USER PREFERENCES FOR SOCIAL CONDITIONS ON THE ST. CROIX INTERNATIONAL WATERWAY

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Abstract: In cooperation with the St. Croix International Waterway Commission the University of New Brunswick and University of Maine conducted a study of waterway users during the summer of 1999 to determine: 1) characteristics of the waterway visit, including activities, method of travel on the waterway, length of stay, camping conditions encountered; 2) characteristics of visitors, including type of groups, previous experience, place of residence, and other sociodemographic descriptions; and 3) visitor preferences for resource and social conditions encountered on the waterway. A mailback questionnaire was administered to a sample of waterway users. Approximately 404 usable questionnaires were returned, for an overall response rate of 62 percent. One of the management objectives of the St. Croix waterway is to provide opportunities for secluded watercourse travel and camping. The waterway has a diverse range of water-oriented settings, defined by geographic features, accessibility, and use history. Therefore, we examine visit and visitor characteristics based upon travel within the areas of the waterway. We compare the significance of indicators for secluded travel and camping for experience quality among the different user groups.

Introduction

The St. Croix International Waterway is a complex of lakes and river segments stretching approximately 115 miles (185km) along the border of eastern Maine and New Brunswick. The waterway is comprised of three major geographic zones: a headwater lakes and river section characterized by mostly undeveloped shoreline, a lower river section of developed and industrialized river, and a tidal estuary and bay system. This study is concerned exclusively with the headwater lakes and upper river section. This region is the longest stretch of undeveloped international waterway east of the Boundary Waters Canoe Area of Minnesota and Ontario. It is listed as one of the state of Maine's Twenty Outstanding Rivers, and it is officially recognized as the St. Croix Waterway Recreation Area by the province of New Brunswick. Most significantly, the St. Croix was included in the Canadian National Heritage river system in 1991, the first such designation in Atlantic Canada.

Since the waterway is an international boundary, recreation and resource management is conducted by several agencies, including the International Joint Commission, the Bureau of Parks and Lands and the State Forest Service in Maine, and the Department of Natural Resources and Energy in New Brunswick. In 1986 a Memorandum of Understanding between Maine and New Brunswick created the St. Croix International Waterway Commission, an advisory agency, that has since taken the lead in studying waterway-related issues and coordinating planning for future waterway management needs. In a 1993 report, the St. Croix International Waterway Commission noted that "distinct land and water management policies are applied without integration on opposite sides of the waterway, leaving it vulnerable to incompatible uses and potential quality loss" (SCICW, 1993, p. 13). It called for further recognition of the region as an "International Heritage Waterway." At the same time it also recommended a range of policies intended to guide development and management in a way that protects the area's cultural and natural heritage, environmental quality, and traditional high-quality recreational opportunities. Particular focus of the latter is placed on secluded backcountry canoe experiences available in the headwater lakes and upper river region.

Providing and maintaining a quality recreation experience requires an understanding of the resource and social conditions that exist on the waterway. Indicators and standards of quality illustrate what visitors to an area expect, prefer, or will accept as part of their recreation experience. This concept has emerged as a central focus of recreation management. Indicators of quality are measurable variables that help define the quality of the recreation experience and standards of quality that define the minimum acceptable conditions of indicator variables (Manning, 1999). Good indicators are practical to measure quantitatively, sensitive to the type and amount of use, and potentially responsive to management control (Lucas & Stankey, 1985; Watson et al., 1998). Several studies examining indicators of quality have revealed some variables to be more important than others (Manning, 1999). For example, litter and other signs of visitor use impacts appear to be more important as compared to management-related impacts such as signs and presence of rangers. Social indicators of quality at secluded campsite locations are more important than ecological indicators. Visitors to more primitive areas or sites may be generally more sensitive to a variety of potential indicators of quality than visitors to more highly used and developed areas or sites. Watson and others (1998) have reported similarity in the rankings of social and resource indicators by wilderness boaters even though users were found to have diverse motivations or experience preferences. On the St. Croix waterway, users have unrestricted access to both primitive and developed sites and a wide range of water-oriented opportunities. The situation suggests the need to understand the diverse recreation experiences and indicators of quality.

One of the management objectives of the St. Croix waterway is to provide opportunities for secluded watercourse travel and camping. The management objective related to "secluded," much like "solitude," is not commonly measured directly but rather through indicators believed to provide feedback on forces that threaten the "secluded" or "solitude" opportunities (Watson et al., 1998). For example, commonly used indicators for this factor include "the number of groups that camp within sight or sound of my campsite" or "the number of boats I see along the waterway in a day". In attempting to understand the management needs for providing for secluded travel and camping in the St. Croix Waterway, this paper does three things. Based upon visitor surveys we first report trends in visit and visitor characteristics in a way that distinguishes the distinct sub-groups of the user population. Second, we examine the significance of different indicators measuring solitude to the waterway experience desired by these sub-groups. Finally, we assess the varying standards held by each of these distinct sub-groups for these indicators of solitude. Several important management implications emerge.

Methods

A multi-stage cluster sampling design was utilized to select users of the St. Croix waterway. The sample period was from June 6, 1999, to September 10, 1999. The primary sampling unit was blocks of time established as sampling shifts of either 7:00 a.m. to 1:00 p.m. or 1:00 p.m. to 7:00 p.m. In total 14 put-in or take-out locations along the waterway were covered by four field technicians. To reduce travel time and distances for the technicians, two were responsible for four sites each and two were responsible for three sites each. This division created four sampling clusters. For each cluster, the sample sites and time were determined by random selection. Each waterway user was greeted, briefly introduced to the purpose of the study, and asked to participate. If users agreed, an interview lasting approximately 2 minutes, was used to determine group type, travel destination, length of visit, number of previous visits and average number of visits per season or if this was the first time visiting the St. Croix waterway. Also, the technician noted the type and number of boats in the group as well as group size.

A self-administered, mailback questionnaire was sent to the sample of waterway users who agreed to receive and complete the survey. Questionnaires were sent to 332 users from the United States, 336 users from Canada, and 13 users from another country, for a total of 681. The mailout procedure basically followed the approach recommended by Dillman (1983). The initial mailing included a questionnaire with a cover letter and postage-paid business reply envelope. One week after the first mailing, a postcard reminder and thank you was sent to everyone. Three weeks after the initial mailing, a follow-up mailing was sent to those who had not responded. A different cover letter in this mailing emphasized the importance of everyone's response. Another questionnaire and postage-paid business reply envelope were included. A second follow-up was sent to those who still had not responded 7 weeks after the initial mailing.

In response to the Waterway Commission's strong desire to protect opportunities for secluded backcountry canoe travel and camping among other desires, we employed a similar visitor survey approach conducted by Watson and others (1992). Among other variables we obtained assessments from waterway users on the significance of social and resource indicators on a 5-point Likert scale from mattering "not at all" to mattering "extremely" in defining the quality of experience on the waterway. The list of proposed indicators posed to all users of waterway were compiled from a literature review and feedback from select resource management specialists. Social indicators to capture secluded backcountry travel and camping included among others "the number of boats I see along the waterway," "the number of large groups (more than 6 boats) that I see along the waterway," "the amount of noise associated with human activity along the waterway," and the number of groups camped within sight or sound of the campsite," and "the percent of time other people are seen while traveling on the waterway." Preferences for these certain indicators were also assessed in a separate set of questions by asking respondents for a preferred number within a given range, as well as for ranges of acceptability and unacceptability.

The waterway has such a diverse range of water-oriented opportunities, each defined by geographic features, accessibility, and use history, that we decided to compare users based upon travel zones within the area. In assessing visit and visitor characteristics we first chose to examine what differences emerged between the five groups defined by these travel zones. The first regional group is that which utilized only the upper lakes. The next is that which utilized only the lower lakes. The third is that which utilized only the upper river, a section typified by quick water and numerous, easy rapids. The fourth is that which utilized the entire, forty-mile river section, combining the quick water of the upper river with a more remote and placid lower section. The final group we defined as those users group who traveled on both lakes and river and stayed out for two or more nights. Visit and visitor characteristics were assessed for each of these groups separately and for the survey population as a whole. In addition, we compared the significance of social indicators among the different user groups.

Results

For the onsite waterway user interviews, response rate was over 99 percent. Only a couple of the waterway users did not want to be interviewed. Of the 681 surveys mailed to waterway users, 31 were not deliverable due to incorrect addresses. Part of the this return figure can be attributed to the fact that the Province of New Brunswick was in the process of adopting a 'civic numbering' plan (Stacey & Daigle, 2000). A total of 404 completed surveys were returned with 220 coming from US users, 181 from Canadian users, and three from other countries for an overall response rate of 62 percent. The majority of the survey respondents were male (80%). The vast majority of

Canadian users were from the province of New Brunswick (94%). The origins of US users were more diverse, but 73 percent were from the New England states of Maine, Massachusetts, Rhode Island, Vermont, Connecticut and New Hampshire. Of the Canadian respondents, only 32 percent were first time users of the waterway and 48 percent of the US respondents were first time users. Of those who have used the waterway previously, approximately 49 percent reported using it between one and 20 times, 29 percent between 21 and 100 times and 22 percent over 100 times.

Visit and Visitor Characteristics

The segmentation of users based upon travel areas within the St. Croix waterway included the upper lakes (n=154), lower lakes (n=38), upper river (n=107), full river (n=57), and extended trippers (n=35). Thirteen users were not part of this classification scheme because of insufficient travel data. Approximately equal proportions of Canadian and US visitors utilized the upper lake region of the St. Croix Waterway (Table 1). Slightly more Canadians utilized the lower lakes (63 percent) and upper river (59 percent) areas. However, US visitors were much more likely to be full river users (89 percent) and extended trippers using both lakes and the river (94 percent). Much more day use was reported by users of only lower lakes (76 percent) as compared to the users of only upper lakes (41 percent). Most overnighters in the upper lakes stayed 2 or more nights (66 percent). As might be expected, users of the full river and extended trippers were more likely to utilize the waterway for extended overnight stays. The two lake groups tend to be more oriented toward motorized use and fishing, with the lower lake group strongly focused on a day-fishing experience. Boat type and primary activity indicate that the upper lakes group is less homogenous than the lower lakes group. On the river sections parties tend to be larger, with more boats. The latter two of these river groups, the two groups that stayed the longest, are also distinctly American in composition. One of the most striking differences between these river groups is in their previous experience with the waterway, with less than 1% of the upper river group visiting for the first time, compared to 65% and 49% for the other two river groups. The two lake groups also have very high levels of previous experience with the waterway compared to all the river groups. Finally, each group also differs from the survey average represented by the overall results.

Table 1. Trends in Visit and Visitor Characteristics

	Waterway user groups					
	Upper Lakes (n=154)	Lower Lakes (n=38)	Upper River (n=107)	Full River (n=57)	Extended Trip (n=35)	All Responses (n=404)
Citizenship	53% Can.	63% Can.	59% Can.	89% US	94% US	45% Can.
Percent day use	41%	76%	21%	0%	0%	29%
Typical overnight stay	66% ≥ 2 nights	1 night	38% 1 night 54% 2-3 nights	95% 2-4 nights	74% 4-6 nights	17% 1 night 27% 2 nights 24% 3 nights
Boat type	46% Motor 30% Canoe	45% Motor 45% Other	87% Canoe	100% Canoe	100% Canoe	58% Canoe 27% Motor
Primary activity	31% Fishing 18% Camp 16% Canoe	92% Fishing	64% Canoe 11% Fishing	79% Canoe	63% Canoe	42% Canoe 26% Fishing 10% Camp
Group size (median)	3	2	7	6	7	3.5
Number of boats (median)	1	1	2	3	3	1
First visit	10%	27%	<1%	65%	49%	26%
Number of years visiting area since first visit (mean)	24.4	19.0	12.7	8.3	7.7	18.6

Significance of Indicators for Secluded Travel and Camping

Table 2 shows the relative influence of 4 potential indicators on the quality of visitor experiences related to secluded travel and camping. The five waterway user groups are again easily distinguished when considering potential indicators of secluded travel and camping. Table 2 shows that for all four questions the lower lakes group responded with the lowest ratings. In no category does the mean response reach even a "matters moderately" level for this group. Conversely, the full river and extended trip groups have significantly higher rankings than the other three groups for these indicators. For all four indicators these two groups responded with averages of "matters very much" or "matters extremely." Again, each group responds in a distinct way from the overall survey results.

We should note that two other indicators ranked higher than the above items for potential indicators of secluded travel and camping. For example, indicators such as "the amount of manmade noise originating away from the waterway" and "the amount of noise associated with human activity along the waterway" were rated as being more important as factors effecting experience quality as compared to number of other users seen on the waterway. These items were consistently ranked higher regardless of the waterway user group and the full river and extended trippers were especially sensitive to noise.

Preferences for Solitude

When respondents were asked to indicate a preferred condition for these potential indicators of secluded travel and camping, the same trends appear. Table 3 shows that on the most densely used section of the waterway, the upper river, respondents have the highest preferred levels for number of boats seen in a day and number of large groups seen in a day. The lower lakes group, predominantly day-use fishers, had the highest preferences for number of groups camped within sight or sound and percent time other people are in sight. Not surprisingly, the lower lakes group also placed very low importance on these two categories as factors influencing experience quality. The two lake groups and the two lower river groups share similar preferences for the number of large groups seen in one day, but the latter have a strong preference for camping away from other groups.

The preferred condition can be useful to identify a proximate standard to describe central tendencies and to determine group norms for visitor acceptance of social impacts for indicators of experience quality. However, more analyses are required to investigate appropriate standards for example, "norm prevalence" (Kim & Shelby, 1998). Of particular importance is the relative significance of the potential indicators that helps define the quality of visitor experience. For certain user groups such as the upper and lower lakes as well as upper river users it might do little good to monitor preferences for conditions if these indicators are not as important as compared to other indicators in defining the quality of the visitor experience. A challenge is posed when for certain user groups, for example, extended trippers, where this indicator is important and travel zone areas overlap by the very nature of the activity.

Table 2. Significance of Potential Experience Indicators on Secluded Waterway Travel and Camping

This matters to me	Waterway user groups[a]					All Responses (n=404)
	Upper Lakes (n=154)	Lower Lakes (n=38)	Upper River (n=107)	Full River (n=57)	Extended Trip (n=35)	
The total number of boats I see along the waterway	2.84	2.39	2.78	3.56	3.47	2.94
The number of large groups (more than 6 boats) that I see along the waterway	2.86	2.49	2.79	3.65	3.64	2.99
The number of other groups that camp within sound of my campsite	3.04	2.18	3.07	4.04	4.03	3.22
The percent of time other people are in sight while I am boating along the waterway	2.50	2.00	2.70	3.51	3.51	2.73

[a] Mean answers on a 5-point Likert scale: 1=matters not at all, 2=matters slightly, 3=matters moderately, 4=matters very much, 5=matters extremely.

Table 3. Preferences for Conditions Related to Secluded Travel and Camping on the St. Croix Waterway

Indicator (range)	Waterway user groups[a]					All Responses n=404
	Upper Lakes (n=154)	Lower Lakes (n=38)	Upper River (n=107)	Full River (n=57)	Extended Trip (n=35)	
# Boats seen/day (0-50)	10	11	15	5	7.5	10
# Large groups seen/day (0-25)	3	3	5	2	3	3
# Groups camped nearby (0-25)	3	4	3	1	0	2
% Time see other people (0-100)	20	30	20	10	10	20

[a] Median responses for waterway user groups.

Management Implications

In designing experience-based management plans, resource managers must strive to protect the resource and the experience without unnecessarily restrictive or heavy-handed techniques. To apply a single management scheme to an area with a complex geography and pattern of visitation will ultimately fail on both these counts. Some groups will be restricted unnecessarily and others will suffer from a diminished experience. The results of this research highlight the importance of conducting baseline investigations of use and user characteristics.

As use levels increase, recreation management planning will be necessary to provide and protect the diverse experiences desired by the St. Croix visitor population. This study demonstrates that opportunities for secluded travel and camping influence experience quality for most visitors to the waterway and are very influential for certain visitors, especially for those visitors who are traveling the waterway on extended canoe trips. As such it may be a key component of planning, along with other factors which were also ranked highly such as litter, campsite condition, visibility of forestry operations from the water, and water levels.

The multiplicity of visitor groups, each with unique standards, seems at first as though it could lead to conflicts between visitors. However, the geographic zones of the waterway provide a management opportunity for offering a diversity of experiences. For example, visitors to the mostly flat water portion of the river have the most restrictive standards for solitude, therefore this region could be zoned in such a way to protect this opportunity without unnecessarily restricting visitors to the upper or lower lakes or upper river. Outreach efforts to achieve this goal might be best focused on the American visitor population, since this group is predominantly from the US. Efforts aimed at enhancing the lower lakes visitor experience should focus on improving the quality of day-oriented fishing excursions. The upper lakes, with the most diverse visitor population, might benefit from campsite types that range from primitive to developed, with certain islands or shoreline sections designated similarly. Presently, the large area of these lakes allows for diverse recreation opportunities without significant conflict.

The upper river is the area which suggests the greatest potential for conflict. Three groups utilize this zone, the upper river group, the full river travelers and the extended trip group. The upper river section could easily be traveled in a long single day. However, more than one half of the upper river group stayed 2 or more nights. This relatively slow rate of travel could perhaps lead to congestion of the limited number of sites in this zone. Also, this group has different standards regarding solitude from the other two groups. A preliminary analysis of other survey questions related to motivation, however, suggests more commonality. Approximately one quarter of the upper river group indicated the primary reason was to spend time with companions as compared to 10 percent for other river groups. However, the majority of all river groups indicated the primary reason they chose the St. Croix waterway was to engage in specific outdoor activities, especially canoeing, fishing and camping.

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