

**Supporting Statement for a New Collection RE: Visitor and Business Surveys
for Cape Hatteras National Seashore
OMB Control Number 1024-new**

B. Collections of Information Employing Statistical Methods

The agency should be prepared to justify its decision not to use statistical methods in any case where such methods might reduce burden or improve accuracy of results.

1. Describe (including a numerical estimate) the potential respondent universe and any sampling or other respondent selection method to be used. Data on the number of entities (e.g., establishments, State and local government units, households, or persons) in the universe covered by the collection and in the corresponding sample are to be provided in tabular form for the universe as a whole and for each of the strata in the proposed sample. Indicate expected response rates for the collection as a whole. If the collection had been conducted previously, include the actual response rate achieved during the last collection.

Business survey. The universe consists of all businesses engaged in fishing tackle/supply; equipment rental/lessons; real estate and home rental; campgrounds; motels and other lodging (excluding rental houses and campgrounds); fishing piers/marinas; recreational fishing charters; commercial fishermen in CAHA (Ocracoke, Rodanthe, Waves, Salvo, Avon, Buxton, Hatteras, and Frisco); as well as businesses located north of the CAHA boundary at the time of the study. Tables B1 and B2 present the approximate size of the universe and the type of sample to be drawn (if not a census). The expected response rate for all the businesses surveyed is 80%, based on similar surveys RTI has conducted in communities around other national parks, such as Yellowstone National Park and Rocky Mountain National Park.

Table B1. Businesses Located in Ocracoke, Rodanthe, Waves, Salvo, Avon, Buxton, Hatteras, and Frisco.

Business Category	Type of Sample	Estimated Size of Respondent Universe	Sample Size	Expected Response Rate	Estimated Responses
Recreational Supply (including fishing tackle/supply, equipment rental and lessons; surf shops and lessons; fishing charters)	Census	40	40	80%	32
Rental agencies	Census	13	13	80%	10
Lodging other than rental homes	Random sample	60	34	80%	27
Commercial fishermen	Random sample	105	20	80%	16
TOTAL		218	107	80%	85

Table B2. Businesses Located North of the Park Boundary.

Business Category	Type of Sample	Estimated Size of Respondent Universe	Sample Size	Expected Response Rate	Estimated Responses
Recreational Supply (including fishing tackle/supply, equipment rental and lessons; surf shops and lessons; fishing charters)	Random sample	40	15	80%	12
Rental agencies	Census	15	15	80%	12
Lodging other than rental homes	Random sample	100	17	80%	14
TOTAL		155	47	80%	38

Visitor survey. The potential respondent universe for the visitor interviews includes all visitors 18 years of age or older using the ocean-side beaches in CAHA from Memorial Day weekend 2009 through October 2009 (under the emergency clearance) and between November 2009 and February 2010 (under a regular PRA clearance). This includes visitors who use the ocean-side beaches between 6:00 a.m. and 6:00 p.m. Visitor groups will be intercepted based on a sampling plan (described in section B.2) stratified by season, location in the park, day of the week, and time of the day.

Table B3 presents the approximate visitation based on National Park Service (NPS) visitation statistics for November 2007 to October 2008. It's assumed that the visitation patterns observed between November 2007 and October 2008 are representative of the visiting behavior expected for the study period. We expect that the large majority of visitors will be on the beach at some point between 6:00 a.m. and 8:00 p.m. For the visitor survey, we expect a response rate of 60%, based on a 74% response rate to a 2002 visitor survey at CAHA that used a shorter on-site contact followed by a mailback survey.

Table B3. Potential Universe for the Visitor Survey.

Sampling months	Estimated Size of Respondent Universe	Sample Size	Expected Response Rate	Estimated Responses
ALL	2,112,126	2,000	60%	1,200

2. Describe the procedures for the collection of information including:
 - * Statistical methodology for stratification and sample selection,
 - * Estimation procedure,
 - * Degree of accuracy needed for the purpose described in the justification,
 - * Unusual problems requiring specialized sampling procedures, and
 - * Any use of periodic (less frequent than annual) data collection cycles to reduce burden.

Business survey. The sampling strategy for the business category is based on a combination of factors, including the need for precision in the estimates, the number and diversity of businesses within an industry category, the extent to which the business targets visitors who will be directly affected by the action alternatives, as well as resource constraints on the

number of calls made. The responses collected from the surveys will provide one source of information used to create high-, medium-, and low-impact scenarios for each action alternative. The actual impacts of the alternatives are inherently uncertain, and the business owners are being asked to provide their best estimate of these impacts. The range of scenarios for each action alternative captures the uncertainty in the actual outcomes, so the precision of the estimates needs to be reasonable, but does not need to be exact. The business sample will be stratified by type of business and location in the villages near CAHA or north of CAHA. A list of businesses (population frame) in each category and location will be compiled from sources that include local yellow pages, chambers of commerce, websites from the tourism bureaus, and input from the Regulatory Negotiating Committee.

Depending on the business type, we will survey all the firms of that type (a census) or select a random sample of businesses. We will sample all the fishing and recreational supplies stores around CAHA. The recreational supply industry category includes a variety of businesses that may be impacted differently, so we will interview all these businesses. The management alternatives have the most direct impact on visitors who use vehicles on the beach and who visit the ends of the islands, Cape Point, and other areas where threatened or endangered species nest and the area is important for fishing. Cape Point also is used for surfing and kite boarding. Thus, many of the customers at recreational supply businesses will be directly affected by the alternatives.

We will contact all the real estate and rental housing businesses around CAHA and to the north. There are a limited number of these businesses, and a large number of visitors rent houses. Compared to rental housing businesses, there are more lodging businesses in the CAHA area, including motels, hotels, campgrounds, and bed and breakfast inns. Because of the large number, we will contact a sample of these businesses, rather than attempt a census.

Commercial fishermen who fish from inside CAHA are an important part of the culture of the area and are likely to be small businesses. Because these fishermen work directly in the park, rather than serving visitors to the park, the impacts on this sector will differ from other sectors. However, the sector makes a smaller contribution to the overall economy of the area than businesses serving tourists. Based on these factors, we will survey a smaller percentage of commercial fishermen.

The beaches outside of CAHA, all of which are north of the park, are not part of the park and so are not affected by the action alternatives. Thus, businesses located north of CAHA (in Nags Head, Kitty Hawk, and the other villages to the north) are expected to be less impacted by the proposed management changes. These businesses will be sampled at a lower rate than businesses around CAHA. The exception is real estate companies north of CAHA. All businesses in this category will be contacted because there are relatively few of them.

The business surveys will be administered by telephone. Up to ten calls will be made to each business if the number is busy or no one answers. If the owner or other individual familiar with the finances of the business is not able to take the survey when we call, we will schedule a later time for the interview. If the survey is not conducted at the rescheduled time, we will attempt to reschedule the interview as many times as necessary until the owner indicates they

do not want to respond to the survey or we make ten calls that go unanswered. Calls will be made on weekdays between 8:00 a.m. and 6:00 p.m. Call-backs for numbers at which there is no answer or a busy signal will be made at different times of the day.

Tables B4 and B5 provide the sample size and 95% confidence intervals for the mean percentage decline in revenue under the action alternative that most restricts ORV access. The standard deviation was assumed to be 15% based on surveys conducted in other parks and informal personal communications from business owners near CAHA.

Table B4. Businesses Located in Ocracoke, Rodanthe, Waves, Salvo, Avon, Buxton, Hatteras, and Frisco.

Business Category	Type of Sample	Survey Sample Size	95% Confidence Interval *
Recreational Supply (including fishing tackle/supply, equipment rental and lessons; surf shops and lessons; fishing charters)	Census	32	5.13
Rental agencies	Census	10	9.30
Lodging other than rental homes	Random sample	27	5.66
Commercial fishermen	Random sample	16	7.35

Table B5. Businesses Located North of the Park Boundary.

Business Category	Type of Sample	Survey Sample Size	95% Confidence Interval
Recreational Supply (including fishing tackle/supply, equipment rental and lessons; surf shops and lessons; fishing charters)	Random sample	12	8.48
Rental agencies	Census	12	8.48
Lodging other than rental homes	Random sample	14	7.86

Estimates will be produced using a design-based approach that incorporates the sampling weights (in cases where a probability-based sampling design was used to select the sample) to estimate the population parameters. When a census is used, standard formulas for the total, mean, and percentages will be used to report population values. If non-response is an issue, then appropriate methods, such as weighting class adjustments, will be used to reduce the potential bias induced by the non-response.

Visitor survey. Visitors will be sampled on the ocean-side beaches. The sampling plan will be stratified by season, day of week, time of day, and type and location of beach. Scheduled sampling days will be based on data supplied by nine housing rental companies on Hatteras Island for occupancy rates by week for 2007. The occupancy rates will be used to estimate the proportion of visitors (including pedestrians) on the beach each week of the year, and selected weeks will be sampled proportionately based on the occupancy data.

Weekends will be sampled at twice the rate of weekdays because information from park staff and from counts of vehicles using the beach indicate that there are about twice as many visitors on the weekend as on weekdays. Sampling days will be divided into three four-hour time periods from 6 a.m. to 10 a.m., from 10 a.m. to 2 p.m., and from 2 p.m. to 6 p.m. Two four-hour periods will be randomly selected for each day on which the survey is conducted. The beaches will be divided into 1/8-mile sections with GPS coordinates for each segment. The beach segments will be clustered according to location. One cluster of beach segments will be selected for each four-hour interview time period to allow for easy driving or walking between segments. Interviews will be conducted at three beach segments during each four-hour time period. The start time for surveying on each beach segment will be randomized across the four hours.

The visitor survey will be conducted by a team of two interviewers using handheld devices to administer in-person computer-assisted questionnaires. The process is as follows

- Use GPS receivers to identify the beginning of the 1/8-mile section of beach, and plant a flag at the start of the section.
- Interviewer 1: Start by walking along the dune line and counting number of people on the beach and in the water until the end of the segment is reached. Plant a flag at the end of the segment.
- Interviewer 2: start interviewing at the beginning of the segment
- Interviewer 1: after counting, start interviewing from the end of the segment
- To interview:
 - i. Stand in the approximate middle of the beach between the dune line and water on the boundary of the beach segment. Imagine a line along the boundary of the segment from the dune to the water, and approach the closest group to the imaginary line from dune to ocean
 - ii. Approach and ask for participation
 - iii. Ask who is in the “group,” including members who might be in the water
 - iv. Ask to interview the member of the group 18 years of age or older who has the next birthday
 - v. After finishing the interview, plant the flag next to the group
- Walk forward and approach the next group closest to the imaginary line from the dune to the beach
- After finishing with all groups in the 1/8-mile section, walk the section of beach to identify any groups that were missed
- For safety reasons, do not interview individuals in moving vehicles, but do interview groups sitting near parked vehicles

Estimates will be produced using a design-based approach that incorporates the sampling weights to estimate the population parameters. If non-response is an issue, then appropriate methods such as weighting-class adjustments, will be used to reduced the potential bias induced by the non-response.

Approximately 25% of the 1/8-mile beach segments will be surveyed (about 60 miles of beach and 30 days of interviewing in four segments each day). We will be sampling with replacement.

The design effect was calculated assuming that six beach segments will be selected at random for each sampling day using a stratified sampling design. It also was assumed that one adult member of every group of beach users in the segment at the time of the survey will be selected at random. This results in a “census of groups of beach users” in the selected beach segment.

The proposed 30 days of interviewing will yield 180 (30*6) beach segments (which result in clusters of beach users). The 180 beach segments will be allocated proportionately to the number of segments in the two strata (Stratum 1 = Hatteras and Bodie with 49 beach segments, and Stratum 2 = Ocracoke with 18 beach segments). After combining all this information, the proposed stratified random sample of 180 beach segments and census of groups within selected beach segments results in a design effect of 1.01

Note that a sample of size n drawn using simple random sampling from a population will usually be more efficient (i.e., have smaller sampling errors) than a sample of the same size drawn by means of a sample of pre-existing clusters in the population. Stratification tends to reduce the sampling errors of the estimator; therefore, it tends to increase the efficiency of the sampling design.

The total number of samples is constrained not only by the available budget, but by consideration of the precision that can be expected. Approximate precision estimates may be obtained, assuming the survey design is simple random sampling. Under this assumption, the confidence interval half-width (precision) can be estimated using the following equation:

$$\text{Half - width} = Z_{1-\alpha} * \sqrt{\text{estimator variance}}$$

where $Z_{1-\alpha}$ is related to the level of confidence required for the estimate (Cochran, 1987). Given that our proposed survey design considers stratification to account for the different types of beaches, the actual precision estimates are expected to be better (smaller confidence intervals) than those obtained with the equation above.

The visitor survey has two objectives: 1) to estimate the percent of the population that will change visit behavior under a proposed alternative, and 2) to estimate the mean number of days in a trip under a proposed alternative. (Trip length has relevant economic consequences.)

For the first objective, if the true proportion of the population estimated to change its behavior under a proposed alternative is 40%, then to produce estimates within 10% of this true value (95% confidence level, 80% power), we need about 377 participants (Table B6).

Table B6. Sample Sizes Required to Estimate True Proportions at Specific Power Levels and Confidence Intervals.

True Proportion	Precision (Half-width)																
	0.05	0.06	0.07	0.08	0.09	0.10	0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20	
0.10	566	393	289	221	175	14	2	117	99	84	73	63	56	49	44	40	36
0.15	801	556	409	313	248	20	1	166	139	119	103	89	79	70	62	56	51
0.20	100	698	513	393	311	25	2	208	175	149	129	112	99	87	78	70	63
0.25	5	818	601	460	364	29	5	244	205	175	151	131	115	102	91	82	74
0.30	8	916	673	516	407	33	0	273	229	196	169	147	129	115	102	92	83
0.35	9	993	729	559	441	35	8	296	249	212	183	159	140	124	111	99	90
0.40	9	104	769	589	466	37	7	312	262	223	193	168	148	131	117	105	95
0.45	7	108	793	608	480	38	7	322	270	230	199	173	152	135	120	108	98
0.50	155	109	801	614	485	39	9	325	273	233	201	175	154	136	122	109	99

From Cochran W.G. 1987. *Sampling Techniques*. New York. John Wiley & Sons

For the second objective—to estimate the mean number of days in a trip under a proposed alternative—we can use an estimate based on the coefficient of variation (CV), which is the standard deviation divided by the mean, i.e., the standard deviation as a percent of the mean. The smaller the standard deviation as a percent of the mean, the lower the CV. If we expect high variability in responses (i.e., the range in number of days varies substantially in the population), then we should be considering population CVs in the range of 75% to 125%. This results in samples that vary in size from 9 to 1539, depending on the desired precision (Table B7).

At CAHA, the final sample size should be the larger of the two sample sizes that satisfies both the first and second objectives of the visitor survey. This means the sample size for the visitor survey should be closer to 1,539 than to 377.

Table B7. Sample Sizes Required to Estimate a Parameter at Desired Precision Levels and Coefficients of Variation.

Population CV	Percent Relative Error of the Estimated Mean					
	5%	10%	15%	25%	50%	75%
25%	98	26	13	6	3	3
50%	387	98	45	18	6	4
75%	867	219	98	37	11	6
100%	1539	387	173	64	18	9
125%	2403	603	269	98	26	13

150%	3460	867	387	141	37	18
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Confidence level = 0.95

3. Describe methods to maximize response rates and to deal with issues of non-response. The accuracy and reliability of information collected must be shown to be adequate for intended uses. For collections based on sampling, a special justification must be provided for any collection that will not yield "reliable" data that can be generalized to the universe studied.

Data from both surveys will be used to inform the economic analysis of the ORV management alternatives. The analysis will focus on the economic impacts of the alternatives relative to the baseline conditions under the two no-action alternatives (years 2007 and 2008). In order to analyze the new alternatives, we must select parameters to quantify changes in factors that affect businesses (such as changes in the number of customers, changes in business revenue, and changes in the mix of business activities) and visitors (such as ORV restrictions). Because of the uncertainty inherent in forecasting future activity, the economic analysis will estimate scenarios covering a range of possible impacts.

The data from the visitor and business surveys are one source of information that will be used to establish the range of possible values for different parameters. Other sources include publicly available secondary data on visitation and economic conditions and information from the visitor survey. The business and visitors surveys and other data sources will be combined to create reasonable ranges for the parameters in the economic model. We plan to use several sources of information, because no single source provides all the data we need, and each source has positive and negative features. Concern has been expressed that the businesses or visitors will answer the survey strategically to influence the outcome of the economic analysis. The questions in the survey and comparisons with other data sources will be used to identify strategic responses.

Business survey. To maximize response rates, the instrument was based on input from a number of parties with survey research experience and from members of the business community around CAHA. This input also was used to make sure the questions could be understood, that the minimum numbers of questions were asked, and that the questions collected the data needed for the analysis. To maximize response rates among businesses, interviewers will assure respondents that their answers will be kept on RTI's secure network in a password-protected folder that only project staff will have access to. In addition, they will be told that the results will be reported in aggregate form, so that no individual business can be identified. All identifying information will be protected to the extent permitted by law (see part A.10 of the supporting statement for more detail).

For each business, the type of business and its location are known. For most businesses, public information on revenue and number of employees also is available. To assess potential non-response bias, when the surveys are complete, the firms that did not participate will be compared with those that did in terms of industry category, location, and size (based on publicly available data). The alternative strategy of assessing non-response bias by asking those who refuse the interview to stay on the phone long enough to answer one or two relevant questions from the survey is unlikely to succeed. This is because the most relevant

questions deal with revenue and changes in revenue under the action alternatives and would take too long to ask to those who have already refused the complete interview.

Visitor Survey. To maximize response rates to the visitor survey, the instrument was based on input from a number of parties with survey research experience and members of the public and park staff familiar with CAHA visitors. This input also was used to make sure the questions could be understood, the minimum numbers of questions were asked, and the questions collected the data needed for the analysis. The interviewers will be carefully trained in how to sample and make contact with visitors and how to convert initial refusals into completed interviews. Non-response rates will be monitored throughout the year of data collection to identify and correct problems.

We will take several steps to identify non-response bias and correct for bias in our analysis. The interviewer will attempt to ask refusers their Zip code or country of residence and also ask (or observe) if the visitor has ever driven a vehicle on the beaches at CAHA. In addition, any easily observable traits of the visitors (such as group size and presence of children), as well as time of day, day of week, and location of interview will be recorded on a log for each contact for a later comparison of respondents with non-respondents.. This information, along with a code for the interviewer, will be analyzed using a probit or logit model to identify systematic patterns in non-response. In any regression analysis, a 2-step selection model (such as a Heckman selection model or propensity model) will be used to help correct regression results for selection bias.

4. Describe any tests of procedures or methods to be undertaken. Testing is encouraged as an effective means of refining collections of information to minimize burden and improve utility. Tests must be approved if they call for answers to identical questions from 10 or more respondents. A proposed test or set of tests may be submitted for approval separately or in combination with the main collection of information.

Business survey. The survey instruments were developed with input from contractor staff including economists, survey research experts, and statisticians. The instruments are based on similar business surveys conducted by the contractor for NPS at other national parks. National Park Service staff, including staff from the Social Science Program and members of the Regulatory Negotiating committee for CAHA, also were consulted about the survey, the businesses to be surveyed, and other aspects of the survey administration. In a pre-test, questions concerning revenue and business size were asked of nine real estate companies in 2007 and early 2008 to make sure that respondents could answer the questions in a telephone interview.

Visitor survey. The survey instruments were developed with input from contractor staff including economists, survey research experts, and statisticians. National Park Service staff, including staff from the Social Science program, and members of the Regulatory Negotiating committee for CAHA, also were consulted about the survey and survey administration. A scoping trip to CAHA took place in October 2008 to identify beaches and beach uses. This information was used to assess the feasibility of different sampling methods. A pre-test took place in December and January involving 9 visitors to evaluate and improve the procedures and the survey instrument.

5. Provide the name and telephone number of individuals consulted on statistical aspects of the design and the name of the agency unit, contractor(s), grantee(s), or other person(s) who will actually collect and/or analyze the information for the agency.

RTI International, a contractor to NPS, designed the survey and will collect and analyze the data. The project manager is Dr. Carol Mansfield (919-541-8053). Other RTI staff participating in the survey design and data collection are Dr. Brenda Muñoz, Mr. Brian Evans, and Dr. Christine Poulos.