Messages as a Means of Reducing Social Trail Use at St. Lawrence Islands National Park

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Abstract

During the 2004 summer visitor season, a covert observational study was conducted at St. Lawrence Islands National Park, Ontario, Canada to assess the extent of social trail use on two islands. The study examined the effectiveness of message text and location of signs aimed at reducing the amount of social trail use by visitors. Attribution and species-at-risk messages were more effective than simple messages at eliciting desired behaviours. Furthermore, when signs were posted at specific locations of interest, social trail use was reduced significantly compared to no messages, or messages located at points of entry alone. Implications for visitor management are presented.

Keywords: *visitor impact, social trails, messaging, attribution, species at risk.*

Introduction

Canada's National Parks are seeking to reduce the amount of visitor impact to Canada's natural and cultural heritage properties in ways that ensure the ecological and commemorative integrity for present and future generations (Parks Canada, 2003). With increasing numbers of visitors dispersing themselves further and deeper into the national parks, human impacts are a major concern for park managers throughout the system. Managers are increasingly turning to education as a means of steering the distribution and behaviour of visitors. While face-to-face contact with park personnel has been found to be most effective (Fennell, 2001), this is not always possible and signs are commonly used to guide national park visitors as to appropriate behaviours in particular situations (Parks Canada, 2001-2002).

Social trails are any trails that were not originally placed by management in an area. They arise due to multiple users traveling on them for, as of yet, unstudied purposes. Social trails can also arise by the re-trampling of pre-existing but closed trails. Regardless of the initial cause, social trails are perpetuated through two means: first, they quickly become more hardened with little use (Cole, 2002); second, their hardening increases their visibility and attractiveness to other park users, who in turn increase the trampling damage and penetration to the park ecosystem. Hence, reducing or eliminating their use through signage is a mechanism for stabilizing ecological integrity through reducing the penetration to sensitive sites.

Previous studies in Canada have shown that messaging in the form of basic ecological knowledge of ecosystems has not had the desired effect on changing visitor behaviours (Alessa *et al.*, 2003). Furthermore, the presence of certain message types, including simple requests, sanction messages, and narratives have had varied success in eliciting desired behaviours (Duncan and Martin, 2002; Cole and Landres, 1996; Roggenbuck, 1992; Golding *et al.,* 1992). Attributional messages are those that compel parks users to attribute the damage they see to the surrounding ecosystem to their own actions and were more effective at reducing depreciative behaviour in an intertidal zone study (Alessa *et al.,* 2003).

While many studies have directly measured physical impacts, such as soil compaction, vegetation loss, and penetration of invasive species due to human influence, few covert studies have observed actual behaviours in natural environments at specific locations where impacting behaviours are a problem (Cole and Landres, 1996). Second, only a handful of studies has examined the use of personal attribution as a means of eliciting desired behaviours in a sensitive area. Third, attributional and species-at-risk messages have not been tested directly on-site to deter visitors from disturbing wildlife through increased social trail use and infiltration.

The study of sign location and text effectiveness is necessary to enable managers to inform visitors about the impacts of their behaviours and prevent their re-occurrence. The study of text effectiveness may also alleviate any sign pollution issues where visitors ignore key messages when overwhelmed with media at particular locations. This study aimed to contribute to these goals by exploring which signs and messages were most effective in which locations in preventing visitors walking off-track in St. Lawrence Islands National Park.

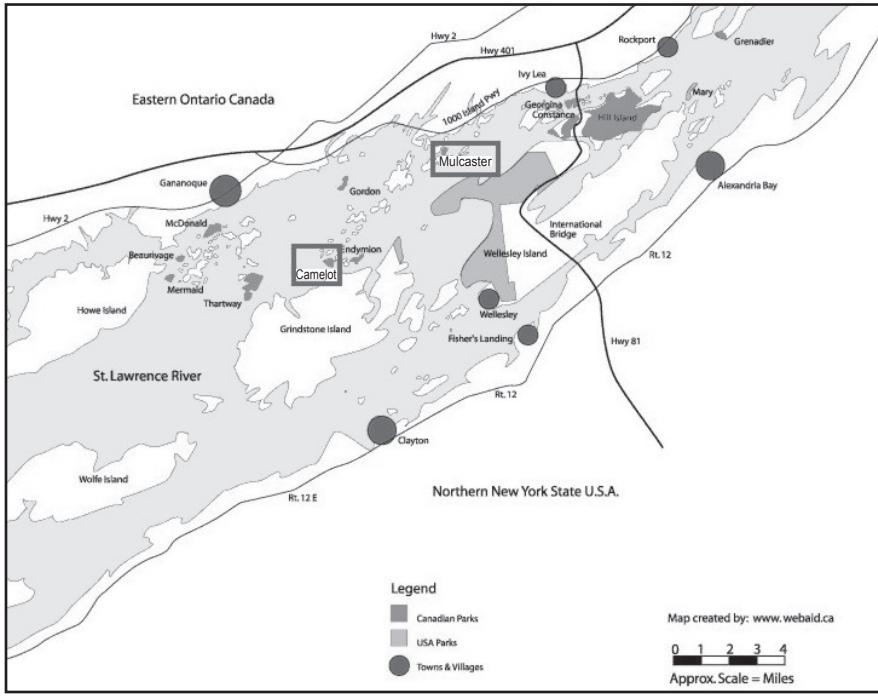
Method

The study site was St. Lawrence Islands National Park near Kingston, Ontario. The Park boasts over 20 small islands and 90 islets accessible only by boat, with a combined surface area of about 10 km^2. Services on the islands include composting toilets, trails, information booths, picnic shelters, floating and crib docks, garbage and recycling removal, interpretive presentations, ecosystem research, and camping sites. Figure 1 is a map of the region, showing the location of the two islands examined in this study.

Camelot and Mulcaster Islands were selected for the study based on the following attributes: a) park managers' recommendations of islands where immediate action was needed; b) sufficiently high visitation rates to ensure a large sample size; c) social trail density to ensure a variety of sites; d) appropriate secure placement of hidden cameras; and, e) presence of sensitive species (on Mulcaster Island) to test species-at-risk messages.

The equipment used consisted of a Gecom Digital Video Recorder (DVR) model EnOne DiVis-CAP2X6004, four VideoComm Technologies model

Figure 1. St. Lawrence Islands National Park, showing the location of Camelot and Mulcaster Islands.



MSC-244c colour MiniSpyCams and respective transmitters, five deep-cycle marine batteries, four Carson Electronics PTC-3 Passive Trail Counters, eight rechargeable 9-volt battery packs, power converter, storage case, and bird boxes to conceal the cameras. Cameras were positioned at sites that allowed viewing of visitors arriving at docks and reading information in the information booths located at boat access points. Cameras were also placed so as to allow viewing of visitors as they approached signs on trails and made choices about use of social trails. The numbers of visitors who a) read the sign and remained on the main trails, or b) read the sign and used a social trail were recorded.

The footage was transmitted to receivers located with the digital video recorder. The storage case was covered with a tarp and buried at a central point in the island with only the receivers exposed. This strategy allowed for the best signals to be absorbed by the centrally located receivers from cameras scattered across the island under study. Visitors could be tracked from their point of entry to their arrival at experimental sites by the timers and video records from the cameras. Other equipment involved four trail counters, which were used as back-up to video data.

Four staged experiment cycles were conducted. First, there was no message – in the park brochure there is one phrase asking that users stay on the main wood-chipped trails. This 'no-message' situation acted as a baseline or control based on the assumption that visitors had very little if any exposure to the request to stay on the main trail system.

During the four-week experimental period, signs comprised either a simple, attribution, or species-at-risk message in both official languages. In each case, the sign location was alternated at weekly intervals between the information booth and the socials trail under scrutiny. The second week a simple sign was placed exactly where the social trail diverges from the main trail (social trail head). The third week had an attribution message located in the information booth. The last week had an attribution message located at the social trail-head.

The second four-week cycle then explored a second island (Mulcaster Island) with emphasis on a species-at-risk targeted message. The first two weeks had the same protocol as the first site. Then a species-at-risk message was placed at the information booth, followed by at the social trail head for four days each. The two-week-long attribution cycle period was eliminated, and the species-at-risk cycle was reduced due to an imminent strike by the Public Service Alliance of Canada Union.

Results

Between June 24th and August 9th, 2004, 1657 usable records were obtained for this study. Baseline statistics were collected during the first week of each cycle at each study island.

On average, 20% of the trails existing on each island were social trails of six different types (not created by management), and the highest impacted island had over 40% of its surface area impacted by social trails alone (Saunders, 2003).

The average number of visitors to Camelot Island was 63 per day. The average number of visitors to Mulcaster Island was 37 per day. These numbers were slightly above those reported for the previous year. It was the goal of this research to discover the most effective mitigation technique in reference to sign location and text at this particular island-based National Park (Table 1).

Hypothesis 1: Simple messages will significantly reduce social trail use. When no message was present, 88.3% of visitors left the main trail on Camelot and 86.7% did so at Mulcaster, indicating that base-level social trail use was broadly similar on both islands. On Camelot Island a simple message (at any location) reduced social trail use by 11.3%. However, on Mulcaster Island simple messages reduced social trail use by double this (22.1 %). The apparent difference in effectiveness of the message on Mulcaster may be due to a number of factors related to the type of users, the smaller size of the island, and its close proximity to the Canadian shoreline. Users of this island tend to be more environmentally conscious eco-tourists using canoes and kayaks to get around since it is closer to shore. It is evident that the results demonstrate that managers can expect a significant reduction in social trail use with simple messages alone.

Hypothesis 2: Location of message will affect social trail use.
When a simple message was presented to visitors at the information booth (located at the dock or point of entry to the island), the percent of social trail use dropped non-significantly by 1.8% on Camelot ($df=1$, Chi-sqr = 102, $p=0.11$) and by a significant 20.5% on Mulcaster ($df=1$, Chi-sqr=74.6, $p<0.001$). However, when a simple sign was presented to visitors at the social trail-head (the point of divergence of the social trail from the main trail), the use of the social trails dropped by an even larger proportion: 23.6% on Camelot ($df= 1$, Chi-sqr = 193, $p < 0.01$) and 35.1% on Mulcaster ($df = 1$, Chi-sqr = 60.378, $p = 0.001$). The larger effects on Mulcaster are evident

again in these data, further emphasizing the fact that contextual factors may be at play in this latter context.

Hypothesis 3: An attribution message will be significantly more effective than a simple message at reducing social trail use in both locations. Message texts also affected social trail use. On Camelot Island, a simple message was significantly ($df = 2$, Chi-sq = 77.45, $p < 0.001$) less effective than an attribution message (11.30 % reduction versus a 39.30 % reduction) in reducing social trail use.

The effectiveness of attribution messages also varied depending on their location. When an attribution message was presented at the information booth on Camelot, social trail use was reduced by 35.9 per cent. When the same

Table 1. Summary of Results from both investigation sites.

Treatment	Per cent reduction of social trail use at Camelot Island	Per cent reduction of social trail use at Mulcaster Island
Simple Message		
No message	00.0	00.0
Simple message	*11.3	*22.1
Message Text		
Simple message	*11.3	*22.1
Attribution message	*39.3	
Species at risk message		*43.0
Message Text and Location		
Simple message at information booth	1.8	*20.5
Simple message at social trail site	*23.6	*35.1
Attribution message at information booth	*35.9	
Attribution message at social trail site	*43.7	
Species at risk message at information booth		*35.7
Species at risk message at social trail head		*47.1

* denotes significant reduction in social trail use at the $\alpha = 0.05$ level.

message was presented at the social trail head on Camelot, use was reduced by 43.7 per cent. It is evident that attribution messages are more effective than simple messages in reducing social trail use in both locations. These results demonstrate that both message text and location are important in reducing depreciative behaviours.

Hypothesis 4: An attributional species-at-risk message at the junction of a social trail giving access to a wild-life habitat will significantly reduce use of this type of social trail.

The largest reduction in social trail use was observed at Mulcaster Island using the species-at-risk message at the social trail divergence site. This situation reduced social trail use by 47.1% (df=1, Chi-sq = 103.8, p = 0.000), whereas using a species-at-risk message at the information booth only reduced social trail use by 35.7 per cent. Overall, this was the most effective messaging technique used in this study. This result once again points to the effectiveness of locating messages directly at sites of potential depreciative behaviour. However, this does not necessarily prove that species-at-risk messages are more effective, since this step was not performed at Camelot where attributional messages were more effective.

Discussion

Hypotheses one through four were supported by the results from this study. Any message reduced social trail use significantly. Messages located at social trail heads were more effective at reducing use in all cases. Similarly, attributional messages were more effective than simple messages at reducing social trail use.

The data indicate that park visitors respond most positively to messages presented at locations where social trails can be differentiated from main trails. In addition, messages that compel visitors to attribute the damage they see on the island to their own behaviour are more effective than simple messages at drawing out desired behaviours, no matter in what location they are presented. However, the ideal situation for reducing social trail use is to have signs containing attributional messages. Where appropriate species-at-risk messages located directly at the social trail heads are at least equally effective as attribution messages, but more effective depending on the audience. Further study of this hypothesis elicited more response from women and children. For further information on the differences between response patterns of males, females, and children, please contact the authors.

Conclusions

We believe that this study was the first that tested attribution and species-at-risk messages in context of reducing social trail use. In developing management intervention techniques that minimize the impacts of visitor behaviour yet retain the quality of visitor experience, we believe that more research needs to be focused on discovering the perceptions visitors have of social trails, how much they do attribute to themselves the damage they witness in national parks, and where the visitors prefer to go in national parks. Previous studies have shown that users are unlikely to contribute to impacts that would degrade their own recreational experiences (Lynn & Brown, 2003). By increasing personal awareness of social trail proliferation and impacts, it is likely that visitors would be less apt to further contribute to the damage.

A reduction of about half of users simply by the introduction of a species-at-risk or attributional message at a sensitive site is worthy of introduction in the island-based ecosystem at St. Lawrence Islands National Park. A further GIS modeling of the park, or other/future parks with similar attributes, using the six patterns of social trail emergence developed in this project, could help prevent their emergence or assist in the future planning of trail networks.

This study was purely observational; hence, internal mechanisms of behaviour cannot be known. Also, the study was context-specific – located at two islands with a specific user type who may be very different from those that visit mountainous or prairie-based parks. Further study will reveal whether diverse user-groups respond to the same message types.

Acknowledgements

This research was funded through Parks Canada's Ecological Integrity Branch, Eastern Ontario Service Centre, and St. Lawrence Island's field unit.

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