Volume III: Summary Report of Methods and Descriptive Statistics for the 1994 Northeast Region Marine Recreational Fishing Participation Survey

Eric Thunberg
Scott Steinback
Gerry Gray
Amy Gautam
Maury Osborn

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Eric Thunberg
Scott Steinback
Social Sciences Branch
NMFS Northeast Fisheries Science Center
166 Water Street
Woods Hole, MA 02543-1026

Gerry Gray
Mathematical Statistician
Division of Biostatistics
U.S. Food and Drug Administration
Center for Devices and Radiological Health
1350 Piccard Drive
Rockville, MD 20850

Amy Gautam
NMFS Office of Science and Technology
Division of Fisheries Statistics and Economics
1315 East-West Highway
Silver Spring, MD 20910

Maury Osborn
Marine Recreational Fisheries Statistics Program Manager
NMFS Office of Fisheries Statistics and Economics
1315 East-West Highway
Silver Spring, MD 20910

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

In 1994 NMFS conducted an add-on survey to the base MRFSS to collect economic and demographic data through the intercept and random household surveys. Demographic data from the household survey was used to develop profiles of coastal county marine recreational fishing participants and non-participants in the Northeast region. These data were also used to develop predictive models of marine recreational fishing participation in five-year intervals from 1995 through 2025.

Based on the survey data, an estimated 2.94 million coastal residents participated in saltwater recreational fishing in the Northeast region during calendar year 1994. The majority of saltwater recreational fishing participants were White male high school graduates aged 35 to 46. Compared to nonparticipants, slightly more participants held a college or post-graduate degree. Proportionally more marine recreational fishing participants were employed outside the home and had higher household income than nonparticipants. This demographic profile was consistent across coastal states in the Northeast region.

The total number of recreational fishing participants in the Northeast is projected to increase by an average annual rate of 0.5 percent through 2025. However, as a proportion of total coastal county population, participation rates were predicted to decline from 11 percent in 1995 to 10.4 percent in 2025. The projected increase in the number of saltwater participants is due to a general increase in population in the Northeast (based on estimates from Census Bureau preferred series "A"). The decline in the participation rate will arise due to changes in the underlying structure of the population (i.e. the 2025 population will be older relative to 1995 and have proportionally more non-Whites). Participation will decline at age 65 and older and increases in the non-White population will exceed those of the White population.

All of the forecasted participation estimates provided in this study are based upon the assumption that the factors that influenced participation in 1994 will not change. Individual attitudes, experiences, social norms, and opportunity determine whether or not an individual will choose to engage in any given recreational activity. The extent to which demographics are correlated with these decisions is not static. However, while social attitudes, preferences, and norms do change they do so only gradually. In spite of its limitations, the likelihood that any given individual may be a recreational fishing participant was shown in this and other studies to be correlated with specific demographic characteristics. Given the consistent relationship between demographics and participation, and the evolutionary pace of social change the forecasts of recreational fishing participation reported in this study are likely to be reliable indicators of trends in fishing participation at least in the short term (5 to 10 years). Obviously, longer term trends are less certain. However, given the dominant effect an aging population will have on Northeast region it seems likely that the region will experience only modest increases in marine recreational fishing participation over the next 25 years.

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CHAPTER 1

INTRODUCTION

Two marine recreational fishing surveys were conducted during 1994 in the Northeast Region (Maine to Virginia). Data from the surveys provided demographic and economic information on marine recreational fishing participants and nonparticipants from Maine to Virginia. In an earlier report (Steinback et al., 1999) the socioeconomic characteristics and recreational fishing preferences were presented for a sample of saltwater recreational anglers interviewed on fishing trips. As well, the perceptions of these anglers regarding current and prospective fishery management regulations were documented. This report serves as a companion to the Steinback et al. study and documents the socioeconomic characteristics of recreational fishing participants and nonparticipants from a sample of households in ten states in the Northeast Region. Results of a statistical model to project recreational fishing participation rates are also reported, and forecasts of recreational fishing participation through the year 2025 are developed for each state in the study.

This chapter provides a brief review of recreational fishing participation and the factors affecting participation. Chapter 2 describes the survey methods and provides descriptive statistics on telephone contacts and refusal rates. Chapter 3 presents descriptive statistics for the entire sample. Sample statistics are compared to census data. Chapter 4 presents data by participation category for the entire Northeast region and for the ten states. Chapter 5 discusses the procedures and results of a statistical model of recreational fishing participation and presents forecasts to the year 2025 of participation for the entire Northeast region and on a state-by-state basis.

1.1 Trends in Marine Recreational Fishing Participation

Two National surveys monitor trends in recreational fishing: the National Survey of Fishing, Hunting, and Wildlife Associated Recreation (referred to herein as the National Fish and Wildlife Recreation Survey or NFWRS) and the Marine Recreational Fisheries Statistics Survey (MRFSS). The NFWRS has been conducted every five years since 1955 by the Department of Interior Fish and Wildlife Service. The NFWRS is designed to monitor trends in several consumptive and nonconsumptive recreational activities.   Snepenger and Ditton (1985) analyzed NFWRS data for the period covering 1955–1980, and found that recreational fishing participation (measured as a percent of the US population) increased over the 25-year period of analysis. However, they did not distinguish between trends in marine and freshwater participation rates.

Figure 1-1 shows numbers of participants and participation rates for total saltwater recreational fishing from 1955 to 1996 in the U.S. (U.S. Bureau of Sport Fisheries and Wildlife, 1955, 1961, 1965, 1972; U.S. Fish and Wildlife Service, 1977, 1982, 1988, 1993, 1997). Participation rates and numbers of participants trended upward between 1955 and 1975, remained relatively stable at a high level from during 1975–1985, but declined in 1991 and changed little in 1996.

Like the NFWRS, the MRFSS provides estimates of marine recreational fishing participation. The MRFSS data indicates a slight downward trend in marine recreational fishing participation in Atlantic and Gulf coastal states from 1981–1997 (Figure 1-2). The downward trend is more pronounced in recreational fishing participation rates and is particularly evident from 1983 to 1990. During 1990 to 1994, the recreational fishing participation rate fluctuated between eight and nine percent but has declined every year since 1994.

Trends in marine recreational fishing participation in the Northeast Region do not follow the patterns shown in Figure 1-2. Over the 1981–1995 period, participation rates in the Northeast were somewhat lower than in the other Atlantic and Gulf coastal states and did not follow the same downward trend (Figure 1-3). Participant numbers fluctuated between 1981 to 1984 but declined in 1985 to a record low of two million participants. Subsequently, participant numbers and rates have been relatively stable. With the exception of 1991, participation in recreational fishing ranged from 2.4 million to 3.2 million individuals over the past decade.
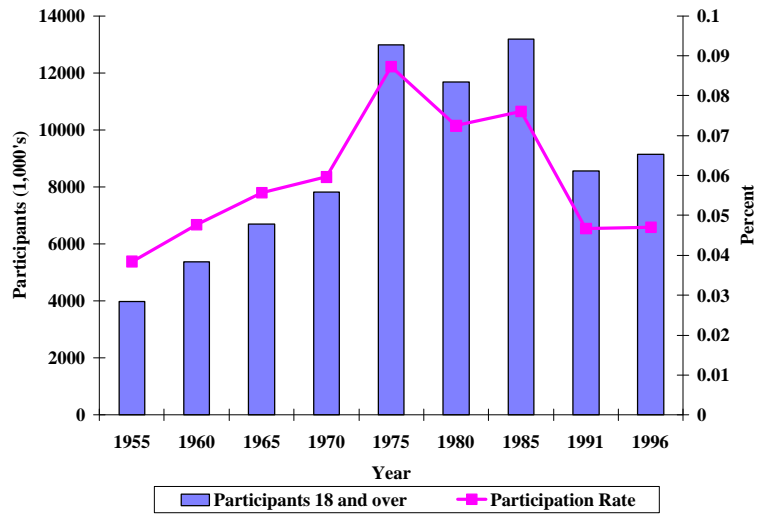
Figure 1-1 NFWRS Estimate of U.S. Total Number of Marine Recreational Fishing Participants and Participation Rate 1955–1996
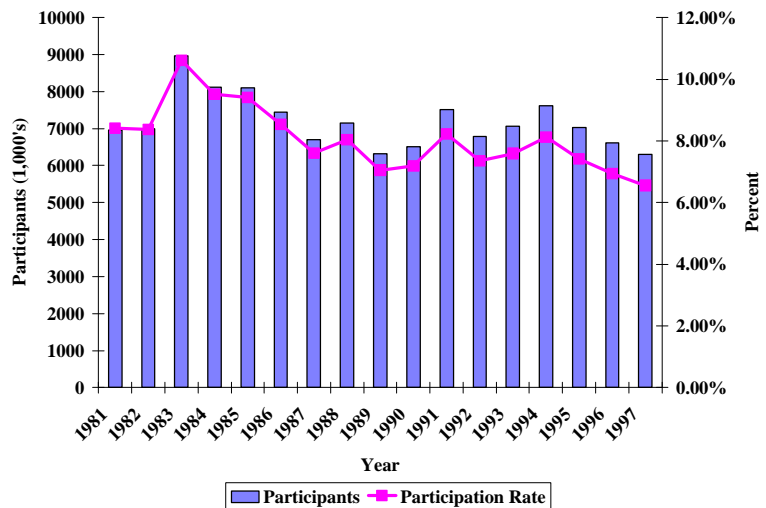
Figure 1-2 MRFSS Estimates of Atlantic and Gulf Coast Participants and Participation Rates (1981–1997)

2

Visual inspection of Figures 1-1 to 1-3 indicates three different patterns in recreational fishing participation and participation rates. The Spearman Rank-Order Correlation Coefficient (ρ) is a simple statistic to test for trends that may be dominated by gradual increases or decreases over time (Snepenger and Ditton, 1985). The NFWRS data show a positive trend in numbers of participants but no trend was detected in participation rates (Table 1-1). Using MRFSS data, a downward trend was detected in both numbers of participants and participation rates

Figure 1-3 MRFSS Estimates of Northeast Region Participants and Participation Rate 1981–1997

in the Atlantic and Gulf of Mexico region, although only the decline in participation rate was statistically significant. By contrast, no trend was detected in participation or participation rate in the Northeast region.

Table 1-1 Spearman Rank-Order Correlation Coefficients for Secular Trend in Participant Numbers and Participation Rates

	NFWRS		MRFSS (Atl&Gulf)		MRFSS (NE)	
	Participants	Rate[a]	Participants	Rate[a]	Participants	Rate[a]
ρ	0.73 (0.02*)[b]	0.15 (0.70)	-0.40 (0.11)	-0.78 (0.0002*)	0.03 (0.92)	-0.20 (0.45)

a   Participation rate computed as a percentage of population.
b   Parentheses represent Prob > |ρ| for null hypothesis ρ = 0.
*   Denotes statistically significant at the .05 level or greater.

1.2 Factors Affecting Recreational Fishing Participation

A variety of factors may influence participation in recreational fishing. Constraints or barriers to participation (Jackson, 1988) can be grouped into five major categories: (1) lack of interest; (2) lack of time; (3) lack of money; (4) lack of facilities; and (5) lack of skill (Searle and Jackson, 1985; Kay and Jackson, 1991). Social and cultural constraints such as age, gender, and income can also affect recreational fishing participation (Aas, 1995). Although economic and

demographic factors are generally not sufficient to explain why individuals make the choices they do, simple relationships can be developed between demographic variables and recreational participation to make projections about future participation in recreational fishing (Loomis and Ditton, 1988). This approach was used by Murdock et al. (1992) in developing forecasts of recreational fishing participation to the year 2050 based on projected national changes in population growth, age structure, minority populations, and household composition. Edwards (1989) developed predictive models to forecast marine recreational fishing for coastal states to the year 2025. Similarly, Milon and Thunberg (1993) developed statistical models to forecast participation rates and produce forecasts through 2010 of Florida resident recreational anglers.

1.3 Study Objectives

The objectives of this study were to: (1) collect demographic data on marine recreational fishing participants and nonparticipants in the Northeast region; (2) develop statistical models to predict the likelihood of marine recreational fishing participation; and (3) forecast the numbers of marine recreational fishing participants based on projected changes in regional population size and composition.

CHAPTER 2

METHODS

2.1 MRFSS Household Survey

The MRFSS household survey is designed to estimate numbers of anglers and numbers of fishing trips taken over a two-month recall period from a telephone survey of households in coastal counties. For each fishing trip, detailed data are gathered on fishing mode (shore, party or charter, and private or rental boat) and primary fishing location (estuary, bay, sound, and distance from shore). The telephone survey is administered to residents of coastal counties (generally defined as counties within 25 or 50 miles of ocean coastline) and covers fishing activity for a two-month period or wave. The survey is conducted in six waves beginning with wave 1 (January/February) and ending with wave 6 (November/December). Interviewing is conducted during a two-week period beginning the last week of the wave and continuing into the first week of the next wave. Due to a general lack of fishing activity, interviews do not begin until wave 2 in the Northeast region. Other than a simple tally, data are not normally collected on individuals or households that have not fished during a given wave, nor are any demographic or economic data collected.

Telephone interviews are conducted by a private contractor with target quotas for completed household interviews in specified strata. Telephone interviews are conducted throughout the week between 10:00 am and 9:30 pm. At least five attempts are made to contact each randomly selected household. Repeated attempts are made until the end of the dialing period to interview every angler in each household.

2.2 Add-on Participation Survey

A participation survey was designed and implemented as an add-on to the 1994 MRFSS telephone survey. Each interview sought to determine the marine recreational fishing participation status (i.e. never fished; has not fished in past 12 months; fished at least once in past 12 months but not during past two months; fished in the past two months) for a sample of individuals 16 years and older. During the interview, demographic data (age, ethnicity, education, gender, income, and employment status) were also gathered. Individuals that had fished during the previous two months were also asked about boat ownership and target species sought in each recent fishing trip.

Data were collected in the Northeast region from May through December (MRFSS waves 3-6). Sampling effort was allocated using standard MRFSS sampling procedures (Fisheries Statistics and Economics Division, 1996) and target sampling rates were established for each of the four participation categories.

A total of 53,553 households were sampled in 1994 as part of the base MRFSS. Of this

total, the participation survey contacted a sample of 11,060 individual households, with no more than one person from each household interviewed (Table 2-1). The total number of completed interviews was 8,621; the completion rate was 77.9 percent.

As noted above, initial target sampling rates were assigned to each of the four different participation categories. These sampling rates were implemented during wave 3. However, these target sampling rates were subsequently adjusted because the number of respondents by participation category fell short of prior expectations.   As individuals who had never fished comprised the largest number of total contacts (83.5%), sampling for this category was reduced to 9.0% and 4.2% respectively for the North Atlantic and Mid-Atlantic regions. Sampling rates for the other three participation categories were set at 100 percent.

All data were collected under subcontract to Burke Marketing Research Inc. The subcontractor was responsible for telephone interviewer training, maintaining quality control, administering the telephone survey, and transmittal of coded data to the Fisheries Statistics Division at NMFS headquarters.

Table 2-1 Summary of Participation Survey

	Total Households	Never Fished	No Fishing in Past Year	Fished in Past Year Not in Past 2 Mos.	2-Month Angler
Households Screened	53,553	44,714	2,081	2,590	4,168
Interviews Initiated	11,060	3,109	1,618	2,461	3,872
Respondent Not Available	1,553	0	582	868	103
Respondent Less Age 16	840	328	68	113	329
Not Completed	46	0	0	48	0
Completed Interviews	8,621	2,781	968	1,432	3,440
Percent Initiated	20.7%	7.0%	77.8%	95.0%	92.9%
Percent Completed	77.9%	89.4%	59.8%	58.2%	88.8%
Sampling Rates					
North Atlantic					
Wave 3		10.0%	34.6%	100.0%	100.0%
Wave 4		9.8%	100.0%	100.0%	100.0%
Wave 5		9.9%	100.0%	100.0%	100.0%
Wave 6		10.2%	100.0%	100.0%	100.0%
Mid-Atlantic					
Wave 3		5.2%	25.2%	76.3%	100.0%
Wave 4		5.8%	100.0%	100.0%	100.0%
Wave 5		5.5%	100.0%	100.0%	100.0%
Wave 6		6.8%	100.0%	100.0%	100.0%

CHAPTER 3

SAMPLE DESCRIPTIVE STATISTICS

3.1 Statistical Weighting Procedures

The base MRFSS uses a stratified sampling design. The Northeast region consists of coastal states from Maine to Virginia. The strata are defined as coastal counties in each state. Following Cochran (1977), population means ($\bar{Y}$) and proportions (P) respectively derived from a stratified sample were estimated as follows:

$$(3.1) \qquad \bar{Y} = \sum_{h=1}^{L} \alpha_h \bar{y}_h \quad \text{and} \quad P = \sum_{h=1}^{L} \alpha_h p_h$$

where the weight α_h is equal to the proportion of population in a given stratum (h) to the total population across all strata, and $\bar{y}_h$ and p_h are the sample mean and proportion in stratum h respectively.

Since the participation survey was conducted from May to December in four two-month waves, an additional weighting factor was required to account for differences in sampling rates across waves. The simplest procedure would have been to take a simple average across waves (w) where the implied wave weight (b_w) would be 1/4. However, if the sample size differs across waves, uniform wave weights will not produce a minimum variance estimator. Sample size (n_{hw}) is determined by a nominal rate n_h and a sampling rate r_w. The minium variance wave weights are proportional to the ratio of the square root of the sample size in a stratum (n_{hw}) divided by the sum of the square roots of sample size across all waves in the same stratum. Hence, while sample size may vary across waves, all strata are sampled at relatively the same level. Under these conditions the population variance can be written as:

$$(3.2) \qquad V[\bar{y}] = \sum_{w=1}^{4} b_w^2 \sum_{h=1}^{L} \frac{\alpha_h^2 \sigma^2}{n_{hw}} = M \sum_{w=1}^{4} \frac{b_w^2}{r_w}$$

where M is the variance at the nominal sampling rate. The population variance is at a minimum when:

$$(3.3) \qquad b_{hw} = \frac{\sqrt{n_{hw}}}{\sum_{1}^{4} \sqrt{n_{hw}}}$$

The population estimates reported hereafter were based on a two-step process. In the first step,

7

weighted estimates for means and proportions were calculated for each wave using the weights defined in (3.1). In the second step, the wave estimates were combined using the weights defined in (3.3) to obtain an overall estimate of population means and proportions.

As noted in the previous section, four participation categories were identified in the survey and different sampling rates were assigned to each category. This sampling regime required an additional adjustment to the procedures used to estimate population statistics. Within each stratum a sample of n_h individuals was contacted and assigned to one of four participation groups. Within each group (i) a sample of m_{hi} individuals were interviewed at assigned sampling rates (see Table 2.1). Thus the poststratified population estimator for the mean was:

$$(3.4) \qquad \bar{Y} = \sum_{h=1}^{L} \alpha_h \sum_{i=1}^{4} \frac{1}{n_h} \sum_{j=1}^{m_{hi}} \frac{n_{hi}}{m_{hi}} y_{hij}$$

That is, each individual observation y_{hij} is "scaled" by the inverse of the sampling rate for group i in stratum h (n_{hi}/m_{hi}). The poststratified population estimator for proportions was calculated in a similar manner.

3.2 Northeast Region Demographic Statistics

The estimated population proportions for selected demographic statistics are reported in Table 3-1. Column 1 of Table 3-1 lists point estimates and standard deviations for population proportions by gender, age group, ethnicity, education, and household income. Column 2 provides the 95% confidence intervals for the point estimates and column 3 lists the 1990 Census Bureau estimates of the demographic variables for the coastal county population 16 years of age or older in the Northeast. The Census estimates are included to provide an indication of whether the participation survey sample is representative of the general Northeast coastal population.

Only a few of the Census Bureau estimates fall within the 95% confidence interval of the participation survey estimates. This does not necessarily imply, however, that the participation survey sample is not a representative sample for several reasons. First, the Census estimates are based on 1990 data while the participation survey was conducted in 1994. Second, with the exception of gender, the participation survey and Census categories do not match exactly. The age groupings are off by one year and the household income groupings differ slightly. The population proportions by education category for the participation survey were calculated for individuals 16 years or older. The Census estimates, however, were only available for a population of individuals 18 years or older. Finally, differences existed in sample frame and survey format used in the Census and participation surveys.

8

Table 3-1 Population Estimates of Selected Demographic Statistics for the Northeast Coastal Counties

Demographic Variable	1994 Participation Survey Proportion Point Estimate	1994 Participation Survey 95% Confidence Interval	1990 Census[c]
Gender			
Male	0.487 (0.0039)[b]	0.479 - 0.495	0.473
Female	0.513 (0.0039)	0.505 - 0.521	0.527
Age Group			
16 to 25 [16 to 24][a]	0.148 (0.0029)	0.142 - 0.153	0.173
26 to 35 [25 to 34]	0.242 (0.0035)	0.235 - 0.249	0.233
36 to 45 [35 to 44]	0.209 (0.0033)	0.203 - 0.216	0.195
46 to 55 [45 to 54]	0.165 (0.0032)	0.159 - 0.171	0.136
56 to 65 [55 to 64]	0.107 (0.0024)	0.102 - 0.111	0.110
66+ [65+]	0.130 (0.0023)	0.125 - 0.134	0.153
Ethnicity			
White	0.737 (0.0031)	0.731 - 0.743	0.740
Black	0.136 (0.0024)	0.131 - 0.141	0.146
Hispanic	0.075 (0.0019)	0.071 - 0.079	0.076
Asian	0.010 (0.0007)	0.009 - 0.012	0.033
Other	0.042 (0.0018)	0.038 - 0.045	0.005
Education			
Less than High School	0.095 (0.0021)	0.091 - 0.010	0.229
High School Graduate	0.305 (0.0039)	0.298 - 0.313	0.294
Vocational or Associate	0.042 (0.0017)	0.039 - 0.046	0.057
Some College	0.209 (0.0033)	0.203 - 0.216	0.185
College Graduate	0.243 (0.0036)	0.236 - 0.250	0.147
Graduate or Professional Degree	0.105 (0.0023)	0.101 - 0.110	0.088
Household Income			
$15,000 or Less [Less than $14,999]	0.121 (0.0023)	0.116 - 0.125	0.190
$15,001 to $30,000 [$15,000 to $29,999]	0.234 (0.0032)	0.228 - 0.241	0.206
$30,001 to $45,000 [$30,000 to $44,999]	0.222 (0.0033)	0.216 - 0.229	0.198
$45,001 to $60,000 [$45,000 to $59,999]	0.186 (0.0031)	0.180 - 0.192	0.149
$60,001 or Greater [$60,000 or Greater]	0.236 (0.0036)	0.229 - 0.243	0.258

a   Numbers in brackets denote Census Bureau categories.

b   Numbers in parentheses denote standard deviations calculated as:

$$V[P] \; = \; \sum_{w=1}^{4} b_h^2 \sum_{h=1}^{L} \alpha_h^2 \frac{p_h q_h}{n_h - 1}$$

c   Source: U.S. Bureau of the Census Home Page, (http://www.census.gov/datamap/www/index.html)

The participation survey sample frame was household members 16 years of age or older, and contact was by telephone. These factors may bias the estimates of the population demographics. The telephone survey limits the population to individuals that own a phone and may introduce a bias against lower income households, and may affect the estimates of demographic variables correlated with income. The participation survey was generally administered to the first person in the sample frame that answered the phone. Any behavioral tendencies associated with household telephone response would thus be reflected in the participation survey estimates.

The 1994 participation survey consisted of 48.7 percent males and 51.3 percent females. The proportion of male participation survey participants was slightly higher than the general coastal county population and vice versa for females.

The age structure of the participation survey sample was approximately equivalent to Census Bureau estimates in the age categories 26 to 35, 36 to 45, and 56 to 65. The proportion of individuals in the youngest (16 to 25) and oldest (66+) age groups was lower than in the coastal county population, while the participation survey had a higher proportion of individuals from age 46 to 55 than in the Census estimate.

The proportion of Whites (73.7%) and Hispanics (7.5%) was approximately the same in both surveys. The proportion of Blacks was slightly lower in the participation survey than in the coastal county population, and the proportion of Asians (1%) represented in the 1994 survey was considerably lower than in the Census survey (3.3%).

As compared to Census estimates, the participation survey sample consisted of considerably fewer individuals without a high school diploma (9.5%). By contrast, proportionally more participation survey participants had some college or college/post-college degree as compared to Census estimates.

The sample distribution of household income follows a pattern similar to that of educational attainment with the sample proportions in the lowest and highest income categories lower than the Census Bureau estimates. Thus, the participation survey sample consisted of proportionally more individuals in the middle income categories ($15,000 to $59,000) than in the general coastal county population.

On balance, the demographic composition of the participation survey as compared to the general population may result in some upward bias in estimated recreational fishing participation rates. For example, males typically have higher fishing participation rates than females. Similarly, fishing participation rates tend to be higher among individuals between the age of 25 and 55. Income also tends to be positively correlated with recreational fishing participation. The effect that educational attainment has on participation rates is ambiguous since education and income levels are often correlated, although Milon and Thunberg (1993) found that educational attainment was negatively correlated with saltwater fishing participation in Florida. Differences in

ethnicity may not be an important source of bias since the sample proportion of Blacks is only slightly lower than that of the general population and the number of Asians in the general Northeast coastal county population is very low.

CHAPTER 4

PARTICIPATION IN SALTWATER RECREATIONAL FISHING

4.1 Participation Categories

For purposes of analysis the four participation categories (Table 2-1) were simplified to accommodate a participation definition based on an annual or 12-month participation rate. Therefore, a saltwater recreational fishing participant was defined as anyone who had fished in saltwater at least once in the last 12 months. Individuals who had never fished in saltwater or had not done so within the past 12 months were classified as non-participants.

The participation rate for coastal county residents age 16 or greater in the Northeast region was estimated to be 10.5 percent with a 95-percent confidence interval of 10.2 to 10.8 percent (Table 4-1). Based on this confidence interval and an estimated coastal population of 29 million residents, the number of individuals that participated in saltwater recreational fishing in 1994 was between 2.97 and 3.14 million. The point estimate of participants based on standard MRFSS procedures (MRFSS participation estimates are based on combined intercept and household data) was 2.94 million coastal county participants slightly below the lower 95 percent confidence interval for the participation survey. Since the MRFSS does not provide a Northeast region-wide estimate of participation, the 2.94 million participants is based on the sum of point estimates for combined North Atlantic and Mid-Atlantic states. For this reason, a confidence interval for participation in the Northeast region cannot be calculated because while point estimates are additive, standard errors are not. However, since the difference between the MRFSS point estimate and the lower 95-percent confidence interval for the participation survey is less than one percent, the confidence intervals of the two survey estimates are certain to overlap.

Estimated participation rates across all states ranged from a low of 7.0 percent in New York to a high of 18.5 percent in Virginia. Coincidentally, the estimates of the number of marine recreational fishing participants for these two states were respectively lower and higher than 1994 MRFSS estimates. This suggests that the participation rate for New York may be underestimated while the participation rate for Virginia may be overestimated. With the exception of New Jersey, the MRFSS participation estimates all fell within the 95 percent confidence intervals of the participation survey estimates. The MRFSS point estimate of New Jersey coastal county resident participants was below the 95 percent confidence interval for the participation survey. However, as was the case for the Northeast region, MRFSS participation estimates and the participation survey confidence intervals overlap.

Table 4-1 Estimated Participation Rates and Number of Coastal County Participants Age 16 or Greater

Region	Participation Rate (%)	Participation Rate 95% Confidence Interval (%)	1994 Participant 95% Confidence Interval (1,000's)	1994 MRFSS Participant Estimates (1,000's)
Northeast	10.5 (0.0016)[a]	10.2–10.8	2,967.5–3,142.0	2,942.6[b]
Maine	15.2 (0.0116)	12.9–17.4	99.5–134.2	115.3 [78.3–152.4][c]
New Hampshire	8.8 (0.0098)	6.8–10.7	35.9–56.6	38.4 [16.7–60.1]
Massachusetts	8.8 (0.0038)	8.1–9.6	292.7–346.9	319.3 [276.1–362.5]
Rhode Island	10.0 (0.0070)	8.7–11.4	69.7–91.4	86.5 [65.5–107.5]
Connecticut	7.8 (0.0046)	6.9–8.7	180.6–227.7	194.7 [151.9–237.4]
New York	7.0 (0.0030)	6.4–7.6	567.4–673.8	693.6 [582.0–804.9]
New Jersey	11.2 (0.0037)	10.5–11.9	617.0–699.2	615.7 [527.6–703.8]
Delaware	15.7 (0.0098)	13.8–17.6	71.6–91.3	79.2 [59.8–98.6]
Maryland	15.2 (0.0045)	14.3–16.1	479.0–539.3	488.9 [416.0–561.7]
Virginia	18.5 (0.0064)	17.2–19.7	369.9–423.7	311.1 [273.3–348.9]

a   Figures in parentheses are standard deviations.
b   A region-wide confidence interval cannot be calculated.
c   Brackets denote 95 percent confidence interval for MRFSS participation estimates.

4.2 Sample Demographics by Participation Category

Sample proportions for subgroups of a stratified random sample are calculated as follows (Cochran, 1977):

$$(4.1) \qquad P_{jm} = \frac{\sum_{h=1}^{L} \alpha_h p_{hjm}}{\sum_{h=1}^{L} \alpha_h p_{hj}}$$

where α_h is the stratum weight, j is the subgroup (participant/nonparticipant) and m is the demographic category (gender, age group, etc.). Equation 4.1 is a ratio estimator where the subgroup proportion is equal to the weighted proportion of individuals among the entire

13

population in subgroup j and demographic category m divided by the weighted proportion of individuals in subgroup j. For example, the proportion of female nonparticipants is given by the ratio of the proportion of nonparticipants that are female in the entire population to the weighted proportion of nonparticipants. Note that the sample weights for stratum, wave, and sampling rates among participation categories described in Chapter 3 still apply. The following sections report demographic results for age, education, ethnicity household income, gender, and employment status for both marine recreational fishing participants and nonparticipants in the Northeast region. Demographic results for individual states were quite similar to that of the Northeast region as a whole and are not discussed separately. Tables of demographic results by state are reported in Appendix A.

4.2.1 Age

Overall, saltwater recreational participants are relatively younger than nonparticipants (Figure 4-1). In all but the youngest (16–25) and oldest age (64+) categories, the proportion of participants is higher than nonparticipants. The majority of participants (27.2%) were between 36 and 45 years of age. Participation in marine recreational fishing initially increases with age, peaks at mid-life and is followed by a general decline in later life. Given an aging population, these results suggest that the number of recreational fishing participants in the Northeast region may decline in the future.

Figure 4-1 Age Groups by Participation Category

4.2.2 Education

Relatively few differences exist in educational status between saltwater recreational fishing participants and nonparticipants in the Northeast region (Figure 4-2). The only obvious difference is that the proportion of marine recreational fishing participants who did not graduate high school (7.5%) is significantly lower than non-participants (12.1%).
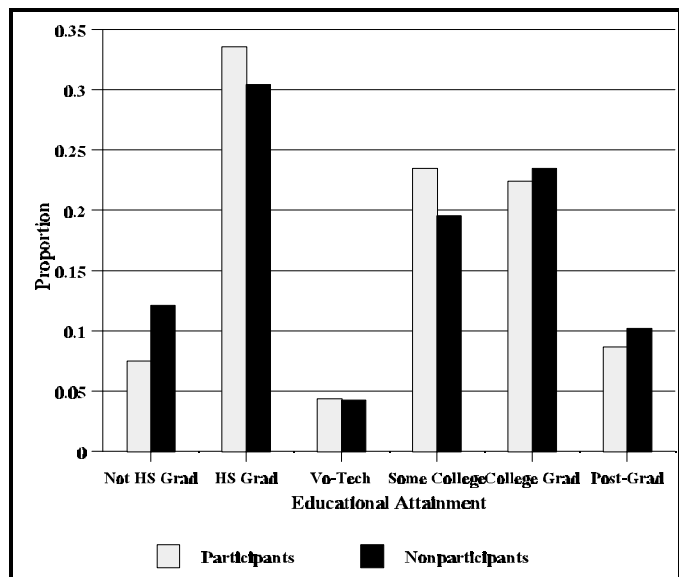
Figure 4-2 Educational Status by Participation Category

4.2.3 Ethnicity

The participant population consisted of more Whites (88.7%) and fewer of all other ethnic groups than either nonparticipants or the Northeast region-wide population (Figure 4-3). Projected changes in population structure for the Northeast indicate a decline in the proportion of Whites and an increase in the proportions of Asians and Hispanics (Campbell, 1996). These projected changes suggest that saltwater recreational fishing participation rates may decline in the future in the Northeast region.
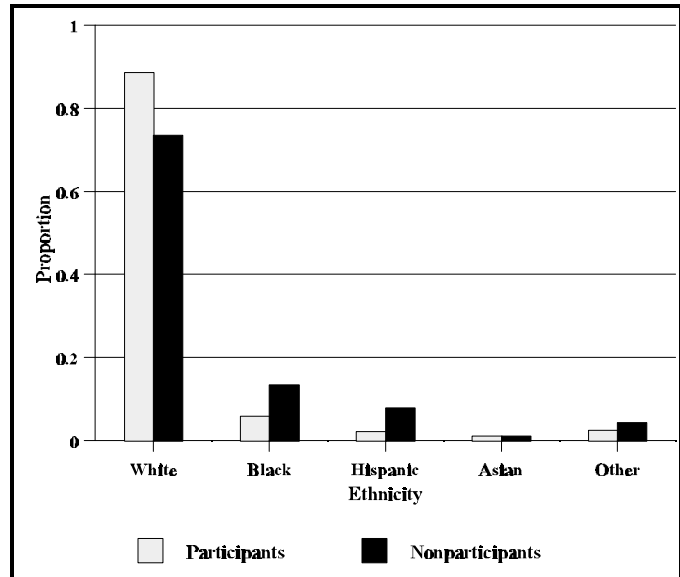
Figure 4-3 Ethnicity by Participation Category

4.2.4 Household Income

Household income distributions of Northeast region saltwater fishing participants and nonparticipants were approximately the same (Figure 4-4). However, a larger proportion of fishing participants occurred in each income category above $45,001 and a lower proportion in every income category below $45,000. The tendency for participants to have higher household income than nonparticipants may be due to the joint impact of the higher proportion of Whites in the participant population and the relatively higher proportion of participants between the ages of 35 and 55. Whites tend to have higher income than non-Whites in the general population and individuals between the ages of 35 and 55 and are generally at their peak income earning potential.
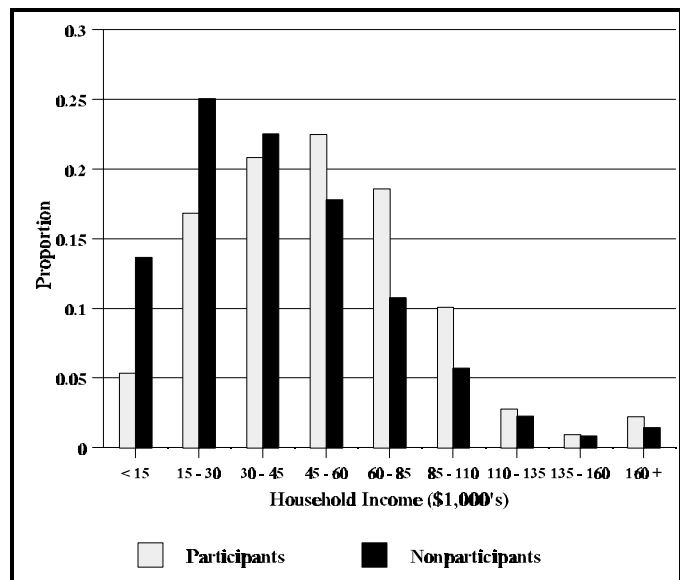
Figure 4-4 Household Income by Participation Category

15

4.2.5 Gender

As expected, saltwater recreational fishing participants in the Northeast were predominantly male (80.1%) (Figure 4-5). Female participants represented 19.9% of the recreational fishing population. By contrast females represented 61.8% of the nonparticipant population.

4.2.6 Employment Status

Recreational fishing participants were more likely to be employed outside the home (76.4%) than nonparticipants (59.2%) (Figure 4-6). This finding may be an artifact of the relatively higher proportion of males in the participant population.
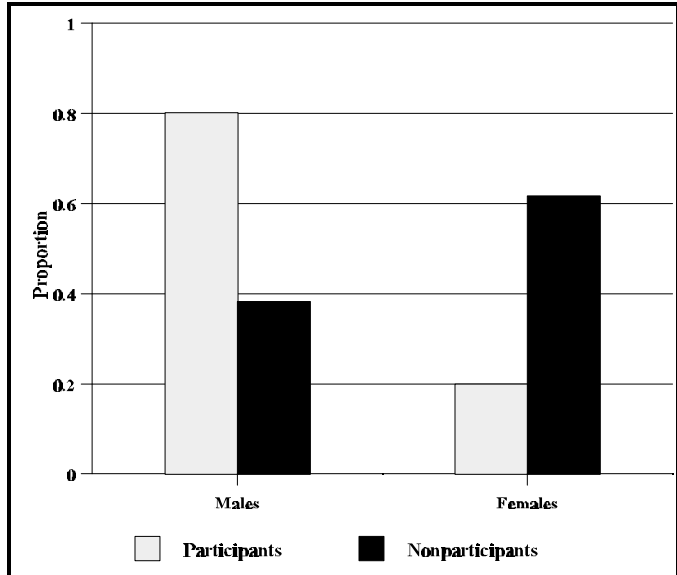
Figure 4-5 Gender by Participation Category
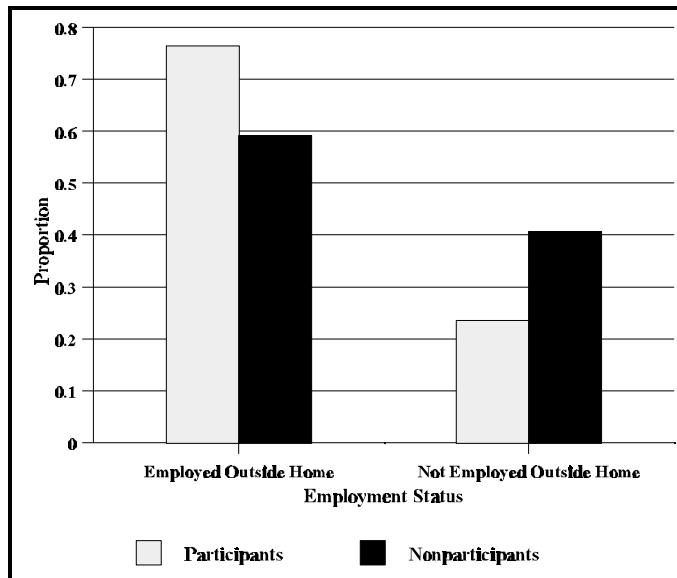
Figure 4-6 Employment Status by Participation Category

16

CHAPTER 5

FORECASTING SALTWATER RECREATIONAL PARTICIPATION

5.1 Modeling Saltwater Recreational Fishing Participation

The data described in previous chapters were used to develop a statistical model to predict saltwater recreational fishing participation in the Northeast region. Consistent with earlier definitions, a participant was defined as anyone who had fished in saltwater at least once in the last 12 months. Individuals who had never fished in saltwater or had not done so within the past 12 months were classified as non-participants.

5.1.1 Model Specification and Estimation

Participation was modeled as a dichotomous choice where a value of 1 was assigned to a respondent that had fished in the past 12 months and a value of 0 was assigned otherwise. Dichotomous processes are typically modeled using either probit or logit regression. Both of these approaches are based on cumulative probability distributions (the cumulative normal for the probit, and the cumulative logistic for the logit) which assure predicted values cannot exceed the 0 to 1 interval for the dependent variable (Pyndick and Rubinfeld, 1981). Although logit and probit models produce similar results, logistic regression was selected in this study because of its computational simplicity.

The demographic data (age, income, education, ethnicity, and gender) collected as an add-on to the MRFSS household telephone survey were used as a set of explanatory variables. Household income and education were treated as continuous variables, while a series of dummy variables were constructed to represent ethnicity and gender-age group effects. Ethnicity was represented by a single dummy variable set equal to 1 if the respondent was non-White and 0 otherwise. Based on previous research, fishing participation for men and women was found to change with age with participation initially increasing early in life and then decreasing late in life (Milon and Thunberg, 1993). To reflect this participation pattern, combinations of gender-age group dummy variables were constructed. Specifically, a total of five dummy variables were defined (males 16–24, males 65+, females 16–14, females 25–64, and females 65+) using males age 24–64 as the base group. Additional dummy variables were defined for the state of residence, using Maine as the base.

To produce population estimates of participation and participation rates, the sample data had to be weighted to be reflective of the population. This weighting was accomplished using the weights developed in Chapter 3:

$$(5.1) \qquad\qquad \gamma_{hwi} \;=\; \frac{\alpha_h}{b_{hw}} * m_{hi}$$

where: γ_{hwi} is a unique weight applied to each observation in stratum h, wave w, and participation category i, α_h is the stratum weight (equation 3.1), b_{hw} is the wave weight by stratum (equation 3.3), and m_{hi} is the inverse of the sampling rates (see Table 2-2).

5.1.2 Participation Model Results

The results of the weighted logistic regression model are provided in Table 5-1. With the exception of the dummy variables for state of residence, the estimated coefficients for nearly all of the demographic variables were statistically significant at the five percent level of significance.

Table 5-1 Coefficient Estimates for Initial Northeast Region Saltwater Recreational Fishing Participation Model

Variable	Estimated Coefficient	Standard Error
Intercept	-1.339*	0.1934
Household Income	0.1211*	0.0204
Education	-0.1204*	0.0214
Ethnicity	-0.7815*	0.2327
Female 16–24	-2.2283*	0.2327
25–64	-1.5407*	0.0822
65+	-3.0120*	0.2882
Male 16–24	-0.2033	0.1155
65+	-0.3833*	0.1323
New Hampshire	-0.1748	0.2317
Massachusetts	-0.1812	0.1937
Rhode Island	0.0076	0.1971
Connecticut	-0.1378	0.1995
New York	-0.0417	0.2014
New Jersey	0.1334	0.2066
Delaware	0.0513	0.1931
Maryland	-0.1102	0.2095
Virginia	0.4903*	0.2051

* Statistically significant at the five percent level or greater for X^2 with one degree of freedom.

Positive coefficients indicate that the probability of participation increases as the variable increases and vice versa for negative coefficients. For example, the probability of being a recreational fishing participant increases with income, but decreases with educational status. All dummy variables are interpreted relative to the base; the base is a White male age 25 to 64 living in a coastal county in Maine. Relative to this base, a non-White Maine coastal resident male age 16 to 24 is less likely to participate. Similarly, non-White and White female coastal residents in Maine are less likely to participate than 25–64-year old White males. As all but one of the individual variables for state of residence were statistically significant, the regression model was reformulated using only a single regional dummy variable (states VA, MD, DE, and NJ = 1; 0 otherwise) and then used to forecast recreational fishing participation in the Northeast region to the year 2025 (Table 5-2). The coefficients of the reformulated model differed little from those in the entire model (Tables 5-1 and 5-2).

Table 5-2 Coefficient Estimates for Reformulated Northeast Region Saltwater Recreational Fishing Participation Model

Variable	Estimated Coefficient	Standard Error
Intercept	-1.2012*	0.0979
Household Income	0.1139*	0.0200
Education	-0.1217*	0.0212
Ethnicity	-0.7882*	0.0925
Female 16–24	-2.2180*	0.2325
Female 25–64	-1.5325*	0.0818
Female 65+	-3.0222*	0.2880
Male 16–24	-0.1853	0.1146
Male 65+	-0.3971*	0.1312
Region	0.2155*	0.0624

*   Statistically significant at the five percent level or greater for X^2 with one degree of freedom.

5.2 Predicted Participation in Northeast Saltwater Recreational Fishing

The probability that an individual with a given set of demographic characteristics would be a saltwater recreational fishing participant was predicted by:

$$(5.2) \qquad P_i = \frac{1}{1 + e^{-(\alpha + \beta X_i)}}$$

By setting income and education equal to their estimated population median values and systematically applying the ethnicity and gender-age group variables, an expected probability for each demographic subgrouping can be calculated (Table 5-3).

Table 5-3 Predicted Probability of Participation by Ethnicity and Gender Age-Group

	Whites		Nonwhites	
Age Group	Females	Males	Females	Males
ME to NY				
16 to 24	0.028	0.178	0.013	0.089
25 to 64	0.053	0.206	0.025	0.106
65+	0.013	0.149	0.006	0.074
NJ to VA				
16 to 24	0.034	0.211	0.016	0.109
25 to 64	0.065	0.244	0.031	0.128
65+	0.015	0.178	0.007	0.090

The model results indicate that White males age 25 to 64 are most likely to participate in saltwater recreational fishing, while non-White females over the age of 64 are least likely to participate. The expected number of participants in any given subgroup can be calculated by the product of the predicted participation probability and the total population size of the subgroup. Summing products across all demographic subgroups gives an estimate of the total number of saltwater recreational anglers in the Northeast region.

Data from the 1990 census provided population size estimates by age, gender, and race for coastal counties in the Northeast region. These data are reported in Table 5-4 for the demographic groups in Table 5-3.

Summing the product of the expected probabilities in Table 5-3 and the population estimates in Table 5-4 gives an estimate of 3.165 million anglers in the Northeast region. Compared to the 1990 MRFSS estimate of participation in the Northeast region (2.561 million) the predicted number of participants is approximately 24 percent higher than the MRFSS estimate

20

a relatively large discrepancy. However, the MRFSS provides an annual estimate of participation while the participation model provides estimates of longer-term trends in participation. The two estimation methods meet different needs and should be regarded as complementary.   For example, from 1990 and 1997 the estimated number of recreational participants from the MRFSS ranged between 2.4 and 3.2 million participants. The estimated number of participants based on the participation model falls within this range.

Table 5-4 1990 Northeast Region Coastal County Population by Ethnicity and Gender Age-Group (millions)

	Whites		Nonwhites	
Age Group	Females	Males	Females	Males
ME to NY				
16 to 24	1.014	1.027	0.399	0.381
25 to 64	4.569	4.379	1.407	1.118
65+	1.535	0.973	0.210	1.120
NJ to VA				
16 to 24	0.664	0.705	0.302	0.305
25 to 64	3.078	3.019	1.080	0.937
65+	0.932	0.613	0.160	0.101

There are several other reasons why the estimates from MRFSS and participation model differ. First, the 1990 MRFSS estimates are based on data collected in that year while the forecast using the participation model was based upon sample data collected in 1994. Second, the MRFSS estimates are based on a combination of household and intercept data. By contrast, the participation survey sample frame was coastal county residents with participation estimates based on demographic variables. Last, as discussed in Chapter 3, the participation survey sample may not be representative of the coastal county population. Relative to Census Bureau estimates, males in the participation survey were slightly oversampled, non-Whites generally undersampled, and participants were typically older and had higher income than the general coastal county population. Thus, the participation model results in some upward bias in the participation probabilities for White males and some downward bias in the participation probabilities for non-Whites and females. On balance, the upward bias created by the joint effect of a higher probability of White male participation and a higher proportion of Whites exceeds any downward bias associated with the non-White and female participation estimates.

The exact magnitude of bias in the participation model is not presently known. The bias

may not be severe as the predicted number of participants is within both the range of historical levels of participation and the range of recent MRFSS participant estimates. Nevertheless, the participation model forecasts are likely to be biased upwards and should, therefore, be regarded primarily as indicators of potential trends in recreational fishing participation in the Northeast region.

5.2.1 Forecasts of Northeast Recreational Fishing Participation 2000 to 2025

The Bureau of the Census has produced forecasts of population by age, gender and race in five-year increments through the year 2025 (Campbell, 1996). These are provided on a state-by-state basis, but are not broken out by coastal and non-coastal counties. For states that are completely (Connecticut, Rhode Island and Delaware) or nearly completely (New Jersey, and Maryland) covered by the MRFSS telephone survey, this presents no problem. For other Northeast states, however, the census forecasts had to be adjusted to estimate the coastal county population. This was accomplished by prorating the census forecasts by the ratio of coastal county population to total state population by demographic grouping (ethnicity and gender-age groups as defined in Table 5-1) using the 1990 census data (Table 5-5). This procedure assumes that the proportional population growth by demographic groupings in coastal counties and non-coastal counties will remain constant over time. If population growth rates in coastal counties exceed that of non-coastal counties, then participation forecasts will be underestimated and vice versa if non-coastal county growth rates exceed that of coastal counties.

Although the number of recreational fishing participants is forecasted to increase gradually through the year 2025, the proportion of coastal county residents participating in recreational fishing is predicted to decrease (Table 5-6). The projected increase in participant numbers is due to a general increase in population, while the decline in participation rate is due to demographic changes in the composition of the population. A portion of the decline is also attributable to the relatively greater growth in population components that have historically had low recreational fishing participation rates. However, the overwhelming factor is aging. The Baby-Boom generation (individuals born between 1946 and 1964) will reach retirement age in the year 2011 (Campbell, 1997) and individuals age 65 and over are predicted to have the lowest rate of participation.

Table 5-5 Proration Factors Applied to Census Population Forecasts

		ME	NH	MA	RI	CT	NY	NJ	DE	MD	VA
Non-White Females	Age 16–24	0.84	0.68	0.77	1	1	0.86	0.99	1	0.98	0.61
	Age 25–44*	0.82	0.80	0.81	1	1	0.89	0.99	1	0.99	0.60
	Age 45–64*	0.85	0.76	0.82	1	1	0.91	0.99	1	0.99	0.61
	Age 65+	0.73	0.80	0.85	1	1	0.91	0.99	1	0.98	0.61
White Females	Age 16–24	0.81	0.63	0.73	1	1	0.49	0.95	1	0.85	0.40
	Age 25–44	0.82	0.64	0.75	1	1	0.54	0.94	1	0.87	0.41
	Age 45–64	0.80	0.60	0.75	1	1	0.57	0.95	1	0.87	0.38
	Age 65+	0.81	0.55	0.74	1	1	0.57	0.96	1	0.86	0.37
Non-White Males	Age 16–24	0.83	0.69	0.78	1	1	0.84	0.99	1	0.97	0.61
	Age 25–44	0.82	0.82	0.81	1	1	0.86	0.99	1	0.97	0.60
	Age 45–64	0.83	0.80	0.82	1	1	0.89	0.99	1	0.98	0.58
	Age 65+	0.93	0.58	0.84	1	1	0.89	0.99	1	0.98	0.61
White Males	Age 16–24	0.81	0.62	0.78	1	1	0.49	0.95	1	0.85	0.44
	Age 25–44	0.81	0.64	0.75	1	1	0.54	0.94	1	0.87	0.43
	Age 45–64	0.80	0.61	0.75	1	1	0.56	0.95	1	0.87	0.38
	Age 65+	0.80	0.54	0.73	1	1	0.56	0.96	1	0.86	0.37

* Age groups 25–44 and 45–64 were disaggregated for purposes of estimating total population by age group. These age groups were subsequently aggregated to estimate numbers of participants by age/gender grouping.

Table 5-6   Predicted Number of Coastal County Resident Saltwater Recreational Fishing Participants Age 16 and Over (2000 to 2025)[*]

Year	Predicted Participants (millions)	Participation Rate
1995 Base	3.214	11.0%
2000	3.284	10.9%
2005	3.372	10.9%
2010	3.472	10.8%
2015	3.549	10.7%
2020	3.609	10.5%
2025	3.656	10.4%

*   Census Bureau preferred series "A " was used for all forecasts.

5.2.2 Predicted Participation in Saltwater Recreational Fishing By State

Given separate estimates of state population by demographic grouping, the mean probabilities reported in Table 5.3 can be used to estimate numbers of recreational fishing participants by state. As in the estimates reported for the Northeast region, the participation model estimates are likely to differ from those from the MRFSS on a state-by-state basis. Table 5-7 reports the participation model estimates by state for 1990 and provides the 95 percent confidence intervals for the MRFSS estimates.

The participation model estimates for Connecticut, Maine, Rhode Island, and Virginia fall within the MRFSS confidence intervals. For the remaining states (except Delaware), the participation model forecasts are above the upper MRFSS confidence interval reflecting the probable upward bias discussed earlier. The participation model forecast for Delaware was slightly below the lower confidence interval of the MRFSS estimate.

The estimated number of participants is projected to increase in all states through 2025 Table 5-8). Virginia is projected to have the highest increase (18.3%) in participation over the 25-year projection period, while Delaware is projected to have the lowest increase (6.5%). In general, changes in state participation follow the regional pattern. That is, an aging population results in initial increases in recreational fishing participation followed by decreasing rates of participation as the Baby-Boom generation moves through the population (Figure 5-1 for New England and Figure 5-2 for Mid-Atlantic states).

Table 5-7   MRFSS and Participation Model Estimates of Recreational Fishing Participants by State for 1990 (Thousands)

State	MRFSS Lower Confidence Interval	Participation Model Estimate	MRFSS Upper Confidence Interval
Connecticut	218.8	280.8	319.0
Delaware	68.1	64.4	93.8
Massachusetts	72.9	387.7	102.0
Maryland	284.5	392.9	391.9
Maine	59.4	87.0	115.6
New Hampshire	22.2	61.1	51.8
New Jersey	462.4	717.9	588.0
New York	437.7	828.7	612.7
Rhode Island	78.5	86.0	123.2
Virginia	215.6	258.5	293.4

Table 5-8 Projected Number of Saltwater Recreational Fishing Participants by State (2000–2025)

State	Projection Year					
	2000	2005	2010	2015	2020	2025
Connecticut	277.4	282.4	290.4	297.2	302.6	307.1
Delaware	74.2	78.0	80.1	81.1	81.7	81.7
Massachusetts	396.5	406.6	416.1	422.7	426.9	429.4
Maryland	424.7	440.4	455.6	467.5	476.9	484.5
Maine	92.0	95.4	98.8	101.4	103.1	103.8
New Hampshire	67.9	72.1	75.1	77.2	78.4	78.9
New Jersey	747.8	768.8	792.6	811.6	828.0	841.6
New York	828.0	836.3	854.6	869.1	880.5	889.7
Rhode Island	84.8	86.8	89.6	91.8	93.5	94.8
Virginia	290.7	305.2	318.7	329.2	337.5	344.0

The estimated number of participants was projected to increase in all states through the year 2025. Although Delaware was projected to see an aggregate increase in recreational fishing participation of 6.5 percent, it was the only state that indicated no change in the numbers of participants from 2020 to 2025. Virginia was projected to have the highest aggregate increase in participation of 18.3 percent over the 25-year projection period. By contrast, New York had the

lowest projected aggregate increase in participation (7.4%). Even though participation was projected to increase in nearly all instances, the rate of change in participation follows the same general pattern as that of the region as a whole. Specifically, an aging population results in initial increases in recreational fishing participation followed by decreasing rates of participation as the Baby-Boom generation moves through the population.
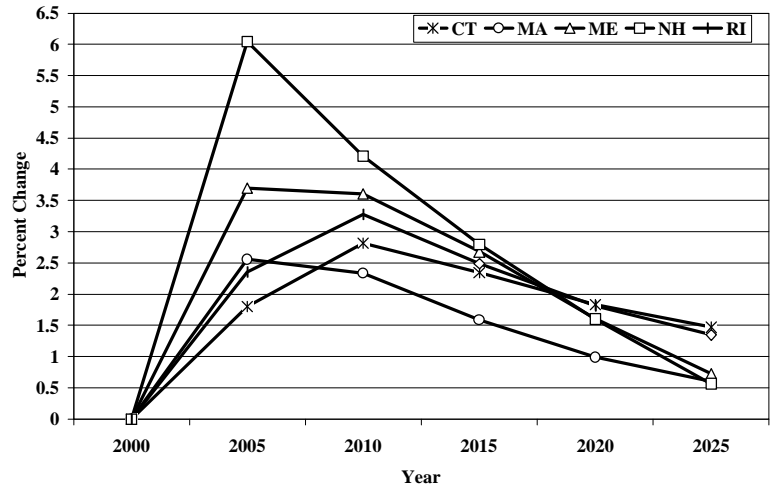

Figure 5-1 Percent Change in Saltwater Angler Participation in New England States (2000–2025)
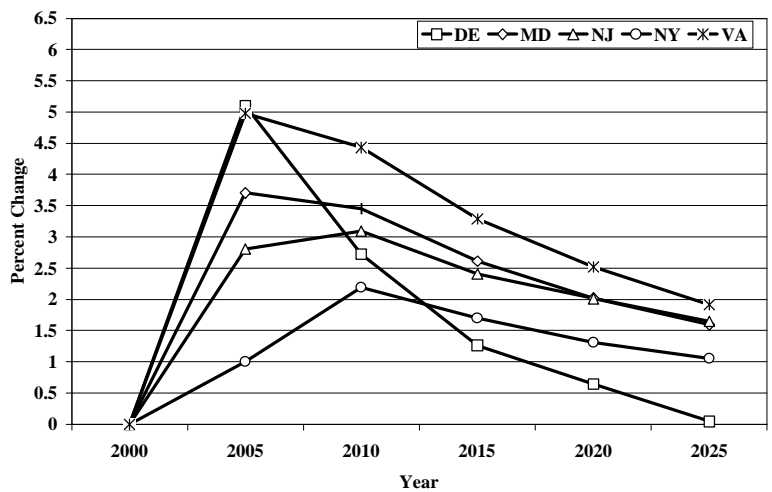
Figure 5-2 Percent Change in Saltwater Angler Participation in Mid-Atlantic States (2000–2025)

CHAPTER 6

CONCLUSIONS

The present study is the first of its kind to develop survey-based participation models and forecasts of saltwater recreational fishing in the Northeast region. The total number of recreational fishing participants in the Northeast is projected to increase by an average annual rate of 0.5 percent through 2025. However, as a proportion of total coastal county population, participation rates were predicted to decline from 11 percent in 1995 to 10.4 percent in 2025. The projected increase in the number of saltwater participants is due to a general increase in population in the Northeast (based on estimates from Census Bureau preferred series "A"). The decline in the participation rate will arise due to changes in the underlying structure of the population (i.e. the 2025 population will be older relative to 1995 and have proportionally more non-Whites). Participation will decline at age 65 and older and increases in the non-White population will exceed those of the White population.

These general participation trends are similar to findings by Milon and Thunberg (1993) for Florida resident saltwater fishing participation. Their forecasts also indicated a modest increase in total numbers of recreational fishing participants and a decline in fishing participation rates. Similarly, Murdock et al. (1992) predicted that total U.S. recreational fishing (freshwater and saltwater) participants would increase at a rate of less than 0.5 percent per year through the year 2050. Edwards (1998) projected an average annual growth rate in marine recreational participation across all coastal states of less than 0.2 percent from 1980 to 2025. The most recent population projections (Campbell, 1996) show an annual average growth rate of 0.9 percent in the U.S. population through 2025. Assuming the population growth rate remains relatively stable, recreational fishing participation rates appear to be likely to decline at a National level.

Projections of future participation cannot be used to predict how many people will actually participate in any give year. Interannual differences in participation are likely to depend on fluctuations in short run economic, climatic, and resource conditions. Estimates of annual participation may be best left to the current MRFSS random household survey. By contrast, the participation projections are likely to provide reasonable estimates of longer term trends in the size of the potential population from which recreational fishing participants may be drawn.

Forecasting participation based solely on demographic change has its constraints. All of the forecasted participation estimates provided in this study (an assumption common to other similar studies; Milon and Thunberg, 1993; Murdock et al., 1992; and Loomis and Ditton, 1988) are based upon the assumption that the factors that influenced participation in 1994 will not change. However, these factors are not likely to remain constant nor are they merely a function of demographics. Individual attitudes, experiences, social norms, and opportunity determine whether or not an individual will choose to engage in any given recreational activity. The extent to which demographics are correlated with these decisions is not static. For example, changing

gender norms may lead to increased participation rates among women relative to current and past levels of female participation. Similarly, lifestyle changes among older individuals may result in higher participation rates among this segment of the population. Thus, tomorrow's participant population may differ from today's.

While social attitudes, preferences, and norms do change they do so only gradually. In spite of its limitations, the likelihood that any given individual may be a recreational fishing participant was shown in this and other studies to be correlated with specific demographic characteristics. Given the consistent relationship between demographics and participation, and the evolutionary pace of social change the forecasts of recreational fishing participation reported in this study are likely to be reliable indicators of trends in fishing participation at least in the short term (5 to 10 years). Obviously, longer term trends are less certain. However, given the dominant effect an aging population will have on Northeast region it seems likely that the region will experience only modest increases in marine recreational fishing participation over the next 25 years.

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APPENDIX A

DEMOGRAPHICS BY PARTICIPATION CATEGORY AND STATE

Sample demographics for coastal county residents by state are reported in in this appendix. Like the Northeast region statistics previously reported, the sample proportions are ratio estimators with stratum, sampling, and wave weights applied as appropriate for each state. Demographic statistics for the Northeast are included in each table to allow the interested reader to compare state statistics with the region as a whole.

Table A-1 Demographic Statistics by Participation Category for Maine Coastal Counties

Demographic Variable	State of Maine		Northeast Region	
	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	79.9	37.1	80.1	38.2
Female	20.1	62.9	19.9	61.8
Age Group				
16 to 25	9.8	16.6	11.7	18.3
26 to 35	23.6	17.9	23.5	21.7
36 to 45	27.5	22.0	27.2	18.5
46 to 55	18.2	12.1	18.1	14.2
56 to 65	12.1	13.2	12.5	10.2
66+	8.8	18.2	7.1	17.1
Ethnicity				
White	96.2	96.2	88.7	73.5
Black	0.0	0.1	5.8	13.4
Hispanic	0.0	2.4	2.1	7.8
Asian	1.2	1.3	1.0	1.1
Other	2.6	0.0	2.5	4.2
Education				
Less than High School	8.9	14.9	7.5	12.1
High School Graduate	35.9	39.2	33.6	30.4
Vocational or Associate	5.7	4.6	4.4	4.2
Some College	17.9	15.5	23.5	19.6
College Graduate	24.8	19.0	22.4	23.5
Graduate or Professional Degree	6.8	6.8	8.7	10.2
Household Income				
$15,000 or Less	7.9	16.0	5.3	13.6
$15,001 to $30,000	27.4	39.2	16.8	25.0
$30,001 to $45,000	30.4	22.3	20.8	22.5
$45,001 to $60,000	28.1	12.6	22.5	17.8
$60,001 to $85,000	5.0	8.4	18.6	10.8
$85,001 to $110,000	1.3	0.0	10.0	5.7
$110,001 to $135,000	0.0	1.5	2.8	2.2
$135,001 to $160,000	0.0	0.0	1.0	1.0
$160,001 or More	0.0	0.0	2.2	1.4

Table A-2 Demographic Statistics by Participation Category for New Hampshire Coastal Counties

	State of New Hampshire		Northeast Region	
Demographic Variable	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	79.6	39.9	80.1	38.2
Female	20.4	60.1	19.9	61.8
Age Group				
16 to 25	13.5	8.8	11.7	18.3
26 to 35	15.3	24.3	23.5	21.7
36 to 45	35.7	16.0	27.2	18.5
46 to 55	22.2	18.0	18.1	14.2
56 to 65	12.1	7.0	12.5	10.2
66+	1.2	25.9	7.1	17.1
Ethnicity				
White	97.6	95.9	88.7	73.5
Black	0.0	0.0	5.8	13.4
Hispanic	0.0	0.0	2.1	7.8
Asian	0.0	0.6	1.0	1.1
Other	2.4	3.5	2.5	4.2
Education				
Less than High School	14.7	12.5	7.5	12.1
High School Graduate	39.8	34.0	33.6	30.4
Vocational or Associate	4.8	2.7	4.4	4.2
Some College	17.6	10.8	23.5	19.6
College Graduate	18.8	30.8	22.4	23.5
Graduate or Professional Degree	4.3	9.2	8.7	10.2
Household Income				
$15,000 or Less	8.7	13.3	5.3	13.6
$15,001 to $30,000	17.0	22.1	16.8	25.0
$30,001 to $45,000	33.6	31.5	20.8	22.5
$45,001 to $60,000	26.5	16.9	22.5	17.8
$60,001 to $85,000	10.8	11.4	18.6	10.8
$85,001 to $110,000	0.0	3.6	10.0	5.7
$110,001 to $135,000	3.5	1.1	2.8	2.2
$135,001 to $160,000	0.0	0.0	1.0	1.0
$160,001 or More	0.0	0.1	2.2	1.4

Table A-3 Demographic Statistics by Participation Category for Massachusetts Coastal Counties

Demographic Variable	State of Massachusetts		Northeast Region	
	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	83.5	44.1	80.1	38.2
Female	16.5	55.9	19.9	61.8
Age Group				
16 to 25	13.7	14.7	11.7	18.3
26 to 35	29.8	23.8	23.5	21.7
36 to 45	26.5	19.2	27.2	18.5
46 to 55	15.1	15.7	18.1	14.2
56 to 65	9.1	8.6	12.5	10.2
66+	5.8	18.0	7.1	17.1
Ethnicity				
White	93.6	90.6	88.7	73.5
Black	1.6	3.6	5.8	13.4
Hispanic	1.3	1.0	2.1	7.8
Asian	1.1	1.6	1.0	1.1
Other	2.3	3.2	2.5	4.2
Education				
Less than High School	6.7	10.0	7.5	12.1
High School Graduate	30.3	27.5	33.6	30.4
Vocational or Associate	4.4	3.4	4.4	4.2
Some College	18.4	15.3	23.5	19.6
College Graduate	28.6	30.0	22.4	23.5
Graduate or Professional Degree	11.9	13.9	8.7	10.2
Household Income				
$15,000 or Less	4.9	11.4	5.3	13.6
$15,001 to $30,000	17.9	26.3	16.8	25.0
$30,001 to $45,000	22.1	24.3	20.8	22.5
$45,001 to $60,000	23.6	19.3	22.5	17.8
$60,001 to $85,000	16.5	7.3	18.6	10.8
$85,001 to $110,000	8.7	6.8	10.0	5.7
$110,001 to $135,000	3.7	2.1	2.8	2.2
$135,001 to $160,000	1.1	1.0	1.0	1.0
$160,001 or More	1.6	1.5	2.2	1.4

Table A-4 Demographic Statistics by Participation Category for Rhode Island Coastal Counties

Demographic Variable	State of Rhode Island		Northeast Region	
	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	88.2	36.8	80.1	38.2
Female	11.8	63.2	19.9	61.8
Age Group				
16 to 25	12.3	13.0	11.7	18.3
26 to 35	27.3	21.6	23.5	21.7
36 to 45	26.6	23.8	27.2	18.5
46 to 55	15.0	9.9	18.1	14.2
56 to 65	12.7	14.2	12.5	10.2
66+	6.2	17.5	7.1	17.1
Ethnicity				
White	90.4	93.7	88.7	73.5
Black	2.6	3.1	5.8	13.4
Hispanic	2.0	2.0	2.1	7.8
Asian	0.6	0.2	1.0	1.1
Other	4.4	0.9	2.5	4.2
Education				
Less than High School	8.3	6.8	7.5	12.1
High School Graduate	40.2	39.4	33.6	30.4
Vocational or Associate	2.3	3.4	4.4	4.2
Some College	17.4	20.3	23.5	19.6
College Graduate	21.1	23.7	22.4	23.5
Graduate or Professional Degree	10.6	6.4	8.7	10.2
Household Income				
$15,000 or Less	6.7	16.4	5.3	13.6
$15,001 to $30,000	22.6	35.5	16.8	25.0
$30,001 to $45,000	27.0	17.5	20.8	22.5
$45,001 to $60,000	28.0	15.5	22.5	17.8
$60,001 to $85,000	11.7	10.4	18.6	10.8
$85,001 to $110,000	3.3	2.6	10.0	5.7
$110,001 to $135,000	0.3	1.8	2.8	2.2
$135,001 to $160,000	0.3	0.0	1.0	1.0
$160,001 or More	0.0	0.3	2.2	1.4

Table A-5 Demographic Statistics by Participation Category for Connecticut Coastal Counties

Demographic Variable	State of Connecticut		Northeast Region	
	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	85.1	31.0	80.1	38.2
Female	14.9	69.0	19.9	61.8
Age Group				
16 to 25	7.9	14.1	11.7	18.3
26 to 35	24.9	21.1	23.5	21.7
36 to 45	27.5	22.0	27.2	18.5
46 to 55	22.3	10.7	18.1	14.2
56 to 65	9.1	12.1	12.5	10.2
66+	8.3	19.7	7.1	17.1
Ethnicity				
White	93.1	90.8	88.7	73.5
Black	2.8	4.4	5.8	13.4
Hispanic	1.9	3.3	2.1	7.8
Asian	1.0	0.2	1.0	1.1
Other	1.3	1.4	2.5	4.2
Education				
Less than High School	9.0	6.7	7.5	12.1
High School Graduate	36.8	33.5	33.6	30.4
Vocational or Associate	2.8	7.1	4.4	4.2
Some College	16.6	19.6	23.5	19.6
College Graduate	21.8	22.5	22.4	23.5
Graduate or Professional Degree	13.0	10.5	8.7	10.2
Household Income				
$15,000 or Less	6.9	10.4	5.3	13.6
$15,001 to $30,000	16.9	16.8	16.8	25.0
$30,001 to $45,000	18.6	24.1	20.8	22.5
$45,001 to $60,000	22.1	19.2	22.5	17.8
$60,001 to $85,000	15.2	13.8	18.6	10.8
$85,001 to $110,000	11.4	9.3	10.0	5.7
$110,001 to $135,000	5.0	3.9	2.8	2.2
$135,001 to $160,000	1.0	1.8	1.0	1.0
$160,001 or More	2.7	0.7	2.2	1.4

Table A-6 Demographic Statistics by Participation Category for New York Coastal Counties

Demographic Variable	State of New York		Northeast Region	
	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	79.8	39.3	80.1	38.2
Female	20.2	60.7	19.9	61.8
Age Group				
16 to 25	14.0	21.3	11.7	18.3
26 to 35	28.2	19.9	23.5	21.7
36 to 45	20.6	17.9	27.2	18.5
46 to 55	16.3	14.8	18.1	14.2
56 to 65	14.3	10.5	12.5	10.2
66+	6.7	15.7	7.1	17.1
Ethnicity				
White	82.0	59.7	88.7	73.5
Black	8.9	17.7	5.8	13.4
Hispanic	5.7	15.1	2.1	7.8
Asian	1.1	1.0	1.0	1.1
Other	2.3	6.6	2.5	4.2
Education				
Less than High School	7.1	13.9	7.5	12.1
High School Graduate	28.7	25.2	33.6	30.4
Vocational or Associate	4.6	3.4	4.4	4.2
Some College	25.7	21.3	23.5	19.6
College Graduate	25.4	24.5	22.4	23.5
Graduate or Professional Degree	8.5	11.7	8.7	10.2
Household Income				
$15,000 or Less	4.3	16.6	5.3	13.6
$15,001 to $30,000	14.3	28.9	16.8	25.0
$30,001 to $45,000	20.2	20.4	20.8	22.5
$45,001 to $60,000	20.9	16.8	22.5	17.8
$60,001 to $85,000	21.8	9.8	18.6	10.8
$85,001 to $110,000	10.4	3.9	10.0	5.7
$110,001 to $135,000	3.3	0.5	2.8	2.2
$135,001 to $160,000	0.9	1.0	1.0	1.0
$160,001 or More	3.8	2.2	2.2	1.4

Table A-7 Demographic Statistics by Participation Category for New Jersey Coastal Counties

Demographic Variable	State of New Jersey		Northeast Region	
	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	82.7	36.6	80.1	38.2
Female	17.3	63.4	19.9	61.8
Age Group				
16 to 25	11.2	22.9	11.7	18.3
26 to 35	21.0	20.7	23.5	21.7
36 to 45	26.1	15.2	27.2	18.5
46 to 55	19.1	13.6	18.1	14.2
56 to 65	15.2	9.6	12.5	10.2
66+	7.5	18.0	7.1	17.1
Ethnicity				
White	90.5	73.3	88.7	73.5
Black	3.7	10.4	5.8	13.4
Hispanic	1.8	10.1	2.1	7.8
Asian	1.1	1.4	1.0	1.1
Other	2.8	4.8	2.5	4.2
Education				
Less than High School	6.0	11.2	7.5	12.1
High School Graduate	33.4	33.4	33.6	30.4
Vocational or Associate	6.1	5.7	4.4	4.2
Some College	23.9	20.4	23.5	19.6
College Graduate	22.7	21.7	22.4	23.5
Graduate or Professional Degree	7.9	7.5	8.7	10.2
Household Income				
$15,000 or Less	4.3	11.5	5.3	13.6
$15,001 to $30,000	17.1	20.1	16.8	25.0
$30,001 to $45,000	21.0	22.2	20.8	22.5
$45,001 to $60,000	19.5	18.8	22.5	17.8
$60,001 to $85,000	18.6	14.8	18.6	10.8
$85,001 to $110,000	14.0	5.9	10.0	5.7
$110,001 to $135,000	2.9	5.7	2.8	2.2
$135,001 to $160,000	1.1	0.2	1.0	1.0
$160,001 or More	1.7	0.7	2.2	1.4

Table A-8 Demographic Statistics by Participation Category for Delaware Coastal Counties

Demographic Variable	State of Delaware		Northeast Region	
	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	76.5	36.4	80.1	38.2
Female	23.5	63.6	19.9	61.8
Age Group				
16 to 25	12.5	15.6	11.7	18.3
26 to 35	22.0	25.2	23.5	21.7
36 to 45	20.7	12.7	27.2	18.5
46 to 55	19.0	13.9	18.1	14.2
56 to 65	18.2	12.1	12.5	10.2
66+	7.7	20.6	7.1	17.1
Ethnicity				
White	91.3	79.0	88.7	73.5
Black	7.3	12.9	5.8	13.4
Hispanic	0.3	0.4	2.1	7.8
Asian	0.0	2.1	1.0	1.1
Other	1.1	5.6	2.5	4.2
Education				
Less than High School	11.9	23.5	7.5	12.1
High School Graduate	45.0	32.6	33.6	30.4
Vocational or Associate	3.0	1.5	4.4	4.2
Some College	17.5	11.1	23.5	19.6
College Graduate	17.2	23.4	22.4	23.5
Graduate or Professional Degree	5.3	8.0	8.7	10.2
Household Income				
$15,000 or Less	12.1	30.5	5.3	13.6
$15,001 to $30,000	20.5	22.0	16.8	25.0
$30,001 to $45,000	31.0	26.0	20.8	22.5
$45,001 to $60,000	18.4	2.5	22.5	17.8
$60,001 to $85,000	9.9	11.0	18.6	10.8
$85,001 to $110,000	3.9	3.7	10.0	5.7
$110,001 to $135,000	2.1	4.2	2.8	2.2
$135,001 to $160,000	1.0	0.0	1.0	1.0
$160,001 or More	1.3	0.0	2.2	1.4

Table A-9 Demographic Statistics by Participation Category for Maryland Coastal Counties

	State of Maryland		Northeast Region	
Demographic Variable	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	78.9	39.2	80.1	38.2
Female	21.1	60.8	19.9	61.8
Age Group				
16 to 25	7.9	14.0	11.7	18.3
26 to 35	18.0	23.4	23.5	21.7
36 to 45	37.9	22.0	27.2	18.5
46 to 55	19.3	16.6	18.1	14.2
56 to 65	10.9	10.4	12.5	10.2
66+	6.0	13.5	7.1	17.1
Ethnicity				
White	88.8	65.9	88.7	73.5
Black	6.6	25.6	5.8	13.4
Hispanic	1.0	4.1	2.1	7.8
Asian	1.0	2.0	1.0	1.1
Other	2.9	2.5	2.5	4.2
Education				
Less than High School	6.3	14.2	7.5	12.1
High School Graduate	38.5	31.4	33.6	30.4
Vocational or Associate	2.1	3.0	4.4	4.2
Some College	28.6	19.7	23.5	19.6
College Graduate	16.9	20.9	22.4	23.5
Graduate or Professional Degree	7.5	10.8	8.7	10.2
Household Income				
$15,000 or Less	5.4	9.5	5.3	13.6
$15,001 to $30,000	15.8	20.1	16.8	25.0
$30,001 to $45,000	17.0	25.2	20.8	22.5
$45,001 to $60,000	24.1	17.4	22.5	17.8
$60,001 to $85,000	21.8	12.2	18.6	10.8
$85,001 to $110,000	10.2	11.0	10.0	5.7
$110,001 to $135,000	2.7	0.5	2.8	2.2
$135,001 to $160,000	1.0	1.7	1.0	1.0
$160,001 or More	2.2	2.4	2.2	1.4

Table A-10 Demographic Statistics by Participation Category for Virginia Coastal Counties

Demographic Variable	State of Virginia		Northeast Region	
	Participants	Nonparticipants	Participants	Nonparticipants
Gender				
Male	72.1	36.6	80.1	38.2
Female	27.9	63.4	19.9	61.8
Age Group				
16 to 25	14.4	15.9	11.7	18.3
26 to 35	20.6	27.0	23.5	21.7
36 to 45	26.9	16.7	27.2	18.5
46 to 55	17.7	13.7	18.1	14.2
56 to 65	10.6	8.6	12.5	10.2
66+	9.7	18.1	7.1	17.1
Ethnicity				
White	85.4	71.3	88.7	73.5
Black	11.2	25.5	5.8	13.4
Hispanic	0.4	1.1	2.1	7.8
Asian	0.7	0.0	1.0	1.1
Other	2.2	2.0	2.5	4.2
Education				
Less than High School	10.0	12.5	7.5	12.1
High School Graduate	32.6	37.9	33.6	30.4
Vocational or Associate	4.5	4.9	4.4	4.2
Some College	25.2	21.8	23.5	19.6
College Graduate	19.8	17.1	22.4	23.5
Graduate or Professional Degree	7.9	5.7	8.7	10.2
Household Income				
$15,000 or Less	6.7	15.6	5.3	13.6
$15,001 to $30,000	17.4	29.8	16.8	25.0
$30,001 to $45,000	19.6	22.1	20.8	22.5
$45,001 to $60,000	28.1	22.0	22.5	17.8
$60,001 to $85,000	18.4	5.0	18.6	10.8
$85,001 to $110,000	6.2	2.4	10.0	5.7
$110,001 to $135,000	0.6	1.7	2.8	2.2
$135,001 to $160,000	1.3	0.3	1.0	1.0
$160,001 or More	1.6	1.0	2.2	1.4

Appendix B

Telephone Survey Instrument

Telephone Survey Instrument - Version A

If Category 1 (No One in Household) Go to Part II.
If Category 2 or 3, Start with Part 1.

44

PART 1. Angler Screening

IF CATEGORY 3 (FISHED IN LAST YEAR BUT NOT LAST 2 MONTHS) GO TO SCREENING QUESTION 2.

    1.   Are you (the angler/one of the anglers) who goes saltwater fishing but has not within the past 12 months?
            Yes))))▸Go to Part II.
            No))))▸May I speak with that angler/one of those anglers?
            If successful, go to INTRODUCTION FOR NEW RESPONDENT.

    2.   Are you (the angler/one of the anglers) who goes saltwater fishing but has not within the past 2 months?
            Yes))))▸Go to Part II.
            No))))▸May I speak with that angler/one of those anglers?

(IF DESIRED FISHERMAN IS NOT IMMEDIATELY AVAILABLE, THANK RESPONDENT AND TERMINATE)

(INTRODUCTION FOR NEW RESPONDENT)

Hello, I'm conducting a survey on saltwater sport anglers for the National Marine Fisheries Service. We are collecting socio-demographic information on saltwater sport anglers. This survey is being conducted in accordance with the privacy act of 1974, therefore you are not obligated to answer any question if you find it to be an invasion of your privacy. I understand that you participate in saltwater fishing, but have not done so within the past (2 or 12) months.
Is this correct? Yes))))▸Go to Part II.
               No))))▸When was the last time you went saltwater sportfishing?
        If within 2 months Go to **Version B** of the Economic Questionnaire.
        If never thank and terminate.

PART II. Economic Questionnaire

(IF INTERVIEWER IS NOT CERTAIN RESPONDENT IS AT LEAST 16 YRS OF AGE, SIMPLY ASK RESPONDENT IF HE/SHE IS AT LEAST 16 YRS OF AGE. IF < 16 YRS OF AGE, THEN TERMINATE AND THANK RESPONDENT.)

1.   How old were you on your last birthday? **(IF RESPONDENT HESITATES, QUICKLY GO TO Q.1A.)**   ENTER NUMBER))))))))))))))▸GO TO Q.2.
               Don't Know   888)),
               Refused   999))2))▸GO TO Q.1A.

    1a.   That is, in which of the following age groups do you belong:

16 to 25	1	26 to 35	2
36 to 45	3	46 to 55	4
56 to 65	5	66 and over	6
Don't Know	8	Refused	9

2.   Code Gender: Male   1)),
                    Female   2))1
                                ▾

IF UNCERTAIN, SIMPLY ASK WHAT IS YOUR GENDER?

3.   Would you describe your ethnic background as:

White	1	Black	2
Hispanic	3	Asian	4
Other(specify)	5	Don't Know	8

```
        Refused            9


4.      What was the last grade of formal education which you have completed?
        (IF RESPONDENT HESITATES, READ LISTED ALTERNATIVES)
                        Less than a high school degree      1
                        High school graduate                2
                        Vocational or community college     3
                        Some college                        4
                        College graduate                    5
                        Post-graduate/professional degree   6
                        Don't know                          8
                        Refused                             9
 *
5 .     Are you personally employed outside the home?
                        Yes                 1
                        No                  2
                        Don't Know          8
                        Refused             9
 *
6 .     Is your total annual household income before taxes over or under
        $45,000?
                +)))))))))))))))))))))))))))))))))))))))))))))-        +)-
                  ▼                                                        ▼
     And is it over or under $60,000?                    And is it over or under $30,000?
 IF OVER)▸ And is it over or under $85,000?      IF UNDER )▸ And is it over or under
$15,000?
 IF OVER)▸ And is it over or under $110,000?
 IF OVER)▸ And is it over or under $135,000?
 IF OVER)▸ And is it over or under $160,000?
                        Less than $15,000                   1
                        $15,001 to 30,000                   2
                        $30,001 to $45,000                  3
                        $45,001 to $60,000                  4
                        $60,001 to $85,000                  5
                        $85,001 to $110,000                 6
                        $110,001 to $135,000                7
                        $135,001 to $160,000 or more        10
                        Don't Know                          8
                        Refused                             9
```

Telephone Survey Instrument - Version B

QUESTION 1 SHALL BE ASKED FOR EACH TRIP FOLLOWING THE TRIP MODE QUESTION ON MRFSS TELEPHONE FISHERMAN QUESTIONNAIRE.

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 *
1 .   Were you fishing for any particular kinds of fish on that trip?
      Yes )))))))))))))))▸  What Kinds?  ))0)▸ 1st Target _____
      No              2                  .)▸ 2nd Target _____
```

DO NOT PROMPT FOR A SECOND SPECIES IF ONLY ONE SPECIES IS MENTIONED. "ANYTHING" IS A VALID ANSWER.

QUESTIONS 2-10 WILL BE ASKED AT THE END OF THE ROUTINE MRFSS TELEPHONE TRIP QUESTIONS

(IF INTERVIEWER IS NOT CERTAIN RESPONDENT IS AT LEAST 16 YRS OF AGE, SIMPLY ASK RESPONDENT IF HE/SHE IS AT LEAST 16 YRS OF AGE. IF < 16 YRS OF AGE, THEN THANK RESPONDENT AND TERMINATE.)

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2.    How many saltwater fishing trips did you take within the past 12 months?
          ENTER NUMBER
          Don't Know        8
          Refused           9

3.    On how many of those trips did you target either bluefish, striped bass,
      black sea bass, summer flounder, Atlantic cod, tautog or scup
      (substitute 'weakfish' for scup in the Middle Atlantic)?
          ENTER NUMBER
          Don't Know        888
          Refused           999

4.    Do you or does anyone living in your household own a boat that is ever
      used for recreational fishing?
          Yes               1
          No                2
          Don't Know        8
          Refused           9

5.    How old were you on your last birthday?  (IF RESPONDENT HESITATES, QUICKLY GO
TO Q.5A.)    ENTER NUMBER ))))))))))))▸ GO TO Q.6.
          Don't Know        8 )),
          Refused           9 ))2)▸ GO TO Q.5A.

5a.   That is, in which of the following age groups do you belong?
          16 to 25          1        26 to 35          2
          36 to 45          3        46 to 55          4
          56 to 65          5        66 and over       6
          Don't Know        8        Refused           9
6.    Code Gender:      Male          1 )),
                        Female        2 ))1
                                         ▾
              IF UNCERTAIN, SIMPLY ASK WHAT IS YOUR GENDER?

7.    Would you describe your ethnic background as:
          White                 1
          Black                 2
```

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              Hispanic                3
              Asian                   4
              Other(specify)          5
              Don't Know              8
              Refused                 9
8.    What was the last grade of formal education which you have completed?
      (IF RESPONDENT HESITATES, READ LISTED ALTERNATIVES)
              Less than a high school degree     1
              High school graduate               2
              Vocational or community college    3
              Some college                       4
              College graduate                   5
              Post-graduate/professional degree  6
              Don't know                         8
   *          Refused                            9
9 .   Are you personally employed outside the home?
              Yes                     1
              No                      2
              Don't Know              8
   *          Refused                 9
10 .  Is your total annual household income before taxes over or under
      $45,000?
              +)))))))))))))))))))))))))))))))))))))))))))))))-    +)-
                 ▼                                                      ▼
              And is it over or under $60,000?    And is it over or under $30,000?
 IF OVER)▸ And is it over or under $85,000?    IF UNDER )▸And is it over or under $15,000?
 IF OVER)▸ And is it over or under $110,000?
 IF OVER)▸ And is it over or under $135,000?
 IF OVER)▸ And is it over or under $160,000?
              Less than $15,000                   1
              $15,001 to 30,000                   2
              $30,001 to $45,000                  3
              $45,001 to $60,000                  4
              $60,001 to $85,000                  5
              $85,001 to $110,000                 6
              $110,001 to $135,000                7
              $135,001 to $160,000 or more        10
              Don't Know                          8
              Refused                             9
```