "beginner" to "advanced" levels, whether youth or adult. Some participants countered,

TABLE 4
Target Audiences for Responding Organizations/Agencies

Audience	*Educators' ranking*	*Practitioners' ranking*
General public	1	1
Teachers	2	4
Young people	3	2
Families	4	Missing from data
Decision makers within organizations	5	2
Resource users	6	5
Nonformal educators	7	8
Influential community leaders	8	6
Legislators	9	7

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however, that "kids attract media and congressional attention [so they] may help accomplish the [conservation] mission." Uniformly, the need to understand audiences was an underlying issue, and discussants stressed a need for resources to help do this, including formulating baseline assessments regarding what different key audiences know, care about, and do with regard to conservation and resource management measures.

Barriers

Survey respondents were asked to identify major barriers to incorporating education into their organization's or agency's conservation work. For both educators and practitioners, the top three barriers were the same: (a) lack of money, time, and other resources; (b) difficulty of measuring effectiveness of education activities; and (c) lack of commitment to education within the organization.

In the interviews, decision makers described similar concerns. Many expressed regret that limited funding and staff preclude their organization or agency from focusing the necessary resources on education. An agency administrator said, "I think that wildlife professionals in general have an understanding of the importance of education, but we're missing the tools and funding to get the job done."

Similar to practitioners and educators, a number of decision makers also voiced concern with the lack of powerful, accessible evidence to demonstrate that education is an effective tool in achieving resource management or conservation goals. They felt that straightforward arguments attesting to the direct, positive benefits of education would not only be helpful to them, but also to practitioners, particularly when having to frame a pro-education argument within a cost-benefit framework. One administrator said that his agency "doesn't place much, if any, emphasis on education [because] we're so driven to count things, to meet our quantifiable goals. We're driven to do activities that have immediate conservation outcomes." To address this concern, another interviewee makes specific recommendations: "For the educators. . . . [providing] examples of success [is] far better than formulating [models for] what might work. [For practitioners and administrators, provide] examples of techniques on the ground that achieved habitat or species success."

An additional concern mentioned by a number of the decision makers was that education is a specialty requiring expertise, and thus must be recognized as such. One interviewee said, "Many scientists think there's nothing to education and they can be good educators, too—that's not necessarily true. Scientists benefit from [learning] how to set educational goals and objectives and different methods that work with different learning styles." This raises concerns as decision makers noted that many practitioners must also serve a dual role as educators, even though they do not have the proper pedagogical training. The leader of a forestry-related NGO said,

> Very few people [in our organization] would self-identify as educators—they are foresters, conservation biologists, they're not educators. They're not trained in education. . . . Why would you expect a forester to be an expert in attracting the attention of a twenty-first-century audience? The audience is disperse, has unusual media habits, and responds to a different set of motivators than foresters do.

He stressed, "Education is a task too important to be left to biologists and foresters."

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TABLE 5
Resources Needed to Improve Efforts to Reach Conservation Goals

	Educators				*Practitioners*			
	Mean	*Median*	*Mode*	*Rank*	*Mean*	*Median*	*Mode*	*Rank*
Strategic planning process**	5.35	6	7	4	4.88	5	7	5
Examples of programs*	6.05	6	7	2	5.74	6	7	1
Program planning checklists**	5.26	5	7	6	4.80	5	5	6
Fundraising strategies	4.92	5	7	7	4.90	5	7	4
Overview of learning theories**	5.24	5	6	5	4.60	5	4	7
Evaluation strategies and models**	6.07	6	7	1	5.52	6	7	2
Program development models**	5.79	6	7	3	5.36	6	6	3

*significant at $p < .05$; **significant at $p < .001$.

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Recommendations for Increasing Organizational and Agency Capacity for Conservation Education

Survey, interview, and discussion group respondents recommended resources that would assist educators and practitioners to more effectively reach conservation goals. Data from all three sources coalesced around several themes: evaluation strategies and models; case study models of education impacting conservation outcomes; program development models demonstrating how to integrate education into conservation frameworks; and resources for bolstering understanding and dissemination of educational research and instructional methods. (See Table 5 for survey responses, including these areas of agreement as well as additional opinions on other potentially helpful resources.)

Provide Evaluation Strategies and Models That Are Accessible to Practitioners

With regard to evaluation, data from all three sources (decision makers, practitioners, and educators) suggested a need for more robust strategies to demonstrate concrete results. Many suggested that training and tools focused on developing appropriate evaluation strategies to assess the success of messaging and programming would be tremendously helpful. One zoo administrator said,

> Currently, we don't do a very good job of testing whether conservation messages are working. . . . [C]oming from the business world, I do think there are better ways to see whether [educational] programs are successful. [. . .] In the business world, we don't shoot in the dark; activities are very targeted. We need to build this into measuring educational impacts, too.

Provide Case Study Examples of Education That Impact Conservation Metrics

Data from the decision makers, practitioners, and educators also suggested that positive, concrete examples of successful conservation education programs, leading to conservation outcomes, would help provide a better understanding of the potential link between strategies such as education and conservation/environmental quality outcomes. In the interviews, decision makers

stressed that concise, well-written, compelling case studies and fact sheets would be useful to emphasize the importance of education to their colleagues, including donors, board members, and other "higher-up" decision makers, particularly those influential in directing funds. One interviewee recommended providing, "successful stories of outreach—the 'how you got things working.'"

Discussion group participants agreed that case studies would be highly desirable, but only if they were thorough and revealed the negatives and challenges as well as the positives and opportunities of integrating social strategies with strategies that have more direct biophysical conservation outcomes. They also recommended that case studies be transferable and relevant to a range of organizational contexts (e.g., agency, NGO, and corporate), showcasing examples of what has worked with different audiences and how those strategies have linked with particular conservation results. (In other words, demonstrate the return on investment of particular educational strategies to specific conservation outcomes.) They also recommended highlighting different geographical settings, community types (e.g., urban, suburban, and rural), and conservation issues (e.g., habitat, water, and energy).

Share Program Development Models That Provide Frameworks for Education as Part of a Conservation Strategy

In the survey, practitioners and educators expressed an interest in program development models, which could include models such as Caffarella's Interactive Model of Program Planning (2002), Delbecq and Van de Ven's Model for Problem Identification and Program Planning (1971), or Boone, Safrit, and Jones's Conceptual Planning Model (2002). The respondents indicated that such models could be useful guides for practice, with both groups ranking models as the third most important resource to help reach conservation goals. When prompted to consider the utility of program development models, discussion group participants were more cautiously enthusiastic, stressing that they would only be useful if they met certain criteria, such as summarizing information from other fields; demonstrating how to adopt the models and apply them to conservation/environmental settings; and using tested approaches.

Develop Resources to Enhance Familiarity With Current Educational Research and Methods of Instruction

Results from the surveys, discussion groups, and interviews indicated a need for providing resources that help enhance practitioners' and educators' knowledge of current research in education and methods of instruction. On the survey, all practitioners' responses with regard to familiarity with educational research were on the negative end of the spectrum. Perhaps surprisingly, educators did not report much greater familiarity: they reported being only slightly familiar with social marketing and values-based communication strategies; a little more familiar with the use of education to achieve conservation goals; and moderately familiar with research on developmental and age appropriateness.

When asked to rate their familiarity with various aspects of educational theory, educators were cautiously confident in their skills, suggesting that their greatest strengths were in pedagogy, learning theories, and curriculum theories. However, they were less confident in their knowledge

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of theoretical areas dealing with community-based education, such as lifespan learning, andragogy, adult developmental psychology, and geriatric education.[4] Practitioners in the discussion group expressed interest in learning about basic educational concepts as well and indicated a paucity of training in educational theory, behavior theory, and other areas that may provide a stronger theoretical platform for their work. This lack of formal training was also mentioned by interviewees, who noted that many educators and practitioners come to their jobs through non-traditional routes without formal training in education, program design, evaluation, or behavior theory.

Another area of interest to both educators and practitioners was to learn more about key research findings that would inform development of conservation education initiatives. Discussion group participants agreed that research reviews would be most useful if they met the following requirements: were concise and credible (both to scientific and non-scientific audiences); avoided jargon; included studies and findings from diverse setting and fields of research (e.g., behavior theory, motivation theory, grassroots/community education); presented straightforward talking points; and, when possible and applicable, provided illustrative examples.

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DISCUSSION

Underlying this study is a theoretical frame and philosophy that learning is a natural process built on notions of acquiring data; and then framing, applying, retrieving, reframing, and reapplying those data throughout the course of one's life (Bloom, 1976; Heimlich & Falk, 2009). We believe that learning is the role of the learner and that education is not about imposing facts, beliefs, and values upon others, but rather is an activity of facilitating and shaping experiences to allow learners to challenge, shape, extend, and change their own beliefs and values. Environmental education is particularly amenable to values clarification (Hungerford, 2010) and lifelong learning (Ardoin, 2009b), as the subjects that form its core—the natural world itself, interaction with built systems, and the critical role played by human actions in spurring and addressing environmental concerns—are constantly in flux, requiring adaptation and response to the changing conditions of our planet. As Falk and Dierking (2010) and others (Bell, Lewenstein, Shouse, & Feder, 2009) have found with regard to science, the vast majority of what is learned about the world around us is obtained in out-of-school settings; similarly, the same can be said for environment (Heimlich & Falk, 2009). Moreover, environmental education represents a complex, multifaceted philosophy and theory of learning that incorporates more than an information-based approach (e.g., Scott & Gough, 2003; Monroe et al., 2007), pressing individuals and communities to consider actions and consequences within cascading interconnected networks of social and ecological systems (Tidball & Krasny, 2010).

Certainly social strategies employed by conservation organizations often include marketing and policy activities, encouraging behaviors, and working toward a certain set of legislative objectives. These types of social strategies have traditionally been perceived as closely aligned with conservation missions as the outcomes are directed, prescribed, and clear. Indeed, we began this study expecting to find a favoring of marketing and policy approaches over education, in part because of the emphasis within conservation organizations on metrics and the drive toward direct fulfillment of and alignment with mission. Thus, one of our interests in undertaking this work was to better understand the place of educational, and related, strategies within the context of

mission-based conservation organizations and agencies, exploring them within the framework of the perceived role of education by educators, conservation practitioners, and organizational leaders. Our data, interestingly, and perhaps surprisingly, supported a more nuanced and complex, learning-oriented definition of education, going beyond a traditional information-provision perspective.

A major challenge to this study is that conservation education within mission-based organizations has rarely been studied theoretically. Some basic frameworks have been put forth regarding education as a strategy within conservation organizations (e.g., Scott & Gough, 2003), yet there is little empirical research critically built on a framework such as that presented in this study. Therefore, we found it important to consider our findings against the framework used. We questioned whether there was a continuum of strategies (e.g., information, communication, education, capacity building), a nesting of strategies, or discrete outcomes based on strategies. Our findings do suggest that there may be perceived roles for varied strategies, but that conservation educators and practitioners operationalize the strategies as more hierarchical, perhaps expanding on the concept of nested strategies. Our interpretations of the findings are that conservation educators and practitioners see education as an important bridge across social strategies. When education is theoretically based, robust, and more than information, educators and practitioners alike perceived it as being able contribute to achieving mission-based conservation outcomes. As this finding is an extension of the direct focus of the study, it suggests that more critical reflection and further exploration are necessary to fully understand the mechanisms and implications by which this may occur.

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CONCLUSION AND IMPLICATIONS

This study had three motivations: First, to illuminate how education, communications, and outreach are being employed as tools for environmental conservation by NGOs and government agencies; second, to gather perspectives on the effectiveness of education, communications, and outreach strategies in achieving conservation goals; and third, to suggest what tools may be helpful in implementing social strategies that contribute to attainment of conservation goals and outcomes. Beyond those initial motivations, we became interested in pursuing and provoking a theoretical discussion of the role of education in conservation organizations. This study focused on examining whether the linearity or hierarchical nature of models put forth adequately represents conceptions of educators and practitioners in how they utilize and understand the role of education in advancing their organizational mission.

As an initial framing, it is interesting to note that survey, discussion group, and interview data suggest that the terms "education," "communications," and "outreach," among others—such as information and capacity building—are used fluidly, without definitional consistency. Distinctions were unclear among and even within organizations. When asked to elaborate, discussion group participants and interviewees indicated that the purpose of the activity was perhaps more important than the label. Efforts to facilitate how people receive, process, and apply information, ideas, concepts, constructs, affect, and skills occurred through a range of strategies, which were classed as "education" in some organizations or agencies and "outreach" or "communications" in others. The umbrella term of "social strategies" seemed to encompass the variety of tools and approaches intended to engage individuals and communities in dialogue around conservation and resource

management and, thus, may be a more appropriate term as has been suggested by some scholars and practitioners (e.g., Fien et al., 2001; Braus, 2009).

With regard to the research questions, overall, responses from practitioners, educators, and decision makers indicated a belief in education's ability to impact conservation goals. However, the reality of the effectiveness of educational strategies appears to be greatly affected by barriers such as lack of adequate training in educational and learning theory; lack of funding and staff members to implement high-quality educational programs; and lack of strong evaluative and empirical evidence demonstrating the positive relationship between education and conservation outcomes.

All three audiences included in this study demonstrated agreement on similar tools that would be helpful in more effectively using education to achieve conservation results. The tools that audiences indicated would be of greatest assistance were case studies in which education had been demonstrated to help achieve positive conservation results; hands-on training in evaluation methods and theory; and provision of simple and straightforward models for developing successful initiatives. Findings also suggest that professional development to help practitioners and educators develop a grasp of learning theory and current educational research would be important.

With NGOs and agencies being driven by biodiversity-conservation targets, program directors and managers are increasingly being asked to demonstrate education's effectiveness as a strategy that works in consort with policy and to achieve on-the-ground conservation results-based science (Jenks et al., 2010). Findings from this study suggest that conservation practitioners and educators alike are interested in and committed to developing more effective ways to enhance individuals' knowledge and skills; engage them in dialogue around natural resource management and use; and, when appropriate, encourage environmentally responsible behavior. Thus, the findings strongly indicate a need for intentional construction of educational programs using research-based, theoretical models of informal learning (e.g., Bell et al., 2009) and behavior change (e.g., Heimlich & Ardoin, 2009). The findings also suggest that well-designed, research-based tools to support education and related social strategies would provide a platform for conservation education to contribute meaningfully to holistic efforts to protect diverse and threatened species and spaces, now and for generations to come.

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NOTES

1. The lead partner on this project is the National Audubon Society, in cooperation with the U.S. Fish and Wildlife Service's National Conservation Training Center and other government agencies, nonprofits, zoos, and aquariums.

2. Sample organizations and agencies included: the National Oceanographic and Atmospheric Administration, the National Park Service, the U.S. Fish and Wildlife Service, Defenders of Wildlife, Disney's Animal Kingdom, Monterey Bay Aquarium, St. Louis Zoo, and Zoo Atlanta, among others.
3. We used these groups to generate ideas as part of an open brainstorming process. As we did not conduct representational sampling nor did we continue to data exhaustion or focus toward a specific question, these were not "focus groups" in their most rigorous sense and, therefore, we term them "data discussion groups" (Clark, n.d.).
4. The lack of expertise among both educators and practitioners with regard to engaging community members represents an area of concern: If conservation actions and goals are most appropriately taken and met by adults and community members, yet education programs are developed based on tools for working with children, this could lead to a disconnection between the educators, practitioners, perceptions of outcomes, and potential for success.

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