Supporting Statement for OMB 0596-0127
National Survey on Recreation and the Environment (NSRE)
PART B

B. Collections of Information Employing Statistical Methods

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.

This Information Collection Request (ICR) is for the National Survey on Recreation and the Environment (NSRE). The proponent is requesting approval to survey approximately 30,000 individuals annually, in continuation of the latest in a series of surveys begun in 1960 as the National Recreation Survey (NRS). This request covers versions 1-6 of the survey).

The most recently available Census estimate of the entities to be sampled (2005) shows the number of non-institutionalized persons 16 or older in the U. S. at 231,323,688 (Table 1). The number of households in 2005 was 113,282,551. (The most current stats. are at http://www.census.gov/prod/1/pop/p25-1129.pdf. No. of households in 2010 is 114,200,000.)

The latest collection from this potential respondent universe for the NSRE was conducted between September 2007 and August 2010. Table 1 provides the Standard Random Digit Dial (RDD) sampling applied during this period and the raw preliminary response rate from the identified universe is provided in Table 2. See Table 2 (below) for final computation of response rates, cooperation rates, refusal rates and contact rates following methods recommended by the American Association of Public Opinion Researchers. Based on these computed response rates, Table 2 provides the expected response rate from an RDD sample.

Table 1: Resident Population 16 years and over and total households in 2009

US Population 16+ (1000s)	# Households (1000s)	Sample Size Proportional	Margin of Error
U. S. (240,987)	114,600	50,000	0.004
NORTHEAST (56,055)	26,380	9,568	0.010
New England (11,664)	5,536	2,563	0.019
Maine (1,082)	549	281	0.058
New Hampshire (1,072)	508	236	0.064
Vermont (512)	252	127	0.087
Massachusetts (5,334)	2,485	1,131	0.029
Rhode Island (855)	406	190	0.071
Connecticut (2,809)	1,336	598	0.040
Mid Atlantic (32,727)	15,308	7,005	0.012
New York (15,652)	7,198	3,313	0.017
New Jersey (6,901)	3,184	1,428	0.026
Pennsylvania (10,174)	4,926	2,265	0.021
SOUTH (88,469)	42,552	18,283	0.007
South Atlantic (46,864)	22,629	9,652	0.010
Delaware (702)	332	148	0.081
Maryland (4,507)	2,118	925	0.032
District of Columbia (499)	252	119	0.090
Virginia (6,244)	2,996	1,253	0.028
West Virginia (1,479)	754	365	0.051
North Carolina (7,353)	3,660	1,520	0.025
South Carolina (3,605)	1,747	757	0.036
Georgia (7,528)	3,520	1,416	0.026
Florida (14,947)	7,250	3,150	0.017
East South Central (14,373)	7,129	3,156	0.017
Kentucky (3,417)	1,699	755	0.036
Tennessee (4,973)	2,466	1,052	0.030
Alabama (3,711)	1,855	847	0.034
Mississippi (2,272)	1,109	501	0.044
West South Central (27,232)	12,794	5,475	0.013
Arkansas (2,259)	1,130	506	0.044
Louisiana (3,498)	1,689	797	0.035
Oklahoma (2,870)	1,428	653	0.038
Texas (18,605)	8,547	3,519	0.017
MIDWEST (52,669)	26,109	11,632	0.009
East North Central (36,674)	18,007	8,091	0.011
Ohio (9,152)	4,553	2,063	0.022
Indiana (5,015)	2,498	1,092	0.030
Illinois (10,095)	4,801	2,108	0.021
Michigan (7,911)	3,876	1,826	0.023
Wisconsin (4,501)	2,279	1,001	0.031
West North Central (15,995)	8,102	3,541	0.016
Minnesota (4,150)	2,090	891	0.033
Iowa (2,378)	1,232	532	0.042
Missouri (4,724)	2,352	1,053	0.030
North Dakota (520)	280	125	0.088
South Dakota (636)	323	139	0.083
Nebraska (1,395)	714	312	0.055
Kansas (2,192)	1,111	488	0.044

US Population 16+ (1000s)	# Households (1000s)	Sample Size Proportional	Margin of Error
WEST (55,458)	25,095	10,517	0.010
Mountain (16,948)	8,002	3,252	0.017
Montana (782)	378	178	0.073
Idaho (1,172)	571	228	0.065
Wyoming (427)	214	97	0.100
Colorado (3,930)	1,912	780	0.035
New Mexico (1,556)	750	337	0.053
Arizona (5,047)	2,329	944	0.032
Utah (2,000)	862	332	0.054
Nevada (2,034)	986	357	0.052
Pacific (38,510)	17,093	7,265	0.011
Washington (5,276)	2,576	1,057	0.030
Oregon (3,053)	1,493	627	0.039
California (28,608)	12,339	5,269	0.014
Alaska (498)	233	113	0.092
Hawaii (1,037)	447	199	0.069

Source: U.S. Census Bureau, Census Estimates 2005 - 2005 households--also called occupied housing units--are estimated by multiplying the 2005 estimate of total housing units times the state proportion of occupied housing units in the 2000 Census.

The expected response rates using standard AAPOR approaches for computing RDD response rates are provided in Table 2.

Table 2 - Response Rates for NSRE 2007-2010

Version 4 and 5		
Response Rate 1	I/(I+P) + (R+NC+O) + (UH+UO)	0.10448
Response Rate 2	(I+P)/(I+P) + (R+NC+O) + (UH+UO)	0.10803
Response Rate 3	I/((I+P) + (R+NC+O) + e(UH+UO))	0.11835
Response Rate 4	(I+P)/((I+P) + (R+NC+O) + e(UH+UO))	0.12237
Cooperation Rate 1	I/(I+P)+R+O)	0.17049
Cooperation Rate 2	(I+P)/((I+P)+R+0))	0.17628
Cooperation Rate 3	I/((I+P)+R))	0.18709
Cooperation Rate 4	(I+P)/((I+P)+R))	0.19344
Refusal Rate 1	R/((I+P)+(R+NC+O) + UH + UO))	0.45043
Refusal Rate 2	R/((I+P)+(R+NC+O) + e(UH + UO))	0.51023
Refusal Rate 3	R/((I+P)+(R+NC+O))	0.58781
Contact Rate 1	(I+P)+R+O / (I+P)+R+O+NC+ (UH + UO)	0.61284
Contact Rate 2	(I+P)+R+O / (I+P)+R+O+NC + e(UH+UO)	0.69419
Contact Rate 3	(I+P)+R+O / (I+P)+R+O+NC	0.79975

I = Complete interview; **P** = Partial interview; **R** = Refusal and break-off; **NC** = Non-contact; **O** = Other; **UH** = Unknown if household/occupied HU; **UO** = Unknown, other; **e** = Estimated proportion of cases of unknown eligibility that are eligible.
Source: The American Association for Public Opinion Research, 2009 *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 6th ed*. Deerfield, IL: AAPOR.

2. Describe the procedures for the collection of information including:

Statistical methodology for stratification and sample selection: Sampling will be a proportional dual frame RDD approach that will represent the spatial distribution of households phones and wireless phones among regions, states, counties, and area codes. No intentional over sampling of areas or population strata will occur. The target will be a random sample of the resident population of individuals 16 years of age or older residing in the United States and the District of Columbia. Households with phones and wireless phones will be selected by means of Random Digit Dialing (RDD), yielding a natural stratification of the sample by state, county, and area code (Frey, 1989; Groves and Kahn, 1979). The RDD samples theoretically provide an equal probability of reaching all households, including landlines—whether the phone number is published or unlisted—and wireless phones for which there are no published directories (Lavrakas, 1987). State rates of wireless-phone-only households are reported by CDC and gathered through the CDC National Health Interview Survey.
It is recognized that including a wireless phone RDD sample will result in an increase in costs, however the dual frame design will help to provide a more representative final sample.

The landline RDD sampling frame produces proportionate stratified random samples from working blocks of phone numbers from Central Office Exchanges (COEs) located within specified geographic boundaries. The sample is first systematically stratified to all U.S. counties in proportion to each county's share of households. The total of telephone households are calculated and divided by the desired sample size to produce the sampling interval. Counties are then ordered alphabetically by state and county within state, a random number between one and the sampling interval is generated, and a cumulative count of household telephones are generated. At the point where the count reaches the random starting point, a specific county is selected. The second element selected is one interval away from the first point. Counties whose population is greater than the sampling interval are selected repeatedly and counties where the population is less than the interval have some chance of being skipped. Thus, the sampled households with a telephone are distributed across counties in proportion to their share of the total population of telephone households.

A second level of stratification occurs when specific blocks of numbers within a county are selected. From a random start within the first sampling interval, one or more blocks of numbers are selected systematically. A second sampling interval is

then calculated by summing the number of listed residential and wireless numbers in each working block and dividing the sum by the desired quantity of elements. Thus, each block's chance of being selected is proportional to its share of listed households, such that the more active blocks of numbers have a greater probability of selection. These methods of stratification equalize the probability of selection for all U.S. telephone households and the resulting sample is self-weighting. No intentional disproportionate sampling will be conducted.

The creation of the set of randomly selected wireless numbers is performed separate from the selection landline phone numbers. For wireless number, first The file of 100-blocks in the wireless frame is sorted by FIPS Code, Carrier name and 100-block.[1] The intent is to provide a stratification that will yield a sample that is representative both geographically and by large and small carrier. A sampling interval is determined by dividing the universe of eligible 100-blocks by the desired sample size. From a random start within the first sampling interval, a systematic *nth* selection of 100-blocks is performed and a 2-digit random number between 00 and 99 is appended to each selected 100-block stem. The desired sample size is based on the proportion of wireless-phone-only to all households in a county.

Once random generated numbers are contacted, eligible respondents will be selected within households by means of a "last birthday" technique. The selected respondent will be the household member 16 years of age or older who last had a birthday. The interviewer inquires how many people in the household are 16 years or older, then asks to speak to the person with the most recent birthday (Oldendick, Bishop, Sorenson & Tuchfarber, 1988). This method of selection is a probability technique based on the premise that the date of a birthday relative to the date on which an interview is requested provides random selection (Salmon and Nichols, 1983), and does not require an enumeration of household members. The technique has the additional advantages of being less threatening (Frey, 1989), provides an equal chance of selection and helps eliminate any bias toward selection of older respondents (Salmon and Nichols, 1983). Moreover, experimental comparisons (O'Rourke and Blair, 1983) of the "last birthday" method with more elaborate selection procedures (i.e., Kish), find no significant differences in representativeness, and report higher cooperation rates with the "last birthday" method (Frey, 1989).

Once random generated numbers are contacted, eligible respondents with wireless phones will be selected. The selected respondent be asked if they are 16 years of age or older before commencing the interview process.

[1] "100-blocks" are groups of wireless phone numbers all having the same area code, prefix, and first two digits of the suffix (where the suffix is the final four digits in a phone number. "100-blocks" are used because this level of resolution is specific to phone type (wireless vs. landline).

- **Estimation procedure:** Estimates of the number of entities (i.e., size of the U.S. non-institutionalized resident population 16 years of age or older) by states and regions were presented in Table 1 (column 1). This table also presented estimated number of households (column 2), and estimated sample sizes for each state and region (column 3). Column 4 of Table 1 reported the estimated theoretical margins of error associated with the proposed state, regional, and national sample sizes assuming a population proportion (P) of 50 percent (i.e., a "worst case scenario"). Table 3 reports the theoretical standard errors and margins of errors for the state and regional samples for various values of P (proportion) and of n (random sample size). The standard errors are derived from the mathematical formula:

$$\sqrt{\frac{P * Q}{n}}$$

Where: P = the proportion of the population exhibiting a characteristic (e.g., playing golf); Q = (1 - P), the proportion not exhibiting the characteristic; n = size of the sample.

Once obtained, the standard errors can be used to estimate the margin of error of the estimates that extend 1.96 standard error units (i.e., the 95% confidence interval) around the estimates, i.e., P +/- 1.96 * (standard error).

Thus, for example, with a sample size of 10,517 (i.e., the sample for the West Region) and a population proportion of 30 percent, the 95% confidence interval for the estimate would be: .30 +/- 1.96 * .0046 = .30 +/- 0.009 = 30% +/- 0.9% = 29.1% to 30.9%.

Using a formula suggested by Lavrakas (1986), the size of the sampling pool for the proposed study is:

$$\text{Size of Sampling Pool} = \frac{\text{Number of interviews to be Completed}}{[HR] * [1 - REC] * [1 - LE]}$$

$$= \frac{50{,}000}{.25 * .95 * .50}$$

$$= \frac{50{,}000}{.11875}$$

$$= 421{,}053$$

Where: HR = estimate of proportion of RDD numbers attached to working phones that will ring appropriate households or wireless numbers;

REC= proportion of respondents determined ineligible due to relational criteria (e.g., no one in household over age 16);

LE = loss of eligible respondents due to refusal, inability to schedule, etc.

In an attempt to provide a more conservative estimate of the required size of the sampling pool of telephone numbers, the estimate is arbitrarily inflated by 10 percent, producing a final sampling pool of 463,158 potential sampling elements or telephone numbers.

Data from the NSRE is widely used by state and federal agencies, among others, to examine participation rates and trends at the national, regional, state and within state levels. Hence, this sample size is needed to provide adequate sample sizes for the more geographically focused analyses (i.e,. regional, state and within state).

Table 3: Theoretical Standard Errors and Confidence Intervals for Various Sample sizes and Population Proportions

	50%		30%		10%	
SAMPLE SIZE	**STD ERR**	**95% CI**	**STD ERR**	**95% CI**	**STD ERR**	**95% CI**
50,000	.0022	(.0044)	.0020	(.0040)	.0013	(.0026)
40,000	.0025	(.0049)	.0023	(.0045)	.0015	(.0029)
25,500	.0031	(.0061)	.0028	(.0056)	.0018	(.0036)
17,500	.0038	(.0074)	.0035	(.0068)	.0023	(.0044)
15,000	.0041	(.0080)	.0037	(.0073)	.0024	(.0048)
12,500	.0045	(.0088)	.0041	(.0080)	.0027	(.0053)
10,000	.0050	(.0100)	.0046	(.0090)	.0030	(.0059)
7,500	.0058	(.0113)	.0053	(.0104)	.0035	(.0068)
5,000	.0070	(.0139)	.0065	(.0127)	.0042	(.0083)
4,500	.0074	(.0146)	.0068	(.0134)	.0045	(.0088)
4,000	.0079	(.0155)	.0072	(.0142)	.0047	(.0093)
3,500	.0084	(.0166)	.0077	(.0152)	.0051	(.0099)
3,000	.0091	(.0179)	.0092	(.0180)	.0055	(.0107)
2,500	.0100	(.0196)	.0091	(.0179)	.0060	(.0117)
2,000	.0111	(.0217)	.0102	(.0200)	.0067	(.0131)
1,500	.0129	(.0252)	.0118	(.0231)	.0077	(.0151)
1,000	.0158	(.0310)	.0145	(.0284)	.0095	(.0186)
500	.0223	(.0437)	.0204	(.0401)	.0134	(.0262)
100	.0500	(.0980)	.0458	(.0898)	.0300	(.0588)

- **Degree of accuracy needed for the purpose described in the justification:**

  ± 3 % at 95% CI (See Table 3)

  Data from the NSRE is widely used by state and federal agencies, among others, to examine participation rates and trends at the national, regional, state and within state levels. Hence, this sample size is needed to provide adequate sample sizes for the more geographically focused analyses (i.e,.

regional, state and within state).

- **Unusual problems requiring specialized sampling procedures:**

  There are no unusual problems requiring specialized sampling procedures

- **Any use of periodic (less frequent than annual) data collection cycles to reduce burden.**

  No special cycles will be needed to reduce burden. Households and wireless users are sampled only once throughout the survey cycle.

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.

NASS Statistics Review: The USDA National Agricultural Statistical Service (NASS) reviewed the statistical methodology and design for generating appropriate response rates for the NSRE.

The Agency's assessment was:

Scot Rumburg
USDA/NASS Statistical Methods Branch
202 720-5617

Observations regarding NSRE Survey:

1. I see no problems with the statistical methodology of this survey. It has been implemented in similar form several times previously so variances and standard error estimates should be good.
2. The time to complete the first part – Participation and Days - seems a little conservative if I am correct that it runs through the first 337 questions. I realize that not all questions will need to be answered and that the survey instrument will route based on negative/affirmative responses, but just answering no to all questions took me close to 10 minutes. Are some questions not asked for certain regions, samples etc.? If you or your contractor have tested and timed it I'm probably not routing correctly and this can be disregarded. All other times seem reasonable.
3. Made a few changes/suggestions in red in the statistics section below for what its worth with regards to grammar and typos: 33, 41, 42, and 43"

(Note from NSRE survey team, all versions and modules have been tested for time per respondent and are as shown in Part A. The typographical errors noted in item 3 were corrected.)

General Overview of Methods Used to Maximize Response Rates and Control for Non-Response Bias

a. Carefully design, test and revise the survey contents

Design of the NSRE phone survey was refined through application to maximize response rates without introducing unnecessary bias. Designers gave careful attention to input received from experienced phone interviewers at the University of Tennessee and elsewhere. Wording assures respondent understanding. Question order eases flow, maximizes and maintains interest in the subject matter, and assures consistency and validity over time.

The NSRE is identified as a government-sponsored survey. Government sponsored surveys have been found to have higher response rates than other surveys. The introduction now reads as follows:

> "Hello. My name is ….. and we are calling on behalf of the United States Forest Service…"

b. Scheduling callbacks

Each eligible number will be attempted a minimum of 15 times at various intervals throughout the day and on different days of the week to maximize the opportunity of interviewing an eligible member of each eligible household or wireless user. To minimize respondent burden and encourage full involvement in the survey, each person is asked, "Is this a good time to answer a few questions or would another time be better for you?"

The Computer Aided Telephone System (CATI) facilitates the scheduling of callbacks at specific times if requested by the respondent. The computer manages the database of telephone numbers so that scheduled callbacks are distributed to the first available interviewer at the designated time and date. An option of receiving a mailed hard copy of the survey is accommodated if the respondent requests it. Very few requests are made for a mail survey.

c. Training

Interviewer training is a vital part of achieving maximum response rates. All interviewers undergo intensive and detailed training so that they have a high level of familiarity and have practiced administering the survey. Each interviewer is monitored regularly for quality control purposes and additional training is provided as needed. An area of emphasis in training is approaches for refusal aversion and refusal conversion.

d. Minimize language barriers

To maximize response rates, the NSRE is also administered in Spanish. Interviewers screen for Spanish-only people at the beginning of the survey. If positive, they are transferred to a Spanish-speaking interviewer.

e. Meet AAPOR quality standards

Similar surveys repeated over a five-year period at the Human Dimensions Research Lab which use the same RDD methods as the NSRE have been shown to produce very reliable results. (See Table 2 for the response, cooperation, contact and refusal rates for versions 1 and 2 of this survey.) Response rates are calculated using alternative methods of calculating response rates as provided by the American Association of Public Opinion Research. The UT Lab follows the code of ethics set by the American Association of Public Opinion Research and constantly works to follow the AAPOR quality standards. Adherence to ethics and quality standards are basic to maintaining response rates and gaining confidence of the interviewee.

f. Attempt to convert refusers

Efforts to convert refusals have been increased by raising the number of call-backs from 8 to 15. As a part of the earlier experiment using pre-notification with the NSRE 2007 survey, a random sample of immediate ("soft refusals," including those who hang up immediately) and a sample of those not ever contacted were selected. A portion of these refusers had a mailing address available. Of refusers with addresses, one-half were sent an explanatory letter indicating the nature of the survey and its importance. The letter notified the household that a further callback would be made to solicit their participation in the survey. Their phone numbers were then attempted again. The results of completed surveys from converted refusers who had been sent a letter were compared with the results from those not sent a letter. Refusal letters increased response rates, but they yielded samples that were more unrepresentative than standard or proportional RDD. This results in significant biases in estimated activity participation rates. Thus, use of refusal letters will not be continued in NSRE 2001 versions 1-6.

g. Weight to correct for over or under representation of population strata

After data collection is complete, demographic characteristics of sample respondents will be compared with the most current estimates of the distribution of population among demographic strata based on the most recent Census of Population projections. The U.S. Census Bureau has advised us that the appropriate population for telephone samples is the civilian non-institutionalized population. Update projections are typically provided in June of each year. This comparison focuses on the non-institutionalized civilian population age 16 or older and looks at proportions of the sample and population by age, sex, race and Hispanic origin. Any necessary corrections based on geographic distribution, ethnicity, sex, and age will be post weighted to align with current estimates of the non-institutionalized civilian population age 16 or older.

The Forest Service and its clients will use post-stratification weighting which adjusts proportions of respondents among demographic strata in the sample relative to proportions of non-institutionalized people 16 or older in the U. S.,

regional or other populations for which estimates are being produced. The objective would be a collective distribution of respondents across socio-demographic strata that mirror the distribution of the U. S. population and regional populations across the same strata. This is a widely accepted, non-controversial and necessary method for addressing non-response issues.

Simple Post Stratification Weighting -- Post-stratification will be used to approximate data that would result from a proportionate sample across demographic strata. Post-stratification adjusts estimates of participation rate means that can be biased because of disproportionate representation of strata, each with a different propensity to participate in different recreational activities. For example, persons 16 to 24 years of age participate in different activities than persons over 65. Post-stratification relies on Census estimates of the distribution of the population among demographic strata.

The NSRE post-stratification corrects for the under- or over-representation of social strata in a sample (Zhang 2000, Holt and Smith 1979). Post-stratification has been successfully applied in similar national surveys in other countries (e.g., Thomsen and Halmoy 1998). For NSRE, a total of 60 strata (6 age x 2 sex * 5 race) have been identified to match identical strata in U.S. Census data. Each individual strata weight, SW_i, is the ratio of the Census population proportion to the NSRE 2000 sample proportion:

$SW_i = P_i / p_i$, where P_i = U.S Census proportion for strata I, p_i = NSRE 2000 sample proportion for strata i.

A weight SW_i >1.0 indicates that the particular strata is a smaller proportion of the sample (underrepresented) than it is in the Census population data. A weight SW_i <1.0 indicates that the strata was randomly sampled in greater numbers (overrepresented) than their proportion of the U.S population. Each individual NSRE respondent belongs to only one of the 60 age*sex*race strata and thus are assigned the SW_i for that strata.

An additional weighting step is to account for the sampling proportions of two other socioeconomic strata: educational attainment and place of residence (rural/urban). The education weight, EW_i, is the ratio of Census to Sample proportions for 9 different levels of educational attainment, ranging from "8th grade or less" to "Doctorate Degree". The residence weight, RW_i, is the ratio of the percentage of the U.S. population living in metropolitan and non-metro areas divided by the same proportions in the NSRE 2000. A single weight, W_i, for each individual survey respondent was then calculated as the product of the three interim weights:

$$W_i = SW_i * EW_i * RW_i$$

Table 4: Estimated Logit participation functions and demographic strata coefficients by activity

Activities (Participation Function Coefficients) [1]

Factor	Walk	Bird	Hunt	Fish	Mboat	Swim_nat
Constant	2.0135 *	-1.7295 *	-2.4595 *	-0.1996	-2.2920 *	-0.3633

	Activities (Participation Function Coefficients) [1]					
Factor	Walk	Bird	Hunt	Fish	Mboat	Swim_nat
Age16_24						
Age25_34	-0.4028 *	0.2950 *	0.1484	-0.1381	-0.2859 *	-0.8554 *
Age35_44	-0.4196 *	0.6511 *	0.01750	-0.0399	-0.2073	-0.8776 *
Age45_54	-0.4822 *	0.9523 *	-0.3326 *	-0.3739 *	-0.4490 *	-1.2848 *
Age55_64	-0.6961 *	1.0253 *	-0.5556 *	-0.7318 *	-0.5743 *	-1.7689 *
Age65p	-0.8667 *	0.8795 *	-1.2766 *	-1.1430 *	-1.0778 *	-2.6188 *
Male	-0.4790 *	-0.3234 *	1.9424 *	0.8941 *	0.2605 *	-0.0838
White	0.2184	0.3193	0.3034	-0.2343	0.5561 *	0.01489
Black	0.0136	-0.5101 *	-1.1572 *	-1.0233*	-1.0292 *	-1.5114 *
Asian	-0.5876	-0.3081	-2.1376 *	-0.6259 *	-0.5952	-1.0633 *
Native						
Hispan	0.3984	-0.0717	-0.2655	-0.4910 *	-0.0695	-0.2902
Educ11						
Educhs	0.0919	0.2228 *	0.0642	0.1732	0.3356 *	0.2535 *
Educcoll	0.6621 *	0.5283 *	-0.3799 *	-0.1052	0.5563 *	0.7895 *
Educgrad	1.1007 *	0.7098 *	-0.8481 *	-0.3349 *	0.5567 *	1.0293 *
Educoth	0.5216	0.6037 *	0.3276	0.0247	0.4603	0.5477 *
Inc25						
Inc50	0.4378 *	0.1548 *	0.5207 *	0.2822 *	0.5972 *	0.4102 *
Inc100	0.5850 *	0.1602 *	0.7252 *	0.4127 *	0.9219 *	0.7177 *
Inc100p	0.8502 *	0.2737 *	0.4584 *	0.3627 *	1.1969 *	1.0508 *
Incmiss	0.1983 *	-0.04255	0.3506 *	0.1057	0.6480 *	0.3695 *
Urban	0.0056	-0.1079 *	-0.9219 *	-0.3769 *	-0.05972	0.0962
Cendiv1	-0.1376	0.4145 *	-0.8985 *	-0.1772	0.0721	1.1323 *
Cendiv2	-0.3649 *	0.0564	-0.4078 *	-0.3788 *	-0.0681	0.8177 *
Cendiv3	-0.3902 *	0.2478 *	-0.3567 *	0.2291 *	0.2390 *	0.8348 *
Cendiv4	-0.4160 *	-0.07608	-0.0617	0.1944	0.1345	0.1971
Cendiv5	-0.3848 *	-0.07841	0.4196 *	0.2287 *	0.1533	0.1306
Cendiv6	-0.3010 *	0.1329	-0.1956	-0.0907	0.3018 *	0.3401 *
Cendiv7	-0.3305 *	0.1265	0.3819 *	0.3008 *	0.6234 *	0.1505
Cendiv8						
Cendiv9	-0.0444	0.1893 *	-0.6487 *	-0.3201 *	0.0646	0.5304 *
Standrdd	-0.1161	-0.0342	0.0496	-0.0295	-0.0431	-0.0823
Rfconv	-0.0120	-0.05902	0.0952	0.0469	0.0105	0.0268

[1.] **=significance at .05 or less and blank means dummy category in constant.*

Table 4: Estimated Logit participation functions and demographic strata coefficients by activity (continued)

	Activities (Participation Function Coefficients) [1]		
Factor	Fam	Hike	Mtnbike
Constant	1.4254 *	-0.1291	-0.4047
Age16_24			
Age25_34	-0.5042	-0.0015	-0.2590
Age35_44	-0.3066	0.0409	-0.5090 *

	Activities (Participation Function Coefficients) [1]		
Factor	Fam	Hike	Mtnbike
Age45_54	-0.8422 *	-0.0358	-0.8405 *
Age55_64	-1.0638 *	-0.2807	-1.3171 *
Age65p	-1.0568 *	-0.8734 *	-2.2554 *
Male	-0.1919 *	0.2922 *	0.5045 *
White	-0.0603	-0.1265	-0.4092
Black	0.5756	-1.5053 *	-0.7284 *
Asian	-0.6144	-0.7431	-1.1048 *
Native			
Hispan	-0.0736	-0.3153	-0.6593
Educ11			
Educhs	0.0311	0.0347	-0.2303
Educcoll	0.3132	0.2549	0.0179
Educgrad	0.2864	0.6239 *	0.2875
Educoth	0.5934	0.0713	0.0161
Inc25			
Inc50	0.2352	0.2692 *	0.1371
Inc100	0.5907 *	0.4858 *	0.1431
Inc100p	0.5509 *	0.5160 *	0.5205 *
Incmiss	0.1868	0.0671	-0.1510
Urban	-0.2239	-0.0160	-0.0016
Cendiv1	0.3516	-0.6420 *	0.0255
Cendiv2	0.1869	-0.7786 *	-0.0032
Cendiv3	0.0070	-0.9184 *	-0.0227
Cendiv4	0.1612	-1.0940 *	-0.3645
Cendiv5	0.2237	-1.2887 *	-0.6838 *
Cendiv6	0.1661	-0.8698 *	0.1349
Cendiv7	0.1893	-0.8318 *	0.0324
Cendiv8			
Cendiv9	0.4111	-0.3019 *	-0.0192
Standrdd	-0.1696	-0.0157	-0.0127
Rfconv	-0.1206	-0.0244	-0.0793

[1.] *=significance at .05 or less and blank means dummy category in constant.

To test for the effects of socio-demographic variables on participation rates logit equations were estimated using both the SAS 9.0 software and LIMDEP 7.0. SAS enabled testing the "main effect" for each socio-demographic variable and pairwise comparison. This is analogous to what is usually done in an analysis of variance. The full results are not shown here since they are not central to submission. The results of the logit equations showing main effects of each demographic variable are summarized in Table 5. What this analysis demonstrated was that demographic factors for which there was either under or over representation in our sample, as compared to the Census, were significant factors in explaining participation in outdoor recreation activities and thus non response bias.

Table 5: Tests (P-values) on the Main Effects in the Logit Participation Models Based on

the Wald Chi-Square Test

Factor	Walk	Bird	Hunt	Fish	Mboat	Swim_Nat	Fam	Hike	Mtnbike
Age	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Gender	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0691	0.0424	<0.0001	<0.0001
Ethrace	0.0019	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0768	<0.0001	0.0305
Educ	<0.0001	<0.0001	<0.0001	0.0006	<0.0001	<0.0001	0.1182	<0.0001	0.0026
Income	<0.0001	<0.0002	<0.0001	<0.0001	<0.0001	<0.0001	0.0012	<0.0001	<0.0001
Urban	0.9509	0.0535	<0.0001	<0.0001	0.3061	0.1067	0.0624	0.8248	0.9839
Cendiv	0.0189	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.4671	<0.0001	0.0003
Standrdd	0.0818	0.4416	0.4996	0.5189	0.3851	0.0777	0.0805	0.7888	0.8585
Rfcon	0.8733	0.2180	0.2235	0.3818	0.8603	0.6294	0.2559	0.7377	0.3900

Multivariate weights will be constructed from the logit results for age, gender and race/ethnicity using Census data for the non-institutionalized population 16 years old and older and our sample data. Multiplicative weights for educational attainment and urban/rural residency will be applied. An application of weighting the NSRE 2005 versions 1 and 2 data provided comparisons of unweighted and weighted estimates of activity participation rates for the "Full Sample" (Table 6). There were significant differences between the unweighted and weighted estimates for 5 of the 9 activities tested. Unweighted estimates were always higher than weighted estimates indicating a general upward bias in unweighted data. Thus, our conclusion is that this weighting will not be sufficient for adjusting for non response bias, there are factors other than demographic factors we have in the survey that are responsible for non response bias. Therefore, we will implement the binary logit selection correction method for each recreation activity in deriving activity participation rates.

Table 6: Differences in Unweighted and Weighted Estimates of Activity Participation Rates: Full Sample

Sample Group/Activity	Unweighted 95% C.I.[1]	Weighted 95% C.I.[2]	Statistically Significant Difference[3]
Walking	0.8723 (0.8658, 0.8788)	0.8513 (0.8442, 0.8584)	Yes, +
Birding	0.4203 (0.4107, 0.4299)	0.3450 (0.3358, 0.3542)	Yes, +
Hunting	0.1255 (0.1190, 0.1320)	0.1191 (0.1128, 0.1254)	No,+
Fishing	0.3417 (0.3325, 0.3509)	0.3380 (0.3288, 0.3472)	No, +
Motor boat	0.2880 (0.2792, 0.2968)	0.2407 (0.2323, 0.2491)	Yes, +
Swimming natural water	0.4532 (0.4434, 0.4630)	0.4034 (0.3938, 0.4130)	Yes, +

Sample Group/Activity	Unweighted 95% C.I.[1]	Weighted 95% C.I.[2]	Statistically Significant Difference[3]
Family outing	0.7237 (0.7059, 0.7415)	0.7197 (0.7019, 0.7375)	No, +
Hiking	0.3486 (0.3355, 0.3617)	0.2987 (0.2860, 0.3114)	Yes, +
Mountain biking	0.1972 (0.1862, 0.2082)	0.1902 (0.1794, 0.2010)	No, +

1. 95 percent confidence interval on estimated activity participation rates using unweighted data.

2. 95 percent confidence interval on estimated activity participation rates using weighted data.

3. Yes or No for statistically significant difference between unweighted and weighted estimates of activity participation rates; + or - indicating unweighted estimate of activity participation rate is greater (+) or less (-) than the weighted estimate of activity participation rate.

h. An additional step for identifying and comparing refusers

An additional step taken with regard to non-response adjustment is to include a follow-up to refusals to ask a very limited number of questions (age and participation in walking). A comparison with RDD age and walking participation results will be done to identify potential non-response bias. Analysis of 2005 versions 1 and 2 demonstrated that there are differences between those who do and do not respond to the full survey. These differences have been shown to result in non-response bias. Current sample weighting is not accounting for all of this bias. An additional sample weight will be constructed as the ratio of respondents'-to-refusers' participation rates. Ratios will be calculated for 10 age x gender strata because analysis of past NSRE data has shown participation rates to be different among these strata. These weighting ratios will be applied to to the full survey.

i. Increase level of detail for recording call dispositions

Keeping more detailed records of residential household status of non-contacted households and wireless users will enable better estimates the value of "e", which is the estimated proportion of cases of unknown eligibility that are eligible. "e" is used to calculate AAPOR's Response Rate 3. In the 2011 NSRE, all no answer and busy signal attempts are reviewed to determine whether the number is residential and if all call attempts resulted in "ring/no answer" or "always busy." Those calls that are of unknown residential status will be coded as such. A residency rate will be kept to indicating the percentage of numbers of unknown status that are likely to be residential households.

j. Reducing Survey Length

Survey length will be kept to 10-12 minutes. Thus, all versions of the NSRE will be limited to not more than a 12-minute interview time on average. All versions of

the NSRE are exposed to extensive testing and refinement before application, thus the alternative designs will be of known time at implementation. The Human Dimensions Research Lab at The University of Tennessee has shown that response rates improve with shorter interviews.

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.

The NSRE has been performed over tens of thousands of individual respondents from 1994-1995 and from 1999 to now. Surveying from 2004 to now has been described earlier. In addition, a number of experiments have been performed with results submitted to OMB in December 2006. The report was entitled "**Survey Response Rate and Bias Results from a Trial of Pre-notification Letters: A Report to the Office of Management and Budget on the National Survey on Recreation and the Environment (NSRE)"** , December 2006. The results of the experimentation performed over NSRE 2005 versions 1 and 2 have been evaluated and are reflected in this request.

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.

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- Tabatha Freeman, Lab Supervisor
- Shelby Singleton, Lab Supervisor

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Southern Research Station, USDA Forest Service
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- Dr. Stan Zarnoch, Statistical Scientist

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