

21. Formulating policies using visitor perceptions of Biscayne National Park and seashore

The site

This study was conducted in a national park located near Miami, Florida. As Figure 1 depicts, most of the park is reef and water, but within its boundaries there are many keys or islands forming a north-south chain bounded by Biscayne Bay on the west and the Atlantic Ocean on the east. The area was selected for demonstration of the evaluation approach, discussed below, because it is part of a large diverse recreation system that includes public parks, beaches, marinas, boating, diving, and commercial water-related activities. It is a unique recreation area annually serving millions of visitors both domestic and foreign.

Evaluation assumptions

The approach to studying public reaction to the Bay uses objective data collection methods to obtain information on specific types of users, or reference public's, ratings of facilities, programs, and services. These data were used to assess fulfillment of Park goals, objectives, and standards, which then form the basis for recommendations that seek to improve management efficiency or maximize overall public gain. It is unlike other management or planning methods in that it blends attitudinal issues such as satisfaction, environmental concern, and expectations relevant for behavior in the Park situation into the evaluation, planning, and policy formulation process. The strategy borrows generously from a variety of disciplines in constructing the approach. Its strength lies in objectively questioning the social acceptability of what Park management has previously accomplished.

Evaluation goals

Differing assessments and perceptions of the services, facilities, and programs offered at Biscayne National Park were examined. The empirical research was guided by the policy evaluation objectives established by Bauer and Gergen (1986): 1) to indicate realistic limitations on the type of Park among potentially competing groups of recreationists; 2) to supply that understanding of current practices and existing forms of organization which will facilitate the introduction of better procedures; and 3) to improve those aspects of the process of policy formation which fall outside the framework of formal decision theory. Given these broad goals, our survey evaluated program implementation by the public throughout the course of a year. It expands the scope of the traditional policy and management

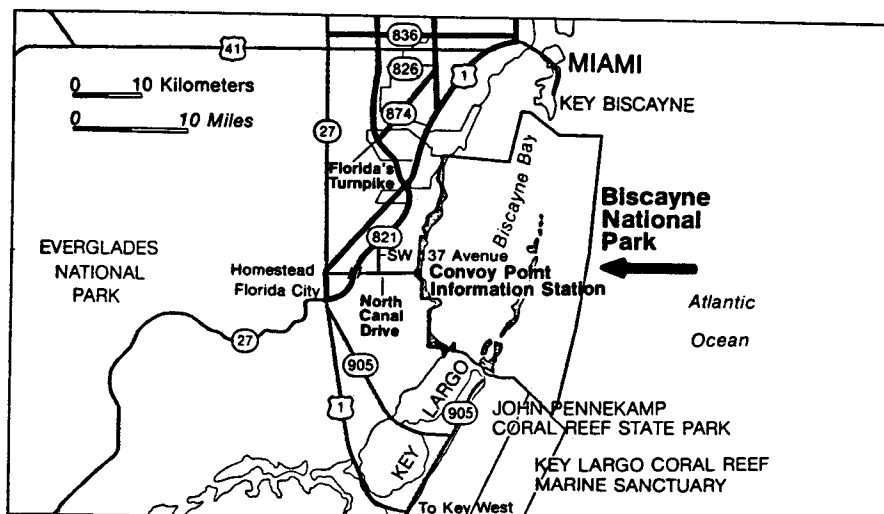


Figure 1. Location of Biscayne National Park.

decision-making process by including public perceptions. These included measures of satisfaction with existing facilities, services and programs, as well as an evaluation of realistic management options for change within the Park. Expectations and aspirations for improving park functioning are thus included in the management and policy determination process. Thus the evaluation was also designed to provide data which reach beyond the present circumstances in Biscayne Bay.

Evaluation approach

The focus of data gathering was first narrowed to identifying those visitor benefits and issues that site managers could realistically change within budgetary and personnel constraints. The evaluation team stressed that managers were partners in the design of the evaluation since the research focused on issues and problems under direct management control. Data gathering centered on the possibility of reform within existing programs and hence perceptions of conflict and factionous conditions were sought from staff during the development of the Park's evaluation instrument. Locating conflict among recreationists, park management, and the marine resource helped to structure the issues addressed by the evaluation protocol. Data were specifically gathered to evaluate the public's response to Biscayne's physical facilities, support services, recreation programs, and park specific problems. Demographic information profiling the Bay recreationists was also collected and analyzed in relation to visitor expectations and their perception of current conditions. These demographic variables included age, sex, ethnicity, education and socioeconomic factors.

After constructing the questionnaire, fieldwork methods were developed to disseminate the instrument to two samples. The first sample consisted of randomly

selected visitors to the park during the summer and winter. The second sample consisted of randomly selected persons with boats registered in Dade County Florida. The first sample of visitors were intercepted in the park and given a questionnaire to return after their visit. The second sample received their questionnaire in the mail and were requested them to return it by mail. A total of 1760 forms were distributed, with samples of 440 intercept and 440 direct mail distributed in the summer, and identical samples in the fall. This seasonal weighting was developed using 1985 visitor statistics, which placed approximately half of the Park's visits during the summer. Once disseminated, 69.2% of the intercept and 49.3% of the direct mail questionnaires were returned.

At each of the sites 'rated' by the questionnaire, every fifth boat, or recreation vehicle that entered or passed a central point was considered eligible for inclusion in the sample. This technique was chosen to ensure an unbiased random sample.

Overall, 59.2% of the forms distributed were returned. This completion rate was secured through the application of the Dillman technique (*Mail and Telephone Surveys*, New York: Wiley, 1984) for maximizing return rates from mailback surveys. This technique includes the use of 1) a personal letter-reminder mailed one week after distribution of a questionnaire, 2) a personal letter and supplemental questionnaire sent to those who had not replied in three weeks after the original distribution, and 3) a final personal letter and questionnaire sent to all who had not returned the questionnaire seven weeks after distribution.

Presentation and analysis of the evaluation data

Frequency distributions and descriptive statistics were calculated for each question. Demographic profiles of typical park visitors, their travel party, and trip characteristics were developed to describe who was using the park. The items evaluating specific park sites, services, and programs were also summarized. These data were then classified by ethnicity of the visitor (Hispanic, Anglo), season (summer or winter), and type of survey administration (intercept or direct mail) to determine if significant differences could be found across the seasons, by ethnicity, and by type of data collection. These tabulations were supplemented with classifications by type of park use in conjunction with the demographic variables.

Because of the large number of questions included in the survey and the huge number of tables that resulted when the data were classified by type of data collection, a decision was made to organize the analysis around the structure of the original questionnaire booklet. The survey instrument thus became a template that displays the frequency distributions of the entire sample of 1043 travel parties. This structure was chosen because the responses to a vast majority of the questions, such as those rating facilities or incidence of problems, displayed little variation across seasons or methods of data collection. In the interest of brevity, the summary distributions discussed below were reported to park management, and any significant differences across levels of the above variables are discussed in the text. Chi-square analyses or t-tests were used to determine statistical significance of differences ($\alpha = 0.05$ or less for the appropriate test statistic).

Table 1. Part I Awareness and visitation of Biscayne National Park.

1.	Were you aware that this area is a national park?	83.3% YES	16.7% NO	<i>n</i> = 1043
2.	Have you ever visited or passed through this area?	91.9% YES	8.1% NO	<i>n</i> = 1043
3.	Have you ever visited this area for pleasure or recreational purposes?	89.2% YES	10.8% NO	<i>n</i> = 1043
4.	In the past 3 months, about how many times have you visited this area for pleasure or recreational purposes?			
	Number of visits:	Average 6.2		<i>n</i> = 930
5.	In the past 6 months, about how many times have you visited this area for pleasure or recreational purposes?			
	Number of visits:	Average 12.0		<i>n</i> = 930.

Evaluation results

Figure 2 and Table 1 were complimentary pages that appeared facing each other in the survey questionnaire (Table 2). Respondents were instructed to indicate whether they were aware that the area represented by the Park on the map was a national park, if they had ever visited or passed through the area, and if they had ever used the Park for recreation purposes. If the respondent had visited this area (*n*=930) they were then asked to complete a series of items concerning their previous visit(s) and impressions of the Park. If those contacted by direct mail had never visited the Park they were instructed to complete items in the latter half of the questionnaire (Table 2) and skip the items directly related to evaluation of Biscayne. This structure allowed comparisons of the demographics and attitudes of visitors to nonvisitors.

After determining how often people visited the park, the next section of the questionnaire, summarized in Tables 3 and 4, requested that visitors detail information about the characteristics of their last visit, travel party, and motivations for using the park's facilities. These data were used by park management to form a prototype of the typical Biscayne visit and travel party.

After supplying this basic information about their last visit, respondents were then asked to detail the sites that they had used or observed on their last visit. These sites and facilities were identified by Figure 2 and the grid in Table 5. If the visitor had used or observed a site or facility, he was then requested to evaluate it using an excellent 1) to poor 4) four-point scale. From a policy perspective, these data indicate relative satisfaction with the park's current configuration. These conclusions were reinforced by data from the next section of the questionnaire (Table 6) that sought more general evaluation of services, facilities, and programs within the park. The distributions on these items were again skewed to the positive. However,

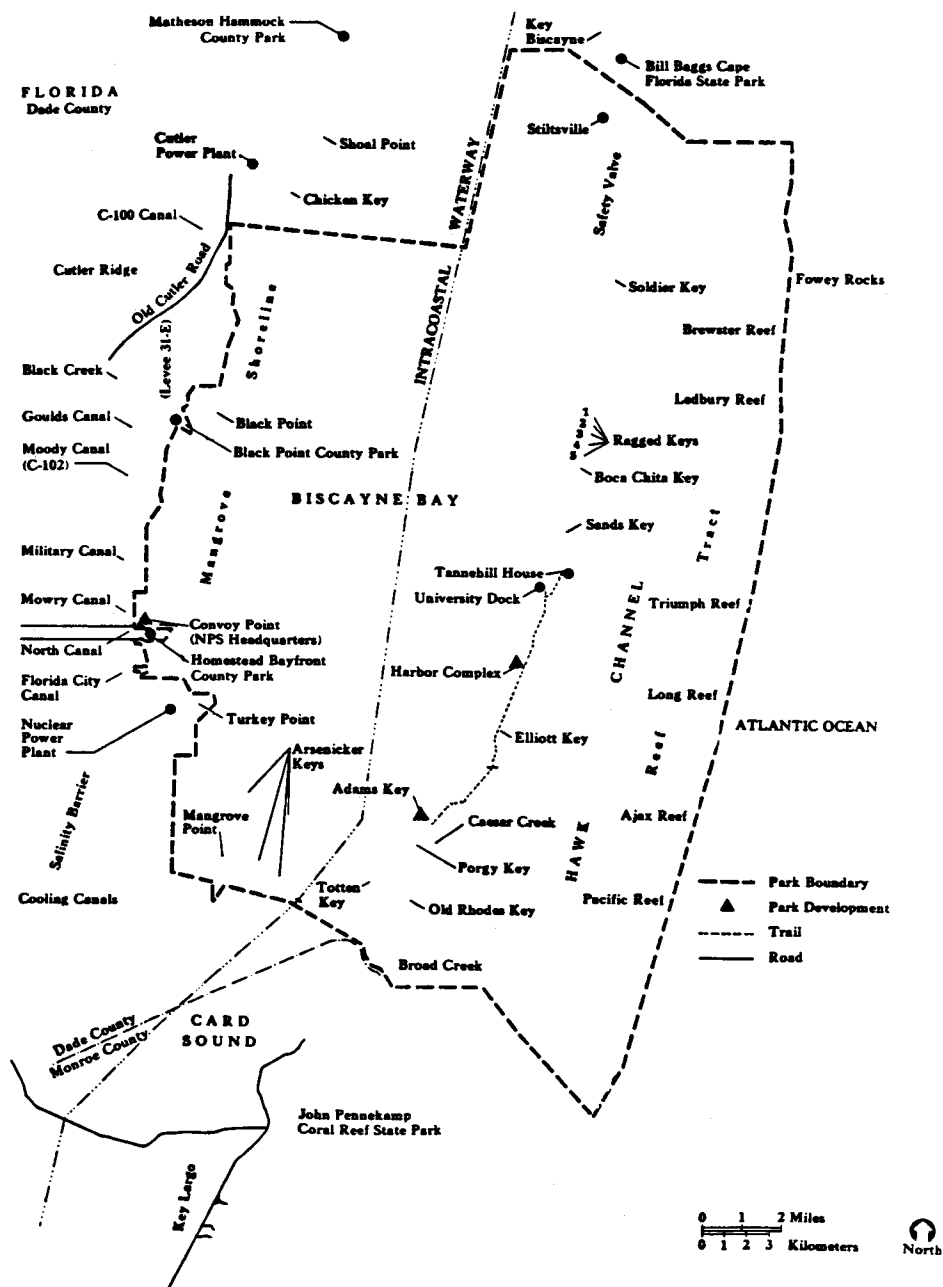


Figure 2. Biscayne National Park.

Table 2. Duration and boat use on respondent's host visit to Biscayne National Park.

6.	On your last visit to this area, did you stay overnight in the Biscayne National Park?			
	<i>n</i> =930		Yes-Overnight Hispanic	Non- Hispanic
	80.4% NO	19.6% YES	12.5%	20.9%
6.bis.	Was your overnight stay on a boat?			
	8.2% YES		91.8% NO	
7.	How many hours did you spend in the Park during your last visit?			
	Number of hours:		10.0 average	
8.	On your last visit to this area, did you use a boat?			
	5.0% NO	95.0% YES	<i>n</i> = 923	
If yes, please describe the boat (sail, motor, length, etc.): <i>n</i> =856				
canoe, rowboat 0.7 houseboat 0.1				
motorboat LT 20' 36.1 sailboat LT 20' 1.8				
motorboat 20-35' 45.3 sailboat 20-30' 7.1				
motorboat 36'+ 4.6 sailboat 36'+ 4.3				

Table 3. Travel party characteristics and reasons for visiting Biscayne National Park.

9. Counting yourself, how many people were with you during your last visit to the Biscayne National Park?		
Number of people: 4.3 average		
10. Which of the following <i>best</i> describes the group of people you were with?		
Check one	Description	
3.9	Alone	<i>n</i> = 930
20.4	A couple	
11.3	Family with children age 12 and under	
5.9	Family with children over age 12	
5.3	Family with children 12 and under and over 12	
14.9	Special interest group (swimmers, fishermen, campers, church group, etc.)	
11.2	Two or more families or relatives together	
27.1	Two or more friends together	

11. What were the major reasons for your last visit to the Biscayne National Park?

Check reasons that apply	Reasons for trip	
23.8	To look at scenery	<i>n</i> = 930
7.3	To visit park facilities, such as visitor centers, demonstration areas, etc.	
84.0	To participate in outdoor recreation activities, such as swimming, fishing, diving, etc.	
9.8	Just passing through to another location	
10.9	Other	

these distributions also illustrate a small, but significant minority of travel parties that hold negative opinions about some aspects of the Park. The effect of these opinions was evident in response to Section IV of the instrument concerning problems within the Park (Table 7), suggestions for change in the park (Section V, Table 8), and interest in activities available within the park (Section VI, Table 9). This section of the questionnaire proved most useful in detailing the kinds of policies different publics would prefer the park management to pursue. When analyzed by ethnicity, Tables 7 through 9 illustrated that Hispanic patrons of the park have much different expectations and desires for their recreation within the park than those of non-Hispanic residents. Given Miami's large Hispanic population, these differences were explored in detail. Hispanics were found to desire a more developed recreation area with organized services, rather than a less developed, more wilderness recreation area preferred by non-Hispanics. Significantly higher rates of Hispanics want the park to change its facilities and services such that there are more signs, control and patrolling by rangers, picnic areas, live demonstrations, mosquito control, scuba areas, navigational aids, developed camp sites, mooring areas, and food/fuel availability. Hispanics report higher rates of problems over lack of written rules, children's activities, insects, wildlife, and dirty restrooms than were manifest by non-Hispanics. Apparently, as a group, Hispanics bring a different set of expectations about what they would like to find within this park than those expressed by non-Hispanic patrons. Hispanic recreationists preferred a more structured setting with more formally organized activities, while Anglos appeared to want the opposite.

The remainder of the questionnaire concerned visitor and nonvisitor preferences for outdoor recreation (Table 10), attitudes toward environmental use and regulation (Table 11), and demographics. From a policy perspective, the environmental use items again found significant differences between Hispanics and Anglos. More Hispanics favored intrusive use of the environment by man, even if such use would ultimately abuse the environment. These data suggest that attempts to maintain the marine resource as a natural area with minimal impacts by man may encounter resistance among a major group of persons currently using the Park.

Table 4. Part II Evaluation of sites and facilities.

On the opposite page is a map of Biscayne National Park. Using this map for reference, please identify those areas or sites within the Park which you visited on *your last* trip to the Park by placing a check in the column to the left of the sites named. Then, please rate your overall impressions of each site you visited on your last trip to the Park by placing a check to the right of each site in the appropriate box (excellent, good, fair, or poor) in the 'Ratings of sites and facilities used' portion of the page. Review the facilities and services listed under each of the sites you visited and place check in the first column to the right of each facility or service (Picnic Area, Dock, etc.) that you used or observed. Finally, rate each facility or service, you used or observed under the 'Ratings of sites and facilities used' portion of the page.

%		%					
Visited this site (*)	Sites Facilities	Used or observed facility (*)	Ratings of sites and facilities used(*)				Average* rating
			Excellent	Good	Fair	Poor	
22.4	Boca Chita Key		38.7	37.6	18.3	5.4	1.89
	Harbor	20.0	42.0	43.7	9.8	4.6	1.77 ^{bc}
	Picnic area	14.0	29.0	39.5	23.4	8.1	2.09 ^d
	Campground	07.0	19.7	32.8	27.9	19.7	2.41
	Trails	09.0	26.2	35.0	25.0	13.7	2.25
13.3	Convoy Point		24.2	57.6	9.1	9.1	2.06
	Glass-bottom boat	1.0	22.2	66.7	-	11.1	2.00
	Snorkeling tour	1.0	18.2	45.5	27.3	9.1	2.30 ^d
	Trail picnic area	3.3	25.0	57.1	10.7	7.1	2.00
	Ranger-led activities	1.3	23.1	46.2	-	30.8	2.50
	Restrooms	8.9	13.4	54.9	18.3	13.4	2.34
	Parking	11.0	28.0	49.0	11.0	12.0	2.08
51.8	Elliot Key		52.3	37.6	8.3	1.8	1.60
	Dock	44.8	52.5	37.6	8.4	1.4	1.59
	Picnic area	34.1	31.7	50.8	13.8	3.8	1.90
	Visitor center	29.8	37.4	43.6	14.3	4.8	1.87 ^b
	Trails	24.5	26.7	45.8	23.1	4.4	2.05 ^b
	Campground	17.7	19.0	52.8	19.6	8.6	2.19
8.5	Adams Key		47.1	29.4	23.5	-	1.76
	Dock	7.2	41.8	35.8	22.4	-	1.82
	Nature trail	2.7	24.0	28.0	40.0	8.0	2.33
	Picnic area	4.1	20.5	43.6	33.3	2.6	2.18 ^b
	Restrooms	4.8	16.7	40.5	23.8	19.0	2.45
41.0	On the Reefs		61.1	30.6	6.9	1.4	1.5
	Mooring/Anchorage	27.6	32.9	43.4	15.1	8.5	2.01
	Markings/Navigational aids	33.9	37.7	38.4	22.3	6.6	2.03
	Safety patrol	20.1	27.1	43.6	15.4	13.8	2.18
43.4	On the Bay		41.5	45.7	11.7	1.1	1.71

Table 4 (continued)

% Visited this site (*)		% Ratings of sites and facilities used(*)						Average* rating
Sites	Facilities	Used or observed facility (*)	Excellent	Good	Fair	Poor		
	Mooring/Anchorage	33.8	39.1	45.0	10.9	5.0	1.81	
	Water transportation service	10.0	26.3	34.7	22.1	16.8	2.31	

* Average ranking a (1) excellent to (4) poor scale. The higher the scale the lower the rating.

^a Hispanic ranking < Anglo $t \leq 0.05$

^b Hispanic ranking > Anglo $t \leq 0.05$

^c Winter < Summer $t = 0.05$

^d Summer > Winter $t = 0.05$.

Table 5. Part III Adequacy of services, facilities and programs.

1. In planning a visit to the Biscayne National Park, visitors usually expect that certain services, facilities, and programs should be available. Below is a list of statements about the Biscayne National Park. By checking the appropriate box, please indicate whether you strongly disagree, disagree, neither agree nor disagree, agree or strongly agree with each of these statements.

EVALUATION (*)%						
Statements	Strongly disagree	Disagree	Neither agree nor disagree	Strongly agree	Average* ranking	
The Biscayne National Park is...						
A. A safe place to swim	2.3	8.0	15.1	57.1	17.6	0.94 ^a
B. A clean, litter-free environment on shore	3.3	19.4	15.4	47.4	14.5	0.60
C. An enjoyable diving experience	0.5	3.2	19.4	52.8	24.2	1.20
D. A park with sufficient docking on the Keys	5.4	23.1	22.0	37.3	12.1	0.36
E. A park opening up nature's beauty	0.8	1.0	9.4	59.2	29.5	1.28
F. A park with convenient restrooms	5.0	18.8	25.8	40.4	10.0	0.42
G. A park offering enough direction signs	3.8	15.7	27.4	43.7	9.3	0.54
H. A park providing enough places to camp	4.1	14.9	40.4	34.3	6.3	0.40
I. A park offering a safe place for boating	1.6	5.0	8.7	61.9	22.8	1.09
J. A park adequately restricting commercial development on the Keys	4.6	6.6	14.3	42.6	31.9	1.06

Table 5 (continued)

Statements	EVALUATION (*)%					
	Strongly disagree	Disagree	Neither agree nor disagree	Strongly agree	Average* ranking	
The Biscayne National Park is...						
K. A park providing access to hiking, boating, fishing and active outdoor use	0.9	2.1	8.7	58.6	29.7	1.25
L. A park with reasonably priced services	3.8	7.6	31.4	45.5	11.6	0.78
M. A park providing a quiet, visual experience	0.9	2.8	9.6	59.1	27.5	1.21
N. A park offering an uncrowded boating experience	7.6	27.1	17.4	35.0	12.9	0.22
O. A park offering enough navigational aids, markers and flags	4.6	17.2	10.7	52.6	15.0	0.63
P. A park providing sufficient anchorage, docks and mooring buoys for boating, snorkeling and diving	3.6	23.3	15.3	45.4	12.5	0.47
Q. A park providing enough information on the weather, water conditions, life on the coral reefs, and what there is to do in the park	4.7	18.4	32.0	36.7	8.3	0.36
R. A park with sufficient shower facilities	6.3	20.9	42.7	26.2	3.9	0.01
S. A park with a welcoming atmosphere	2.7	4.4	23.8	54.5	14.7	0.97

* Weighted average with (-2) strongly disagree, disagree (-1), neither (0) agree (+1), strongly agree (+2). Positive scores denote agreement, negative scores denote disagreement.

^a Hispanic > NonHispanic.

Table 6. Part IV Problems encountered by park visitors.

This set of questions concerns problems you and those with you may have run into during your last visit to Biscayne National Park. Please indicate how much of a problem each item was *for you or anyone with you on this visit* by placing a check () in the appropriate box.

Problems	Not a problem at all	A small problem	A big problem
A. Poor fishing	40.9	36.1	22.9
B. Crowding on the Bay	42.4	42.8	14.8
C. Litter on the Bay	37.8	43.9	18.2
D. Crowding on the Reefs	59.9	30.2	9.9

Table 6 (continued)

Problems	Not a problem at all	A small problem	A big problem
E. Pollution on the Reefs	54.3	29.1	16.5
F. Crowding in campgrounds	63.4	26.5	8.1
G. Noisy children in campgrounds	74.9	9.1	6.0
H. Loud music in campgrounds	63.3	24.5	12.2
I. Dirty restrooms and showers	47.1	33.2	19.6
J. Not enough information about area's history	55.3	35.6	9.0
K. Uninteresting presentation of the area's history	65.1	28.9	6.1
L. Not enough information on park rules and regulations	56.5	29.9	13.6
M. Not enough information on the area's natural environment	55.7	34.1	10.2
N. Uninteresting presentation of information on the natural environment	68.6	26.2	5.2
O. Not enough wildlife	57.4	29.8	12.8
P. Too many insects	23.4	34.6	42.0
Q. Not enough things for children to do	64.0	27.6	8.4
R. Rowdy people	58.8	31.6	9.5
S. Vandalism	65.2	25.9	8.9
T. Pets not on leashes	73.9	19.4	6.6
U. Not enough parking space near entry points	51.5	31.5	17.1
V. Too many park service regulations on visitors	75.2	18.4	6.5
W. Not enough written information about things to do and see	56.8	32.7	10.5
X. Raccoons bothering campsite	77.2	18.9	3.9
Y. Crowding at docks or in harbor	32.2	42.2	37.1
Z. Reckless boat operators	24.2	38.5	37.1
AA. Pollution in the Bay	36.6	41.6	21.8
BB. Other (write in):			
1.			
2.			

Table 7. Part V Support for or opposition to proposed park changes.

1. At different points within the Park there are resources, facilities, and programs provided for you and other visitors. Sometimes visitors tell us that we need more or less of different resources, facilities or programs. Below is a list of things that people have told us we need more or less of – what do you think? By checking the appropriate box, please indicate whether you strongly oppose, oppose, neither oppose nor support, support, or strongly support each suggested change listed in the left-hand column.

Suggested change	Degree of support or opposition()				
	Strongly oppose	Oppose	Neither oppose nor support	Support	Strongly support
A. Need more places to get fuel and food on shore	12.2	12.6	24.2	32.6	18.4
B. Need more self-guided tours on the Reefs	6.4	11.1	38.2	34.5	9.9

Table 7 (continued)

Suggested change	Degree of support or opposition()				
	Strongly oppose	Oppose	Neither oppose nor support	Support	Strongly support
C. Need more short hiking trails on the Keys	4.1	7.7	49.5	32.1	6.7
D. Need more signs indicating where services are located	5.5	9.3	36.6	37.6	9.0
E. Need more visible rangers patrolling	3.9	9.7	33.5	36.0	16.8
F. Need more developed campsites	8.2	15.8	43.2	24.4	8.4
G. Need more anchorage/mooring areas	5.0	9.5	33.1	38.6	13.8
H. Need more rangers to inform us	3.7	10.5	49.4	26.8	9.5
I. Need more park guides to explain things	4.1	11.6	54.9	23.0	6.3
J. Need more picnic areas with toilets, water, shade, and close parking on shore	5.0	12.8	29.9	36.9	15.4
K. Need more aggressive enforcement of safety rules and regulations on the Bay	3.6	9.1	31.4	31.9	24.1
L. Need more clean restrooms with adequate supplies	2.9	4.8	30.8	41.0	20.8
M. Need more navigational aids and markers	2.8	8.0	35.1	36.6	17.4
N. Need more exhibits	4.6	11.6	55.2	23.5	5.0
O. Need more live demonstration projects that inform us about the Bay	3.9	8.7	47.9	30.6	8.9
P. Need more regulation of spear fishing	9.5	11.8	32.2	23.4	23.1
Q. Need more visitor centers	7.3	15.5	52.8	19.7	4.6
R. Need more regulation of boats around diving areas	3.5	7.7	24.9	37.2	26.7
S. Need more restrictions on hook and line fishing	24.3	26.5	31.8	11.4	6.0
T. Need more special use areas for snorkeling and scuba diving	4.4	8.9	27.4	37.5	21.9

Table 7 (continued)

Suggested change	Degree of support or opposition()				
	Strongly oppose	Oppose	Neither oppose nor support	Support	Strongly support
U. Need more areas set aside for just viewing the wildlife and their habitat	3.3	5.9	34.1	37.9	18.8
V. Need more mosquito control in camping and picnic areas	5.8	6.3	18.0	27.0	42.8
W. Need to charge fees to increase quality of programs	20.3	19.5	30.8	22.1	7.3
X. Need less regulations and law enforcement on the Bay	29.2	28.8	26.7	7.8	5.7
Y. Need less noise in campgrounds and along trails	3.3	5.9	65.9	18.4	6.4
Z. Need less care in picking up litter	43.9	32.7	17.5	3.4	2.4
AA. Need less regulations on diving	22.6	29.2	32.5	9.5	6.2
BB. Need less water skiing	19.2	22.4	40.0	9.1	9.3
CC. Need less sport fishing	39.1	28.8	24.3	4.3	3.5
DD. Need less commercial fishing	6.8	7.2	16.5	17.3	52.1

Table 8. Part VI Interests.

We would like to ask you a few questions about the kinds of activities in the Biscayne National Park that interest you. Below is a list of activities that different people do. First, please check () those activities that you or anyone with you participated in on your *last visit* to the Park. Use the box to the left of each activity for this purpose. *If you have not visited the Park, leave this column blank.* Then, *whether you have visited the park or not*, please indicate how interested you are (very interested, interested, or not interested) in each of the activities listed by checking the appropriate box to the right of each activity.

Participated on last trip (%)	Activity	Degree of interest % (Check the appropriate box)		
		Very interested	Interested	Not interested
56.9	A. Swimming or wading	62.0	32.2	5.7
42.0	B. Snorkeling on reefs	68.1	21.9	10.1
27.6	C. Diving	57.3	22.9	19.8
13.8	D. Spear fishing	31.1	20.7	48.3
46.3	E. Spin cast fishing	62.4	21.1	16.5
39.0	F. Visiting Elliot Key	44.9	45.9	9.1
11.6	G. Hiking	18.1	42.3	39.6
4.6	H. Camping on land	18.9	39.0	42.1
25.5	I. Picnicking	34.5	47.3	18.2
2.5	J. Traveling by tour boat	10.5	19.0	70.5
13.7	K. Sailing	33.4	25.3	41.3
61.9	L. Boating	78.2	18.8	3.0
16.3	M. Water skiing	33.6	29.2	37.2
12.8	N. Photography (land)	27.3	48.9	28.8
7.2	O. Underwater photog- raphy	26.3	36.5	37.3
22.8	P. Bird and wildlife watching	32.7	43.5	23.8
12.3	Q. Looking at visitor center exhibits	13.5	52.1	34.5
14.4	R. Nature walks (self- guided)	47.1	33.6	19.3
16.8	S. Boat camping	48.6	36.0	15.4
28.2	T. Using the park for access to the Fla. Straits for fishing	54.9	30.3	14.9
16.8	U. Beach combing	31.2	46.4	22.4
1.8	V. Ranger evening campfire programs	11.4	35.1	53.5
1.1	W. Ranger guided nature walks	10.7	34.2	55.1
1.3	X. Ranger guided snorkeling	14.6	30.1	55.3

Table 9. Part VII Outdoor activities.

Now we would appreciate some more information about the outdoor activities in which you participate. Below is a list of outdoor activities that different people enjoy. Please place a check in the box to the left of each activity that you participate in at least once a year. If you don't participate in an activity at least once a year, leave the box blank. Next, for each of the activities that you have checked (those that you participate in at least once a year), please indicate how often you participate in this activity by checking the appropriate box to the right of the activity.

Percent participate at least once a year (%)	Activity	HOW OFTEN? (%)					
		% Once a week or more	% 2 or 3 times a month	% Once a month	Once every couple of months	% 2 or 3 times a year	% Once a year
32.4	A. Camping in remote wilderness areas	0.6	4.8	5.1	17.1	41.0	31.4
30.3	B. Camping in developed campground	1.3	2.0	6.9	14.7	47.1	28.1
15.1	C. Hunting	6.7	14.7	5.3	10.7	38.0	24.7
82.5	D. Fishing	20.4	37.9	17.1	13.8	8.8	2.0
14.7	E. Riding motorcycles, trailmobiles, snowmobiles, etc. off the road	8.8	17.0	6.8	23.8	24.5	19.0
11.0	F. Driving 4-wheel drive vehicles off the road	8.0	16.1	17.9	20.5	25.5	15.0
22.0	G. Wildlife and bird photography	5.3	10.5	15.8	28.1	28.5	11.8
25.0	H. Bird watching	16.5	12.5	18.4	20.4	23.1	9.0
28.8	I. Hiking	4.4	7.7	16.8	27.5	33.6	10.1
37.8	J. Nature walks	3.4	8.9	16.3	26.8	31.8	12.6
42.0	K. Walking for pleasure	32.8	23.0	13.6	16.2	12.4	2.1
38.7	L. Bicycling	28.8	26.8	14.4	15.2	10.1	4.8
13.0	M. Horseback riding	7.1	7.1	10.2	9.4	30.7	35.4
21.4	N. Canoeing	2.3	3.7	7.9	23.1	32.4	30.6
31.7	O. Sailing	20.1	20.4	10.8	18.9	20.4	9.3
50.8	P. Other boating (water skiing)	18.0	32.3	17.6	16.6	12.6	2.9

Table 9 (continued)

Percent participate at least once a year (%)	Activity	HOW OFTEN? (%)					
		% Once a week or more	% 2 or 3 times a month	% Once a month	Once every couple of months	% 2 or 3 times a year	% Once a year
44.8	Q. Outdoor pool swimming	32.8	27.7	15.9	14.8	7.9	0.9
54.7	R. Other swimming outdoors	24.6	37.4	16.4	14.2	06.6	0.5
15.5	S. Golf	17.1	19.6	17.1	20.3	17.1	8.9
18.2	T. Tennis	24.2	20.4	14.0	19.4	15.6	6.5
31.1	U. Playing other outdoor games or sports	28.8	25.3	19.3	17.4	8.2	0.9
29.4	V. Going to outdoor concerts, plays	2.3	7.0	12.8	29.5	32.6	15.8
35.2	W. Going to outdoor sports events	6.8	11.8	15.1	30.4	29.0	6.8
58.3	X. Visiting zoos, fairs, amusement parks	1.8	4.4	10.3	24.5	40.5	18.7
45.6	Y. Sightseeing	7.1	16.2	15.8	25.8	31.2	3.9
47.7	Z. Picnicking	3.7	15.5	23.9	29.7	23.1	4.1
42.2	AA. Driving for pleasure	19.4	24.1	25.5	15.0	13.3	2.6
	BB. Other outdoor activities (write in): 1. 2. 3.						

Table 10. Section VIII Environment use and regulation.

In this section, we would like to get your opinion about a number of issues concerning the environment in general. For each of the following statements, please indicate the extent to which you agree or disagree by placing a check () in the appropriate box

Statements	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Average*
a. We are approaching the limit of the number of people the earth can support.	18.6	26.7	25.1	24.8	4.8	0.39
b. The balance of nature is very delicate and easily upset.	42.8	45.7	6.2	4.9	0.4	1.35 ^a
c. Humans have the right to modify the natural environment to suit their needs.	2.5	17.0	16.8	39.3	24.5	-0.80 ^a
d. Mankind was created to rule over the rest of nature.	4.9	12.9	19.6	34.4	28.2	-0.85 ^a
e. When humans interfere with nature it often produces disastrous consequences.	34.6	41.8	11.3	8.5	3.7	1.07 ^a
f. Plants and animals exist primarily to be used by humans.	3.1	9.6	16.2	44.3	26.8	-0.98 ^a
g. To maintain a healthy economy we will have to develop a 'steady-state' economy where industrial growth is controlled.	24.3	42.9	19.8	9.2	3.8	0.93
h. Humans must live in harmony with nature in order to survive.	56.7	36.9	4.4	0.9	1.1	1.54
i. The earth is like a spaceship with only limited room and resources.	35.5	40.7	12.6	8.8	2.4	1.12 ^a
j. Humans need not adapt to the natural environment because they can remake it to suit their needs.	2.1	6.3	12.0	38.2	41.3	-1.25 ^a
k. There are limits to growth beyond which our industrialized society cannot expand.	24.3	40.5	19.4	12.0	3.5	0.87 ^a
l. Mankind is severely abusing the environment.	45.5	36.8	9.7	6.3	1.7	1.30
Summated scale	9.49					

* Weighted average with strongly agree (+2), agree (+1), neither (0), disagree (-1) and strong disagree (-2). Positive scores denote agreement, negative scores denote disagreement.

^a Average for Hispanics $\leq .05$.

^b Average for Hispanics > Anglos; $t \leq .05$.

^c Summated environmental awareness scale items A through L (C, D, F, H, J reversed). Range -20 (anti-environment) to +20 (pro environment). Hispanic 6.5, Anglo 10.0 ($t \leq .0002$).

Table 11. Part IX Conclusion.

These questions deal with information about you and your family. They will help us to determine who uses and who does not use the Park so that we can plan to meet your needs. *All* information that you give us is strictly confidential and will not be associated with you as an individual.

1. Where do you live? (Please fill in:)

City: _____ State: _____ Zip Code: _____
 (If outside USA: City: _____ Country: _____)

2. Check the category that *best* describes where you have lived most of the time up to now:

Check one	Type of place
1.8	On a farm or ranch
3.4	In the country, but not on a farm or ranch
2.3	In a small town (population less than 2000)
6.8	In a town or small city (2501–25 000)
10.3	In a city (25 001–100 000)
37.5	In a suburb within 25 miles of a large city (more than 100 000)
38.0	In a large city (more than 100 000)

3. Is this place (where you have lived most of the time up to now) near the water? (Please check:)

87.0 YES 13.0 NO

4. Check the category which includes your *total household income before taxes* last year:

Check one	Income category
1.0	Less than \$5000
2.1	\$5000 up to \$10 000
7.7	Over \$10 000 up to \$20 000
14.4	Over \$20 000 up to \$30 000
19.8	Over \$30 000 up to \$40 000
17.9	Over \$40 000 up to \$50 000
16.9	Over \$50 000 up to \$70 000
8.7	Over \$70 000 up to \$100 000
11.5	Over \$100 000

Table 12. Demographic characteristics.

5. What is the highest level of education you have completed so far? (Please check the most appropriate description.)

Check one	Level of education completed
1.0	Grade or elementary school
4.1	Some high school
8.9	High school diploma
15.5	Some school after high school, such as Business or Technical School
26.5	Some college
19.9	Graduated from college
9.3	Some graduate work beyond college
8.0	Master's degree
6.7	Doctoral or professional degree

6. What is your occupation or line of work? Describe what you actually do. (If student, housework, or retired, please say so.)

7. What is your marital status (Please check one:)

19.0	Single
69.2	Married
9.2	Divorced
1.4	Separated
1.3	Widowed

8. What is your race or ethnic background (Please check one:)

Hispanic
White, other than Hispanic
Black, other than Hispanic
Oriental
American Indian
Other (Specify: _____)

9. What is your age? (Please fill in your age:)
Age: _____

10. What is your sex? (Please check:)

88.6	Male
11.4	Female

Conclusions

The case study of Biscayne presented above demonstrates a technique for evaluating visitor assessments of a marine recreational environment and how such information can be used to enhance both resource management and public policy guiding the evolution of the park system. From a park management perspective Biscayne's data suggest a need for sensitivity to expectations that different ethnic groups bring to the Park when designing services and programs offered within the Park. From a regional policy perspective, the data suggest addressing the issue of whether marine recreational areas should have increased development and formal control to maximize visitor satisfaction, or remain undeveloped natural areas.

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Stephen V. Cofer-Shabica
University of Georgia,
Athens, U.S.A.

Robert E. Snow
Georgia State University,
Atlanta, U.S.A.,

Francis P. Noe
National Park Service,
U.S.A.