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RESTRICTIVE AND NON-RESTRICTIVE MANAGEMENT OF PARK VISITORS*

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ABSTRACT

Natural resource area managers who restrict recreational access to control resource damage from recreation, can expect backlash responses from recreationists. The extent of support expressed by recreationists for land management policies that would restrict behavior while at a national park was measured using a survey instrument. Two variables—environmental attitudes and knowledge of damage to park natural resources by recreationists—were found to be positively related to support for both nonrestrictive and restrictive visitor management policies. Frequent users of the park were less likely to express support for restrictive policies that limited their use of the park. Implications for management are discussed.

INTRODUCTION

Public land managers are invariably caught in a dilemma of trying to protect parks and other natural resource areas while permitting public recreation. When recreational visitation to a site threatens the physical, cultural, or ecological integrity of

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the area, managers are responsible for intervening to stop damage caused by visitors. This often means restrictive use policies. Such policies may anger visitors, resulting in backlash behaviors such as vandalism [1] or political lobbying by debarred user groups to encourage legislative overruling of management decisions [2, 3]. Without visitor support for management policies, managers can expect an erosion of public and political support, further threatening a park's integrity. Lacking public support for restrictive measures, some managers may choose to avoid conflict with visitors by ignoring resource problems caused by recreationists. A better understanding of what kinds of variables affect level of support for restrictive management policies will help managers develop short- and long-term education and public relations strategies. Such information is needed to help protect the resource and insure the least amount of impact on the quality of the visitor's recreational experience.

This study investigates the relationship of visitors' environmental attitudes knowledge of park damage and previous park experience to their receptiveness to nonrestrictive and restrictive recreational management policies. Nonrestrictive management strategies are used to encourage responsible behavior through educational programs (essentially appeals to conscience and environmental responsibility). Restrictive policies limit behavior through regulation and are implemented through zoning, lotteries, site closings, management-controlled trip itineraries, and law enforcement [4, 5].

Damage to natural resource areas from recreationists may stem from willful acts such as littering and graffiti, but most adverse effects result from minuscule impacts from each visitor with the cumulative effects causing substantial ecological damage. With many national parks and forests hosting hundreds of thousands of visitors each year, resource damage from overuse is an overwhelming problem for managers.

Hardin addressed the issue of overuse of national parks in his classic essay "Tragedy of the Commons" [6]. He describes conditions, similar to those today, in which overcrowding and overuse had eroded the qualities of the parks most valued by visitors and he advocates restricting access to parks through such methods as ability to pay, lotteries, queues, or merit-based admittance. Hardin criticizes the use of appeals to conscience while advocating "mutual coercion" in which the affected public recognizes a problem and mutually agrees to restrict everyone's freedom [6]. Although such a method has proven successful in nonrecreational circumstances [7], recreational behavior has psychological qualities that may limit the acceptability of restrictive regulations to recreationists. Furthermore, influencing individuals to recognize and think about overuse problems may be difficult since recreation is uncritically viewed by both recreationists and the general public as benign: often being blindly touted as a viable economic alternative to more obviously damaging commodity/extractive uses of natural resource areas [8].

Restricting or banning some recreation activities because of overuse may be an imperative in some situations, but such policies are unlikely to be well-received by recreationists. If recreation is a chance to "recreate" by escaping the structure and constraints of work and regular routines, then heavily regulated recreation areas should have little appeal to most visitors. Research indicates that recreational activities are freely chosen and intrinsically motivated [9]. Iso-Ahola describes leisure experiences as motivating because of their "freeing" or liberating qualities [10]. Tinsley and Tinsley characterize optimal states of leisure as: "a) a total absorption in the activity at hand; b) lack of focus on self; c) feelings of freedom; d) enriched perception of objects and events; e) increased sensitivity to bodily sensation; f) increased sensitivity to and intensity of emotion; and g) decreased awareness of the passage of time" [11]. Few of these characteristics can be maximized in the presence of rules and regulations that constrain recreational experiences or require the individual to oscillate between participating in a recreational activity and judging the appropriateness or lawfulness of personal behavior.

Not only is the quality of recreation experiences affected by externally applied regulations and laws, but the ability of recreationists to understand how their behavior is detrimental is limited by the transitory nature of a park visit. Because damage from visitors often occurs in small increments, visitors rarely envisage their contribution to the problem. Since visits sometimes last only a few hours and the effects of a damaging behavior may not appear for weeks, months, or even years, a visitor may never observe the damage much less relate it to their own behavior. For example, lantern-burned campground trees die slowly from insects and disease; erosion gullies from off-trail use only begin to show after several hard rains; and visitors rarely recognize the algal growth in streams as eutrophication from improper waste disposal. Ownership of a park is also nebulous; visitors may care little about a park in contrast to their own home, community, or work environment. Encouraging this lack of awareness of recreation-related resource damage is the widely held myth that "nonconsumptive" recreation is harmless and is an optimal use of public lands [8].

Because of the psychological qualities of recreation, both researchers and managers agree that nonrestrictive management is a preferred means of solving resource issues, but not all problems can be solved in this manner [12-14]. Some visitor impacts must be controlled through restrictive policies. Is it possible to provide information about research damage and appeal to a visitor's environmental conscience as a means of gaining support for what otherwise could be politically unpopular restrictive management decisions? This study examines such a prospect. Knowledge of the consequences of harmful impacts from visitors, plus environmental attitude are hypothesized to have a moderating affect on visitor behavior. A third factor, the frequency of visitation to a site, has been inversely related to behavior change in related studies and will also be analyzed.

Before park visitors can be expected to behave responsibly, they must hold a favorable attitude towards natural environments and must have enough knowledge and understanding of fragile resources to judge the correctness of their behavior. Since parks often harbor unique flora and fauna, general ecological knowledge may not be sufficient for visitors to make appropriate decisions. For instance, many individuals understand that plants prevent soil erosion. However, after walking and running across lawns and athletic fields all their lives without causing perceptible damage, visitors may see little harm in walking across a sand dune or an alpine meadow; yet, these environments are delicate and easily, if not instantly, damaged.

All the knowledge an individual has about a park constitutes a belief system. Beliefs (thoughts perceived as true) are associated with attitude formation which is often predictive of behavior [15-17]. Several studies have investigated the relationship between knowledge of environmental problems and environmental attitudes. Other studies have investigated behavior change from educational programs.

Hamilton found a moderate relationship between knowledge level and concern about the environment among college students [18]. Arcury found that three categories of environmental knowledge—general, energy, and local problems—were related to environmental attitudes as measured using the New Environmental Paradigm Scale [19, 20]. Arbuthnot found that education was more important in motivating pro-environmental behavioral commitments than attitude or personality variables [21].

In natural resource settings, Chan found that educational appeals to school groups and individuals collecting marine organisms in tidal pools decreased the numbers of organisms collected by visitors [22]. However, less specific information has been ineffective. Werling investigated the relationship between general ecological knowledge learned in the classroom and its relationship with littering behavior and willingness to volunteer for a "stewardship day" [23]. He found no relationship between knowledge gain and either of the two behavioral measures. Information does affect attitudes and behavior but it may have to be specific to the situation to be effective.

Previous experience at a park affects the degree which recreationists are attentive to new information. Several studies have investigated using brochures singly or in combination with face-to-face appeals to get visitors to change trail or campsite choices in overused areas. Frequent or experienced users were consistently less likely to be persuaded by new information designed to change their behavior [24-27]. Manfredo and Bright suggest this may be due to the limited utility of seeking out new information about a park because the frequent visitor already has adequate knowledge of the affordances of an area [27].

Another interpretation of the frequent users and their knowledge of the site is suggested in research by McCool [28]. He investigated differences between state resident and nonresident visitors to water-based wildland recreation areas.

Resident users (i.e., frequent users) tended to be more involved in consumptive and psychomotor activities, while nonresidents (i.e., first time or infrequent users) were more likely to be involved in appreciative activities. Nonresident recreationists were more interested in learning about the site while resident recreationists were using the site because of its convenient location. It follows that first time or infrequent visitors should be expected to desire more detailed information about a site, since learning about an area is one of their major goals. In contrast, frequent users are often only using the area for consumptive, mechanistic, or physically oriented sports. Since recreationists with extensive site experience are less likely to seek out information about recreation options at the site, they also may not be receiving messages about recreation-related resource damage and the need to change their behavior.

Environmental attitudes are judgmental beliefs about human interaction with the environment. Previous research suggests they may play a role in the acceptability of environmental regulation within a recreational context. Studies of environmental attitudes suggest that age, education, and political ideology are consistently good demographic predictors of environmental attitudes. People who are well-educated, young, and liberal are more likely to have stronger pro-environmental attitudes [29, 30]. Fishbein and Ajzen [15] and Ajzen and Fishbein [16] have documented the relationship between attitudes and behavior in numerous studies in many different contexts.

Studies in outdoor recreation have investigated how environmental attitudes are related to choice of outdoor recreation activities. Dunlap and Heffernan hypothesized that participants in outdoor recreational activities hold stronger environmental attitudes and are more concerned about environmental issues directly pertaining to outdoor recreation [31]. Their research, supported by replications and extensions, provides moderate support for their hypotheses [32, 33].

Environmental attitudes may affect recreational activity choice, but what role do attitudes play in support of specific management orientations and policies? Jackson investigated relationships between outdoor activity preferences and support for obtrusive recreational facilities development [34]. He found that appreciative outdoor recreationists involved in activities such as canoeing, hiking, and cross-country skiing were generally opposed to development of obtrusive recreational facilities. Hunters, generally labeled as consumptive users, were also more likely to oppose such developments [33]. Recreators using mechanized snowmobiles, motorboats, trail bikers, and anglers indicated support for facilities. Since the first cluster of users desire undeveloped areas while the second cluster is more likely to want amenities, this research only indicates that recreationists wish to protect or enhance the quality of their own preferred recreational activity. It does not necessarily indicate willingness to accept restrictions on their own behavior.

Several general studies have investigated how individuals react to environmental problems that threaten their own self interest. Grunig and Stamm demonstrated that individuals will choose restrictive policies to solve various environmental problems

only when the restriction does not effect them [35]. When individuals are the cause of an environmental problem, they tend to choose substitution solutions, rather than restrictions. Applying this research in a recreational context suggests that even pro-environmental recreationists will oppose restrictive management practices but will support policies that provide functional alternatives.

METHODS

This research investigates the relationship between knowledge of recreationist-related park damage, environmental attitudes, frequency of visitation in the last year, and support for restrictive or nonrestrictive management policies.

Site Description

The study took place at Biscayne Bay National Park, located near Miami, Florida. Most of the park is comprised of reef and water, with many keys or islands forming a north-south chain bounded by Biscayne Bay on the west and the Atlantic Ocean on the east. This area is part of a larger more diverse recreational system that includes public parks, beaches, and marinas that cater to boating, diving, sightseeing, and other marine-related recreational activities.

Site Survey

A mailback questionnaire was designed to evaluate visitors' perceptions of proposed management changes. These policies were suggested as ways the park's natural resources could be protected. The sample intercept period, July 26-30, 1989, coincided with the opening of the lobster season. The intention was to contact park users who were active consumers and not just passive sightseers (the latter forming the largest core of park visitors) [36]. Sampling focused on the more consumptive and mechanistically-oriented park user who may have a greater and more direct effect on the resource. Most contacts were made at boat ramps.

The Respondents

The visitors were approached by trained interviewers at boat ramps at Matheson Hammock, Convoy Point-Bayfront Park, and Black Point. Five-hundred and ten visitors agreed to receive a mailback questionnaire, of which 485 provided valid addresses. A modified Dillman procedure resulted in a return of 295 questionnaires for an effective return rate of 60 percent [37].

The respondents in the survey were predominantly male (90%), married (75%), with an average age of thirty-eight years. Eighty-five percent had completed sixteen years of education. Their educational achievement is reflected in their occupations and incomes; 69 percent were employed in technical, business, or professional jobs, and earned a median income of between forty- to fifty-thousand dollars. The majority (96.6%) were State of Florida residents and 92 percent lived

in a city or suburban residence. Most of the park visits were day use, 93 percent with an average stay of about five to eight hours in the park. The sample of respondents were mostly repeat visitors and used the park frequently, averaging approximately twenty-two visits a year.

The Survey Instrument

The survey instrument was composed of an environmental attitude scale, a knowledge test, a question about frequency of park use over the last year, and a scale measuring support for proposed management strategies ranging from non-restrictive to restrictive policies. The environmental attitude scale was a nine-item version of the original twelve-item "New Environmental Paradigm Scale" designed to measure general environmental attitudes. The scale uses a five-point Likert-type scaling. For this study, a summation of the nine items provided an overall environmental attitude score. Three items measuring anthropocentric orientations were recoded so the highest values represented pro-environmental attitudes.

A knowledge scale was composed of ten true and false questions measuring the respondents knowledge of specific user impacts at the park. Questions dealt with user impacts on coral and seagrass and ecological relationships between fish and coral. Each item was scored (-1) for a wrong answer, (0) for not sure, and (+1) for the correct answer. The individual item scores were summed for a measure of overall awareness of park impacts.

Support for management decisions was measured by asking opinions about sixteen management policies. The items covered a broad range of policies, including keeping existing policies, information campaigns, and restrictive zoning to protect either people or the resource. None of the items proposed a complete ban on an activity. One item was also included dealing with site management, rather than visitor management. The scale uses a five-point Likert type format. Principal components analysis with a varimax rotation produced three factors. Two of the three factors were interpretable and useful for the analysis. One was labelled restrictive policies, the other, nonrestrictive policies. The three items forming the third factor dealt with boat anchoring policies. This third factor was not used in any of the analyses.

RESULTS

The factors, listed in Table 1, are labelled "restrictive" and "nonrestrictive." The "restrictive" items spatially limit but do not ban recreation activities. The non-restrictive scale is composed of items that would only provide educational information or directly affect only those visitors who are apprehended by law enforcement officials while abusing the park. Reliability analysis indicates a Cronbach alpha coefficient of 0.71 for the nonrestrictive scale and 0.82 for the restrictive scale. The two scales were deemed adequately reliable and were used as dependent variables.

Table 1. Factor Analysis of Items Measuring Support for Hypothetical Changes in Visitor Management Policies

Item	Factor Loading	Cronbach Alpha	Item Mean
FACTOR 1: Restrictive Items			
Separate scube diving and spear fishing from snorkeling areas for safety.	0.85843		2.89
Develop exclusive zones for snorkeling and scuba diving.	0.83959		2.90
Limit spear fishing to designated areas.	0.73582	0.82	3.20
Restrict use of motorized boats in seagrass areas.	0.64112		2.99
Require reduced boat speeds over patch reefs.	0.60148		3.30
Ban boat anchoring on patch reefs.	0.56785		3.46
FACTOR 2: Nonrestrictive Items			
Promote an information campaign for a litter-free bay.	0.73964		4.78
Organize a Park Service auxiliary to help patrol and protect bay resources.	0.66812		4.08
Require mandatory public instruction on resource protection if bay user is found damaging the bay.	0.65608		4.46
Inform bay users about protecting the environment.	0.62096	0.74	4.81
Develop campaign on safe boat operation.	0.55574		4.52
Prohibit use of chemical spraying on bay area.	0.49501		4.33
Continue current regulations on boat anchoring off patch reefs.	0.45883		3.90

NOTE: Based on a scale of 1 to 5 with: 5 = strongly support, 4 = somewhat support, 3 = neutral, 2 = somewhat oppose, and 1 = strongly oppose.

The knowledge test measures specific knowledge of park damage caused by boating and scuba divers at the park and understanding of simple ecological relationships such as the relationships between fish and coral and fish and mosquito larvae. The test score was used as a measure of knowledge about resource problems in the park. Internal reliability of the test was calculated as 0.74 using the Kuder-Richardson algorithm. The median score was (3). The range was from (-8) to (+10).

The attitude scale is based on nine of the twelve items from the New Environmental Paradigm scale [20]. This scale has been used extensively to measure global attitudes towards the environment and has been shown to be reliable and valid. Reliability analysis indicates a Cronbach alpha coefficient of 0.74.

Table 2. Summary Table of Bivariate Correlations of Variables

Items	Restrictive	Nonrestrictive	Attitude	Knowledge
Nonrestrictive	.36**			
Attitude	.23**	.47**		
Knowledge	.27**		.29**	
Number of visits	−.17**			.12

*$p < .05$.
**$p < .01$

Regression analysis was used to measure the relationship between either restrictive or nonrestrictive visitor management policies and the three independent variables—global environmental attitude, specific knowledge of environmental damage at the park, and number of previous visits to the park. A correlation matrix of the variables is presented in Table 2.

Results of the regression analyses are summarized in Tables 3 and 4. For the nonrestrictive management policies, pro-environmental attitude and park knowledge were both moderate predictors of support for management policies. Number of visits in the last year, often used as a measure of past experience, was not a significant predictor. The regression equation resulted in an R-square of 0.30.

All three independent variables—environmental attitude, knowledge, and number of visits to the park—were significant predictors of support for restrictive management policies. Previous experience at the park has a negative beta value indicating an inverse relationship between number of previous visits and support for restrictive management policies. Individuals that visited the park more frequently were less likely to support restrictive policies. The variance explained is small ($R^2 = 0.14$) but the differences in, and directions of, the beta weights provide worthwhile information.

DISCUSSION

Outdoor recreation managers supervise sites used by visitors with diverse motivations and values for participating in specific recreation activities. Any policy change can lead to lower satisfaction for the recreator and conflict between management and visitors. Regression analysis indicates that both knowledge of park damage and environmental attitudes play a role in visitor support for restrictive and nonrestrictive management decisions. Frequency of visits to the park in the last year was inversely related to support for restrictive decisions.

The importance of park specific information in gaining support for restrictive management policies comes from comparison of the knowledge and attitude betas between the two regression analyses. For nonrestrictive policies, the beta value

Table 3. Regression Analysis of the Effects of Knowledge, Environmental Attitude, and Number of Previous Visits on Support for Nonrestrictive Management Policies

Independent Variables	Beta	*t*	ρ
Number of visits	0.02	0.367	.7137
Attitude	0.44	6.960	.0000
Knowledge	0.22	3.433	.0007

NOTE: $R^2 = .30$.

Table 4. Regression Analysis of the Effects of Knowledge, Environmental Attitude, and Number of Previous Visits on Support for Restrictive Management Policies

Independent Variables	Beta	*t*	ρ
Number of visits	–0.22	–3.58	.0004
Attitude	0.19	2.93	.0037
Knowledge	0.22	3.32	.0010

NOTE: $R^2 = .14$.

(0.44) for environmental attitudes was twice the strength of the beta value for knowledge (0.22). With restrictive polices as the dependent variable, the knowledge beta (0.22) was slightly stronger than the environmental attitude beta (0.19). Once restrictive policies were proposed, knowledge of how recreationists impact an area was more strongly related to support for proposed user restrictions than level of pro-environmental attitude.

Most of the environmental problems at Biscayne Bay are site specific. The reefs have been heavily damaged by behaviors that in other settings might cause little if any harm. Since grass in lawns grows back in a few weeks, it would be difficult for even conscientious visitors to imagine that seagrass takes five years to grow back after being cut with boat motor props. Touching or standing on coral is harmful and boat anchor chains have damaged as much as 50 percent of the coral reefs at Biscayne Bay National Park. Yet, touching other living organisms rarely is harmful and boat anchors do little harm in other bodies of water. Based on the above examples, it is easy to understand how damage occurring at Biscayne Bay may not be intuitively obvious to visitors. Getting specific information to visitors

about how their behavior can damage the resource should be a key component of any information campaign.

Manfredo et al. found experienced users had less desire for information about a site and were less likely to change their behavior based on agency information [27]. In the Biscayne Bay survey, number of previous visits in the previous twelve months to the park, was inversely correlated with expressed support for restrictive management policies. It is only possible to speculate about the reasons. Manfredo et al. suggests that visitors with previous experience have less need for basic user information and therefore do not seek out new information [27]. Even if they are presented with new information, they will be less attentive to it because they already have established recreational goals for the area and know how to use the park to meet those goals.

Frequent and long-time visitors to a site may be different in the types of activities they choose. Appreciative recreationists who come to parks to view scenery or watch wildlife may visit parks infrequently in contrast to individuals engaged in psychomotor sports (water skiing or mountain biking) or consumptive/subsistence activities. Individuals that participate in athletically demanding sports must engage in the activity frequently enough to maintain their skill level. Recreationists partly dependent on hunting or fishing for food might also be more frequent participants. The Biscayne Bay sample was taken at boat ramps at the start of the lobster season. By the nature of the location and timing of the sampling, respondents to the questionnaire were more likely to be consumptive or mechanistically oriented recreationists. Other frequent visitors may be using a park visit as an excuse just to get out of the house or the city. If frequent visitation is related to mechanistic/consumptive activities or to motivations not directly related to appreciating the resource, it could be hypothesized that frequent visitors are less likely to care about a park and be concerned about resource damage. Since special efforts must be made to get information to frequent visitors, a thorough understanding is needed of why some visitors are frequent users of recreation areas.

Environmental attitudes proved to be a significant predictor of support for both restrictive and nonrestrictive management policies. The size of the relationship is impressive considering that the NEP scale was a general measure and did not focus specifically on land ethics. With expressed support for restrictive policies, environmental attitudes showed a significantly weaker positive relationship.

With only a general environmental attitude measure, it is difficult to dissect the weak relationship found with support for restrictive policies. Grunig and Stamm's work suggests that even environmentalists who generally support restrictions when they are not personally effected by regulations designed to mitigate an environmental problem, will object to policies that restrict their own behavior [35]. This may explain why level of pro-environmental attitude was a weaker predictor of support for restrictive policies. Another explanation offered by Schwartz hypothesizes that individuals with prosocial tendencies may react negatively to policies that restrict behavior since these individuals are already intrinsically

motivated to act appropriately and will resent a policy that implies coercion is necessary [38]. In the realm of environmental attitudes research, some support for Schwartz's hypothesis is found in a study of college students completed by Pettus and Giles [39]: Respondents with internal locus of control were less likely to support environmental regulations, although they were more likely to display environmentally appropriate behaviors. Although recreationists with strong pro-environmental attitudes may resent regulation, it is questionable whether they pose any threat to management. More sensitive environmental attitude measures are needed to segment visitors, allowing further exploration of this issue.

CONCLUSION

In the unique realm of freely chosen, intrinsically motivated recreation behavior, the role of environmental attitudes, knowledge of one's own negative impacts, and previous experience play a significant role in how visitors perceive policies that directly impact their recreationally-oriented behavior. As demand grows for outdoor recreation around large urban areas, managers will continually be faced with having to restrict recreation practices, and in doing so risk political backlashes from disaffected groups. This study provides evidence that managers should continue to develop a land ethic and environmental attitudes in their patrons and members of surrounding communities. Information which clearly relates resource damage to the behavior of recreationists must be aggressively provided. Special efforts should be made to reach frequent and long-time visitors.

Converging research findings related to frequent visitors require more detailed investigations. This group may be a special class of visitors with strong place attachment to a natural resource area based on proximity and affordances, yet these visitors are more likely to be involved in high impact activities or facility-intensive activities [28]. In many parks, much of the critical resource-related information about the park may be reaching mostly first time or appreciative recreationists. These individuals are most likely to be concerned and least likely to be the cause of resource damage. If knowledge of negative impacts from recreational use is a critical variable in gaining support for restrictive policies, then reaching long-term and frequent users may be a key factor in an education or public relations campaign. Since frequent user groups may be substantially harder to reach than appreciative oriented visitors, development and evaluation of special communication strategies may be a high priority activity for education and interpretive planners and researchers.

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