USING SOCIAL SCIENCE RESEARCH IN THE MANAGEMENT OF COASTAL WILDERNESS SETTINGS

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Abstract: Although there exists a significant literature dealing with visitor management in terrestrial areas, relatively little research exists to inform us about visitor management of coastal wilderness areas. Coastal wilderness areas are particularly attractive to visitors in part because so few of the desirable coastal regions in the world are protected in any kind of wilderness condition. These settings are usually highly diverse in flora and fauna, yet are extremely fragile and difficult to sustain for tourism or other purposes. As a result, the cost to manage such areas is often high, compared to other types of wilderness settings. Hence coastal areas are particularly challenging to manage in a wilderness condition.

This paper describes how survey research can be used to deal with crowding, the control of visitor impacts, and the establishment of user fees. Within the framework of these management issues, the paper extends the wilderness literature in such important areas as carrying capacity, quotas, reservation systems, and willingness to pay (contingent valuation).

This paper is illustrated with visitor surveys and management actions introduced in the West Coast Trail wilderness area of Pacific Rim National Park, located on the west coast of Canada. Visitor research was used to establish a quota of 52 people per day, a telephone reservation system, and a user fee of CAN$65.00 per person. Surveys indicated that visitors supported these measures, and felt that crowding and resource impairment had been reduced to acceptable levels.

Keywords: wilderness management, satisfaction, carrying capacity, quota, willingness to pay

Introduction

The attraction of coastal areas for tourists is well known, and has resulted in the development of many island and coastal settings around the world for intensive forms of tourism. Marinas, resorts, hotels, restaurants are examples of the kinds of tourist venues developed in attractive coastal settings. However some coastal settings have been managed for less intensive wilderness experiences. In Canada, Pacific Rim National Park and Pukaskwa National Parks are two examples of coastal wilderness settings where few facilities are found and human influenced change is not significant.

Compared to terrestrial wilderness areas, coastal wilderness settings are often more fragile and difficult to sustain as tourism destinations, without compromising the pristine nature of the resource base or the wilderness experience provided. Crowding, and damage to natural features are significant management issues affecting the quality of tourism experiences. The purpose of this paper is to examine approaches to wilderness management in coastal settings, and how management can be supported with visitor research, drawing upon studies conducted on the West Coast Trail wilderness area of Pacific Rim National Park.

Wilderness Management in Coastal Areas

Wilderness areas are pristine natural settings, with few facilities, and little evidence of human induced change. These are places where natural processes and natural energy flows are sustained "as they existed in the absence of human influences" (Hendee, Stankey, and Lucas, 1990). The associated tourism experience is usually characterized by opportunities for solitude, spiritual integration with nature, learning about nature, challenge, and self reliance. This wilderness experience differs from the experience provided in more developed natural settings, where easier access is provided, more facilities are provided, a greater management presence is provided, higher densities of visitors are accepted, visitor impacts on natural features are more pervasive, and other types of use of the area may be more evident (e.g., urban development, logging, commercial fishing). Natural tourism settings can in fact be arrayed along a continuum from the primitive to the modern, by varying each of these management factors (Clark and Stankey, 1979).

Coastal settings can also be developed to different levels, depending on the planning objectives and visitor experience provided. In this paper, the discussion concerns only those settings at the primitive or wilderness end of the spectrum. This is not to suggest that other types of coastal tourism settings are of lesser value or significance. Coastal wilderness areas however are somewhat less numerous, and often are significant for ecological/scientific reasons as well as tourism values. For this reason, the management of coastal wilderness is particularly challenging.

Management of wilderness areas has come to mean the "management of human use and influences to preserve naturalness and solitude" (Hendee et al., 1990). Appropriate wilderness management strategies include techniques such as the following: limiting use (rationing use); dispersing use; limiting party size; limiting length of stay; providing information on minimal impact camping; concentrating use; prohibiting certain kinds of use; separating incompatible uses; and, requiring reservations.
More controversial wilderness management strategies include the following: providing more facilities (such as toilets, tables, and garbage containers); providing more enforcement of regulations (such as more frequent patrols by park wardens); and, hardening heavily used sites to protect against resource damage (e.g., high standard trails; provision of tent pads at campsites). These strategies are controversial because some people feel such measures represent too high a level of development or management presence for designated wilderness: the naturalness of a setting is diminished by such actions.

Some of these strategies have emerged out of the carrying capacity literature, which suggests that there exists some level of visitor use beyond which unacceptable impacts occur—impacts to the resource, or impacts on the experience (e.g., crowding). Many difficulties have emerged with this approach (Graefe et al., 1984). For example, who determines what is an acceptable/unacceptable resource impact? Who determines what is unacceptable/unacceptable level of crowding? Should managers make these decisions; should tourism operators make these decisions; should visitors make these decisions? Is it possible to arrive at consensus between these groups; is it possible to arrive at consensus within any one of these groups? Research has indicated that managers often hold different views than visitors, and that visitors vary considerably in their preferences for wilderness conditions.

In summary, coastal wilderness areas face similar visitor management challenges as found in other types of wilderness settings, in terms of crowding and resource impacts. However, coastal wilderness areas are particularly difficult to manage, for the following reasons:
1. It is often difficult to disperse use away from congested areas.
2. Coastal environments are particularly sensitive to human impacts.
3. The cost to manage these settings can be high.
4. Lack of consensus of acceptable or appropriate management conditions.

Wilderness Management on the West Coast Trail (Pacific Rim National Park)

Many of the wilderness management issues described in the literature have occurred at Pacific Rim National Park, in the designated wilderness area known as the West Coast Trail. Located on the west coast of Vancouver Island, the area is characterized by a variety of spectacular beach settings, flanked by lush temperate old growth rainforests. Opportunities are excellent for observing whales and other marine wildlife. The hiking experience includes beach walking when tides allow, and a rough trail carved through the dense forest. This trail is made quite physically challenging due to the numerous bogs, streams, and gullies to be crossed, as well as the weather which can be very wet and stormy.

Twenty five years ago the West Coast Trail was not well known, and was hiked by only a small number of people. Over time, more people heard about this magnificent hiking experience, and use levels rose sharply. As a result, visitors began to raise concerns about crowding and undesirable impacts on park resources. Park managers responded by making improvements in trail standards to protect the heavily trampled vegetation and soils. These improvements included the construction of boardwalks, ladders, bridges and cablecarts.

Visitor surveys conducted in 1984 and 1989 revealed concerns regarding crowding, muddy trail conditions, litter, human waste, need for a second information centre at the southern trailhead (Port Renfrew), ferry service, and the effects of nearby logging. The management response to these concerns included the following: limit of group size to 10 persons; quota of 52 people allowed to start each day; reservation system; toilets at campsites; more regular trail maintenance schedules; and, establishment of a second visitor information centre, to provide information on trail conditions and minimum impact camping.

These management responses were criticized by some people, feeling that use levels should be restricted further, and that actions aimed at hardening the trail in some fragile actions and providing toilets detracted from the wilderness character of the experience. Parks Canada implemented these measures partly because of the lack of other options. For example, it is difficult to disperse use because the West Coast Trail is located in a narrow protected band skirting the shoreline, the area is heavily forested and difficult to penetrate away from the established trail, and visitors are most interested in the experience located at the forest–beach interface. In short, the opportunity to redistribute use to other areas in the park is limited.

Nevertheless, park staff felt the need to return to the public to determine the acceptability of these measures, so a visitor survey was conducted in the summer of 1993, using mail survey techniques developed by Dillman (1979) to encourage high response rates and response quality. A total of 768 completed usable questionnaires were returned, representing a response rate of 66%. This sample size allowed for a calculation of a margin of error of plus or minus 3.3% at the 95% confidence level.

Visitor Perceptions of Wilderness Conditions

In order to measure visitor acceptance of the trail conditions and prevailing management strategies, respondents were asked to assess the quality of their
experience, and what contributed or detracted from their experience. Past experience with surveys of visitors to this area suggests that visitors like to be consulted, particularly if they feel their opinions will have an impact on the way the setting will be managed.

We asked visitors to indicate how they felt about each aspect of their experience, using a five point rating scale: very dissatisfied; somewhat dissatisfied; neither; somewhat satisfied; and, very satisfied. Nearly everyone in the sample indicated they were somewhat satisfied or very satisfied with their experience, but when they were asked to comment on specific aspects of their experience, a number of concerns emerged (Figure 1): frequency of staff patrols; garbage at campsites; condition of boardwalks; human waste; privacy at campsites; and, condition of outhouses. These are all factors where at least 30% of the sample did not indicate they were somewhat satisfied or very satisfied.

Although some of these concerns are fairly significant to some visitors, park managers decided they were unwilling to create more facilities, or provide more warden patrols. Even though as many as 30% of respondents indicated concerns, park staff felt any additional management presence would detract too much from the wilderness experience they wished to provide. This response is consistent with some of the wilderness literature which argues that management actions should be driven by management objectives, rather than relying exclusively on visitor preferences (Hendee et al., 1999).

Acceptability by Visitors of the Quota System

A quota of 52 people per day entering the trail was implemented the previous year. This management action was aimed at reducing crowding reported in previous visitor surveys, and reducing visitor impacts on natural features. Previously, use levels had not been controlled and had reached 10,000 people, most of whom visited during the peak period of July–August. The quota of 52 people entering per day was determined by taking the prior annual use level of 10,000 people, and redistributing this use evenly throughout the entire season, running from May 1 to September 30. Hence annual use levels were kept constant, but daily use levels were greatly reduced in the peak season by shifting visitation more into the shoulder seasons.

Visitors were asked to comment on the quota system, crowding, and perceived resource impacts. Most visitors (78%) were satisfied with the quota system, but a significant number (27%) felt the number of people encountered at campsites was too high (Figure 2). However, numbers of encounters on the trail were not as large a concern. Perceived impacts on park resources (e.g., litter, damage to vegetation) were viewed as unacceptable by 26% of Canadian visitors; but only 9% of German visitors objected (Figure 3).

With this level of visitor support, Parks Canada decided to retain the quota system at 52 people per day, recognizing however that support for this approach was not unanimous and approximately 25% of current visitors would prefer fewer encounters.

At a theoretical level, these findings appear to be consistent with a significant body of literature dealing with perceived crowding in natural settings. For example, Grammann (1982) argues that a situation will be evaluated as crowded not when contacts reach a certain level, rather, when the number of contacts restrict or interfere with a desired goal, such as achieving solitude or establishing a campsite. In this study, hikers felt more constrained at campsites (which were limited in size), compared to the situation on trails where the number of encounters may not have constrained people as much as at campsites.

Acceptability by Visitors of the Reservation System

Reservation systems are not always favored by wilderness writers, because visitor behavior is controlled rather than influenced, thus diminishing the freedom of action associated with wilderness experiences (Hendee et al., 1990). However, when a quota system is implemented, a reservation system is more supportable, in that people can be guaranteed the opportunity to visit an area where use levels are controlled. On the West Coast Trail, up to 40 of the 52 places available in the daily quota are allocated for reservations; the remaining 12 places are available on a first come, first served basis.

Visitor opinions were mixed regarding this reservation system, with 26% opposed. Reasons for this mixed response were explored with a series of follow-up questions, illustrated in Figure 4. Although many people felt the reservation system made it "easier to plan ahead," many felt this made it "more difficult to hike the trail on short notice;" it was "difficult to phone to make a reservation;" it "detracts from the freedom of a wilderness experience," or, "the CAN$25 fee was a concern."

Parks Canada responded by retaining the reservation system, but improved the telephone system by implementing a 1,800 telephone number developed by Tourism B.C. for all accommodation listings in the province. Use of this reservation system remains high. In the two years since this study was conducted, the reservations for the season are sold out within three days.
Figure 1. Satisfaction with the West Coast Trail.
Figure 2. Perceptions of crowding: number of encounters.

Figure 3. Perceived visitor impacts on park resources.
Acceptability by Visitors of a Proposed User Fee System

User fees have been criticized because, like a reservation system, they regulate or restrict visitor behavior rather than influencing or modifying visitor (Henley et al., 1990). Specifically, user fees are criticized because they may constrain those unable to pay a fee. However, fees were considered for the West Coast Trail because the budgets for managing national parks in Canada have declined dramatically in recent years due to fiscal restraint policies of the federal government, while at the same time, the number of national parks has increased.

The limited literature addressing willingness to pay to travel in a wilderness area suggests the maximum acceptable price is about CAN$25 per person (Fedler & Miles, 1986; Lindsay et al., 1992). A national public opinion poll had indicated support in principle of establishing a user fee at heavily used backcountry areas in national parks (Reid, 1993). However, the determination of how much visitors were willing to pay to hike at particular settings such as the West Coast Trail was not known.

Respondents were provided with the information that the cost to taxpayers in Canada to maintain the West Coast Trail was CAN$65 per hiker. How much of this CAN$65 did they feel was fair to charge people to hike the West Coast Trail? Responses in Figure 5 indicate that 85% of the sample were prepared to pay at least CAN$25, although Germans were less willing to pay a fee at the higher end of the scale. Subsequent analysis by income level showed no significant variation by lower or higher income groups.

Possible reasons for this result are as follows:
1. Respondents were provided with the real cost to manage the trail. This information was not provided in other studies reviewed.
2. Hikers were assured that the revenues collected in the user fee would be retained in the park for trail maintenance, and would not be collected in consolidated revenues by the federal government.
3. People already spend considerable sums for equipment and food; so the user fee may be rather small in comparison.
4. Hikers may be comparing this fee with the cost to stay in commercial campgrounds or provincial parks (generally between CAN$12-CAN$16 per night).
5. Hikers surveyed can relate their opinions on a user fee to high emotional feelings as a result of their hiking experience.

It is also important to mention that willingness to pay measures have been criticized on at least two levels; "strategic bias," and "hypothetical bias" (Bishop & Heberlein, 1990; Johnson et al., 1990). Strategic bias refers to the tendency of respondents to deliberately provide a lower or higher willingness to pay response compared to their true feelings. Hypothetical bias refer to the difficulty many people have in assigning a monetary value to a commodity not normally sold or purchased in the market place. Both of these concerns were addressed in the West Coast Trail survey. First, hypothetical bias was mitigated by providing hikers with the actual cost to manage the West Coast Trail. Hikers could provide what they felt was a reasonable user fee, given the true actual cost of managing the trail. Strategic bias was addressed by providing a relatively low consequence. The maximum consequence was CAN$65, which compares favorably with the cost of other camping opportunities in commercial campgrounds or provincial parks. Finally, it should be noted that these results are more an indication of "acceptance to pay," rather than willingness to pay. We suspect that visitors would probably pay even more than indicated in these results. True willingness to pay estimates may be difficult to determine, but we feel these results indicate a strong acceptance of the principle of paying a fee. This is significant finding, within the context of a national park system where user fees are virtually non-existent at the time this study was conducted.

As a result of this research, Parks Canada decided to implement a user fee of CAN$65 per person to hike the West Coast Trail. During the last two years, the quota and reservations have been filled to capacity, with few objections. Similar studies conducted in Banff and other national parks have resulted in the introduction of user fees in other national park wilderness areas in Canada (Parks Canada, 1995).

Summary

This paper describes how concepts of wilderness management can be applied to coastal wilderness areas. In coastal areas, management for wilderness is constrained by the following:
1. The difficulty in protecting coastal areas in a wilderness condition, given the high demand to use these places for other purposes, or for intensive forms of tourism development.
2. The difficulty in dispersing people away from the marine interface, where crowding and resource impacts are most severe.
3. Marine settings are particularly sensitive to visitor impacts.
4. The cost to maintain ecological integrity in these settings is often higher than in other types of wilderness settings.

Of the management issues described for the West Coast Trail, site hardening and trail design (bridges, boardwalks, ladders, cablecars, toilets) are viewed by some people as controversial and a departure from the simpler forms of
Figure 4. Attitude to reservation system.

Figure 5. Acceptable user fee.
infrastructure normally associated with wilderness areas. However, this level of site management may be necessary in coastal wilderness where site conditions are so sensitive to visitor impacts. Other management strategies for coastal wilderness areas were supported by visitors to the West Coast Trail, including the following: limits to party size; quota system; reservation system; and user fees.

Visitor research was an integral part of the process for introducing and validating the use of these strategies, although it can be argued that wilderness areas should not be managed just to meet tourism demands. In fact this study demonstrated circumstances where Parks Canada decided not to provide more services and facilities such as more warden patrols, even though a significant number of visitors would welcome such actions.

References


UNDERSTANDING PATTERNS OF TRAVEL IN THE GREAT BARRIER REEF REGION: IMPLICATIONS FOR MANAGEMENT OF COASTAL AND MARINE TOURISM

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Abstract: A critical component of managing coastal and marine tourism is understanding the patterns of tourism use of these areas. The Great Barrier Reef (GBR) is one of Australia’s major tourism draws, visited by more than 1.3 million commercial tourists in 1994. Despite this significance there is virtually no data available on the patterns of use of this area by tourists. A search of the tourism and environmental management literature indicates that such information about tourists is generally scarce. In response to this gap in the research data one of the core questions guiding a major research project focused on tourism and the Great Barrier Reef is this one of understanding where and how tourists access the GBR. The present paper will report on a survey of over 1600 tourists to the GBR region which included questions designed to elicit information on numbers of trips to the GBR, points of departure and types of operations used. The survey also measured various socio-demographic and psychographic details of the tourists. The resulting data provides two levels of information on coastal and marine tourist behaviour in the GBR region. The first level is an overall pattern of where and how visitors access the reef. The second level will examine the relationships between travel patterns and visitor characteristics. The two major questions to be addressed in the paper are concerned with the identification of patterns of marine tourist behaviour and explanations of this behaviour. The answers to these questions are of significance in developing models to explain and predict coastal and marine tourism patterns.

Keywords: travel patterns, visitor segments, sustainable tourism

Research Needs For Strategic Tourism Planning in Coastal and Marine Settings

It is appropriate to begin with the principles of ecologically sustainable development as these provide the broad framework within which strategic tourism planning operates. In Australia we have had the benefit of a federal government sponsored process of examining what ecologically sustainable development means for tourism. The ESD Working Group concerned with tourism (1991) suggested that an ecologically sustainable tourism industry would be one which:

- considers carefully the quality of experiences offered,
- does not diminish the range of educational, recreational and environmental activities available to present or future generations,
- protects biological diversity and maintains ecological processes and systems,
- ensures the cultural integrity and social cohesion of communities.

To achieve such a tourism industry as described above requires regional strategic planning. The major elements and principles of in strategic planning for tourism are described in Guan (1994) and Hall and McArthur (1993). The most important point for the present paper from discussions of tourism strategic planning is the need for planning to be based on research information. In particular research into tourists and the structure of tourism in a region is seen as important for effective planning. These are the elements, however, most often missing from the process of planning and management of protected areas. Many authors have suggested that there has been too much emphasis, often as the result of political pressure, on development or implementation rather than research and evaluation (Dowling, 1993; McArthur and Hall, 1993; Guan, 1994). “The long-standing reliance on ‘gut feeling’ is being overdone and cannot be seen as reliable in the dynamic world of the visitor” (McArthur and Hall, 1993, p. 267).

Issues in Marine Protected Area Management

Kenchington (1993) proposed three major components of marine conservation management. These were management of structure (or the preservation of viable examples of the ecosystems under protection), management of process (or the maintenance of those processes necessary to sustain biological processes in the protected area), and management of amenity or the provision of options for human use of the protected area. It is this last component of management that is most direct relevance to the present discussion. Management for amenity involves decisions about the location and type of access and facilities provided for human use, and the regulation of different uses. It has long been recognised in the recreation and protected area management literature that managers have a major influence on visitor experiences through the way in which they provide settings...
Figure 1. Overall patterns of travel in the GBR Region.
for activities (Driver and Brown, 1978). Thus it is the management of amenity that most directly impacts upon the nature of tourism in a region.

**Research Needs: A Summary**

In summary, we must understand and research the following aspects of tourism in order to effectively plan for, develop and manage quality sustainable tourism to marine and coastal settings.

1. **The spatial distribution of tourism.** This first research area refers to a generating a detailed description of tourist use of an area. Such a description is necessary if managers are to be able to identify such things as sites of potential impact or use conflicts, or locations for facility provision.

2. **The nature of the market.** In order to make sound decisions on matters of access and facility provision managers must understand the factors which influence the experiences sought by visitors. These decisions must be guided by information on the motivations and expectations which guide tourist decisions. Specifically, it is must be recognised that there are different types of tourists, or market segments, each with a different profile in terms of activities sought, motivations and expectations.

3. **The factors which explain each of the above.** As previously noted, it is also necessary for managers to be able to predict future trends and requirements. Such predictions require both an understanding of larger forces in tourism such as changing patterns of travel opportunity, and the processes which create existing patterns of tourist activity.

**The Present Study**

The Great Barrier Reef Marine Park (GBRMP) encompasses an area of nearly 350,000 km² stretching from latitude 10.5 to 24.5 degrees along the coast of Queensland. Much of the Great Barrier Reef World Heritage Area is included in the Marine Park. The GBRMP contains 2,500 reefs and 250 continental islands (Ortezen, 1988). The Great Barrier Reef (GBR) is a major tourist attraction with more than 1.3 million commercial visitors in 1994. The growth in tourism to this marine protected area has been a cause for concern over sustainability and impacts in recent years with agreement that much more research into tourist use of the region is necessary (Kenchington, 1993; Benzaken, 1993). In particular information on the spatial distribution and types of tourist visiting the GBR has been identified as of particular value to managers (Benzaken, 1993).

The present paper will report on these two aspects of tourism to this region using the information gathered in a major survey of visitors to a region adjacent to the Central Section of the GBRMP. The survey results will be used to investigate overall patterns of use and the relationships between patterns of use and visitor characteristics. Thus the present paper is concentrating on the first two aspects of tourism described in the summary above and seeks to use data on these aspects to examine the fifth aspect of understanding the factors which influence the structure of tourism. As the fifth topic is of direct interest to a broad audience this paper will concentrate on examining the relationships between travel patterns and visitor characteristics.

**Method**

A total of 1,664 surveys were collected from visitors to the North Queensland region. The aim of the research project was to gather information about reef tourism from as broad a range of visitors as possible. To achieve this aim surveys were handed out at local and regional tourist information centres, at transport modes such as ferry terminals, major tourist attractions and on a variety of commercial reef tourism operations. These operations included day trip operators using large catamarans with pontoons moored at the destination reef, large catamarans visiting sand cays, smaller boats traveling both to reefs and to islands, cruise boats and dive trips. The overall response rate was 80%.

International visitors accounted for 36% of the sample, with a further 23% interstate visitors, 33% residents from coastal regions adjacent to the GBR and 9% visitors from other parts of the region. The average age of the sample was 37 years (Std Dev = 15) with a median age of 33 years. The mean length of stay for tourists not on a recreational day trip was 25 days (Std Dev = 47), although more than half of the sample were staying in the region for less than 12 days.

**Results**

**Understanding Patterns of Access**

Respondents were asked to use a map of the region to indicate their actual and intended travel itinerary. They were also asked about actual and intended visits to the GBR focusing on the types of operation used to access the GBR and points of departure. Figure 1 provides a map of the region under study showing the distribution of visitors' stopovers. The figure also provides the distribution of departure points used to access the GBR. Tourists appear to travel extensively throughout the coastal regions adjacent to the GBR. The prominence of Townsville as a departure point for reef tours reflects the restrictions of the
survey region. Caims and Port Douglas are the major departure points for commercial reef operations.

As the major focus of this paper was on investigating the relationships between travel patterns and visitor characteristics the data were examined to identify travel patterns. Thus examination indicated that visitors could be segmented or categorised on the basis of their reef travel behaviour.

Five main groups were identified:
1. Visitors who had not been and were not going to the reef on this trip to the region (24% of the sample).
2. Visitors who had not been to the reef when surveyed but who intended to go while in the region (9.4% of the sample).
3. Visitors who had been on one reef trip during their stay and did not intend to visit the reef again (34%).
4. Visitors who had been once and intended to go again during their stay (9%).
5. Visitors who had been to the GBR more than once during their stay in the region (22%).

Three travel pattern groups were chosen for further study. The last two groups were combined as the only difference between them was the time they had spent in the region before being surveyed, and the second group was removed from further analysis as it was not possible to determine whether their actual behaviour would match their intentions.

The two groups who had visited the reef were used to further examine patterns of reef access. Table 1 summarises the date on types of reef operation used and points of departure for these two groups. Clearly day trips using large catamarans traveling to pontoons moored at a reef are popular operations especially for visitors who travel only once to the reef. Visitors who go more than once are more evenly spread across the different types of operation. Of particular interest is the difference between first and second trips for those who go to the reef more than once. More detailed analyses of this information suggested that these visitors sought variety in their reef experiences with 74% choosing a different kind of operation for their second trip to that used on their first trip. This was particularly the case for large day trip operators with 33% of the visitors choosing a different type of operation for their second experience. Visitors going on dive trips were the most likely to repeat that experience (47% repeated a dive trip). The respondents also chose variety in their departure points with nearly 70% choosing a different location for their second trip.

Relationships Between Travel Patterns and Visitor Characteristics

The major question driving the analyses reported in this section was why do some people not visit the reef, why do some only visit once, and why do some repeatedly visit the reef? To answer this question a number of visitor characteristics likely to distinguish among these three groups were explored. The characteristics investigated included sociodemographic features (such as length of stay or transport used), activity participation and motivations for, or benefits sought from travel experiences.

Table 2 contains a summary of the analyses conducted for sociodemographic and trip features. Only analyses which found differences between the groups significant at the .01 level are reported. The results reported in Table 2 tell us that visitors who do not go to the reef are older, more likely to be traveling with children, more likely to be using their own vehicle, to be staying for a shorter time and to be interstate visitors. It is also worth noting that the biggest differences were usually found between this group and the two groups of actual reef visitors. It is noteworthy however that repeat reef visitors did have much longer trips and were more likely to be international than were visitors going to the reef on only one occasion.

Significant differences were also found among the three groups for activity participation and these are summarised in Table 3. Two major points can be made about the results in Table 3. Firstly, the “Don’t Visit” group generally have low rates of participation across the full range of activities. Secondly, in this table the largest differences usually lie between those who visit more than once and the other two groups. This is particularly the case for more physically strenuous activities such as walking and rafting and for the more nature-based activities such as seeing wildlife and bird watching.

The final set of characteristics which were investigated were the benefits sought from travel. Table 4 provides information on the travel benefits sought by the three groups. Again, a clear pattern emerges with the “Visit More Than Once” group valuing learning and excitement more highly than the other groups. The “Visit Once” group place the highest value on the social benefits of travel. Investigations were also conducted into the levels of satisfaction expressed for reef experiences by the two groups who had visited the reef. There were no difference between the two groups for overall satisfaction but the repeat visit group were more likely to say they would visit the GBR again if they returned to the region (87% versus 74%).

The research identified three main types of visitor to the coastal regions adjacent to the Great Barrier Reef. The first group who did not visit the GBR can be described as
### Table 1: Types of Tourist Operation and Points of Departure for Great Barrier Reef Trips

<table>
<thead>
<tr>
<th>Type of Operation</th>
<th>Visit Once</th>
<th>Visit More than Once</th>
<th>Visit More than Once</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day Trip (Ponoon)</td>
<td>50%</td>
<td>34%</td>
<td>12%</td>
</tr>
<tr>
<td>Day Trip (Helicopter)</td>
<td>9%</td>
<td>12%</td>
<td>10%</td>
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<tr>
<td>Cruise (more than one night)</td>
<td>7%</td>
<td>7%</td>
<td>5%</td>
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<tr>
<td>Dive Trip (more than one night)</td>
<td>4%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Dive Trip (day trip)</td>
<td>4%</td>
<td>13%</td>
<td>17%</td>
</tr>
<tr>
<td>Charter Fishing</td>
<td>2%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Day Trip (Island/s)</td>
<td>10%</td>
<td>20%</td>
<td>38%</td>
</tr>
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</table>

### Table 2: Summary of Analyses of Socio-Demographic and Trip Features

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<th>Don't Visit</th>
<th>Visit once</th>
<th>Visit more than once</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age (SD)</td>
<td>30 years (15)</td>
<td>36 years (15)</td>
<td>35 years (15)</td>
</tr>
<tr>
<td>% traveling with children</td>
<td>34%</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>% traveling with friends</td>
<td>16%</td>
<td>21%</td>
<td>24%</td>
</tr>
<tr>
<td>% International</td>
<td>8%</td>
<td>33%</td>
<td>54%</td>
</tr>
<tr>
<td>% Interstate</td>
<td>21%</td>
<td>28%</td>
<td>29%</td>
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<tr>
<td>% IntraState</td>
<td>16%</td>
<td>8%</td>
<td>5%</td>
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<tr>
<td>% Local residents</td>
<td>55%</td>
<td>29%</td>
<td>10%</td>
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<tr>
<td>% using private vehicle</td>
<td>55%</td>
<td>37%</td>
<td>31%</td>
</tr>
<tr>
<td>% using bus</td>
<td>7%</td>
<td>13%</td>
<td>24%</td>
</tr>
<tr>
<td>% using plane</td>
<td>11%</td>
<td>17%</td>
<td>16%</td>
</tr>
<tr>
<td>Mean Length of Stay in region (SD)</td>
<td>16 days (20)</td>
<td>17 days (25)</td>
<td>35 days (65)</td>
</tr>
</tbody>
</table>

### Table 3: Summary of Analyses of Activity Participation

<table>
<thead>
<tr>
<th>Activity Participation</th>
<th>Don't Visit</th>
<th>Visit Once</th>
<th>Visit More Than Once</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birdwatching*</td>
<td>16%</td>
<td>20%</td>
<td>33%</td>
</tr>
<tr>
<td>Bushwalking*</td>
<td>19%</td>
<td>26%</td>
<td>35%</td>
</tr>
<tr>
<td>Camping*</td>
<td>18%</td>
<td>26%</td>
<td>35%</td>
</tr>
<tr>
<td>Canoeing*</td>
<td>10%</td>
<td>9%</td>
<td>14%</td>
</tr>
<tr>
<td>Mangrove Visits*</td>
<td>10%</td>
<td>13%</td>
<td>25%</td>
</tr>
<tr>
<td>Rainforest Walks*</td>
<td>43%</td>
<td>67%</td>
<td>91%</td>
</tr>
<tr>
<td>Snorkeling*</td>
<td>16%</td>
<td>20%</td>
<td>59%</td>
</tr>
<tr>
<td>Scuba Diving*</td>
<td>8%</td>
<td>15%</td>
<td>34%</td>
</tr>
<tr>
<td>Seeing Wildlife</td>
<td>22%</td>
<td>30%</td>
<td>52%</td>
</tr>
<tr>
<td>Swimming*</td>
<td>22%</td>
<td>66%</td>
<td>72%</td>
</tr>
<tr>
<td>Viewing Marine Animals</td>
<td>17%</td>
<td>43%</td>
<td>49%</td>
</tr>
<tr>
<td>Visit Beaches</td>
<td>43%</td>
<td>62%</td>
<td>75%</td>
</tr>
<tr>
<td>Viewing Islands</td>
<td>29%</td>
<td>53%</td>
<td>66%</td>
</tr>
<tr>
<td>Visiting National Parks</td>
<td>28%</td>
<td>43%</td>
<td>58%</td>
</tr>
<tr>
<td>White Water Rafting*</td>
<td>4%</td>
<td>9%</td>
<td>64%</td>
</tr>
</tbody>
</table>

*Difference is greatest between third and other two groups.

### Table 4: Summary of Analyses of Travel Benefits Sought

<table>
<thead>
<tr>
<th>Travel Benefit</th>
<th>Don't Visit</th>
<th>Visit Once</th>
<th>Visit More Than Once</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel in General</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn/develop new skills</td>
<td>2.2 (0.7)</td>
<td>2.0 (0.6)</td>
<td>1.9 (0.6)</td>
</tr>
<tr>
<td>Be with family and friends</td>
<td>2.2 (0.8)</td>
<td>2.5 (0.9)</td>
<td>2.7 (0.8)</td>
</tr>
<tr>
<td>Seek entertainment</td>
<td>2.3 (0.7)</td>
<td>2.0 (0.7)</td>
<td>1.9 (0.6)</td>
</tr>
<tr>
<td>Travel to the GBR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Be with family and friends</td>
<td></td>
<td>2.3 (1.0)</td>
<td>2.6 (1.0)</td>
</tr>
<tr>
<td>Learn about the GBR</td>
<td></td>
<td>1.7 (0.8)</td>
<td>1.5 (0.7)</td>
</tr>
</tbody>
</table>

Note: Table reports mean scores on a four-point scale from 1 "very important" to 4 "not at all important". Figures in brackets are Standard Deviations.
older, more likely to be local residents, travelling with children for shorter stays with low levels of activity participation. The second group who visit the GBR only once during their stay in the region were younger with shorter stays in the region and moderate levels of activity participation particularly for more strenuous and nature based activities and with mainly social travel motives. The third group of repeat reef visitors were the youngest, most active, most international, with the longest stays and motives related to self development and nature experience.

Discussion

The visitors profiles described in the previous section are consistent with other major surveys of visitors to this coastal region. None of the previous studies, however, investigated actual reef travel behaviour and so were not able to connect these visitor or market segments to types of operation used or frequency of reef travel. The present study provides this connection and these results on the relationship between travel behaviour in a marine protected area and visitor characteristics has valuable implications for managers.

Several important management implications can be drawn from the results which have been described. The first and most important is that of growth and change in demand for operations. Clearly there will be continued growth in demand for reef operations with growing visitor numbers to these coastal regions and this will provide continued support for large day trip operations which are the preferred option for one time and first time reef visitors. As the region matures as a destination, however, and attracts higher proportions of repeat visitors, the present study results suggest greater demand for smaller more specialised operations at a greater variety of locations. Demand is likely to both support existing high use nodes and spread use to other areas. Currently the Great Barrier Reef Marine Park Authority allocates two types of permits to commercial tourist operators—site specific and roving permits which allow the operator to move around several reef locations. Roving permits are harder to monitor and control. So the increased demand in currently low use areas will be for smaller boats with roving permits. Given that visitors using these operations are more active and more interested in reef contact, then this increased demand will result in more pressure on a broader range of sites.

Managers then are faced with the dilemma of allocating use or access to two growing but not necessarily compatible uses, thus large site specific day trip operations and smaller, roving, more reef intensive operations. If, as this study indicates, there is a tendency to move to smaller, more specialised operations, then managers need to understand that current allocations of access to any one particular type of operation may restrict future growth and opportunities for other types of operations.

Finally, the visitors who do not go to the reef need to be considered. Why doesn't this group go to the Great Barrier Reef? It could be that the appropriate opportunities are not available. In that case further research could indicate new opportunities for tourism operators. It could be argued that encouraging more reef visits is inconsistent with sustainable use. It should be remembered, however, that this group are less likely to be exposed to interpretation about the reef (they were not significantly different to the other groups in their use of land-based interpretive settings such as aquaria) and less likely to support its conservation. (The study found that this group were consistently, although not significantly, less likely to describe the Great Barrier Reef as valuable, living, complex, unique, fragile or beautiful.) More than half of this group live on the coast adjacent to the Great Barrier Reef and so their reluctance to visit the reef is a lost opportunity to promote more sustainable behaviours where they live.

References


USING INTERPRETATION TO
MANAGE VISITOR BEHAVIORS
IN FRAGILE COASTAL AREAS

Diane Kuehn
New York Sea Grant (United States)

Abstract: Visitor use of fragile coastal areas often causes
problems such as erosion of sand dunes and destruction of wildlife
habitat. Managing visitor behavior patterns in these areas is crucial to
preserving them. Interpretation (i.e., educating visitors about resources
and attractions in an entertaining way) is an important mechanism
for managing visitor behaviors. By implementing a carefully planned
interpretive program that includes the development of interpretive signs,
publications, and exhibits, and hiring of interpretive staff, the impacts
of visitor use can be reduced. The planning process involves
inventorying coastal resources, identifying objectives and goals, and
implementing and evaluating the plan. A case study of the interpretive
program developed for the Eastern Lake Ontario Dune and Wetland
Area, a 17-mile stretch of sand dunes and wetlands along Lake
Ontario's eastern shore in New York state, will be discussed.
Interpretive signs, publications, and staff are used in this program to
dissuade visitor impacts in the area. This program coordinates
the activities of the two state agencies and one not-for-profit group that
own property in the area, making it possible to create interpretive signs
and publications that meet visitor and resident needs, are suitable to
the coastal environment, are consistent throughout the area, and are
economical to produce. Program evaluation is currently underway and
includes measuring the re-vegetation of beachgrass on dunes eroded by
visitor use, and observing visitor use patterns. Positive feedback has
been received from private property owners, and state and local
agencies.

Keywords: interpretation, interpretive planning, wetlands, sand
dunes

Introduction

Coastal areas are often susceptible to damage caused by
visitor use. Sand dune erosion, sand infiltration into
wetlands, and loss of wildlife habitat are a few of the issues
that face coastal areas today. These issues are not likely to
decline in the future. Visitations to coastal areas is expected
to increase into the next century as more and more people
participate in water-related activities such as boating,
swimming, and fishing (Cordell, 1990). Because of this,
finding a way for visitors to use coastal areas while
preserving these fragile resources is crucial.

One method that has been found effective for lowering
visitor impacts is interpretation. By educating visitors about
the damage that incorrect use of coastal areas causes and
enabling them to correct their actions, the destruction of
coastal areas can be greatly reduced. This presentation
focuses on how an interpretive plan was developed and is
being implemented along a sand dune and wetland area in
central New York state.

Background Information

Along Lake Ontario's eastern coastline is a 17-mile stretch
of sand dunes and wetlands, New York's only freshwater
dune ecosystem (Figure 1). This area is comprised of three
Wildlife Management Areas managed by the New York
State Department of Environmental Conservation (DEC),
one state park managed by the New York State Office of
Parks, Recreation, and Historic Preservation (OPRHP),
two natural areas (one managed by the DEC) owned by
The Nature Conservancy (TNC), and many privately-
owned properties.

Visitor use is high in the area. Visitor use studies conducted
from Memorial Day Weekend through Labor Day Weekend in 1988, 1989, and 1990 show that the mean
number of one-hour summer visits to state-owned properties varied from 73,500 at Southwick Beach State
Park to 26,400 at Deer Creek Wildlife Management Area.
Of these visits, 67.0% were for beach use, 18.0% for
swimming, 7.0% for dune use, 1.3% for camping, and 0.3% for
off-road vehicle use (Bonanno et al., 1990).

Dune erosion caused by visitor use is a continual problem
in the area. Activities such as walking or riding vehicles
across the dunes kills the American beachgrass that holds
the sand in place, causing dune erosion. Once erosion
begins, sand filters into the wetlands once protected by the
dunes, harming wildlife habitat and decreasing the quality
of recreational opportunities there.

In order to educate the public about the fragile dune and
wetland environment, a group called The Ontario Dune
Coalition (TODC) formed in the mid-1980s. Members of
the group included state and local agency representatives,
and members of local community and not-for-profit
groups. Early efforts of the group included hiring a dune
naturalist and holding an annual Dune Appreciation Day
during which the dunes were planted with beachgrass and
naturalist-led hikes were offered to the public.

The combined efforts of the naturalist and the Dune
Appreciation Days increased public awareness of the
problems facing the dune and wetland area, and, to a
certain degree, reduced pedestrian and visitor traffic over
the dunes. TODC realized that a more comprehensive
interpretive effort was still needed. In 1993, New York Sea
Grant, a founding member of TODC, suggested that a
comprehensive interpretive plan be developed. This plan
would contain a list of prioritized recommendations for
interpretation on the five properties in the dune and
Figure 1. The five state-managed properties within the Eastern Lake Ontario Dune and Wetland Area contain numerous access point, trails, and creeks.
wetland area open to the public. During the summer of York College of Environmental Science and Forestry (SUNY CESF) was hired as a Sea Grant Scholar to develop the plan.

The Planning Process

Inventorying Coastal Resources

Inventorying involves identifying the resources that exist in a coastal area. For the Eastern Lake Ontario Dune and Wetland Area, the resources consisted of the dunes and wetlands; local flora and fauna; and numerous trails, creeks, and ponds scattered throughout the area. Access points to the trails and waterways were also inventoried, along with the facilities (e.g., rest rooms, fishing piers) located at each. “Trouble spots” (i.e., areas of incorrect or high use) as well as information on the absence or presence of adequate directional signage were noted.

Developing Objectives

Several outcomes or objectives were identified from the inventory and group discussions with TODC. These objectives were:

1. To change incorrect visitor use of the dunes by educating visitors about the effects of improper use on dune erosion and wetland degradation.
2. To channel visitor use to designated walkways, trails and boat routes, dune walk-overs, and state-owned or state-managed access areas.
3. To interpret information about flora, fauna, and wetland and dune habitats to visitors.

Developing a Theme

Theme development was crucial to guiding the development of the interpretation in the dune and wetland area. A theme is the concept or idea that unifies or connects the resources of a region, and is stated in sentence format. Visitors should have a clear understanding of it during their visit. The theme developed for the Eastern Lake Ontario Dune and Wetland Area is: “With a little understanding and care, the sand dunes and wetlands of eastern Lake Ontario can be preserved for both wildlife and people.”

Identifying Interpretive Recommendations

Interpretive recommendations are developed by considering the objectives and theme for the area, and determining the best methods for accomplishing them through interpretation (i.e., by developing interpretive centers, exhibits, signs, guidebooks, or taped messages, or hiring staff). The recommendations for the Eastern Lake Ontario Dune and Wetland Area were compiled in a report 1995, a graduate student from the State University of New York entitled “Interpretive Recommendations for the Eastern Lake Ontario Dune and Wetland Area” (Earnest, 1995). The recommendations are prioritized in the report to enable easy decision making and implementation by state and local agencies should funding become available. Some of the recommendations included in the report are below.

Signs. Three series of interpretive signs are suggested for the area. The first, “erosion control signs,” are recommended for installation on the beach in front of the dunes, especially near high impact areas. A small size (9” x 11”) was chosen so that, while still visible, the signs would not detract from the natural landscape.

The second type of sign suggested are directory signs. By showing where public access points are in the area, these signs would reduce the use of “unofficial” or highly sensitive access areas. Interpretive information about lowering the impacts of visits to the area would also be included on them.

The third type of sign are trail signs. This series of interpretive signs would be installed along a highly-used trail that travels through Southwick Beach State Park and Lakeview Marsh Wildlife Management Area. The signs would educate visitors about the habitat transition from woodland to wetland to sand dune along the trail.

Guidebook. A guidebook to the many trails and canoe routes in the area is recommended in the plan for channeling visitor use to designated public access areas and trails. Interpretive information about how to prevent dune erosion and local flora and fauna would also be included.

Other recommendations. Several other recommendations were included in the interpretive plan:

1. Develop lesson plans on dune ecology for the teachers of school groups visiting the area.
2. Continue hiring a dune naturalist annually.
3. Increase the patrolling of the state-owned properties by the DEC.
4. Develop additional trails.
5. Improve the directional signage at designated access areas.

The development of a dune interpretive center, while included in the plan as a potential option for future development, was not strongly recommended. Such a center could potentially increase visitation to the area, and consequently dune erosion and wetland degradation.

Implementing the Plan

All members of TODC have worked together to implement and fund the interpretive recommendations. Each agency has installed its own interpretive signs, saving
installation costs. Guidebook printing and sign production costs were funded by a New York State grant obtained by the Oswego County Department of Planning and Community Development. The salary for the Sea Grant Scholar position was funded by the New York Sea Grant Institute. Sea Grant staff also designed the signs and guidebook, saving an estimated $3,000 in design costs. Dune naturalists have been hired by the DEC, NY Sea Grant, OPRHP, and TNC, and through foundation grants in the past.

Certain factors were kept in mind during the design of the interpretive signs and guidebook. First, that visitors were being given a negative message during their visits (i.e., “stay off the dunes”). This message needed to be communicated to visitors in as positive a way as possible. This was done by not only educating visitors about dune erosion and its causes, but encouraging them to become land stewards during their visits to prevent it. Next, if visitors are expected to stay off the dunes, they will need to cross the dunes on designated walkways. A series of walkways is currently being established, some of which are wooden structures, others designated paths. Both signs and guidebook maps identify the locations of these walkways. Third, certain site characteristics needed to be considered as sign materials were chosen. In the past, wood signs and sign posts installed along the beach were used for campfire fuel. Aluminum signs and posts were therefore chosen. Heavy-gauge aluminum signs would also be able to withstand the fierce coastal environment. Finally, the limited budget for the signs and guidebook ($10,000) made it necessary to look for sign materials that could be made into multiple copies as inexpensively as possible. For this reason, fiberglass embedded signs were chosen for the area directory signs and silk-screened ones for the “erosion control” signs.

Signs. Six different “erosion control” signs were designed and produced: “Poison ivy,” “Dunes are fragile,” “Dunes are fragile...use designated walkways,” “Bank swallows,” “Dune blowout,” and “Designated walkway” (Figure 2). These are being posted on state-owned and TNC properties by the DEC, TNC, and OPRHP. Private landowners have also agreed to post these signs on their property.

Fiberglass embedded signs were chosen for the large (30” x 45”) directory sign. These signs are being posted at ten major access areas throughout the dune and wetland area on kiosks funded and built by the DEC and Seaway Trail, Inc. (the planning organization for the Seaway Trail, a scenic byway along New York’s Great Lakes coastline which passes through the dune and wetland area).

Guidebook. Five-thousand copies of the 24-page guidebook entitled “Sand, wind, and water: A recreational guide to eastern Lake Ontario’s dunes and wetlands” were printed in 1996 (Earnest and Kuehn, 1996). These are being distributed by the DEC, OPRHP, TNC, NY Sea Grant, and other state and local agencies.

Promotional Considerations

Because of the fragile nature of the dune and wetland area, the interpretive plan suggests that no formal promotion strategy be implemented. Rather than attracting increased numbers of visitors to the area, the interpretive program should continue to focus on lowering the impacts of the visitors that are already coming.

Evaluation

Prior to the development of this comprehensive interpretive plan, evaluation of interpretive efforts was purely observational. Namely, identifying whether areas that were planted with beachgrass and posted with a “Stay off the dune” sign were soon trampled or not. Many of the areas planted with beachgrass continue to be undisturbed today. However, extensive dune erosion continues in certain locations, indicating that while the combination of hiring a dune naturalist and encouraging public participation in dune restoration efforts was effective, a more comprehensive interpretive plan was still needed.

Following the installation of “erosion control signs” throughout the area in the spring of 1996, a formal evaluation program was initiated by NY Sea Grant. This program is comprised of two major components: identifying the impacts of the interpretation on the visitors coming to the area, and identifying changes in the growth of beachgrass on the dunes. The first component involves observing visitor use of the dunes in the Deer Creek Wildlife Management Area, a highly-impacted area that has been posted with erosion control signs. The second component involves measuring the revegetation of beachgrass in dune blowout areas (gaps through the dunes caused by wind erosion), and measuring changes in revegetation annually. The results of this second component will not be available for several years.

Other outcomes have resulted from this project. The graduate student hired to write the interpretive plan successfully completed her Master of Science degree. The state and local agencies involved have a better understanding of the value of interpretation, and are now working on their own to implement portions of the interpretive plan in the state-owned properties they
manage. And finally, the willingness of landowners to participate in the interpretation program by posting interpretive signs has been established.

Conclusion

In the past, studies of visitor use have indicated that most visitors visit the dune and wetland area mainly to use the beach and lake for recreational activities. An average of 7% of visitors walk through the dunes, and 0.3% use off-road vehicles on the beach and in the dunes, both activities which lead to dune erosion (Bonanno et al., 1990). It is this 7.3% of visitors that need to be educated about the impacts of their activities on dune erosion and wetland degradation.

Past interpretive efforts have proven to be effective in increasing the public's awareness of dune erosion. Through the development of a comprehensive interpretive plan for the area, this effectiveness will increase. Although increased patrols of the area combined with interpretation would be most effective, declining state budgets do not make this feasible at present. Increased stewardship by private landowners is an important component of interpretive efforts in this area. Implementation of more of the recommendations in the interpretive plan is anticipated (pending funding) in the future.

References


