The role of volunteerism in sea turtle conservation management

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ABSTRACT

Wildlife and its management is an 'old' concern of common pool resource theory. This paper explores new ways of managing of an 'old' commons. With a decrease in government spending in various conservation programs, the role of volunteers in conservation has expanded. In programs like the North Carolina Sea Turtle Project (NCSTP), volunteers are authorized to conduct the day-to-day monitoring and management activities of the State. There are few studies exploring the experiences of volunteers as extensions of state management. How do volunteers see themselves contributing to wildlife conservation? Are they empowered in their roles as volunteers acting on behalf of the state? To answer such questions, eleven focus groups were conducted with volunteers who engage in monitoring of sea turtle nesting beaches in North Carolina. This research examines the ways in which volunteer engagement in education and science may contribute to their empowerment. Analysis suggests that many volunteers consider education an essential part of their experience and value their role as educators. As a result of their positive experiences with education and outreach, many volunteers felt empowered by their roles. In contrast, volunteers displayed varying opinions about science and degrees of satisfaction about their role as scientific data collectors. In this regard, they are less confident in assuming the responsibilities of the state. Although this new model of management capitalizes on volunteer labor and enthusiasm, it creates new challenges for management, some of which arise from relations between the state and volunteers, rather than the nature of the commons itself.

Keywords: volunteers; citizen science; education; conservation; management

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INTRODUCTION

The North Carolina Sea Turtle Project

The North Carolina Sea Turtle Project (NCSTP) is comprised of a network of approximately 700 volunteers who monitor sea turtle nesting beaches in coastal North Carolina. The NCSTP is coordinated by the North Carolina Wildlife Resources Commission (NCWRC), which is mandated by the Endangered Species Act to monitor and protect sea turtle habitats. Volunteers provide essential support to the State as the NCWRC has only two sea turtle biologists on its staff and lacks funding and resources to monitor the nesting beaches along North Carolina's coastline (Campbell 2007). Volunteers are permitted to collect scientific data on sea turtle nesting and monitor nesting beaches during the sea turtle nesting season. The NCSTP includes 23 Volunteer Beach Organizations (VBOs) that support the NCWRC.

The predominant sea turtle species that nests in North Carolina is the loggerhead sea turtle *(Caretta caretta)*. Each female turtle lays about 120 eggs per nest, or clutch, and each turtle may lay 4-7 clutches during a nesting season. NCSTP volunteers are permitted by the NCWRC to conduct various activities on the beaches. The volunteers begin monitoring beaches for sea turtle tracks in the month of May in order to search for nests (NCWRC 2010). Volunteers also excavate sea turtle nest three days after a nest hatches in order to compute egg hatch success rates and check for live hatchlings that remained in the nest. Through monitoring duties such as patrolling beaches in search of nests, volunteers often interact with tourists who may stop to ask them questions about their activities. Such encounters provide opportunities for volunteers to discuss the sea turtle project with beachgoers.

Volunteers in the NCSTP engage in citizen science, which refers to nonscientists collecting scientific data (Trumbull et al. 2000). In addition to recording data on nests and hatches, NCSTP volunteers also assist in collecting data from strandings, which occur when injured or dead sea turtles are washed up on beaches. Volunteers record data for the National Marine Fisheries Service (NMFS) on the size, sex, location and condition of the turtles (NCWRC 2010). Some volunteers also assist with necropsies of dead sea turtles. The various data collected by the volunteers are utilized by the State in order to improve understanding of trends in sea turtle population and behavior. The data assist the State in formulating management strategies.

Research Questions and Objectives

As volunteer-based conservation management programs become increasingly popular, gaining an improved understanding of volunteer experiences can be beneficial for managers because participants may have an "influence in building a potentially powerful constituency of knowledgeable advocates for the environment" (Ryan et al. 2000). In addition to supporting conservation managers in monitoring and data collection activities, volunteer-based conservation programs can also lead volunteers to become environmental stewards.

This paper seeks to explore this newer method of managing an 'old' common and draws from eleven focus groups that were conducted with members of VBOs in the NCSTP. Content from the focus groups was qualitatively analyzed in order to:

- Understand volunteer experiences in the NCSTP
- Explore the values that volunteers attach to conservation, education, and science
- Understand how the experiences of NCSTP volunteers relate to the literature on citizen science and volunteerism

METHODS

This research examines data collected from eleven focus groups conducted with volunteers in the NCSTP. The focus groups were conducted as part of a large multi-method study of the NCSTP, which included a mail-based survey of NCSTP volunteers, interviews with State scientists, interviews with coordinators of VBOs and participant observation of volunteers on two sea turtle nesting beaches. Focus groups allow for an understanding of the complex interactions between people and places (Cameron 2000) and often provide a platform for participants to speak freely about different issues. In addition, focus groups are a beneficial tool for studying environmental values because such values are "deeply held and […] clearly reflect a complex interpretation of individual experiences and collective beliefs about nature, landscape, and society" (Burgess 2000).

Focus groups were conducted in eleven beaches and were led by Myriah Cornwell, a Ph.D. student at the Duke University Marine Lab. For two of the beaches, participants were chosen from volunteers the researcher had worked with previously. For some of the remaining beaches, the researcher asked beach coordinators to select participants based their interest. Some beach coordinators also recommended more experienced volunteers to participate. Finally, some beach coordinators gave the researcher lists of beach volunteers and the researcher contacted the volunteers to select participants for the focus groups (M. Cornwell, pers. comm.). Data collected from the eleven focus groups were qualitatively analyzed using the NVivo 8 software.

LITERATURE REVIEW

Volunteers in Conservation

In recent years, a decrease in government spending for various programs has led to an increased demand for participants in the volunteer sector. Several conservation programs are supported by volunteers, which helps reduce costs for managers, making volunteers essential to the environmental movement (Ryan et al., 2000). Several state-led environmental monitoring programs depend on volunteers who contribute scientific data to state databases (Frost-Nerbonne & Nelson 2004).

Although the demand for conservation volunteers has increased, they are underrepresented in the literature compared to social service and heath care volunteers (Campbell & Smith 2005). Studies that do examine volunteers in conservation focus on:

1) Evaluating the quality and accuracy of volunteer-collected data (Mumby et al. 1995; Darwell & Dulvy 1996; Schmitt & Sullivan 1996; Saunders 2002; Foster-Smith & Evans 2003).
2) Understanding volunteer motives and exploring the benefits they receive from participation (Miles et al. 1998; Ryan et al. 2001; Campbell & Smith 2005).

Ryan et al. (2000) administered surveys to understand volunteer motives in three ecological stewardship programs. The primary motivations for participation were helping the environment and learning about nature (2000). In addition, Ryan et al. (2000) argue that because environmental stewardship programs often give volunteers the opportunity to see tangible results of their work, volunteers may feel more motivated to continue.

Some studies explore factors that contribute to volunteer satisfaction in conservation projects. For volunteers in an ecological restoration project near Chicago, personal growth and fascination with nature were the biggest sources of satisfaction (Miles et al. 1998). Other sources included making a difference, participating in new experiences, physical fitness, socialization and personal growth (1998). The satisfaction gained from making a difference suggests that participating in conservation projects can be empowering for volunteers. For example, volunteers in Illinois who maintained trees in public areas felt a sense of accomplishment that created personal satisfaction (Miles et al. 1998).

Although the literature identifies various sources of contentment in volunteers, most studies do not identify education as an important component of volunteer experiences. Ryan et al. (2000) find that learning is a motivating factor for volunteers, and Markus & Blackshaw (1998) include education in a questionnaire administered to flying-fox rehabilitation volunteers. However, neither study explores the role of education in detail. There is a need for more in-depth studies on volunteer experiences as volunteers are “people with a deep commitment to their work. They are not free labour, but individuals who will keep coming if their needs are fulfilled. Program co-ordinators need to recognize the engagement with the environment, the learning opportunities and the benefits that volunteers gain from contributing their time” (Ryan et al. 2000). In addition, gaining an improved understanding of volunteer experiences can help managers to assess their relationships with volunteers.

Citizen Science

The term citizen science “evokes a science which assists the needs and concerns of citizens [and] implies a form of science developed and enacted by citizens” (Irwin, 1995) in which citizens are involved in producing knowledge. As a result of globalization, there have been an increased number of opportunities for engagement

between science and citizens (Leach, Scoones & Wynne 2005). Citizen science projects can benefit both project managers and participants. For example, participants may gain an increased understanding of scientific concepts (Trumbull et al. 2000) while managers gain scientific data collected by participants. Citizen science has grown in popularity as a tool for conservation management. In a review of studies on citizen science projects, Silvertown (2009) states that "almost any project that seeks to collect large volumes of field data over a wide geographical area can only succeed with the help of citizens" and argues that information dissemination techniques such as the internet have contributed to the growth of citizen science projects.

Bridging Citizen Science and Volunteer Literature

In many environmental monitoring programs, volunteers contribute to scientific knowledge by collecting data for managers (Foster-Smith & Evans 2003). Volunteer-based citizen monitoring has become an important method of collecting data for marine conservation programs (Koss & Kingsley 2010). One study on volunteer citizen monitoring in the United Kingdom identifies two different types of volunteers who contribute to the UK Biodiversity Action Plan (BAP). Ellis & Waterton (2004) state that the identity of volunteers in the BAP moves "between responsible biological recording for conservation and passionate engagement with nature." The first category of volunteers consisted of 'data drones' who filled knowledge gaps about species and were more easily integrated into public policy. The second category of volunteers was composed of those who engaged experientially with nature. Although the later category of volunteers was more empowered, the authors state that it was more complicated to integrate them into biodiversity policy as "the policy framework [is] ostensibly interested only in record cards" (2004).

Studies on both citizen science and conservation volunteers have found that participation can lead volunteers to become environmental stewards and advocates (Ryan et al. 2000; Carr 2004). In addition, the literature on both subjects make claims to empowerment. For example, citizen science gives volunteers an opportunity to contribute to scientific data collection. Carr (2004) argues that citizen science projects can also empower participants, especially if participants are able to contribute to the acquisition of knowledge.

RESULTS

Education as a valued activity in volunteer experiences

Education emerged as an important theme for many of the volunteers in the focus groups. Education and outreach occur in both informal and formal settings: some members of VBOs host educational programs, while others educate tourists while patrolling the beaches. Several volunteers asserted that education was an integral aspect of their role in the NCSTP. This is interesting to note, as most studies that explore the motives of conservation volunteers do no emphasize the role of education in volunteer experiences. One volunteer said that education was an "integral part of what

we should be doing" (FG 4)[2]. Another stated that education was "most of" what the volunteers did in the project (FG 2). Thus, volunteers considered their contribution to education and outreach to be an essential part of their involvement with the project.

Several focus group participants stated that education and outreach contributed to sea turtle conservation. One said patrolling the beaches allowed volunteers to generate public awareness about sea turtles and the environment:

> "Awareness. You have to be aware. As long as you're aware of things, not only sea turtles, but [the] environment and what's happening in it, that's important and I mean, if nothing else, I think that's what the patrol does. Make people aware that things are happening here that we want to make you aware of." (FG 1)

Another volunteer discussed how education extended beyond informing people about sea turtles to teaching the importance of protecting beaches: "I think the more we share it and let other people be aware of what we're doing, the more benefit we're going to get from it. You know, the beach will be cleaner because there are more people aware" (FG 5). Both volunteers valued awareness building and felt that their involvement in education allowed them to contribute to the process. The volunteers desired to spread knowledge about conserving the coastal environment with the hopes of creating more environmental stewards.

Some volunteers stated that they specifically wanted to educate children in order to see them become environmental stewards of the future.

> "I think one of the biggest things I get from this whole process is when we have excavations and we have all the little children come; to see their eyes and you know to see what they're experiencing. I just hope […] that maybe when they get older they follow in our footsteps and hopefully there will be turtles around." (FG 5).

This suggests that the volunteer valued wildlife conservation and hoped to spread this value to others. She hoped that children would also learn to value wildlife and continue to be environmental stewards even as adults.

In addition to identifying the benefits of education and outreach on conservation, some volunteers also discussed how these activities benefited themselves. Many volunteers stated that they enjoyed building awareness about conservation and some discussed the positive feelings they experienced while educating others. Some also said they experienced a sense of fulfillment from educating. For example, one volunteer described the enjoyment she felt from educating tourists: "It's exciting to talk to people who are not exposed to [turtles] at all" (FG 6).

[2] Focus Group 4

For some volunteers, education and outreach were not only enjoyable but also empowering. One discussed the importance of her ability to spread knowledge about sea turtles to people in her community:

> "I know that my involvement has made so many other people aware […] people didn't even know we had this project. Or didn't even know probably that we have turtles nesting […] it's exciting to know that because of the involvement I've had, I've been able to share that with people and made them aware." (FG 5)

By spreading awareness about sea turtle conservation, volunteers become positive advocates for the environment.

The Role of Science in Volunteer Experiences

Volunteers in the NCSTP expressed various opinions regarding their involvement with science. Some volunteers felt uncertain about whether or not they were contributing to scientific data collection. Although some said that the data they collected provided a meaningful contribution to science, others were unsure if they were contributing scientific knowledge to the State. Some also expressed a desire for more feedback from managers regarding the use of the data. Throughout the focus groups, volunteers cited several examples of the data they collect such as measuring crawls and collecting hatch success rates of sea turtle nests. One volunteer said, "we do a lot of statistics […] on the ratio of hatchlings to eggs laid and all that kind of thing" (FG 7). Some volunteers discussed the process by which their data is used by the State. One said, "Science is very much…we're more dispensing the data. We're not…yeah we're collecting the data and send[ing] it to research. We don't process it" (FG 10). In many of the focus groups, volunteers acknowledged their involvement in scientific data collection, but did not elaborate on the subject.

A few volunteers talked about obtaining and sharing experiential knowledge. For example, one volunteer gave an example of a case in which volunteers' experiential knowledge contributed to science: "To a certain degree, I think just the anecdotal information that we provide probably will give science a direction for study or at least maybe even either support or disprove some of their […] observations. But hopefully it will be to support them" (FG 2). Another volunteer described a situation in which experiential knowledge yielded a discovery:

> "There [are] so many things we learn from every hatch. Like in that situation, we found out because [the eggs] were moved before a storm, they were level on a beach in a place that we knew was going to get [wet], […] and I moved [them] from under an underwater location to a higher space on the other end of the beach, so they were moved very late in the gestation. And nobody knew if they would survive that. Well there were half a dozen eggs that were clearly, stayed, were still viable three weeks after they should have hatched. […] So clearly that moving was survivable, that's something we didn't know before." (FG11)

In both cases, volunteers discussed the value of experiential knowledge gained by volunteers during their participation in the project. Thus some volunteers felt that their experiences beyond the prescribed data collection activities contributed to science.

Participants in another focus group also discussed the value of the knowledge they obtained from the data they collected in support of the state:

> "Participant: It seems to me it'd be almost like […] the hierarchy? Somebody up there has to say to the little guy there on the street…
> Participant: The worker bee.
> Participant: Yeah, the worker bees – I consider that's what we are, the worker bees to the scientists and if it weren't for us, there would be a lot of things that would be lost.
> Participant: Information lost, especially.
> Participant: That's the point I was trying to make. We're before the science part, the things that we were able to do working directly with the turtles and the science, they can make their findings, I guess, but uh…" (FG 1)

These volunteers identified a distinct hierarchy between the State and themselves. However, they assert the significance of their role as an extension of the State management by arguing that they play a vital role in scientific knowledge acquisition.

In contrast, some volunteers were unsure whether they had contributed to science. One volunteer said, "We do keep records of every nest when it's excavated at the end and the eggs are counted. We do – [the beach coordinator] does – pass that information along to the state and hopefully, you know, it's looked at and um, kept in record someplace and studied. I don't know." The volunteer described the process of data collection and transfer, but was unclear about how the data was used by managers. Another volunteer also questioned the use of the data collected by volunteers: "Does the Resource Commission really use our statistics and stuff […] or do they kind of just pigtail it as, 'oh, its just the turtle ladies and men out there gathering data?" The volunteers were unsure of how their data were processed after being submitted to the State.

In one focus group, volunteers identified a gap between their data collection activities and the actions of the State:

> "Participant: We don't know. We don't know what they find.
> Participant: Because like Amelia said, we don't know the results of what they're doing. If it said…y'all could send us a turtle newsletter.
> Moderator: Are you on the seaturtle.org list?
> Participant: Yes.
> Moderator: But so there's no real communication down to the project?
> Participant There's no real connections. There's no connections between what we do and what you do. Besides that we're all making any difference even. I mean, do you all know, is there a difference?" (FG4).

Other volunteers also expressed a desire for more feedback from the State regarding the volunteer-collected data. One said, "We don't get anything" (FG 2) and a second continued, "We don't know anything" (FG 2) when asked whether they received a lot of feedback from the State. One volunteer wanted to see a more concise report from the State with "more FAQs and not all the numbers" and called a report on nesting success published by the State "mind-boggling" (FG 3). The comments suggest that some volunteers were unsatisfied with the feedback they received.

DISCUSSION

The Role of Education in the NCSTP

Participation in education, outreach and awareness building activities was an important aspect of volunteer experiences in the NCSTP. Volunteers consistently described various positive feelings associated with education and outreach. The prominence of education in focus group discussions was particularly interesting because there is a lack of emphasis on this subject in the literature on conservation volunteers. A few studies cite education as a motive for continued participation[3], but there is a lack of in-depth studies on the value of education to volunteers. Mail-based surveys conducted with NCSTP volunteers reaffirmed the importance of education for volunteers[4]. 30.9% of volunteers answered that "educating the public about sea turtles" most accurately described their work in the NCSTP, which was second only to "conservation" (46.3%). When volunteers were asked to list what they felt should be the NCSTP's mail goal, educating the public about sea turtle conservation was the third most common answer with 87 respondents (22.5%). In addition, some volunteers suggested that the NCSTP should improve education programs in order to build awareness about sea turtle conservation. Thus, the volunteers' enjoyment of and dedication to education is reflected in both the surveys and the focus groups.

NCSTP volunteers emphasized education because they hoped to teach beachgoers about sea turtles and conservation. They wanted to educate the public about conservation in order to promote environmental stewardship, which suggests that volunteers placed high value on conservation. Literature on both citizen science and conservation volunteers suggest that involvement in citizen monitoring programs often lead participants to become stewards and advocates for conservation. Carr (2004) states that 'community science encourages practitioners to act." In addition, Miles et al. (1998) found that education volunteers in one study displayed higher overall satisfaction than non-education volunteers. This satisfaction was also reflected in NCSTP volunteers, who were motivated not only by the opportunity to contribute to a conservation project, but also by the ability to spread awareness about conservation to the general public. The commitment of conservation volunteers to education and

[3] Ryan et al. (1998) identify learning as a motive and Marcus & Blackshaw (1998) include education in their questionnaire to volunteers.

[4] Survey data was obtained from Nick Mallos, a former graduate student at the Duke Marine Lab, who developed and analyzed the surveys.

awareness building can benefit program managers. Volunteer in the NCSTP support the State by contributing scientific knowledge. In addition, they work to educate the public about conservation, which can also benefit managers if volunteers successfully encourage beachgoers to engage in behaviors that have positive effects on the environment.

The Role of Science in the NCSTP

Ellis & Waterton (2004) identified two models of categorizing citizen science volunteers in the BAP. The NCSTP volunteers who described themselves as "worker bees" emphasized the value of the scientific data they collect. The 'data drone' model described by Ellis and Waterton (2004) also focuses on data collection. However, 'worker bee' is a clear contrast from the 'data drone' because NCSTP volunteers who identified themselves as 'worker bees' considered their work to be essential to the project. They not only acknowledged their involvement in data collection, but also considered their contribution to be indispensable to the scientists (FG 1). This suggests that some volunteers feel empowered in their role as data collectors, particularly because they identified a meaningful purpose for the data they collect.

Other NCSTP volunteers were less clear about their impact on the project with regards to science. This was often driven by uncertainty regarding the use of the data they collect. For example, one volunteer even asked if the NCWRC used the data collected by volunteers. Ellis & Waterton (2004) found that some volunteer naturalists in the UK identified a lack of transparency regarding the use of their data by managers. One volunteer felt alienated after recognizing "that her data may have [been] passed through many hands and perhaps undergone a series of manipulations" (2004). Some NCSTP volunteers, who asked for more feedback from the State, were also unclear about the use of the collected data. It is important for managers to note this uncertainty that some volunteers had regarding the actions of the State. For example, the State should note the desire of some volunteers to receive more feedback on the use of the data they collect. This may be challenging for the State to address because the responsibility of managing the entire NCSTP lies on just two scientists in the NCWRC. Overall, the various opinions of NCSTP volunteers shed light on the variety of experiences and values of volunteer citizen scientists. As the role of volunteers in the management of coastal commons grows, it becomes increasingly important to understand the complexity of volunteer experiences and the challenges of managing such programs. Understanding these issues can help managers gain insight on volunteer experiences and assist with management.

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