## Supporting Statement B

## Social Science Assessment and Geographic Analysis of Marine Recreational Uses and Visitor Attitudes at Dry Tortugas Natural Research Area and Biscayne National Park

OMB Control Number 1024- NEW

## 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. When the question "Does this ICR contain surveys, censuses, or employ statistical methods?" is checked "Yes," the following documentation should be included in Supporting Statement B to the extent that it applies to the methods proposed:

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.

## Biscayne National Park

The respondent universe is any person who could be a potential respondent (e.g. anglers, divers/snorkelers, and boaters) using the park. Anglers, divers/snorkelers, and boaters can access Biscayne National Park through several access points including three marinas; Homestead, Black Point, or Matheson Hammock. Data are available from NPS Public Use Statistics Office on the number of people who use each marina during each month of the year. We accessed these data for 2007, 2008 and 2009, and calculated the average monthly use for each marina (Table B1). These numbers will be used to represent a numerical estimate of the potential respondent universe. From this, we will draw the sample of anglers, divers/snorkelers and boaters. However, the distribution of anglers, divers/snorkelers and boaters within this universe is not known.

Therefore, based upon the sampling strategy described below for each marina, potential respondents will be intercepted on or near boat ramps and asked to identify their primary activity (angling, diving/snorkeling or boating), as well as provide their name, mailing address and/or email address. In order to ensure a representative sample, we aim to obtain contact details from a total of 4,500 individuals during the months of April to October 2012. In order to achieve this aim we have calculated the number of successful interceptions that must occur by month and marina (Table B2) weighting these calculations based on current use levels. To account for an anticipated on-site refusal rate of $10 \%$ (Loomis $2008 \mathrm{a}, \mathrm{b}, \mathrm{c}$ ), sampling above these numbers will be required (Table B3).

Since individuals will already have agreed to receive a survey, we expect a reasonable rate of return for completed surveys. Based upon similar research completed in the region (Loomis, 2008 a, b, c), we will be assuming a $50 \%$ response rate for this data collection effort. This expected return rate means that a non-response bias analysis will be a key factor in determining the representativeness of the population sample. This will be facilitated through the collection of non-respondent data such as gender, race/ethnicity, primary language and age.

Table B1. Average monthly use at Homestead, Black Point and Matheson Hammock marinas for the years 2007, 2008 and 2009 during the months when sampling will occur.

|  | Homestead | Black Point | Matheson Hammock | Total |
| :---: | :---: | :---: | :---: | :---: |
| April | 2,194 | 2,269 | 2,131 | 6,594 |
| May | 2,168 | 2,620 | 2,880 | 7,668 |
| June | 2,238 | 2,958 | 2,841 | 8,037 |
| July | 2,807 | 4,101 | 3,462 | 10,370 |
| August | 2,217 | 2,669 | 2,837 | 7,723 |
| September | 1,555 | 1,815 | 2,195 | 5,565 |
| October | 1,385 | 1,348 | 1,663 | 4,396 |
| Total | 14,564 | 17,780 | 18,009 | 50,353 |

Table B2. Estimated sample size (weighted for use) required for Homestead, Black Point and Matheson Hammock marinas during selected months during which sampling will occur.

|  | Homestead | Black Point | Matheson Hammock | Total |
| :---: | :---: | :---: | :---: | :---: |
| April | 131 | 135 | 127 | 393 |
| May | 129 | 156 | 172 | 457 |
| June | 133 | 176 | 169 | 479 |
| July | 167 | 244 | 206 | 618 |
| August | 132 | 159 | 169 | 460 |
| September | 93 | 108 | 131 | 332 |
| October | 83 | 80 | 99 | 262 |
| Total | 868 | 1,059 | 1,073 | 3,000 |

Table B3. Contact and Response Rates by User Population for Quantitative Survey of Biscayne National Park

|  | Homestead | Black Point | Matheson <br> Hammock | Total |
| :--- | :---: | :---: | :---: | :---: |
| Estimated Population for 2010 | 14,564 | 17,780 | 18,009 | 50,353 |
| Number of On-Site Contacts | 965 | 1,177 | 1,192 | 3,334 |
| Acceptance Rate | $90 \%$ | $90 \%$ | $90 \%$ | $90 \%$ |
| Number of Usable Postal or Email <br> Addresses | 868 | 1,059 | 1,073 | 3,000 |
| Survey Response Rate | $50 \%$ | $50 \%$ | $50 \%$ | $50 \%$ |
| Usable Surveys Obtained | 434 | 530 | 536 | 1,500 |

An area of methodology implementation that was highlighted as potentially limiting during survey instrument development was that of language barriers. Due to the ethnographic characteristics of the region, it is expected that there will be a large population of Spanish speakers in the respondent universe. Although this is not expected to pose any problems based on previous research experiences in the Florida region, it is acknowledged that efforts should be made to ensure this factor does not bias the sample. Therefore, to facilitate the interception process, especially at Matheson Hammock and Black Point marinas, the interceptors deployed will be able to converse in both English and Spanish. However, it is expected that at least one individual in a group will be able to speak English and that person will be targeted for interception. Since there will be no pre-determination of the individual selected before the group is approached no bias will be created. This will also avoid the necessity of translating the surveys into Spanish.

## Dry Tortugas National Park

Dry Tortugas National Park (DRTO) lies at the western end of the Florida Keys. As such it is difficult for many people to reach the park since larger boats are needed to make the journey and there is no access by road. However, despite these limitations, there are still several distinct visitor subpopulations that make the journey. Visitors in these different subpopulations are likely to differ in their motivations and expectations, including cultural and historical interests as well as physical activities, when considering a trip to DRTO and thus need to be studied separately. The three groups of interest can be categorized by their primary activities or interests and have, for this study, been defined as visitors (to Fort Jefferson and Garden Key), divers/snorkelers, and boaters in general. These groups represent the respondent universe. Two quantitative survey instruments were designed to elicit information from these different user populations. To the extent possible, the surveys ask analogous questions to allow comparison among the groups.

Visitors to Fort Jefferson, divers/snorkelers, and boaters can access Dry Tortugas National Park by using a number of different modes of transport, the two main ones being by ferry boat (park concession) or by private recreational vessel. Data are available on the number of people who
use each mode of transport during each month of the year on the NPS Statistical Website (http://www.nature.nps.gov/stats/park.cfm). As described with BISC above, these visitation statistics were accessed for 2007, 2008 and 2009 and averaged to generate an expected visitation rate for 2011 (Table B4, B5). This is the numerical estimate of the potential respondent universe. From this will be drawn the sample of visitors to Fort Jefferson and Garden Key, divers/snorkelers and boaters. However, the distribution of Garden Key visitors, divers/snorkelers and boaters within this universe is not known.

Therefore, based upon the sampling strategy described below, private recreational vessel users (both divers and boaters) will be contacted through the established permit system through which all boat registration numbers are collected and stored in a database. Access to this database has already been secured. Visitors using the ferry service to visit Fort Jefferson and Garden Key will be intercepted on or near the boat dock from which the ferry service leave in Key West, or on the boat itself, asked to identify their primary activity (historical tourism, diving/snorkeling or camping), and asked to provide their name, mailing and/or email address.

In order to ensure a representative sample, we aim to obtain contact details from a total of 2,000 individuals during the months of April to October 2011. In order to achieve this aim we have calculated the number of successful interceptions that must occur by month and transportation mode (Table B4) weighting these calculations based on current use levels. To account for an anticipated on-site refusal rate of $10 \%$ (Loomis 2008 a, b, c), sampling above these numbers will be required (Table B6). Since individuals will already have agreed to receive a survey, we expect a reasonable rate of return for completed surveys. Based upon similar research completed in the region (Loomis, 2008a, b, c), we will be assuming a $50 \%$ response rate for this data collection effort. This expected return rate means that a non-response bias analysis will be a key factor in determining the representativeness of the population sample. This will be facilitated through the collection of non-respondent data such as gender, race/ethnicity, primary language and age.

Table B4. Average monthly visitation for the years 2007, 2008 and 2009 at Dry Tortugas National Park during the months when sampling will occur ( 2 most commonly used modes of transportation)

|  | Ferry Visitors | Private boaters | Total |
| :---: | :---: | :---: | :---: |
| April | 4,820 | 888 | 5,708 |
| May | 4,391 | 1,205 | 5,596 |
| June | 4,944 | 916 | 5,860 |
| July | 5,647 | 951 | 6,598 |
| August | 3,967 | 412 | 4,379 |
| September | 1,884 | 540 | 2,424 |
| October | 2,054 | 620 | 2,674 |
| Total | 27,707 | 5,532 | 33,239 |

Table B5. Estimated sample size required at Dry Tortugas National Park during selected months during which sampling will occur.

|  | Ferry Visitors | Private boaters | Total |
| :---: | :---: | :---: | :---: |
| April | 290 | 53 | 343 |
| May | 264 | 73 | 337 |
| June | 297 | 55 | 353 |
| July | 340 | 57 | 397 |
| August | 239 | 25 | 263 |
| September | 113 | 32 | 146 |
| October | 124 | 333 | 2,000 |
| Total | 1,667 |  |  |

Table B6. Contact and Response Rates by User Population for Quantitative Survey of Dry Tortugas National Park

|  | Ferry Visitors | Private boaters | Total |
| :--- | :---: | :---: | :---: |
| Estimated Population for 2010 | 27,707 | 5,532 | 34,082 |
| Number of On-Site Contacts | 1,852 | $*$ | 1,852 |
| Acceptance Rate | $90 \%$ | $*$ | $90 \%$ |
| Number of Usable Postal or <br> Email Addresses | 1,667 | 333 | 2,000 |
| Survey Response Rate | $50 \%$ | $50 \%$ | $50 \%$ |
| Usable Surveys Obtained | 833 | 167 | 1,000 |

*Contact details for private boaters will be collected using the permit system; therefore, no on-site contact will be made with these individuals.

## 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.

The determination of the necessary sample sizes of 1,500 and 1,000 for BISC and DTRO respectively, are based upon a calculation of $3 \%$ of the estimated number of users for each park during the sampling time period of April to October, 2011. These sample sizes are certainly large enough to provide the necessary power for inferential statistical tests to be conducted. This point is critical due to the fact that there are multiple survey instruments for each park. The entire sample at each park will be exposed to an identical set of core questions allowing generalizability to the broader population of users of these two parks. The proposed sample sizes, when divided to encompass the different versions of the survey instruments will still be sufficiently large to be testable for significant differences.

## Biscayne National Park

The three survey instruments that will be utilized in BISC have been developed around primary recreational activity. In this case, the sample will be divided by the respondents' self-selection into one of three groups: divers, anglers, or motorized vessel passengers. These activity groups have been identified as the dominant recreational activities in this park by BISC park staff. It is expected that the sample of respondents will be divisible equally into these three activity groups. Since one individual may engage in more than one of these activities, the respondent will be asked to select a primary activity when intercepted. This will allow close monitoring of the sample sizes over time by the research team. To ensure equal sample sizes one-third of the diver and angler samples will be given the marine reserve survey instead of the activity specific one. This will not only help ensure effective sample sizes across the each survey group but also allow the views and attitudes regarding marine reserves of all users groups to be collected.

Geospatial data will be collected by a smaller sample of voluntary park users and used in conjunction with existing biophysical data layers in order to facilitate the identification of recreational hotspots with the boundaries of BISC by resource type. A total of 150 individuals ( $10 \%$ of the total BISC sample) will be asked to place a small spatial data logger called Super Trackstick (http://www.trackstick.com) on their boat or their person throughout their time within Biscayne National Park. The Trackstick will continuously and automatically record its exact route, stop times, speed and direction. This method will reduce the need for the individually user to recall their exactly journey route. These data can then be directly downloaded to data managing software and analyzed removing any possible transfer errors that may occur. Utilizing GPS units such as Tracksticks will allow sophisticated data analysis as well as provide the opportunity to produce maps, in formats such as Google Earth.

## Dry Tortugas National Park

The two survey instruments that will be utilized in DRTO have been developed around primary form of transportation to the park. The sampling strategy is, therefore, defined by the visitor numbers already calculated (see Tables B4-B6). Following this strategy will ensure a large enough sample to allow statistical analysis is collected for each group.

Several strategies will be employed to ensure the randomness of each sample at each park. For intercepts at BISC all initial contacts will be face-to-face. To ensure randomness every nth group or individual will be intercepted. If groups are encountered, only one individual per group will be asked to participate. Asking the potential respondents who had the most recent birthday will assist in identifying that individual in a random way. Interceptors will be supplied with clicker counters as a means of simplifying the counting process.

For the DRTO, two strategies will have to be employed. For visitors taking the ferry to the park the interception technique described above will be employed at the ferry dock, or if necessary on the ferry itself during the trip. To this end, NPS staff members have already been in contact with the concession owner to facilitate this if interception on the dock proves too logistically complicated. For private boaters, contact details will be supplied via access to an established permit database. A random sample, based upon random number generation, will be selected from that database each month during the project time frame.

## 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.

Methods designed to maximize response rates will be employed at every phase of the data collection effort. Interception rates will be maximized through initial training of interceptors. The training program will focus on approach techniques and body language. The project team has used this training program in several other survey efforts (Loomis et al, 2009) including similar efforts in the Florida Keys (Loomis, 2008 a, b, c).

Individuals will be approached either before or after participating in their activity of choice to minimize the intrusion on visitors' trip experience and increasing their likelihood of participation. To ensure that intrusion is minimized further only contact details (mail and/or email address), primary activity and three demographic variables (gender, age, race) will be collected on-site. This will limit the on-site interaction to approximately three minutes per interception unless the respondent initiates further interaction. Due to the fact that the potential universe of respondents is large and ethnographically diverse, there is the potential for language barriers to play a large role in non-response, especially in BISC whose visitor population is heavily influenced by the City of Miami. Bilingual interceptors will be placed at the two most northern marinas, Matheson Hammock and Black Point, in order to reduce this potential bias.

In order to take advantage of changing methods of communication and information access, as well as provide respondents with the ability to choose a preference, all survey instruments will be available for distribution in either a mail or Internet version. These versions will be identical with the only difference being method of distribution. The Internet version will be distributed using an Internet-based survey tool that provides a unique link to each respondent in order to ensure the results are not biased by block answering.

To maximize response rates for the both the online and mail survey, a multi-phased contact approach will be employed (Dillman et al, 2009). This method advocates a personalized approach to make sure that potential respondents feel that the research project is legitimate and that they are truly important to the success of the project. The mail questionnaire will be sent within one month
of contact a pre-addressed, stamped return envelope will be included and the completed questionnaire will be mailed back to East Carolina University for raw data retrieval and analysis. A follow-up thank you/reminder letter will be sent out one week after initial mailing to the entire respondent list. A second letter and (second) questionnaire will be sent out three weeks after initial mailing; and a third letter and (third) questionnaire will be sent out four weeks after the initial mailing. Respondents will be tracked through a unique identification number to guarantee that a potential respondent not receive unnecessary correspondences. The Internet-based survey will follow the same mailing schedule and format with unique links for each respondent to follow in order to access the survey.

Standard tests for non-response bias will be conducted. The first set of tests will examine potential non-response bias based on visitors who refuse to participate during the initial contact. These tests will be based on observed and recorded characteristics (e.g., gender and age) of the visitors refusing to participate. If significant differences are observed for specific variables (age, gender and race), further analyses will be conducted to determine the extent of potential bias and whether statistical techniques such as weighting are necessary to provide unbiased results.

The second set of non-response tests will focus upon individuals who were supplied with a survey instrument but did not complete it. The standard way to test for non-response bias is to compare the responses of those who return the first mailing of a survey to those who return the second mailing to compare the characteristic under investigation (age, gender and race). . Those who return the second questionnaire are, in effect, a sample of non-respondents to the first mailing and the assumption is that these individuals are representative of that group. Differences between the results will be determined by comparing the means of each group for a random sample of variables.
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.

The methods of sample collection and survey distribution are well established in the literature for social science data collection (Dillman et al, 2009, Vaske, 2008), therefore testing of these methods will not be undertaken.

Eighty-five percent of the questions included on the survey instruments have been tested prior to this survey effort in both non-OMB approved (Loomis et al, 2008, a, b, c) and OMB approved data collections which this research unit have been involved in (OMB Approval \#0648-0572 Socioeconomic Research and Monitoring Program in Florida Keys National Marine Sanctuary: Recreation/Tourism in the Florida Keys: A 10-year Replication. Main Contact: Dr. Vernon R. Leeworthy). Five percent of the questions included on the survey instruments were taken from the NPS "pool of known questions" that included items that have already been approved by OMB. These questions cover the demographics component of the surveys as well as park use history questions that are present on all the survey instruments. All of this information and pre-use allowed the burden component of this data collection to be determined.

In order to establish a justification for the remaining $10 \%$ of questions, related literature in the region and disciplinary area were examined. This investigation provided both a theoretical basis for all the questions as well as examples of expired OMB projects that had utilized questions of a
similar or exact nature. Due to this, no testing of the survey instruments will be conducted. The following bullet points describe the relevant social theories and OMB collection examples.

- The questions in the Activity Information and History Section use Specialization Theory as a foundation.
o Specialization theory is based on prior research conducted by Bryan (1977), Ditton et al (1992), Salz et al. (2001). These concepts have been built on throughout the literature and form the basis for questions asked in this section.
- The questions in the Activity Locations, Use Substitution Section use Substitution Theory as a foundation.
o Substitution theory, in this case the trade of one zone for another, is rooted in economic theory and pertains mainly to the modeling of choice behavior (Peterson et al. 1984). It has been used to investigate resource settings (O'Leary \& Dottavio 1981), geographic area (Ditton et al. 1975) and providers (Cordell 1976). These concepts are well entrenched in recreational literature and form the basis for the questions asked in this section. Substitution theory has been included in a variety of research projects including recreation visitor studies throughout the USA (e.g. OMB Approval \# 07100002 Question 19)
- The questions in the Personal \& Crowding Norms Section use two sets of Normative Theory as foundations.
o Crowding norms research is based on prior research conducted by Manning (1985), Westover (1989) Vaske \& Donnelly (2002). These concepts have been built on throughout the literature and form the basis for questions asked in this section. Crowding norms have been included in a variety of research projects including recreation visitor studies throughout the USA (e.g. OMB Approval \# 0596-0108 Question 14) to recreational carrying capacity studies (e.g. OMB Approval \#1006-0025 Question 13).
o Personal norms research is based on prior research conducted by (Heywood 2002, Heywood et al. 2002, Heywood \& Murdock 2002). These concepts have been built on throughout the literature and form the basis for questions asked in this section.
- The questions in the Performance/Satisfaction, Expectations Section use Motivations Research as a foundation.
o Motivation research is based on prior research conducted by Driver (1983), Manning et al, (1999), Finn \& Loomis (2001). Expectation and satisfaction research is based on prior research conducted by Vaske et al (1980), Lounsbury \& Hoopes (1985) and Ajzen \& Driver (1992), Ditton et al (1992). These concepts have been built on throughout the literature and form the basis for questions asked in this section.
- The questions in the Perceptions of Resource Conditions Section use Acceptability and Perception Theories as foundations.
o These questions use acceptability theory and perception theory, long established sociological theories, to help understand the way the recreationalists are viewing the resource and how complexly their thought processes are regarding the management issues of Biscayne National Park. By using these theories to understand the user
management can develop adaptive and pre-emptive management strategies (e.g. OMB Approval \#0648-0534).

Tests were conducted to investigate the collection and analysis of the GIS spatial data proposed for BISC. This was necessary to ensure the data loggers collected all the foreseen necessary data and that the technology is supplying accurate location information. Four individuals were asked to collect non-project relevant data on four different days in March 2009. One additional collection was conducted in the marine environment in April 2009. The results were analyzed using the methods described in detail in question 16 of Part A of this OMB submission. This will allow the project team to test the potential of these data and ensure the quality of information being supplied during this project itself. Individual tracks for short and long journeys were generated and Google earth maps were also generated to test the manufacturers claim of compatibility.

## 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.

The Human Dimensions Research Unit of East Carolina University will actually collect and analyze all the data pertaining to this project. This research unit is led by Dr. David Loomis, Associate Professor, Institute for Coastal Science and Policy, East Carolina University (Tel: 252-737-4263). The members of the research unit that will be responsible for respondent interceptions, data collection and project logistics are Shona Paterson and Sarah Young (Tel: 252-737-2327).

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## Example 0MB \# references

OMB Approval \#0648-0534-Knowledge, Attitudes \& Perceptions of Management Strategies and Regulations in Florida Keys National Marine Sanctuary. Main Contact Dr. Vernon R. (Bob) Leeworthy

OMB Approval \#1006-0025 - Ririe Reservoir, A Recreation Carrying Capacity Study. Prepared by EDAW, Inc. Seattle, Washington

OMB Approval \#0596-0108 - Utah River Study: Recreational Use, Value and Experience of Boaters on Rivers Managed by the BLM in Utah. Prepared by Utah State University, Institute for Outdoor Recreation and Tourism.

OMB Approval \#0710-0002 - Outdoor Recreation Use and Value: Snake River Basin of Central Idaho. Prepared by Agricultural Enterprises, Inc. and the University of Idaho

Department of Agricultural Economics and Rural Sociology

