Understanding and managing the off-road vehicle experience: indicators of quality

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Off-road vehicle (ORV) use is one of the most popular and fastest growing leisure activities in the United States. Most research on ORV use has focused on its potential environmental impacts and conflicts with other types of recreation, while relatively little research has examined the ORV experience itself. The concept of indicators and standards of quality has emerged in the literature as a conceptual framework for understanding and managing outdoor recreation. This study applies the concept of indicators of quality to ORV use at Cape Cod National Seashore (Cape Cod). (Standards of quality for indicator variables are addressed in a companion paper in a later issue of Managing Leisure.) Qualitative interviews were conducted during the 2004 use season with 61 ORV users at Cape Cod to gather information on indicators of quality for the ORV experience. A content analysis was performed on the transcripts, and results suggest that crowding, the portion of the ORV route open, ease of obtaining a permit, amount of litter, availability of support facilities, and the behavior and actions of ORV users are potential indicators of quality. The portion of the ORV route open may be a less useful indicator because it is not easily adaptable due to current legislative and regulatory guidance for the management of threatened shorebirds. The other variables are better potential indicators because they may be more readily measured and managed.

Keywords: ORVs, indicators of quality, visitor experience and resource protection, motorized recreation, Cape Cod National Seashore

INTRODUCTION

Off-highway vehicle (OHV) use is one of the most prevalent and fastest growing leisure activities on public lands in the USA. During the period from 1982 to 2001, the number of participants increased by more than 100%, and from 1999 to 2005 the estimated number of OHV users in the USA grew from 36 to 51 million people (Cordell, 2004; Cordell et al., 2005). This indicates that nearly one in every five US residents uses an OHV. OHV recreation is also common in many other countries, such as Australia, Canada, and South Africa. The potential benefits of the activity (including challenge, spending time with family, and experiencing nature) will likely contribute to the continuation of these trends (Dennis, 1987; Woods, 1981).

OHVs include (1) motorcycles designed for off-highway use, (2) all-terrain vehicles (ATVs) and other specially designed off-road motor vehicles, and (3) street-legal four-wheel drive jeeps, automobiles, or sport utility vehicles (SUVs) when used for off-road recreation (Cordell et al., 2005). Some definitions of OHVs also include snowmobiles. The third category of OHVs above – street-legal vehicles used for off-road recreation – is defined here as off-road vehicles (ORVs).
ORV use is a substantial component of the OHV activity, and ORVs are the subject of the remainder of this paper.

Recreational use of ORVs can impact both the ecological and experiential qualities of the areas where it occurs. These impacts led the US Forest Service in 2006 to label unmanaged recreation in the form of ORV use as one of the four threats to the health of the nation’s forests and grasslands in the 21st Century (USDA Forest Service, n.d.). Likewise, the US National Park Service (NPS) is engaged in efforts to manage ORV use at several units of the national park system, including Denali National Park, Big Cypress National Preserve, Cape Hatteras National Seashore, and Cape Cod National Seashore.

The ecological impacts of ORV use have been widely studied and found to include damage to vegetation, increased erosion, reduced air quality, and disturbance of wildlife (Godfrey and Godfrey, 1980). Several extensive literature reviews of ORV use and its impacts have been conducted (Atkinson and Clark, 2003; National Off-Highway Vehicle Conservation Council, 2009; Stokowski and LaPointe, 2000). An examination of these reviews shows that nearly all research on ORV use has been directed toward the ecological consequences of the activity. Relatively little research has been conducted on the ORV user experience and management for the quality of that experience. This will be important to address since ORV use has been accepted in culture, policy, and law as a legitimate leisure-time activity on many public lands. In this paper, we do not ask whether ORV recreation should be allowed on public lands, but rather, how can ORV use be managed in the places it has been allowed to provide a high-quality experience for participants?

Most of the behavioral and experiential research that does exist examines conflict between ORV and non-ORV users. Motorized recreation has been shown to disrupt the experience of non-motorized recreationists, and these experiential impacts are largely one-sided (Badaracco, 1976; Jackson and Wong, 1982; Knopp and Tyger 1973; Noe et al., 1982). A study that went beyond the issue of conflict measured perceived crowding, satisfaction, and attitudes toward ORV use for both residents and non-residents of Cape Hatteras National Seashore (Hughes and Vogelsong, 2004). This study surveyed ORV users for normative standards related to crowding, but did not report if crowding was a factor important in defining the ORV experience. Also, in a study of snowmobiling at Yellowstone National Park this activity was regarded by participants as providing “highly meaningful recreational experiences, grounded in appreciating the park’s unique natural features and attributes” (Davenport and Borrie, 2005). Specifically, snowmobiling provided a level of freedom, access, and connection with the park that participants felt would not have been possible otherwise.

As demand for this already popular activity continues to increase in the USA and in other counties, more informed management of ORV use will be required. Scientific, empirically based information to understand the ORV experience will be important. More specifically, information is needed about the factors that influence the enjoyment of the activity. This paper describes a study that seeks to understand important aspects of the ORV experience at Cape Cod National Seashore and how these aspects might be managed to promote high-quality ORV recreation.

**INDICATORS OF QUALITY**

Several conceptual frameworks such as limits of acceptable change (LAC) (Stankey et al., 1985), visitor impact management (VIM) (Graefe et al., 1990), and visitor experience and resource protection (VERP) (Manning, 2001; National Park Service, 1997) have been formulated to help guide
management of recreational impacts and associated experiences. VERP is the framework currently used by the NPS to address visitor-related impacts at national parks, seashores, and other units of the national park system (Manning, 2001).

VERP begins by directing managers to set objectives for resource conditions and the quality of the visitor experience. However, these objectives must ultimately be expressed quantitatively in the form of indicators and standards. Indicators are measurable, manageable variables that act as proxies for desired resource and visitor experience conditions. Standards define the minimum acceptable condition of indicator variables. VERP requires that indicator variables be monitored. If monitoring suggests that standards of quality are in danger of being violated, then management action is required. Management actions can include a variety of practices, including use limits, spatial or temporal redistribution of use, protection of the site from further impacts (e.g. site hardening), educating visitors in an attempt to reduce impacts, and direct mitigation (e.g. picking up litter and replanting areas of vegetation).

To be most effective, indicators should meet several criteria (Manning, 2007; National Park Service, 1997). Two primary criteria are noted in the above definition of indicators, measurable and manageable. Indicators must be measurable to objectively determine their condition. Moreover, if indicators are outside the scope of managers’ control, then there may be little reason to focus on them in the context of management planning. Measurability and manageability are the focus of this paper since they are fundamental in determining if a variable can be used as an indicator.

Other criteria for good indicators do exist (for a review, see Manning (2007) or National Park Service (1997)). For example, indicators should also be significant to either leisure participants and/or managers. Use levels, for example, are both measurable and manageable, but unless participants feel that use levels are important in defining the quality of their experience, then it does little good to focus on use levels as an experiential indicator of quality. Additional criteria for good indicators include being objective, specific, reliable, repeatable, related to visitor use, sensitive, efficient to measure, and integrative. All of these characteristics must be considered in combination with the context of application – specifically policy, political, resource, and managerial constraints – when choosing indicators. Ultimately, the weighing of these additional characteristics for the selection of a final list of indicators requires the informed judgment of leisure managers.

One of the most common ways to inform the development of indicators of quality is through survey research directed at leisure participants and others who are most affected. For example, participants may be asked to report what they enjoyed most and least about their time at an area, or they may be asked to rate the importance of a list of potential resource and experiential impacts. Responses to these questions are then categorized and weighed against the criteria for indicators (Belnap, 1998).

Survey methods have helped NPS managers select indicators at various park units. For example, surveys were used to identify seven potential indicators of quality for visitors to the Boston Harbor Islands National Recreation Area (Budruk and Manning, 2006; Manning et al., 2005). These indicators included the number of people at one time at attraction sites, number of groups encountered while hiking, environmental impacts to trails, environmental impacts to campsites, amount of litter, amount of graffiti, and amount and quality of information provided to visitors about the park. At Alcatraz Island, which is part of the Golden Gate National Recreation Area, the number of
visitors in the historic prison’s cellhouse was identified by visitors as the most important indicator of quality (Manning et al., 2002). In other instances, indicators of quality may be informed or formulated by applying management judgment, by examining laws or policy guiding the management of an area, or through other means of consultation with the public (National Park Service, 1997).

Qualitative interviews have been suggested as another research-based approach for informing the development of indicators (Manning, 2007). Interviews typically ask a set of open-ended questions that encourage respondents to provide narrative, contemplative answers. Interviews with visitors and stakeholders were used at Arches National Park to identify indicators as part of a planning process employing the VERP framework (Manning et al., 1995). This study suggested that indicators of quality for the visitor experience at the park include the number of people at frontcountry attraction sites, the number of parties encountered along trails and at campsites, the number of vehicles encountered along the park road, the number of social trails and associated environmental impacts, the level of trail development, and visitor information regarding off-trail hiking regulations. Interviews were also used to identify indicators for the wilderness experience at Gates of the Arctic National Park (Glaspell et al., 2003). Analysis of transcripts from thirty-two interviews showed that visitors’ wilderness experiences were influenced by approximately 20 attributes, including the feeling of being the first visitor, a sense of freedom, timelessness of the area, and interactions with wildlife.

Qualitative methods, such as interviewing, may provide a greater depth of insight into recreational experiences than more quantitative approaches and are particularly useful when little is known about the nature of experiences or what influences them (Borrie et al., 2001; Glaspell et al., 2003). For example, measures of central tendency often employed in analyzing and reporting findings from quantitative recreation-related studies do not capture the full context or description of visitors’ experiences. Using qualitative methods to encourage respondents/visitors to elaborate on their experiences may therefore be well suited in helping to suggest indicators of quality.

**ORV USE AT CAPE COD NATIONAL SEASHORE**

Cape Cod National Seashore is located on the eastern coast of the USA in the state of Massachusetts (Figure 1). It was designated in 1961 as a unit of the US National Park System, and is now managed (along with over 390 other sites) by the NPS. This federal-level protection means that this area has been set aside as a national resource for enjoyment by all US citizens, not just local or state residents. Prior to 1961, the area was used by people who drove vehicles over its sand beaches. This area’s originating legislation and its subsequent interpretation through judicial review (e.g. Conservation Law Foundation of New England vs. Secretary of the Interior, 1989) recognized the activity of driving over the sand with ORVs as an appropriate and accepted use of the national seashore.

In the first few decades after establishment of the seashore, ORVs use was not formally managed, resulting in an extensive system of routes and trails on both beaches and sand dunes (Thatcher and Slobodian, 2004). The limited popularity of four-wheel drive vehicles necessary to drive on the beach kept the number of vehicles participating in the activity relatively low. However, as vehicles with four-wheel drive became commonplace in the 1990s – even attaining status as a cultural fad – demand for ORV driving on the seashore and elsewhere has increased (Monz et al., 2004).
Concern and the threat of litigation over increasing use levels and the potential impacts of ORV use on the Piping Plover, an endangered shorebird, led the NPS in 1995 to engage in a negotiated rule-making process with key stakeholders. An outcome of this process was a limit of 3400 ORV use permits granted per season. As of 2004, subsequent amendments to this limit have adjusted the number to 3200 annual permits and a pool of 200 weekly permits, which are reused throughout the season. In 2004, 3200 annual permits and a total of 2644 weekly permits were issued (Thatcher and Slobodian, 2004). Permit holders can use a 13.7 km ORV route at the seashore, but seasonal and temporary closures of portions of the ORV route to protect Piping Plover nests and chicks may substantially reduce the length of the ORV route available at any one time.

**METHODS**

During the 2004 ORV use season, indicators of quality for the ORV experience at Cape Cod were explored using qualitative interviews. Semi-structured interviews were conducted with users of the Cape Cod ORV route. Both ORV drivers and passengers were interviewed. ORV users were approached while they were on the route and asked to participate in the study. Those who agreed were asked a set of structured questions. These questions were used to guide the interview, but the interviewer was permitted to ask other clarifying or exploratory questions. The structured questions were open-ended and focused on collecting background information about a respondent’s ORV use, attitudes concerning ORV management, and potential indicators of quality for the ORV experience.

A purposive sampling approach was used in the selection of respondents. In this approach, respondents are selected based on the richness of information that they may contribute to the purpose of the research, not on their ability to represent a generalized population (Patton, 2002). In this study, purposive sampling was used to promote the inclusion of respondents from the diverse range of users on the ORV route. Purposive sampling was necessary because some ORV user types or attributes (e.g. users engaged in painting, holding a weekly permit, or at less utilized portions of the ORV route) are represented by a
relatively small portion of the ORV population, and these may not have been included in a randomly or systematically chosen sample of respondents.

Respondents were selected in order to represent a range of possible user attributes within one or more of six desired sampling categories: ORV permit type, gender, age, ORV type, activity engaged in, and use location. When multiple ORV users with the same attributes were present (e.g. engaged in fishing), the closest user to the researcher was selected as the respondent. Each respondent was asked to complete a brief card that collected information on their age and gender, and they were asked during the interview about the type of permit and ORV they had. These cards and responses were reviewed during the interview process to help judge if respondents represented a full range of possible user attributes in the six sampling categories indicated above. Interviews were conducted during both peak (July and August) and non-peak (May and October) ORV use periods. All interviews were conducted anonymously and recorded using a microcassette player. Tapes were later transcribed verbatim.

A content analysis was performed on the transcripts. Interviews were coded based on procedures described by Patton (2002) and Miles and Huberman (1994). Multiple codes were assigned, if applicable, to a response to a single question. For example, if respondents mentioned both wildlife and litter in their response to a question, then codes for both of these issues were assigned. Coding was viewed as the process of segmenting data into simpler, general categories that could be used to expand and tease out new questions and levels of interpretation (Coffey and Atkinson, 1996). All codes were developed inductively (Strauss and Corbin, 1990) – as they emerged from the text of the transcripts – but the structured questions were used as an organizing framework. The frequencies of codes were calculated for each question. Any text coded as ‘miscellaneous’ (i.e. those providing no meaningful information related to the study questions, e.g. “I don’t know”) is excluded from this paper for purposes of clarity. The codes resulting from the content analysis were used to identify potential indicators of quality for the ORV experience.

RESULTS

A total of 61 interviews were conducted during the 2004 ORV season: 2 in May, 26 in July, 22 in August, and 11 in October. Data saturation, the point at which little new information emerged, was used to help determine the appropriate number of interviews to be conducted (Marshall, 1996). Respondents were intercepted along the entire length of the ORV route and asked to participate in the study. Interviews lasted on average approximately 20 min, and over 700 pages of transcribed data were produced from the 61 interviews. A range of attributes in the pool of respondents was obtained for each of the six desired sampling categories. Across all the respondents, 77% held an annual ORV permit and 23% held a weekly permit. The age of respondents ranged from 18 to 83 years ($\bar{x} = 49.9, s = 13.1$). Males comprised 78% and females 22% of those interviewed. The respondent pool contained 67% SUV/truck users and 33% recreational vehicle (i.e. motor home) users. Respondents were engaged in a variety of activities, including fishing, sunbathing/relaxing, socializing with others, playing games on the beach, painting, and driving.

The Ideal ORV Experience

When asked to describe “their ideal ORV experience”, respondents provided answers that were grouped into 11 codes (Table 1). The most frequently occurring response codes that met the primary criteria of being measurable and manageable were those of
peacefulness and solitude. For example, Respondent #4 said “I think the sunset is what I enjoy out here. And I like sitting back relaxing and enjoying the beach. I mean, it’s…it’s awful peaceful.” Also, Respondent #8 typified the narrative associated with the code of solitude.

Respondent #8: When there isn’t as many people around, it’s great. When there’s a lot of people around, it’s a pain in the ass, you know. I mean you can’t imagine what it used to be like, I mean, you go along and you know, it’s really you and the seas.

Interviewer: What do they do that…?
Respondent #8: Well, they don’t do anything. It’s just they’re there.

Good weather, social experiences with friends and family, and meeting friendly people on the ORV route are codes that are not easily manageable, and in some cases difficult to measure. Good fishing was also excluded from consideration as a potential indicator because, while being measurable, management of the migratory, ocean-based fishery in the area is outside the authority of the NPS. Solitude and peacefulness, however, both might be managed by limiting the number of vehicles allowed on the ORV route, dispersing use, or through noise regulations. A limit on the number of vehicles that can use the beach at any one time is considered by Respondent #33 as a management method to promote solitude at Cape Cod.

Respondent #33: I don’t know whether to suggest this or even hint of it, but there’s a Department of the Interior beach in Maryland called Assateague Island and they have a beach access quota. And when the number of vehicles is reached, the beach is closed. And when one person leaves the beach, then another vehicle can enter the beach.

Interviewer: How do you feel about that arrangement?
Respondent #33: It’s probably necessary. It’s necessary. It helps to minimize the density so that the people who are on the beach can seek and find and appreciate the reason they went there. Some people go there for solitude and if there’s 15,000 people on the beach, they’re not going to find solitude. So beach density is a personal thing.

Other potential indicator variables that emerged from this question, though with

<table>
<thead>
<tr>
<th>Code</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good weather</td>
<td>18</td>
</tr>
<tr>
<td>Good fishing</td>
<td>17</td>
</tr>
<tr>
<td>Social experiences with friends and family</td>
<td>13</td>
</tr>
<tr>
<td>Solitude</td>
<td>11</td>
</tr>
<tr>
<td>Peaceful</td>
<td>6</td>
</tr>
<tr>
<td>Nature/wildlife to watch</td>
<td>6</td>
</tr>
<tr>
<td>Meet friendly people on the ORV route</td>
<td>4</td>
</tr>
<tr>
<td>Positive interactions with NPS</td>
<td>3</td>
</tr>
<tr>
<td>Open access to ORV route/no closures</td>
<td>3</td>
</tr>
<tr>
<td>No trash on beach</td>
<td>2</td>
</tr>
<tr>
<td>Having an inter-dune route for public ORV use</td>
<td>1</td>
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</tbody>
</table>

Table 1 Codes assigned for the responses to the question of “Describe your ideal ORV experience at Cape Cod. For example – what are you doing? What are other people doing? What are beach conditions like?”
less frequency, were nature/wildlife to watch, positive interactions with NPS staff, open access to ORV route/no closures, trash on beach, and having an inter-dune route for public ORV use.

A Good Day Using an ORV

Respondents were asked “What things make for a good day using your ORV at Cape Cod?” Of the resulting codes, solitude and peacefulness again arose as the most frequent responses for consideration as potential indicators (Table 2). Many of the codes from the previous question emerged once again in the response to this question, though with slightly different relative frequencies. For example, concepts of solitude and open access to the ORV route, and their relationship to each other, are expressed by Respondent #18 when asked what makes for a good day.

Respondent #18: No crowds.
Interviewer: What do you mean by that?
Respondent #18: It’s a day you can come out here where you’re not jammed in wall to wall... You know, the sad thing is, you know, with all the closures and stuff, as it jams in, it condenses people, so it takes a lot of the magic out. Even about five, six years ago, you could come out still on the weekend and have a hundred yards between vehicles, so you could just set up and be in like your own little world.

The code ‘no conflicts in use between swimmers and fishers’ was added during coding to the potential list of indicators in the answers to this question. Respondent #38 stated that “…when we come, we try to make sure that we’re not surrounded by fishermen because I’m afraid I’m going to get hooked.” This code relates to safety issues associated with swimmers and fishers using the same area.

Changes to the ORV Experience

Respondents were next asked “How has your experience using ORV’s at Cape Cod changed for the better or worse over the years?” Code frequencies indicate that visitors’ experiences on the ORV route predominantly changed for the worse (Table 3). The primary reasons given for this include closures of the ORV route for the Piping Plover and the resulting loss of space, increases in use levels, and greater difficulties in obtaining an ORV use permit. Respondent

Table 2 Codes assigned for the responses to the question of “What things make for a good day using your ORV at Cape Cod?”

<table>
<thead>
<tr>
<th>Code</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good weather/ocean conditions</td>
<td>26</td>
</tr>
<tr>
<td>Good fishing</td>
<td>24</td>
</tr>
<tr>
<td>It’s perfect as it is/any day is a good day</td>
<td>9</td>
</tr>
<tr>
<td>Solitude</td>
<td>8</td>
</tr>
<tr>
<td>Peacefulness</td>
<td>8</td>
</tr>
<tr>
<td>Socializing and spending time with friends and family</td>
<td>7</td>
</tr>
<tr>
<td>Wildlife/nature to watch</td>
<td>4</td>
</tr>
<tr>
<td>Minimal ORV route closures/an open ORV route</td>
<td>2</td>
</tr>
<tr>
<td>No conflicts in uses between swimmers and fishers</td>
<td>2</td>
</tr>
<tr>
<td>Meeting nice people on the ORV route</td>
<td>1</td>
</tr>
<tr>
<td>Positive interactions with NPS</td>
<td>1</td>
</tr>
<tr>
<td>No litter on the beach</td>
<td>1</td>
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</tbody>
</table>
#30, for example, indicated a change for the worse in the experience because both more ORVs are using the route and the closure of parts of the ORV route for the Piping Plover.

**Respondent #30:** To answer that question honestly, I would say the difference between now and twenty years ago was, I think there’s 80 percent more of the people coming out to the beach with ORVs than there ever was 20 years ago. You’d never see the beach this crowded 20 years ago, and you hardly knew one out of five families that owned an ORV, and now every household has one or two. And I think that’s what the difference is...Well, yeah, it did [also] change with all the regulations. They’re more...the bird regulations, closing the beaches, we got family coming down and now they can’t go down the beach here. We’re all crowded in. Everybody’s jammed together as we said before.

Respondent #20 was uncertain of the changes that had occurred due to use levels, but he felt that the amount of time required to get an ORV permit had increased.

**Respondent #20:** I mean there definitely seems to be an increase in interest, but I, I think there’s fewer people out here this summer than there were in the past couple years. So, it’s, it’s hard to tell, like I mean I know I was standing in line a heck of a lot longer in the last two years to get a permit than I have been, but when I get out here, I don’t see any, I don’t see those numbers.

To a lesser extent, some respondents felt that the experience had changed for the better. The text associated with these codes suggested that for some respondents enjoyment of the activity improved because they became more experienced with it, because of better facilities or management provided by the NPS, or for personal reasons. For example, Respondent #5 reported a change for the better because his knowledge of the activity had increased.
Respondent #5: Well, I’m learning what to bring and what not to bring. The first year I came I had no clue. I brought all the wrong equipment. I didn’t bring a tent. I didn’t bring a sheet to block the wind. I didn’t bring, um, I brought all the wrong stuff, but it’s like camping. The more you do it, you learn what’s important and what’s not. And, uh, I’m not as nervous. The first time I went out on the beach, I thought I was pretty hot shit because I had a Jeep when I was a kid and I didn’t air it down...I got so stuck. Now I know to take it easy, you know, what they tell you in the ranger station, they’re right. Um, and you just go slow and you have a good time. So I guess, just really learning what stuff to bring, what attitude to bring with you is probably what I’ve changed the most.

Improving the ORV Experience

The last question used to probe respondents for potential indicators asked “What could be done to improve the quality of your ORV experience at Cape Cod?” Answers to this question resulted in a more expansive list of codes (Table 4). The most numerous code found in the responses to this question suggested adding facilities such as additional stations to re-inflate tires after reducing their pressure for driving on the sand (a requirement for over-sand driving by both policy and practicality) or portable toilets on the ORV route. Respondent #39 suggested another type of facility when he answered “Well, at times, you have a lot of boats out here on the beach, and usually they leave their trailers just anywhere. I think they should have a corral, a separate spot just for the trailers.” Another code response with a higher frequency of occurrence was that of reducing the impacts of ORV route closures associated with the Piping Plover. This was the basis of the response from Respondent #1.

Respondent#1: I guess it’d be the bird issue. I mean, they seem to be thriving and I guess the powers to be have taken it off the endangered species list and once they do that and open up the beach, it’ll give people more, more experience, you know, more flexibility to be out here. And do what they want to do. See, in the, in

<table>
<thead>
<tr>
<th>Code</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add support facilities (e.g. air stations, water, port-a-potties)</td>
<td>13</td>
</tr>
<tr>
<td>Reduce closures/open up more of the ORV route</td>
<td>10</td>
</tr>
<tr>
<td>Improve permitting process</td>
<td>9</td>
</tr>
<tr>
<td>Reduce litter on the ORV route</td>
<td>6</td>
</tr>
<tr>
<td>Better/more consistent regulations and enforcement</td>
<td>5</td>
</tr>
<tr>
<td>Increase number of permits given out</td>
<td>4</td>
</tr>
<tr>
<td>Provide more/better information about closures</td>
<td>3</td>
</tr>
<tr>
<td>Reduce ORV numbers</td>
<td>2</td>
</tr>
<tr>
<td>Open an inter-dune route for ORV use</td>
<td>2</td>
</tr>
<tr>
<td>Provide more fire permits</td>
<td>1</td>
</tr>
<tr>
<td>Address conflict between swimmers and fishermen</td>
<td>1</td>
</tr>
<tr>
<td>Reduce visual and space impacts of self-contained vehicles</td>
<td>1</td>
</tr>
<tr>
<td>Reduce the number of weekly permits</td>
<td>1</td>
</tr>
<tr>
<td>Open the self-contained vehicle area more or to more than 100 vehicles</td>
<td>1</td>
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the fall, when everything shuts down, the beach is open and you can drive 12 miles, 12, 14 miles of nothing but beach, you know.

Several respondents answered this question by suggesting improvements to the permitting process or reducing the amount of litter. Respondent #27 answered by saying “I think they’re working with it, it is just dealing with... how to do the permits, and like I said, there’s no easy way for that...[it] was a disaster this year on that day [they began giving out the permits]...”.

Respondent #46 felt that litter was an important issue. He answered “I don’t know that there’s much that they can do other than I noticed there’s a lot more, as the season goes on, a lot more garbage on the beach, and I don’t know how they might want to manage that a little bit better. I’ve seen some of the people trying to collect some of the garbage, but I think there should be a better effort. That is the one thing that does detract is the garbage.”

Codes that consistently appeared in the results from the other questions – crowding and user conflicts – also emerged in the response to the question on how the quality of the ORV experience could be improved. New codes were seen in the answers to this question that indicated that better information is needed on route closures, permit numbers or types should be changed, or that there is a need for better or more consistent regulations and enforcement. Respondent #3 suggested the latter two changes.

Respondent #3: Make all federal beaches conform to the same rules and regulations that Cape Hatteras has. Cape Hatteras is the most successfully managed, customer friendly, user friendly area that I’ve ever fished. They actually welcome the fishermen to spend their money down there. Up here, they could care less. You get the feeling up here that if they could take us off these beaches, that if the Massachussetts Beach Buggy Association didn’t keep these beaches open, they would close them to us, in a, in a heartbeat, like they closed Wood End.

Interviewer: Anything else that could be done to improve it?

Respondent #3: They could take the limit off of the permits. Raise the limit, so that they don’t exclude people that live more than two hours away.

**DISCUSSION**

By identifying the codes that consistently emerged in the responses to these four questions and the relative frequencies of those codes, several potential indicators of quality may be identified for the ORV experience at Cape Cod, including crowding, the portion of the ORV route open, ease of obtaining a permit, amount of litter, availability of support facilities, and the behavior and actions of other ORV users. Crowding – the perception of use densities as being too high – is derived from the frequent emergence of codes related to solitude, peacefulness, and ORV use levels.

All of these variables meet the criteria for indicators of quality, though to varying degrees. The ORV use level, and presumably crowding, is currently measured and managed at Cape Cod through the ORV route access permits. This provides managers with a way to control the number of vehicles that use the ORV route on an annual basis. Managing crowding, however, may require that use levels be monitored and managed at particular times, possibly on a daily basis or even by counting the number of vehicles using the ORV route at any one time. Traffic counters are currently in place at several key access points to the Cape Cod ORV route, but these counters only provide an indication of the number of vehicles passing by a point during any given time period, not a direction of travel.
To manage use levels on the beach at any one time, directional traffic counters would need to be placed at all four access points to the NPS managed ORV route. Alternatively, manual counts could be performed by rangers as they patrol the beach.

Closely related to the issue of crowding is the portion of the ORV route that is open at any one time. Closures of the route to protect the Piping Plover exacerbate high-use levels and crowding by reducing the amount of space available to ORV users. In recent years, a substantial portion of the route was closed during the months of June and July, sometimes leaving only a few tenths of a kilometer open for use by all permit holders. During the 2004 use season that this study was conducted, portions of the ORV route were closed for a total of 58 days (Thatcher and Slobodian, 2004). The portion of the ORV route open is easily measurable, but the degree to which it can be managed is currently limited by legislative and regulatory guidance for impacts to the Piping Plover, thus making it problematic as an indicator of quality.

The ease of obtaining a permit and the amount of litter in the area are perhaps better indicators of quality than the portion of the ORV route open. The amount of litter can be measured, and when it exceeds a given level, then employees or volunteers could remove it. Educational messaging or programs could also be used to more directly address littering behavior among ORV users. However, some litter washes ashore from the ocean, so a portion of litter on the beach will not be reduced through these latter methods.

Likewise, the length of time visitors wait to receive their ORV permit may be measured through periodic visitor surveys or observed directly and then mitigated by adding personnel or through implementation of more efficient permitting processes. Changes to these processes could include the ability to reserve weekly ORV permits by mail, phone or internet; making better use of information technology (e.g. databases and bar-coded permits) during permitting; and the issuance of only a certain number of permits per day instead of the first-come first-served system that was used during the 2004 season.

The last two potential indicators, support facilities and the behavior and actions of other ORV users, can be measured by surveying visitor opinions. ORV users could be asked if they believe the current facilities provided are adequate and if problems exist with the actions of other users. More objective measures of these variables could include wait times to use facilities, the number of speeding violations observed, or incidents of conflict reported among users. When these measures violate standards defined by managers, then facilities may be added or removed as necessary or policies enacted or more stringently enforced to address user conflicts.

This paper is one of several qualitative studies that suggest the usefulness of providing numbers related to the occurrence of qualitatively derived codes (Morgan, 1997; Racevskis and Lupi, 2006; Shively, 1992). Code frequencies are presented in this paper because they provide a general indication of the prevalence of different responses. One might be tempted to ask how many times a code must be assigned or from what percentage of respondents must codes be derived before a variable is included as a potential indicator. No guidance or techniques exist to answer this question, nor does the use of quantitative procedures overcome it. We relied on the reoccurrence of codes assigned for responses to multiple questions (with varying frequencies) to determine and rationalize the selection of potential indicator variable presented here. This same method has been used to select indicators from a list of codes developed from interviews with visitors to Arches National Park (Manning, 2007).
CONCLUSIONS

ORV use is a popular recreation activity and demand for it is likely to continue at Cape Cod and on other public lands, both in the USA, and in other countries. The NPS is mandated to manage ORV use and to provide for the enjoyment of the national seashore by all its visitors. This study provides insight into important experiential variables for ORV use at Cape Cod, and these variables can be used as indicators of quality to measure and manage the ORV experience.

Potential indicators suggested by this study for the ORV experience at Cape Cod are crowding, the portion of the ORV route open, ease of obtaining a permit, amount of litter, availability of support facilities, and the behavior and actions of other ORV users. Substantial management input and judgment are needed in the selection of any 'final' list of indicators (Manning, 2007), but variables that are integrative, reliable, related to visitor use, efficient to measure, and significant to managers or visitors often make the best indicators (Manning, 2007; National Park Service, 1997). Crowding, litter, and the time needed to obtain a permit meet these criteria. Indicators suggested for Cape Cod may serve as a starting point for understanding and managing ORV experiences at other sites. However, their direct application to other areas (without confirmation of their importance to ORV users at these sites) may not be appropriate since indicators often vary based on the context.

Indicators of quality provide a management-focused construct that can be broadly applied to other types of ORV use (e.g. trail riding) and in other settings (e.g. forested areas). Similar research is needed to explore ORV use in these other contexts to determine the degree of commonality or disparity of indicators of quality for the ORV experience in general. This is particularly true give the intense and growing popularity of motorized recreation and the lack of empirical research about behavioral and experiential aspects of this form of recreation. Also, the use of qualitative methodologies, such as interviews, to assess indicators is underrepresented in the literature. This is of concern since one of the intents of research on indicators is to capture a breadth of variables that adequately reflect the variety of personal experience attained during leisure activities.

The findings from this study suggest what is important to ORV users’ experience at Cape Cod, but the findings also leave open the question of what should be the minimum acceptable condition of each indicator variable. For example, the number of vehicles using the ORV route and litter are clearly important to many ORV users. However, how many vehicles should be allowed to use the ORV route at any one time, and when does the amount of litter become objectionable to ORV users? The results of this qualitative inquiry into indicators of quality were used to inform the development of a quantitative survey of ORV users intended to provide answers to these questions – in the form of standards of quality. Standards of quality resulting from this survey of ORV users are the subject of a companion paper in a later issue of Managing Leisure.

REFERENCES


