

THE EFFECT OF REGULATORY SIGNS ON CAMPING BEHAVIOR IN THE COASTAL ENVIRONMENT: A CASE STUDY OF THE ZEKE'S ISLAND NATIONAL ESTUARINE RESEARCH RESERVE

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INTRODUCTION

Zeke's Island, a component of the North Carolina National Estuarine Research Reserve, is a 1,160 acre undeveloped site located along North Carolina's southeastern coast in portions of New Hanover and Brunswick Counties. The Reserve is comprised of three upland islands (Zeke's, No-Name and North) totaling approximately 183 upland acres plus a 70-acre portion of an adjacent barrier spit. The remainder of the Reserve, approximately 907 acres, includes inter-tidal salt marshes/mud flats and sub-tidal estuarine waters. The complex is sandwiched between the Atlantic Ocean, bounded by the barrier spit, to the east, and the Cape Fear River, bounded by a rock jetty, to the west. The primary source of tidal exchange is via the river.

The Reserve site is owned by the State of North Carolina and managed by the North Carolina Department of Environment and Natural Resources, Division of Coastal Management, as part of the Coastal Reserve Program. Zeke's Island is one of four such sites in the state managed under a cooperative agreement with the federal government through the National Oceanic and Atmospheric Administration, Estuarine Reserve Division. The primary mission of the national reserve system is to develop federal, state, and community partnerships to protect the nation's estuarine and coastal resources and to promote informed management and stewardship through scientific understanding linked with public education. State statutes and rules allow compatible recreational uses and other activities on the Reserve. Four full-time employees and several temporary staff detail these uses in a site management plan that is updated every five years and implemented.

Although a fairly pristine and isolated reserve site, the Zeke's Island Reserve is located near the communities of Wilmington, Carolina Beach and Kure Beach. These communities attract significant numbers of in-state and out-of-state tourists and local residents each year. Many of these tourists and residents choose to recreate on the Zeke's Island Reserve due to its less crowded, undeveloped character and nature. Access is primarily by small boat, kayak or canoe, although some sections of the Reserve can be reached by foot at low tide. Additionally, the barrier spit has off-road vehicular access through the adjacent Fort Fisher State Recreation Area. Acceptable activities on the Reserve include swimming, beach combing, sunbathing,

nature study, fishing, hunting, boating, and picnicking. Certain upland areas of Zeke's and North Islands have been historically popular destinations for primitive camping, a traditional recreation use on the Reserve at the time of its inclusion into the North Carolina National Estuarine Research Reserve Program in 1985.

SELECTIVE LITERATURE REVIEW

Brown and Hunt (1969), report that on-site information programs, like signing can be an effective technique to assure dispersion of visitors to areas or in ways that are acceptable to the managers. Furthermore, Jubenville and Twight (1993) suggest that signs used along a trail, road or waterway can be an effective way to present a simple idea when it is difficult or impractical to have someone on the site. However, the key for this technique to be effective is that the message must remain simple. A complicated sign may confuse users especially if there is no one on-site to explain the message. Butler (1993) states that even if signs are the most basic form of an interpretive program, they can be effective. However, when using them, managers must realize that visitors who encounter them will read them at their own speed (self-pacing) and will only read what interests them. Butler points out that there is a direct link between interpretation and management. As such managers can use interpretative tools such as signs "to help minimize negative effects on the local community and natural environment, to enhance visitor safety, to minimize recreational conflicts and generally to improve the method of visitor dispersal", and "to assist park management by developing programs and facilities that will aid in minimizing destructive behavior and enforcement problems, while guiding visitors towards designated and selected locations." Finally, Chavez, et al. (2001) found that generally outdoor recreators followed and understood signs in a natural setting. However, the sign needed to be clear and unambiguous. Furthermore, the study found differences in the level of visitor understanding of the sign's message based on the user's past visitation experience, outdoor recreation experience, and education

Authors have also established frameworks to evaluate the effectiveness of signs as management tools. Jubenville and Twight (1993) suggest that the collection of baseline data on the condition of resources is essential in the long-term evaluation of an interpretative (signing) program. However, such action will only examine resource and recreational use of the area and not the effectiveness of communication and participant understanding of the sign program. For this, periodical quality control is necessary. In addition signs used as a regulatory tool will not be effective unless coupled with continuous user monitoring and rule enforcement. Furthermore, Bucy and Bucy (1991) offer a very simple criterion to evaluate the effectiveness of signing i.e. effort vs. reward. In other words, if the effort is high to get the information from the sign, such as reading the small print, people will not do it. Consequently, messages need to be clear and concise and must have a perceived benefit.

METHODOLOGY

From 1993–1996, researchers from the Environmental Studies Program and the Department of Health, Physical Education and Recreation at the University of North Carolina at Wilmington examined and studied the impacts of recreational use in general and camping in particular on the natural resources and physical features of the Zeke’s Island Reserve. Documented impacts from recreational use included soil compaction, loss of upland and wetland vegetation, litter, and shoreline erosion. A site record for each documented impact area was developed that consisted of a map, narrative description, photographic record and a Global Positioning System (GPS) location. The research findings from 1993-1996 were used to create a longitudinal database of recreational impact sites on the Reserve. This database was developed to help managers understand how the natural processes of the Reserve (e.g. vegetation growth, sand movement, wind, storms, wave scouring etc.) mitigate recreational impacts. The creation of the impact database provided a baseline for comparison to new impact over time. By 1995, the results of this study supported the initial research hypothesis that recreation, especially camping, was having an unacceptable and negative impact on the physical features of the Zeke’s Island Reserve.

In 1995, the management staff decided that camping would no longer be an authorized recreational activity on the Zeke’s Island Reserve. This management decision was based on the documented impacts camping was having on the physical features of the Reserve, e.g. soil compaction, loss of upland vegetation, loss of wetlands vegetation, shoreline erosion, litter, etc. Due to limited enforcement personnel within the Division of Coastal Management, the management decision was made to implement the restriction on camping on the Zeke’s Island Reserve through a series of strategically placed information signs. These informational signs were erected on the Reserve in 1995.

In the fall of 2000, researchers returned to the Zeke’s Island Reserve to investigate the effect of the signs in reducing camping related impacts to the natural resources and features of the Reserve. Researchers re-visited the documented camping impact sites identified in the 1993-96 study. New site records were developed for each of the previously visited impact areas. In addition, the Reserve was canvassed to locate physical impacts due to any new camping activity that had occurred since the ban was initiated in 1995. The 2000 site data were then compared with the previously collected 1993-96 data to isolate any change in camping behavior.

RESULTS

The results of this study support the research hypothesis that the passive use of regulatory signs is an effective management tool for reducing the impacts associated with camping behavior on the Zeke’s Island Reserve. Ten (10) camping impact areas were identified in the 1993-96 study. By the fall of 2000, five years after the implementation of the regulatory signs banning camping on the Reserve, only one active camping impact area could be identified. The other nine previously identified impact sites either could not be located or showed no sign of current use or activity. In addition, the sites that could be located showed signs of natural mitigation ranging from moderate mitigation (> 50% of previous impact unnoticeable) to complete mitigation (100% of previous impact unnoticeable). For the purposes of this study, mitigation meant that the natural processes of the Reserve, such as new vegetation growth, shoreline

erosion or sand overwash, had eliminated previous indicators of recreational impact. This does not mean that the sites had naturally been restored to the pre-impact visual landscape or plant community composition.

The data also indicated that previously identified boat access sites onto the island had also been mitigated. This finding would suggest that an ancillary result of banning camping was also the reduction in the concentration of boat landings near previously identified camping sites. This result may be explained by the fact that since the ban on camping, users of the Zeke's Island Reserve no longer needed to land boats as close as possible to previously established camping areas to off load equipment and supplies. Consequently, current users may well be dispersing where they land on the Reserve thereby dispersing subsequent impact to the natural resources and physical features of the Reserve. This action would have the effect of reducing the long-term and identifiable impacts from such activity. Further study would be needed to confirm the validity of this hypothesis.

CONCLUSIONS

Based on the results of this study, the researchers believe that the passive use of regulatory signs is an effective management tool in regulating visitor behavior within the Zeke's Island Reserve. As such, managers are encouraged to increase public education regarding why management decisions such as banning camping are needed. In this way, managers can reinforce what appears to be a current willingness of the users of the Zeke's Island Reserve to following regulations. Such educational efforts may go a long way in continuing and improving public support for the mission of North Carolina National Estuarine Research Reserve Program. Conversely, managers need to recognize the fickle nature of public opinion. Only through a conscious, well-developed public information and education management plan can managers hope to continue long-term public support for and compliance with Reserve regulations. In this light, the results of this study should be of value not only to the managers of the Zeke's Island Reserve, but also to other coastal natural resource areas where passive regulatory actions are used or are proposed for use to meet management goals and objectives.

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