

EXPLORING ELEMENTS THAT INFLUENCE STEWARDSHIP IN THE EASTERN LAKE ONTARIO DUNE AND WETLAND AREA

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Abstract.—The Eastern Lake Ontario Dune and Wetland Area (ELODWA) is a 17-mile stretch of sand dunes, wetlands, and woodlands along the eastern shore of Lake Ontario in New York State. Reductions in negative, visitor-caused impacts on the dunes (e.g., trampling of dune vegetation and sand erosion) are thought to be due in part to the extensive visitor education efforts of government agencies and non-governmental organizations. This study seeks to identify the elements influencing the development of a stewardship ethic in ELODWA users via 60 in-person qualitative interviews. Interview data revealed that both on-site management actions and socialized elements (e.g., upbringing) influenced the stewardship actions of visitors. Recommendations based on the analysis include diversifying on-site management and communicating a consistent stewardship message over time.

1.0 INTRODUCTION

Many researchers have studied the influence of educational efforts on managing visitor behaviors in natural settings over the past 25 years (McAvoy and Dustin 1983, Vander Stoep and Gramann 1987, Duncan and Martin 2002, Kuehn and Thompson 2007). The Eastern Lake Ontario Dune and Wetland Area (ELODWA) is a 17-mile stretch of sand dunes, wetlands, and woodlands located in north-central New York State. At the ELODWA, extensive visitor education efforts by government agencies and non-governmental organizations in the area may be partially responsible for reductions in negative, visitor-caused impacts on the dunes (e.g., trampling of dune vegetation and sand erosion) (Kuehn and Habig 2005, Kuehn and Thompson 2007). The strong stewardship ethic of many ELODWA visitors and local residents is of interest to agencies and

organizations like the New York State Department of Environmental Conservation, New York State Office of Parks, Recreation and Historic Preservation, New York Sea Grant, and The Nature Conservancy. Natural resource stewardship, defined as “making conscious decisions to act responsibly towards our environment” (Fisheries and Oceans Canada 2009), may play an important role in encouraging protective behaviors by resource users during their visits to natural areas. If understood, the elements influencing the development of this stewardship ethic in ELODWA users could be used to foster similar stewardship values in users of other natural areas.

While a stewardship ethic has an important role in visitors’ careful use of natural resources, the existing knowledge base about what influences the development of stewardship values and behaviors in users is extremely limited. The purpose of this study is to identify management strategies that encourage ELODWA users’ stewardship of natural resources. To accomplish this goal, we conducted 60 interviews during the summer of 2008 to identify stewardship-related actions, the factors influencing stewardship in both resident and nonresident male and female ELODWA users, and whether a stewardship ethic develops immediately or over time. The results and management implications of this study are discussed below.

2.0 METHODS

We conducted 60 in-person interviews with local residents and nonresidents in the ELODWA during summer 2008. We established a stratified random sampling framework to sample visitors by location (five areas providing public access within the ELODWA), day of week, time of day (morning, early afternoon, late afternoon), gender, perceived age (i.e., 18-40, 41-60, 61+ years), and proximity of residence to ELODWA area (residents were defined as those living within 20 miles of the ELODWA, while nonresidents were defined as those living 21 miles or more away). We developed a stratified sampling framework for randomly chosen days

Table 1.—Stewardship-related actions mentioned by respondents (n = 60)

Code	Resident		Visitor		Total
	Male	Female	Male	Female	
Stayed off dunes	12	13	5	9	39
Practiced carry in-carry out or 'leave no trace'	5	5	3	7	20
Picked up litter (of others)	4	2	5	5	16
Stayed on designated trails	2	2	2	2	8
Asked others to stay off dunes	3	2	2	1	8
Left/piled driftwood on the beach	0	1	2	2	5
Planted beach grass	2	1	0	0	3
Installed snowfencing on personal property	1	1	0	0	2
Built dune walkover on personal property	0	1	0	0	1
Assisted with organized events (e.g., beach clean-ups)	0	0	0	1	1

during summer 2008. On interview days, the interviewer requested an interview from the first visitor encountered who seemed to meet the sampling criteria for gender and age during the specified time of day. The interviewer first asked, “How many miles do you live from this area?” and used the response to determine whether the individual fit the resident/nonresident criterion for that day. If the individual did not fit the criterion, the interviewer proceeded to find another interviewee.

The interviewer used an interview guide and short demographic questionnaire for all interviews. Interviews lasted 15 to 20 minutes, were recorded (with interviewee permission), and transcribed. We examined the data (using qualitative analysis methods) for stewardship actions, elements influencing stewardship-related actions, and whether a stewardship ethic developed immediately or over time. We also analyzed data for patterns to identify themes, subthemes, and concepts (Taylor and Bogdan 1998); we used codes to name each. We then summarized results by the number of male and female residents and nonresidents describing each of the codes.

3.0 RESULTS

3.1 Demographics

The average age of responding ELODWA users was 42 years with a range of 18 to 72 years. Due to the sampling framework utilized, 50 percent (30 individuals) of the interviewees were male. In addition, half of the interviewees resided within 20 miles of the area they were visiting (15 male and 15 female residents) while

the other half resided more than 20 miles from the area they were visiting (15 male and 15 female nonresidents). Respondents had an average of 15 years of education (12 years of high school plus 3 years of college or vocational training on average). All residents and 90 percent of the nonresidents were repeat visitors.

3.2 Participation in Recreational Activities

Users participated in diverse recreational activities during their visit, including swimming (35 interviewees), sunbathing/relaxing on the beach (31), walking on the beach or a trail (23), playing ball/Frisbee on the beach (16), picnicking (13), socializing (9), and boating (8).

3.3 Themes, Subthemes, and Concepts

Qualitative analysis of the data explored three themes: stewardship actions, elements influencing stewardship actions, and stewardship development. The subthemes and/or concepts related to each theme are discussed below.

3.3.1 Stewardship actions

Two questions were asked to identify stewardship actions: (1) “Is there any action that you’ve done today that you think helps protect the dunes from erosion?” and (2) “Is there any action that you’ve done in the past that you think helps protect the dunes from erosion?” The concepts (i.e., actions) mentioned by respondents are shown in Table 1. Nearly two-thirds of all interviewees mentioned staying off the dunes; practicing carry in/carry out, picking up others’ litter, staying on designated

trails, and asking others to stay off the dunes were also mentioned often. A greater number of residents (25) than nonresidents (14) mentioned that they stayed off the dunes (the message communicated through interpretation in the area), while equivalent numbers of residents and nonresidents (10 individuals each) mentioned practicing carry-in/carry-out (an action not included in ELODWA interpretation). One male interviewee indicated that he carried out both of these actions during his visits.

#30 (male resident): Well, I always pick up my trash. I don't litter around or go over the fences, or mess with the sand dunes. Just look at them.

3.3.2 Elements influencing stewardship

Interviewees were asked to explain what had caused them to take the stewardship action(s) that they had mentioned. They identified 54 different concepts that were grouped during the analysis into 11 subthemes. Table 2 shows all subthemes and 21 concepts (related to each subtheme) mentioned by five or more interviewees. The subthemes of "personal beliefs concerning protecting the dune resource," "educational elements," and "appreciation for natural resources" were mentioned by 52, 44, and 38 of the interviewees, respectively, as influencing their stewardship actions.

Four concepts were related to protecting the dune resource in the subtheme of personal beliefs. Two-thirds of the interviewees mentioned that dune protection is important in general (no specific reason for this importance was given). One male resident explained his belief that human intervention is needed to protect the dune ecosystem.

#11 (male resident): I think it's [i.e., dune protection] important. I think mother nature plays a major role in that. I think there needs to be some human intervention. To what degree, I think we got to...it seems that natural dunes aren't getting enough protection.

For the subtheme of educational elements, 13 separate concepts were identified, 6 of which were mentioned by five or more interviewees. Nearly half of the interviewees mentioned the influence of ELODWA signage that

communicates stewardship actions. The small interpretive signs placed along the beach in front of the dunes were mentioned most often. The following interviewee was able to paraphrase the message on these small signs.

#16 (male resident): I read, like, the signs and that. You know, there's signs that just say, "Dunes are fragile, keep off them."

Interviewees also mentioned discussions with dune stewards (i.e., hired staff that educate visitors about dune erosion and protection); brochures, guidebooks, and articles about dune protection; and discussions about dune protection with unspecified people. Signage was mentioned more often than these other educational mechanisms, probably because of its constant presence in the ELODWA. The dune stewards (who work 7-hour days, 5 days a week) and publications (available only through specific distribution points) are not as consistently available as the signs. However, while interviewees indicated that signage was their most widely used form of interpretation, several interviewees used alternate forms of interpretation instead, suggesting that different forms of interpretation may be necessary to accommodate different visitor educational preferences.

In the appreciation for natural resources subtheme, eight concepts were mentioned by five or more interviewees. Two concepts were each mentioned by nearly one-quarter of the interviewees: "doing the 'right thing' for the resource" and "keeping the resource the way it is ('natural')." The following two quotes express these two concepts.

#3 (male visitor): [Picking up litter]'s the right thing to do.

#42 (female visitor): "There's so much in the environment that's being taken away, and this is one of the natural beauties that I just think it's important to keep it the way it was intended to be..."

Other subthemes mentioned by 10 or more interviewees included "physical on-site influences," "observations of change in the resource," "socialization," "personal/family benefit" of the dunes, and "personal investment of

Table 2.—Elements influencing stewardship development. All subthemes mentioned are included; only those concepts mentioned by five or more interviewees are included (n = 60)

Subtheme	Concepts	Resident		Visitor		Total
		Male	Female	Male	Female	
Personal beliefs concerning protecting the dune resource		12	14	13	13	52
	Dune protection is important in general	12	10	9	10	41
	Dune protection is important to maintain sand on the beach	0	4	3	2	9
	It is important to protect the dunes for people	2	2	0	1	5
Educational elements		13	11	11	9	44
	ELODWA interpretive signs	9	6	5	8	28
	Discussions with dune stewards	4	2	5	2	13
	Media (brochures, guidebook, articles)	1	6	3	0	10
	Discussions about dune protection with unspecified people	3	2	1	4	10
	Sharing knowledge/ discussions with family	1	2	2	2	7
	Education in general (media)	1	3	0	1	5
Appreciation for natural resources		11	9	7	11	38
	Doing the “right thing” for the resource	0	3	4	6	13
	Keeping the resource the way it is (“natural”)	4	4	1	4	13
	Don’t want to lose resource	5	2	2	2	11
	Don’t like litter on beach	4	2	1	2	9
	Respecting resources in general	4	0	1	2	7
	Perception that the resource is unique	2	1	1	3	7
	Having respect for this resource	3	1	1	1	6
	The resource is pretty/beautiful	1	1	1	2	5
Physical on-site elements		4	2	3	5	14
	Designated routes (string fencing, walkovers)	2	2	2	4	10
Observations of change in resource		3	3	4	3	13
	Observing degradation over time (in past)	3	3	2	3	11
Socialization		3	3	2	4	12
	It’s the way I was brought up	0	2	2	2	6
Personal/family benefit		2	2	4	2	10
Personal investment time/ finances		2	2	3	3	10
	Involvement in a nongovernmental organization	2	1	3	3	9
Regulatory influences		2	0	0	2	4
Benefits for society		2	0	0	2	4
Knowledge of resource		1	0	2	0	3

time/finances” in dune protection. The most frequently mentioned physical on-site influence was designated trails and walkways. One female nonresident indicated that string fencing, a psychological barrier used throughout the ELODWA, influenced her decision to stay out of the dunes.

#45 (female visitor): I stay on the little paths that they rope off and stuff like that.

Interviewees frequently mentioned that observing the past degradation of the dune system and its restoration over the past 20 years had influenced their actions in the ELODWA. One female resident described some of the changes that she has observed in the ecosystem.

#22 (female resident): “I came here when I was a little girl and there are no dunes like they used to be. They used to be 40 feet in the air and everything. And just the erosion, the wind, and people trampling over them has all worn them down. And that’s [staying off the dunes] what’s gonna keep it that the pond stays the pond [in other words, that’s what will prevent sand from infiltrating the pond behind the dunes].”

Socialization related to a natural-resource protective ethic was also identified as influencing stewardship actions. The concept of “it’s the way I was brought up” was mentioned by six interviewees, and is summarized by the following quote.

#43 (female resident): I think when I was little, my mom and dad had said not to do that, and then I just didn’t have any interest in climbing them and touching them [i.e., the dunes].

Ten interviewees mentioned the benefit of the dune system for the interviewee and/or his/her family in general. They indicated that the use of the area by their children and grandchildren, or themselves, influenced their desire to protect the area.

Ten participants also mentioned personal investment of time or financial resources for dune restoration. Nine interviewees specifically referred to their involvement in a

nongovernmental organization related to natural resource management or protection in general.

#22 (female resident): I’ve been to the meeting for the new water thing that they’re having for the lake levels and all of that; I’ve been to that meeting. I try to get involved in the town of Sandy Creek because that’s the town that this is in...to see what’s going on. I belong to the sportsmen’s club. I haven’t joined the people for the bird sanctuaries, and actually taking care of the dunes but... Now I’m retired and I’m up here full-time so...we’ll see what next year brings. I like to get involved!

Fewer than 10 interviewees mentioned three subthemes: regulatory influences, benefits of the resource for society, and knowledge of the resource base. Regulations and the enforcement of regulations concerning dune use were mentioned by only four interviewees, as were benefits of the resource for society in general (e.g., benefits for future generations in general were mentioned). Knowledge of the resource base included concepts related to an in-depth understanding of flora and fauna on-site or of the process of dune erosion.

3.3.3 Stewardship development over time

Interviewees were asked “Did you feel that protecting the dunes from erosion was important during your first visit, or is it something that developed over time?” Two subthemes emerged through analysis. More than half (31) of the interviewees mentioned the first subtheme, “incremental changes in perceptions about stewardship over time.” One male nonresident described the stewardship ethic that developed in him through the interpretive signs’ consistent message:

#26 (male visitor): It basically developed over time. Seeing a sign every time and staying off it [i.e., the dunes].

Many interviewees also indicated that their protective ethic had developed as they aged.

#43 (female resident): Developed over time. I didn’t really have a sense in that when I was younger.

Eight other interviewees explained that their stewardship-related behaviors occurred immediately due to on-site signage and physical structures. One male resident explained how the interpretive signs encouraged his adherence to stewardship practices during his first visit to the ELODWA.

#59 (male resident): "When I first came here, I read like the signs and stuff, but ... I didn't really know exactly what it was out here, but I tend to honor that, you know. That's what you gotta do."

It appears that education media encourage establishment of a stewardship ethic during initial visits, and that the consistent use of management messages strengthens this stewardship ethic in follow-up visits.

4.0 DISCUSSION AND CONCLUSION

The objectives of this study were to identify stewardship-related actions, identify the elements influencing stewardship in ELODWA users, and understand how stewardship develops over time. Interviewees mentioned 10 distinct stewardship actions that they perceived as preventing dune erosion. Five or more interviewees used five of these actions in the ELODWA. Staying off the dunes was mentioned by nearly half of the interviewees, probably because of the extensive signage in the area that communicates the "Dunes are fragile – please stay off" message. Carrying out litter also was mentioned frequently, even though litter itself has little impact on dune erosion and litter removal is not mentioned in any of the interpretive media used in the ELODWA. This concept apparently is an important part of many interviewees' beliefs about resource protection. It seems likely that stewardship actions within the ELODWA are encouraged both by on-site management and by behaviors (such as not littering) encouraged in areas outside of the ELODWA.

While interviewees identified diverse elements that influence their stewardship actions, they most frequently mentioned personal beliefs concerning natural resource protection, natural resource appreciation, and educational influences. Such personal beliefs are likely to be reinforced over time through positive experiences in natural areas such as the ELODWA, educational

programs sponsored by schools and organizations, and socialization. Educational influences such as signs, brochures, and conversations with dune stewards are likely to influence visitors' actions immediately and strengthen the stewardship ethic in visitors over time. While most interviewees indicated that their stewardship ethic had developed over time, some reported participating in stewardship actions during their first visit because of on-site educational media and physical structures.

While it may be difficult for managers to influence the socialized development of a stewardship ethic in visitors, this research suggests that it is possible for managers to influence on-site stewardship actions. On-site educational efforts such as signage, roving interpretation provided by the dune stewards, and brochures appear to be highly effective at influencing stewardship in ELODWA visitors. While on-site media may be essential for encouraging stewardship actions by first-time users, providing a consistent message over the long term (nearly 20 years in the case of the ELODWA) appears to be an effective means of encouraging a long-term stewardship ethic in visitors. Combining different educational media (e.g., signs, brochures, and roving interpretation) also appears to be important, since not all interviewees used only one type. While many interviewees mentioned the small interpretive signs, others used brochures or information presented by the dune stewards instead. Using diverse media is likely to accommodate the varied interests and educational preferences of visitors, thus influencing a greater number of visitors than a single type of media alone.

The use of physical structures (such as dune walkovers and string-fenced trails) also appears to be important for on-site management. Although physical structures were mentioned by a moderately low number of interviewees (14 individuals), combining the use of physical structures with educational media seems to strengthen the effectiveness of each. While the educational media explain to visitors why dune protection is important, the physical structures support the educational message by directing and limiting access to the dunes. Regulations (mentioned by only four interviewees) appear to be only slightly influential, which is not surprising given the limited enforcement of regulations in the area.

In summary, this study explored the stewardship actions, elements influencing stewardship, and whether stewardship development occurred immediately or over time among resident and nonresident ELODWA users. The results indicate that actions such as staying off the dunes and picking up litter are common, and appear to be influenced both by on-site educational messages and socialized, offsite elements. On-site elements (e.g., physical structures and educational media) influence visitors' actions during initial visits to the ELODWA, while the constant presence of educational materials on-site strengthens the stewardship ethic over time. Repeat visitation and exposure to interpretive messages also appear to influence reinforcement of a stewardship ethic, as noted by differences in stewardship actions taken by residents and nonresidents. The diversity of management strategies in the ELODWA appears to be successful in addressing the different interests and educational preferences of a range of visitors.

5.0 CITATIONS

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