Report to the North Carolina Sea Grant Program, the North Carolina Department of Environment and Natural Resources (NCDENR) and the North Carolina Beach, Inlet and Waterway Association (NCBIWA) on the Economic Impacts and Economic Benefits of Recreational Boating Along the Atlantic Intracoastal Waterway (AIWW) in North Carolina

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Contents

Introduction 1

General Methodology 2

Results 4

Economic Benefits 4

Contingent Valuation Method (CVM) Survey 4

Data Summary: Independent Variables 6

Travel Cost Method (TCM) Analysis 8

Contingent Valuation Method (CVM) Data 10

Contingent Valuation Method (CVM) Analysis 11

Aggregate Economic Benefits 14

Economic Impacts 15

Estimating Baseline AIWW Recreational Boating Trips During the Study Period 17

Boater Expenditures per Trip 24

Economic Impact Methodology 26

Aggregate Economic Impacts 30

Summary Analysis/Implications 33

Acknowledgements 38

References 39

APPENDIX 1--Survey Form 40

Tables 44

Introduction

Recent decisions by the federal government to either scale back or cease dredging of the Atlantic Intracoastal Waterway (AIWW) and its associated shallow draft inlets in North Carolina has raised serious concerns regarding the future of the AIWW among North Carolina state government officials, North Carolina local government officials and numerous private individuals and organizations. This concern reached a boiling point in late 2004 and early 2005.

Partly in response to this perceived crisis and in an attempt to develop and evaluate strategies to maintain the AIWW and its associated shallow draft inlets, Congressman Mike McIntyre created the Congressional Coastal Action and Advisory Committee. This Committee is chaired by Dr. Jim Leutze and is composed of individuals representing various local government, private, commercial and non-profit interests concerned about the AIWW and other coastal issues in North Carolina. The committee met at Caswell Beach on April 25, 2005 to discuss strategies for addressing the lack of federal funding for dredging of the AIWW and its shallow draft inlets in North Carolina. The Committee reached a decision at this meeting to solicit funding for a comprehensive economic impact and economic benefit study of the AIWW and its associated shallow draft inlets. Dr. Jim Herstine, Ph.D. and Dr. Chris Dumas, Ph.D. were asked to spearhead the study in association with Dr. John Whitehead, Ph.D., Dr. Woody Hall, Ph.D. and Dr. Ed Graham, Ph.D.

The study as originally proposed by Drs. Herstine, Dumas, Whitehead, Hall and Graham was entitled *"A Determination and Analysis of the Economic Impacts and Economic Benefits of Recreational, Charter and Commercial Boating and Marine Related Business Along the Atlantic Intracoastal Waterway in North Carolina and Oceanfront Beach Nourishment"* and consisted of the following components to be conducted over a 2-year period of time beginning in May 2005:

1. Collection and analysis of Recreational Boaters' Data

2. Collection and analysis of Charter/Head Boat Owners/Operators and Passengers Data
3. Collection and analysis of Marine Related Businesses and Commercial Operations' Data
4. Collection and analysis of Property Value Along the AIWW Data
5. Collection and analysis of Oceanfront Beach Nourishment Data

This report only addresses the collection and analysis of the Recreational Boaters' data.

The funding for the Recreational Boaters' component of the study came from three sources:

1. The North Carolina Sea Grant Program authorized a mini-grant for $9,945 entitled *"A Preliminary Assessment of the Economic Impacts and Economic Benefits of Recreational Boating Along the Atlantic Intracoastal Waterway in North Carolina "*
2. The North Carolina Department of Environment and Natural Resources authorized a grant for $25,000 entitled *"An Initial Assessment of the Economic Impacts and Economic Benefits of Recreational Boating Along the Atlantic Intracoastal Waterway in North Carolina"*
3. The North Carolina Beach, Inlet and Waterway Associated served as the conduit for an additional $10,201 for a total budget of $45,146

General Methodology

In May 2005, Drs. Herstine, Whitehead and Dumas prepared a survey instrument to be administered to recreational boaters utilizing the AIWW in North Carolina (Appendix 1). The survey instrument was designed to solicit responses from both transient and local recreational boaters along the AIWW in North Carolina regarding their frequency of use of the AIWW, economic data regarding expenditures while using the AIWW and, the impact that dredging or the lack of

dredging of the AIWW and its associated shallow draft inlets would have on their future use of the AIWW.

Survey administration began in June 2005 and concluded in late November 2005 at multiple locations from the Virginia – North Carolina border in Currituck County to the North Carolina – South Carolina border in Brunswick County. The survey administration locations in North Carolina along the AIWW included Coinjock, the Dismal Swamp Visitors' Center, Belhaven, Oriental, Beaufort, Morehead City, Atlantic Beach, Swansboro, Scott's Hill, Wrightsville Beach, Carolina Beach and Southport. Approximately 1,400 field surveys were collected and 250 mail surveys.

Two general categories of economic results are presented, economic benefits and economic impacts. Economic benefits measure the value of AIWW recreational boating to the boaters themselves. Economic impacts measure the economic effects of the boaters' spending on businesses, employment, wages, and government tax revenues.

Economic benefit estimates are provided for NC resident and non-NC resident (transient) boaters. The changes in economic benefits resulting from changes in AIWW navigability are estimated. Economic impacts are calculated for three coastal North Carolina regions (northern, central and southern) and for the state as a whole. Economic impacts are also provided by boater residency (NC resident vs. non-NC resident). Changes in economic impacts resulting from changes in AIWW navigability are estimated.

Results

Economic Benefits

Contingent Valuation Method (CVM) Survey

The Atlantic Intracoastal Waterway (AIWW) has an authorized navigable depth of 12 feet. It is actually maintained at depths ranging from 7 to 12 feet. The average depth of the North Carolina portion of the Atlantic Intracoastal Waterway is 10 feet. The theoretically preferred economic benefit of changes in the average depth of the AIWW is the willingness to pay to enjoy a gain or the willingness to pay to avoid a loss. Measures of willingness to pay are appropriate for use in benefit-cost analysis of AIWW policy.

The model of willingness to pay is:

$$WTP = f(q, p, y)$$

where WTP is willingness to pay, q is the quality of boat outings, p is the cost of a boat outing (i.e., travel cost) and y is household income. According to economic theory, WTP should increase with quality (e.g., depth), decrease with the cost and increase (decrease) with income if boating is a normal (inferior) good. Measurement of the cost of a boat outing in this context is problematic (explained below). The potential mis-measurement of cost and the absence of historic data on quality leads to the following model:

$$WTP = f(\Delta x, y)$$

where Δx is the change in boat outings that would arise from a dredging policy that affects quality. Willingness to pay is expected to increase with the change in the number of boat outings.

Willingness to pay is measured with the contingent valuation method (CVM). The CVM directly asks survey respondents for their willingness to pay values in highly

structured hypothetical scenarios (Mitchell and Carson 1989). Survey respondents, owners of boats longer than 16 feet, are presented with the following hypothetical AIWW dredging scenario:

> Federal government funds for dredging of the Atlantic Intracoastal Waterway in NC are threatened. If dredging completely stops, the average depth of the NC portion of the Atlantic Intracoastal Waterway would be about 4 feet. A NC dredging and maintenance program would provide enough funding to maintain an average depth of 12 feet in the NC portion of the Atlantic Intracoastal Waterway. The dredging and maintenance program would be funded by a $A surcharge on your annual boating registration fee. Each registered boater with a boat longer than 16 feet using the NC portion of the Atlantic Intracoastal Waterway would be required to purchase a sticker each year to be placed alongside the registration number on the boat. Would you be willing to pay $A in additional annual boating registration fees each year for this program?

One of five dollar amounts, $A, ($A = $10, $25, $50, $75 or $100), was randomly assigned to each respondent. Respondents who answered “no” to the willingness to pay question were asked if they would be willing to pay $1. Respondents who answered “yes” to either question were directed to a follow-up question that asked how sure they were that they would really pay the amount if actually placed in that situation. Respondents who answered no were asked for the reason for not paying.

In order to connect hypothetical willingness to pay responses with actual behavior, boaters are asked about their boating trips under various conditions, including those presented in the hypothetical scenario. First, boaters are asked for the number of separate boat outings taken on the AIWW in NC in their boat during the past 2 months. Respondents are asked the same question for the past 12 months (Trips1). Respondents who indicated that this was not a typical year

for their boat outings were asked for the number of outings they normally take during a typical year (Trips1x).

Boaters are asked about the number of boat outings that they would take on the AIWW over the next twelve months under current conditions (Trips2) and over the next 12 months if dredging of the AIWW was increased and the average depth of the North Carolina portion was about 12 feet (Trips3). Finally, boaters are asked about the number of boat outings that they would take on the AIWW over the next twelve months if dredging stopped completely and the average depth of the North Carolina portion was about 4 feet (Trips4).

Data Summary: Independent Variables

After deletion of cases with missing values on key economic variables we consider a sample of 1006 owners of boats greater than or equal to 16 feet in length. We consider NC residents (n = 902) and non-residents (n = 104) separately. Variables considered in this analysis, their description and statistical summary are in Tables 1 and 2. Average boat length is 28 feet and 42 feet for residents and non-residents. Average boat draft is 3 feet and 4 feet for NC residents and non-residents.

North Carolina residents took an average of 38 boat trips on the AIWW during the 12 months prior to the survey interview. Non-residents took an average of 12 trips. For most (83%) the past 12 months was a typical year. Trips in a typical year are 42 for residents and 11 for non-residents. The number of trips expected during the next 12 months with current depth, increased depth and decreased depth are 42, 46 and 23 for residents and 27, 33 and 19 for non-residents. Eighty-four percent and 38% of the resident and non-resident boaters typically take single day trips. Sixty percent of the resident trips are for the primary purpose of fishing. Nineteen percent of the non-resident trips are for the primary purpose of fishing.

The cost of an AIWW boat trip is measured by the sum of money and time costs, TC = cd + (δwd/mph), where TC is the terrestrial travel cost of an AIWW boat outing, c is the cost per mile, d is round trip distance, δ is a fraction of the wage rate, w is the wage rate and mph is miles per hour (Parsons 2003). The cost per mile is set at $0.47 for respondents who trailer their boat and $0.37 for all others. Round trip distance is obtained from the survey. The opportunity cost of time is set at 33% of the wage rate. The wage rate is household income divided by 2000 hours. Miles per hour is set at 40 for respondents who trailer their boat and 50 for all others.

Respondents who trailer their boat to a boat launch (26%) are asked for the number of miles from their home to the place they usually launch their boat. Respondents who keep their boat at a marina (53%) are asked for the number of miles from their home to the marina. Respondents who have a private dock at their home (13%) and respondents who keep their boat somewhere else are assumed to travel zero miles. Travel cost for residents is $67 and $210 for non-residents.

As mentioned above, the travel cost variable is measured with error for several reasons. First, the cost of a boat trip on the AIWW is the sum of the terrestrial and aquatic cost of access to the AIWW. We have no information on the aquatic cost (i.e., the cost of the boat ride from the marina to the AIWW). Second, we have no information on the nature of the boat outing on the AIWW. The AIWW may be the destination of the outing (i.e., a single-purpose trip) or a gateway to another water body (i.e., a multipurpose trip). The calculation of travel costs for multipurpose trips is unresolved in the economics literature (Parsons 2003). For these reasons, the benefit estimates obtained from travel cost recreation demand analysis conducted below are of dubious value in this study and, as mentioned above, use of a proxy for travel cost in the CVM analysis is warranted.

Recreation demand analysis requires inclusion of the price of a substitute recreation site. In our case, suppose that without dredging the NC portion of the

AIWW became too difficult to navigate. North Carolina boaters might travel to the Virginia or South Carolina portions of the AIWW. We constructed substitute travel cost measures for access to Virginia Beach and Myrtle Beach using travel distance computed from the home zip code to the destination zip codes using the same travel and time cost equation as above. The Myrtle Beach travel cost variable performed better in the empirical analysis. Travel cost to Myrtle Beach is $270 for residents and $267 for non-residents.

Income is typically subject to significant item non-response in household surveys. In this survey, 9% of residents and 12% of nonresidents do not report their household income. For reporting households, household income is $85 thousand and $93 thousand for residents and nonresidents. In order to retain willingness to pay information on those boaters who do not report their income we code missing income as zero (Income2) and include a dummy variable for respondents with missing income (Missinc). The average annual household income with 9% of the missing income values coded as zero income is $77 thousand and $82 thousand for residents and non-residents.

Almost all of the boaters are white (98% and 100% for residents and non-residents) and most are male (87% and 83% for residents and non-residents). For residents the average age is 46, the average household size is almost 3, the average number of children is less than one, 73% are married and the average number of years of schooling is 16. For nonresidents the average age is 52, the average household size is almost 3, the average number of children is less than one, 72% are married and the average number of years of schooling is 16. Like income, these demographic variables are subject to significant item non-response and they are not included in the analysis below.

Travel Cost Method (TCM) Analysis

The travel cost method (TCM) can be used to estimate the economic benefits of recreation trips (Parsons 2003). The TCM exploits the negative relationship

between distance traveled and the number of trips. The relationship is converted to demand by converting distance to the travel cost of a trip. With these data the difficulty of accurately measuring the full costs of an AIWW boating trip makes estimation of the economic benefit of these trips difficult. However, the TCM is still useful in testing the validity of the trip data and conducting a multivariate test of differences in trips under different policy scenarios.

We employ four trip observations for each boater in pseudo-panel data. The first panel is the "revealed preference" typical trips during the past 12 months (Trips1x). The second, third and fourth panels are the "stated preference" trips during the next 12 months under various conditions (Trips2, Trips3, Trips4). The independent variables include the travel cost to the access point to the AIWW (Travcost), the substitute site cost (Subcost1), income (Income2, Missinc) and boat draft (Draft). We also control for differences in the revealed preference and stated preference data with a stated preference dummy variable (SP = 1 if stated preference data, 0 otherwise) and interactions between the stated preference dummy variable and the travel cost variable (SPTC) and income (SPY).

We use the random effects Poisson regression model to estimate the recreation demand model (Whitehead, Haab and Huang 2000). The Poisson model accounts for the integer nature of the dependent variable (i.e., x = 0, 1, 2 …). The random effects specification accounts for the panel data set, avoiding errors associated with assuming that each observation is a different boater.

The regression results for NC single day and multiple day boaters are in Table 3. The trip data are internally valid and resemble a demand curve for both single-day and multiple-day trippers. In other words, the number of trips falls with the increase in travel costs and increase with increases in the cost of the substitute. The number of trips falls with increases in income indicating that AIWW boating traps are "inferior goods." Trips also fall with increases in boat draft.

The nonparametric signed rank test indicates that differences in trip levels across scenario are statistically significant ($p < 0.0001$ for each comparison). However, these tests may be confounded by other variables. Holding these variables constant in the regression analysis allows for a multivariate test for differences in trip levels. These tests indicate that differences in trip levels are significantly different. Respondents state that fewer trips would be taken with an average depth of 4 feet and more trips would be taken with an average depth of 12 feet. In the single day trip model, more trips are taken with stated preference data and the boaters are less responsive to changes in travel cost and income when stating trips (see Whitehead, Haab and Huang 2000 for a similar result). Surprisingly, the stated preference results are opposite for the multiple-day trippers.

Contingent Valuation Method (CVM) Data

About 74% of residents and 69% of nonresidents are willing to pay the bid amount (Table 4). We define "very sure" respondents as those who answer 7 or above on the certainty scale question (Whitehead and Cherry forthcoming). Over 90% of residents and nonresidents are very sure that they actually would pay the amount (Table 5). After considering only those who are very sure about their willingness to pay, 67% and 64% of residents and non-residents are willing to pay the bid amount (Yes1sure in Table 4).

The percentage of very sure yes responses declines with the bid (Table 4). For residents, willingness to pay the bid amount falls from 87% to 47% as the bid amount rises from $10 to $100. For nonresidents, willingness to pay the bid amount falls from 74% to 50% as the bid amount rises from $10 to $75 and inexplicably rises to 84% at $100.

Of those respondents who are not willing to pay the bid amount, 74% and 65% of residents and non-residents are willing to pay $1 (Yes2 in Table 4). Eighty percent of residents and 90% of non-residents are very sure about $1 (Table 5).

Of those few respondents who would not pay $1, most residents think that it is unfair to make boaters pay, some don't trust government or are not affected by a shallow AIWW (Table 6). Most non-residents would not pay because they are not a NC registered boat owner.

The credibility of hypothetical CVM scenarios is a necessary condition for the validity of willingness to pay responses. Several questions were asked of respondents in order to determine the credibility of the CVM scenarios. Boaters are asked for their perceptions of the effectiveness of the dredging program in terms of how likely they think it is that the NC portion of the AIWW would be maintained at an average depth of 12 feet. Most respondents think that it is very likely or somewhat likely (Table 7). Thirty percent of resident anglers and 22% of non-resident anglers think that maintenance of this depth is not likely at all. We control for differences in scenario credibility in the model below.

Another measure of the credibility of the hypothetical scenarios is the change in perceived quality of the AIWW with dredging (Table 8). Boaters are asked about their opinion of the navigability of the AIWW with the dredging program and an average depth of 12 feet and the current average depth of 10 feet. Under current conditions, 74% of residents and 60% of non-residents think that navigability is good, very good or excellent. With a 12 foot average depth, 97% of residents and non-residents think that navigability would be good, very good or excellent. These differences suggest that the hypothetical scenarios lead to changes in perceptions of the quality of the AIWW.

Contingent Valuation Method (CVM) Analysis

A regression model is used to estimate the average willingness to pay for the permit that would fund the dredging program and the determinants of willingness to pay. In order to combine the behavior and willingness to pay data in a theoretically appropriate way we use the empirical model described by Whitehead (2005):

$WTP = \alpha\Delta x + \beta' X_1 + e_1$

$\Delta x = \theta' X_1 + \lambda' X_2 + e_2$

The willingness to pay equation is a parameterization of the theoretical model described above where α is the coefficient on the change in trips variable, β and δ are coefficient vectors on the vector of independent variables, X_1, in the willingness to pay and change in trips equations and λ is a coefficient vector on instrumental variables, X_2. The error terms e_1 and e_2 are normally distributed.

If this model is estimated independently, the coefficient on the change in trips variable will likely be biased since the change in trips is an endogenous (i.e., choice) variable. With endogeneity bias, the unobserved variables that affect both willingness to pay and the change in trips will be correlated $r(e_1, e_2) \neq 0$, and the change in trips variable in the willingness to pay model will be correlated with the error term $r(\Delta x, e_1) \neq 0$.

In order to minimize endogeneity bias we estimate the change in trips as a function of all independent variables in the willingness to pay model and a vector of instrumental variables X_2. Instrumental variables are uncorrelated with willingness to pay but highly correlated with the change in trips. The model is:

$WTP = \alpha E(\Delta x) + \beta' X_1 + e_1$

$\Delta x = \theta' X_1 + \lambda' X_2 + e_2$

The predicted value from the trip change model, $E(\Delta x)$, is used as an independent variable in the willingness to pay model in order to avoid endogeneity bias.

We estimate this model for NC residents with the Tobit regression due to the censored nature (i.e., large number of zeros) of the dependent variable. Trips2, Draft, Age and its square are the instrumental variables. The change in trips is increasing in baseline trips, boat draft and age (at a decreasing rate). None of the

variables in the X_1 vector (dollar amount, trip cost, substitute cost, income) are statistically significant. The predicted value is a change of 25.61 trips.

If willingness to pay is normally distributed the probability of a recoded yes response is equal to the probability that willingness to pay is greater than or equal to the bid amount

$$Pr(Yes1sure) = Pr(WTP \geq A)$$

Mean willingness to pay and standard errors are constructed using the Delta Method (Cameron and James 1987, Cameron 1991).

The willingness to pay model described above is estimated for NC residents (Table 9). The full model is not appropriate for the nonresident data. In this case we estimate a simple model with only the bid amount as an independent variable. In the resident and non-resident models the scale parameter, σ, is positive and statistically significant. The scale parameter is the negative inverse of the probit coefficient on the dollar amount variables. This result indicates that boaters are less likely to be willing to pay as the dollar amount rises. Evaluating each coefficient at the mean of the independent variable, the average willingness to pay is $90 for residents and $99 for nonresidents.

The probit coefficient vector for residents is multiplied by the scale parameter so that each coefficient can be interpreted as a marginal effect. A marginal effect is the impact on willingness to pay of a one unit change in the independent variable. Resident boaters who think the dredging program is not likely at all to be effective are willing to pay $20 less than those who think it is somewhat or very likely to be effective. Boaters who view the CVM scenario as credible are willing to pay $96. Boaters who think that the scenario is not likely at all are willing to pay $76.

Resident boaters are willing to pay $0.46 more for each additional $1000 increase in income. The income elasticity of willingness to pay is 0.39. Each 10% increase in income increases willingness to pay by 3.9%.

Resident boaters are willing to pay $0.48 for each additional boat outing. Considering that the average change in boat outings as average depth increases from 4 feet to 12 feet is 25, the value of these additional outings is about $12 of the $90 total willingness to pay estimate per boater. The remainder of total willingness to pay, $78, can be interpreted as the increased value of boat outings that are currently taken. Considering that the number of boat outings without the dredging policy is about 21 (from Table 2, Trips4 – $E(\Delta x) = 21$), the average value of the dredging policy for each trip taken without it is $3.71. These estimates reflect the diminishing marginal returns of trip quality. In other words, the value of the dredging policy for the first 21 trips taken is $3.71 per trip. The value of the dredging policy on the next 25 trips is $0.48 per trip.

Aggregate Economic Benefits

The aggregate benefits of an AIWW dredging policy is the sum of aggregate benefits to residents and nonresidents of NC. In February 2003, 355,453 boats were registered in NC. Of these, 144,135 were less than 16 feet. Of the 211,318 boats with length greater than or equal to 16 feet almost all, 203,953, have zip codes within the range of the zip codes of the boaters in the AIWW survey sample. Each NC resident boater would be willing to pay $90 annually in the form of a surcharge on their boater registration fee to support a dredging policy that would lead to an average 12 foot depth in the NC portion of the AIWW instead of a 4 foot depth. The 90% confidence interval for boater willingness to pay is [$81.59, $99.40]. An estimate of the aggregate annual benefits of this policy to residents is $18.36 million. The 90% confidence interval for aggregate willingness to pay is [$16.64 million, $20.27 million].

An estimate of the number of non-resident boaters that transit the NC portion of the AIWW is the number of boaters at the Great Dismal Swamp and Albemarle and Chesapeake Canal (Moffat and Nichol, 2005). The average from 2001-2005 is 14,600. Non-resident boaters are willing to pay $99 annually. The 90% confidence interval for non-resident boater willingness to pay is [$63.35, $134.23]. The aggregate annual benefits of this policy are $1.44 million. The 90% confidence interval for aggregate willingness to pay is [$0.92 million, $1.96 million].

Economic Impacts

The economic impacts of reduced AIWW navigability are determined by comparing economic activity under a baseline scenario of current (2005) AIWW navigability with economic activity under an alternative scenario of reduced AIWW navigability (4 ft average depth). Economic impacts occur in two general categories: impacts resulting from changes in the number of recreational boating trips, and impacts resulting from changes in the number of boats purchased/maintained by recreational boaters (i.e., some, not all, boaters may choose to stop purchasing/maintaining vessels due to decreased AIWW navigability).

In outline, the annual economic impacts of boater trips under baseline conditions are determined by: (1) estimating the baseline number of recreational boating trips made per year in the study region during the study time period for North Carolina resident boaters and non-resident boaters separately, (2) estimating the average expenditures by spending category (i.e., boat fuel, slip fees, restaurants, etc.) made per trip (for resident boaters and non-resident boaters separately), the portion of expenditures spent in North Carolina, and the portion of expenditures spent within each geographic area of the study region, (3) multiplying the baseline trip numbers by the average expenditure numbers to generate *direct impact spending* estimates by expenditure category, geographic region, and boater residency, (4) using an economic input-output model to estimate the

employment, labor income (wages and salaries), and taxes supported by the direct spending, and (5) using an economic input-output model to estimate the indirect and induced impacts (i.e., the economic "multiplier effects") of the direct spending on economic output/sales/business activity, employment, labor income (wages and salaries), and taxes.

The annual economic impacts of boat purchases/maintenance by AIWW boaters under baseline conditions are determined by (1) estimating the number of North Carolina resident recreational boaters who use the AIWW (i.e., excluding Dare and Hyde county boaters and all charter and partyboats), who are susceptible to changes in AIWW navigability (i.e., have boats greater than 16 feet in length), and who indicate on the sample survey that they would cease boating altogether (rather than move their boat to another location and continue boating, buy a smaller boat and continue boating, etc.) in response to reduced navigability, (2) estimating the average value of the boat owned by boaters with the above characteristics, (3) assuming that vessels depreciate fully over 20 years and that, on average, $1/20^{th}$ of vessel value must be purchased each year to maintain the vessels (these are annualized direct impact expenditures), (4) calculating the portion of these purchases made from North Carolina boat builders, and (5) using an economic input-output model to estimate the employment, wages, and taxes supported by the direct expenditures, as well as the indirect and induced impacts supported by the direct expenditures.

To estimate the impacts of *changes* in AIWW navigability conditions, the economic benefits model (described in the preceding section of this report) is used to estimate the percentage change in the average number of AIWW recreational boating trips resulting from a change in navigability conditions. The percentage change in trips is calculated separately for NC resident boaters and non-resident boaters. The percentage changes are applied to the baseline numbers of trips to estimate changes in total trips. Changes in total trips are multiplied by average direct expenditures per trip to estimate changes in direct

impact spending. An economic input-output model is then used to estimate the changes in employment, wages, and taxes supported by the direct expenditures, as well as changes in indirect and induced impacts resulting from changes in direct impact spending. The change in direct expenditures on boat purchases/maintenance is estimated as the loss of the annualized value of boat purchases from NC boat builders made by NC resident boaters who say that they would stop boating altogether under reduced navigability. An economic input-output model is then used to estimate the changes in employment, wages, and taxes due to the loss of direct expenditures on boat purchases/maintenance, as well as changes in indirect and induced impacts resulting from changes in direct expenditures.

Estimating Baseline AIWW Recreational Boating Trips During the Study Period

To determine baseline aggregate economic impacts of baseline recreational boater activity on the AIWW during the study period, the sample number of vessel trips must be expanded to the estimated total number of AIWW recreational boater trips made during the period. This section describes the methodology for expanding the number of sampled trips to the number of total trips. It should be kept in mind that only vessels 16 feet or greater in length are sampled in the survey, as smaller vessels likely would not be affected by the potential changes in AIWW depth considered in this study. As a result, trip estimates and changes in trip estimates refer to vessels 16 feet or greater in length (i.e., if the trip numbers appear small relative to the apparent numbers of vessels on the waterway, remember that we are concerned only with vessels 16 feet or greater in length). In addition, the survey considers private recreational boaters only—charter and party boat trips are not considered here (these trips will be addressed in a future survey). Finally, coastal NC boating that occurs in the northern part of the state along the outer banks (i.e., Dare and Hyde counties) does not depend critically on the AIWW and is excluded from the

analysis. Survey locations, counties, and coastal geographic regions (as defined in this study) are presented in Table 10.

The methodology used to estimate baseline trip numbers relies on the field survey information only. The mail survey data are not used because they do not indicate when the boater would have been at a particular location along the AIWW, and so we cannot allocate the trip to the appropriate location, day and time within the sampling frame. (The mail survey data are used, however, to estimate willingness to pay for maintaining AIWW navigability in the Economic Benefits section of this report.)

If there were days on which, or locations where, the field surveyors collected zero surveys, then the trip estimates should be adjusted to avoid overestimating the aggregate number of trips. However, there were no days on which, or locations where, the field surveyors collected zero surveys—each time surveyors collected surveys, they collected at least one survey.

Because the survey questions ask about expenditures per boating trip (not per boating day), data for any multi-day boating trip should be included in the database only once. It is possible that boaters making multi-day trips could be approached more than once by field surveyors. To ensure that the data pertaining to a particular trip occurred in the data set only once, the field interviewers asked each respondent whether they had already been interviewed for this survey during this particular boating trip. If so, the respondent was not interviewed again during that particular boating trip.

On the other hand, if a boater made several separate boating trips on the AIWW during the season, then each trip should have the opportunity of being sampled by the field survey administrators, and the data from each sampled trip should be included in the data set. The field surveyors did collect data from those boaters who happened to be sampled on multiple, but separate, boating trips.

For those non-NC residents who take multiple trips each year on the AIWW, not all of these trips may involve travel in NC. The analysis assumes that all trips are similar to the one taken when the boater was interviewed in NC. If some of the trips made by multiple trip-takers do not involve NC, then the analysis would tend to overestimate the impacts in NC of trips made by non-NC residents. On the other hand, expenditure data were not collected from non-NC residents who make a single trip per year on the AIWW that involves travel in NC. Omitting these trips would tend to underestimate the impacts in NC of trips made by non-NC residents. These two effects cancel one another to some extent.

Trip numbers may be underestimates to the extent that vessels launch from and return to counties whose principal marinas are not directly on the AIWW route but are in relatively close proximity to the AIWW, such as Craven County (New Bern). We assume that all boaters traveling on the AIWW in NC on a given day pass by (but do not necessarily stop at) one of our field survey locations and have the opportunity to be selected in the survey sample.

Each field survey provided information on one vessel trip. The distribution of field surveys varied significantly across survey locations, weekday vs. weekend day, and morning vs. afternoon/evening. Raw data on the numbers of field surveys collected are presented in Table 11 by survey location.

For the purpose of economic impact analysis, the number of surveys (trips) must be aggregated by functional economic area in order to properly estimate economic multiplier effects. Functional economic areas are geographic regions that are semi self-sufficient, in that most people living in the region work and shop mostly within the region. For the purposes of this study, three geographic regions are defined; Northern NC Coast, Central NC Coast, and Southern NC Coast (see Table 10). Information on the numbers of boater trips by survey location and by geographic region are provided; however, only the information by

geographic region will be used in the economic impact analysis in order to properly account for the effects of functional economic areas. The distribution of field surveys by geographic region is presented in Table 12.

Survey sampling occurred between June 17, 2005, and November 19, 2005 (see Table 13 for the distribution of field surveys across months within the study period). During this time, there were 111 weekdays and 45 weekend days. Since not all locations could be surveyed on all days due to budget limitations, estimates of the average number of boater trips on each type of day (weekday and weekend day) are developed for each survey location. The average number of trips per weekday (weekend day) for a particular location is multiplied by the number of weekdays (weekend days) in the study period to produce an estimate of the number of weekday (weekend day) trips made at that location during the study period.

Surveyors were in the field between 6am to 11pm in blocks of time (denoted here as "sampling periods") that varied from 2 to 4 hours in length (see Table 14 for the distribution of field surveys by time of day). For the purpose of extrapolating the total number of trips from the sample number of trips, we assume an average of 3 hours per field sampling period. There are potentially two, 3-hour survey sampling periods each morning (i.e., 6am to 8:59am, and 9:00am to 11:59am) and four 3-hour survey sampling periods each afternoon/evening (i.e., 12noon to 2:29pm, 3pm to 5:59pm, 6pm to 8:59pm, 9pm-11:59pm). Data on the distribution of sampling effort (number of sample periods) by location and geographic region, weekday vs. weekend day, and time of day are presented in Tables 15 and 16.

The number of surveys collected per 3-hour sampling period typically differed significantly between weekdays and weekend days, and between morning and afternoon/evening sampling periods, as shown in Table 17. These differences reflect differences in the intensity of use of the AIWW by recreational boaters across weekdays and weekends and across time of day.

The number of surveys collected per 3-hour sampling period also differed across survey locations, as shown in Table 18. These differences reflect differences in the intensity of use of the AIWW by recreational boaters across geographic locations.

Not all vessels present at a particular location during a particular sampling period were surveyed due to the limited number of survey personnel. The surveyors selected at random the particular vessels to be surveyed from among the vessels present. However, the fraction of vessels surveyed at the survey site during the sample period was noted by the surveyors. This allows the total number of vessels present to be calculated from the number of vessels sampled. For each location, the average fraction of vessels surveyed is presented in Table 19a.

Because sampling periods (i.e., sampling effort) were distributed differently across the various survey locations in terms of time of day and day of the week sampled, our methodology develops separate trip estimates for each survey location for weekday mornings, weekday afternoon/evenings, weekend mornings, and weekend afternoon/evenings. Due to budget constraints, sampling did not occur at all survey locations/days/times during the study period. In addition, sampling did not occur on rain days, defined as days on which daily precipitation was more than 0.5 inch at the primary weather monitoring location within each region (Weather monitoring locations: Northern region--Elizabeth City, Central region--Morehead City, Southern region--Wilmington). The numbers of clear weather (non-rain) weekdays and weekend days for each region are presented in Table 19b.

For those locations/days/times where sampling **did** occur, the following formulas are used to estimate total trips at each location:

Weekday Morning Total Trips = Number of Clear Weather Weekdays in Sample Period * Two 3-hr Sampling Blocks per Morning * (Number of

Field Surveys Collected / Number of Sampling Blocks) * (1 / Fraction of Vessels Surveyed at location)

Weekday Afternoon/Evening Total Trips = Number of Clear Weather Weekdays in Sample Period * Four 3-hr Sampling Blocks per Afternoon/Evening * (Number of Field Surveys Collected / Number of Sampling Blocks) * (1 / Fraction of Vessels Surveyed at location)

Weekend Morning Total Trips = Number of Clear Weather Weekend Days in Sample Period * Two 3-hr Sampling Blocks per Morning * (Number of Field Surveys Collected / Number of Sampling Blocks) * (1 / Fraction of Vessels Surveyed at location)

Weekend Afternoon/Evening Total Trips = Number of Clear Weather Weekend Days in Sample Period* Four 3-hr Sampling Blocks per Afternoon/Evening * (Number of Field Surveys Collected / Number of Sampling Blocks) * (1 / Fraction of Vessels Surveyed at location)

For those locations/days/times where sampling **did not** occur, total trips are estimated for each location based on average values from similar locations/days/times using the following formulas:

Weekday Morning Total Trips = Number of Clear Weather Weekdays in Sample Period * Two 3-hr Sampling Blocks per Morning * [Ave. Number of Surveys per 3-hr Sampling Block for this Location * (Fraction of Ave Number of Surveys per 3-hr Sampling Block Across All Locations Collected During Weekday Mornings)] * (1 / Fraction of Vessels Surveyed at location)

Weekday Afternoon/Evening Total Trips = Number of Clear Weather Weekdays in Sample Period * Four 3-hr Sampling Blocks per Morning *

[Ave. Number of Surveys per 3-hr Sampling Block for this Location * (Fraction of Ave Number of Surveys per 3-hr Sampling Block Across All Locations Collected During Weekday Afternoon/Evenings)] * (1 / Fraction of Vessels Surveyed at location)

Weekend Morning Total Trips = Number of Clear Weather Weekend Days in Sample Period * Two 3-hr Sampling Blocks per Morning * [Ave. Number of Surveys per 3-hr Sampling Block for this Location * (Fraction of Ave Number of Surveys per 3-hr Sampling Block Across All Locations Collected During Weekend Mornings)] * (1 / Fraction of Vessels Surveyed at location)

Weekend Afternoon/Evening Total Trips = Number of Clear Weather Weekend Days in Sample Period * Four 3-hr Sampling Blocks per Morning * [Ave. Number of Surveys per 3-hr Sampling Block for this Location * (Fraction of Ave Number of Surveys per 3-hr Sampling Block Across All Locations Collected During Weekend Afternoon/Evenings)] * (1 / Fraction of Vessels Surveyed at location)

The estimated total numbers of baseline AIWW recreational boating trips made at each survey location and within each geographic region during the study period, by weekday vs. weekend day, and by time of day are presented in Tables 20 and 21.

The percentage of trips made by North Carolina resident boaters vs. non-North Carolina resident boaters varied across survey locations, as shown in Table 22. These differences reflect primarily more intensive use of the AIWW by North Carolina residents at locations close to population centers. The numbers of surveys collected at survey locations 3, 9 and 13 are not large enough to permit reliable inferences about non-resident use. For these locations, the regional non-resident use percentages presented in Table 23 are more reliable.

Boater Expenditures per Trip

Recreational boaters' expenditures per trip are calculated using the field survey data only, as the mail survey was not a random sample of boaters on the waterway but rather was a targeted sample of boaters who used one of two particular waterfront facilities. Results would be biased in favor of the mail survey respondents' answers if the mail survey data were included in analysis.

Within the field survey data, only those boaters who reported taking more than one trip on the AIWW in the last 12 months are included in the analysis, as expenditure data were not collected from those boaters reporting only one AIWW trip in the last 12 months. The original reason for focusing on boaters making multiple trips was to concentrate on boaters with greater familiarity with AIWW navigability conditions, because these are the boaters who would be best able to estimate the impacts of changes in navigability on boating, and these boaters would be most impacted by changes in navigability. Because we have no expenditure data for boaters making a single AIWW trip per year, we must make the assumption that their per-trip expenditures are similar to those of boaters making multiple trips per year.

Of the 1076 field survey boaters making multiple trips per year (and therefore being asked about their expenditures), 1051 provided expenditure data. The survey collected information on recreational boaters' expenditures associated with their current AIWW trip. The expenditure categories considered in the survey are listed in the left-hand column of Tables 24 to 29.

For each expenditure category (except boat rental expenditures and wages/salaries of hired captain/crew, see below), the survey respondent was asked for total expenditures over the entire trip, the portion of total expenditures occurring within the state of North Carolina, and the portion of total expenditures occurring within the survey county.

The survey did not collect information on boat rental expenditures by state and county, because it was assumed that boat rental expenditures occur in the county from which the trip originates. If the county of trip origin was within North Carolina, then the boat rental expenditures are assumed to occur within North Carolina; otherwise, they are assumed to occur out of state. If the county of trip origin is the same as the county in which the survey occurred, then the boat rental expenditures are assumed to occur in that particular county.

Similarly, the survey did not collect information on hired captain/crew wage expenditures by state and county. Captain/crew wage expenditures are allocated between North Carolina and out-of-state and among individual counties within North Carolina using the procedure described above for allocating boat rental expenditures.

Due to a mistake on the field survey forms, the field survey did not collect data on boaters' slip fee expenditures—money spent to moor a vessel at a dock overnight while the boaters sleep, either on the vessel or in a motel/hotel/inn on shore. We estimate slip fee expenditures using the following methodology. Following the field and telephone surveys, the study authors conducted an additional, informal telephone survey of ten marinas along the AIWW from Elizabeth City to Wilmington offering overnight slip rental. Slip fees varied depending on location and the availability of water and electricity access, but a typical slip rental fee was $2 per vessel foot per night for a slip with water and electricity access. The marinas reported that their slip fees do not vary by season. Based on this information, for the purposes of this study we assume that the typical slip rental fee along the AIWW is $2 per vessel foot per night with water and electricity access. For each survey respondent, this slip fee value was multiplied by the length of the boater's vessel and the number of nights the boater spent on this particular trip to produce an estimate of total slip fees spent on the trip. The number of nights was calculated as the number of trip days reported by the boater minus one (as a result, boaters taking a day trip would

incur zero slip fees). The proportion of a boater's total slip fee expenditures occurring within North Carolina was assumed to be equal to the proportion of the boater's total non-slip fee expenditures occurring within the state. Similarly, the proportion of a boater's slip fee expenditures occurring within the survey county was assumed to be equal to the proportion of the boater's total non-slip fee expenditures occurring within the county.

Average AIWW recreational boating expenditures per trip by expenditure category and by geographic region are presented for North Carolina residents in Tables 24 to 26 and for non-North Carolina residents in Tables 27 to 29.

Economic Impact Methodology

Two economic impact scenarios are considered, a baseline scenario reflecting the economic impacts of current recreational boating activity on the AIWW, and an alternative scenario measuring the impacts of reduced AIWW navigability from current conditions to an average depth of 4 feet.

Several measures of economic impact are calculated:

- Employment
- Economic output / business activity
- Labor income (workers' wages, salaries & benefits)
- Government tax and fee revenues

Each of the economic impact measures listed above is sub-divided into several sub-components:

- Direct Impacts (the direct impacts of the initial spending itself)
- Indirect Impacts (the impacts associated with business activities servicing and supporting the direct impacts)
- Induced Impacts (the impacts associated with additional household spending by employees and business owners who receive additional wages and profits due to the direct and indirect impacts)

- Total Impacts (the total of the direct, indirect, and induced impacts)

The direct impact component measures the immediate impacts of an initial change in the economy, for example, an increase in sales by a particular industry due to boater spending. The indirect impact component measures the economic ripple effects on industries that supply/service the directly-impacted industries. The induced impact component measures household spending feedback effects that are changes in household spending by the employees and owners of the businesses affected by the direct and indirect impacts. Together, the indirect and induced impacts are often called "economic multiplier effects." Multiplier effects track the "trickle-down" effects of direct impact activities in the regional economy. We calculate multiplier effects using economic input-output model methodology. The term "total economic impact" refers to the sum of the direct, indirect and induced impact components.

Input-output analysis methodology is commonly used by economists to estimate economic multiplier effects. Input-output analysis is an economic modeling methodology used to estimate the full economic impacts of a given, initial change in spending in a regional economy. Input-output analysis tracks the flow of dollars between and among businesses, consumers, workers, and government agencies within a study region. (See Miller and Blair (1985) for additional information on input-output analysis.)

IMPLAN Professional® Input-Output Analysis computer software (Minnesota IMPLAN Group, Inc. 2005) is used in this study to conduct input-output analysis. IMPLAN is a leading input-output modeling software package used by university researchers, government agencies, and consultants nationwide. The IMPLAN software tracks over five hundred industry sectors, and local, state and Federal government sectors, on a county-by-county basis.

The IMPLAN model reports employment impacts as the total number of jobs supported, including both full-time and part-time jobs (the government survey data are not sufficient to distinguish full-time from part-time jobs).

IMPLAN tracks federal, state, and local government tax revenue impacts. Federal taxes considered include: Social Security taxes, income taxes, corporate profit taxes, and other indirect business taxes. Local and State taxes within the model include: Social Security taxes, income taxes, property taxes, sales taxes, motor vehicle licenses and fees, corporate profit taxes, and other indirect business taxes. Results are reported on an annual basis.

The methodology used to estimate the economic impacts of the wages paid to hired boat captains and crew is somewhat more involved than the methodology used to estimate the impacts of boater spending on goods and services. The multiplier effects (induced impacts) of wages paid to hired captains and crew living in North Carolina are estimated by subtracting estimated taxes and savings from wages and running the "after tax, after savings" income through the economic input-output model. Taxes and savings are removed from wages before calculating multiplier effects because most tax dollars and savings dollars leave the local area and are not re-spent within the county. However, local property taxes are re-spent within the region, and these taxes are run through the economic impact model, assuming that they are placed in the general funds of local governments and expended according to general budget allocations. (Note: Local sales taxes paid by hired captains and crew also remain to be re-spent within the region. However, the multiplier effects of local sales taxes are not based on household income. Rather, sales taxes are calculated later in the input-output modeling process, based on the goods and services purchased in the local region by the captains and crew.) For the purpose of accounting for savings and taxes, we assume that captains and crew have household incomes between $35,000/yr and $50,000/yr. The average savings rate for U.S. households in this income category is approximately 5.5% of pre-tax household

income (USBEA-REIS 2002). The average net tax rate (including Federal and state income taxes, but excluding Social Security, Medicare, and local sales and property taxes) for North Carolina households with household incomes between $25,000/yr and $75,000/yr is approximately 15% of household income (USBEA REIS 2002); we assume that 10% goes to Federal income taxes and 5% to state income taxes. The Internal Revenue Service (Sec. 3121(b)(20), I.R.C.) considers fishing boat crew and skippers who work on vessels with a crew size of less than 10 to be self-employed. As a result, captain and crew pay the full 15.30% in self-employment Social Security and Medicare taxes. Average property taxes paid per dollar of personal income for a representative county in each geographic region are presented in Table 30.

Table 31 presents an example to illustrate the methodology for calculating the direct economic impacts of wages paid to hired captains and crew living in the local area. In this example, the $123.83 in wages (per trip average) paid to hired captain and crew living in the central NC region (Carteret County) results in $77.02 in direct spending by the captains and crew after taxes and savings.

Direct spending by hired captains and crew resulting from wages paid by recreational boaters by survey region and boater residency are presented in Table 32.

It is assumed that direct spending by captains and crew occurs within the county if the survey respondent indicated that the captain and crew wages were paid within the county, and a similar assumption is made for direct spending by captains and crew within the state. Direct expenditures are divided among various goods and services according to average household expenditure patterns by household income category (we assume $35,000 to $50,000 per year in household income for hired captains and crew members) as measured by the U.S. Consumer Expenditure Survey (USBLS 2002). Some of these expenditures will occur inside the survey county (state), and some will occur outside the county

(state). For each county (and for the state as a whole), the IMPLAN database (MIG 2005) contains information on the percentages of expenditures by county (state) residents occurring inside vs. outside the county (state) for each product category. Expenditures occurring inside a county (state) contribute to the county (state) multiplier effect, whereas expenditures occurring outside the county (state) do not. For example, a crewmember may purchase a shirt from a mail order catalogue of a company based in another state, and this money leaves the county and the state and does not contribute to multiplier effects. For the purpose of estimating the number of captains/crewmembers employed by the wages paid to them by AIWW recreational boaters, we assume an average wage of $45,000 per year per captain/crewmember (although some captains certainly earn much more than this amount, and some inexperienced crewmembers earn much less), and divide total wages by $45,000 per captain/crewmember to estimate direct captain/crew employment.

Aggregate Economic Impacts

Estimates of the regional economic impacts of AIWW recreational boater trips under baseline conditions are presented in Tables 33 to 44 by geographic region and boater residency. These estimates are calculated using the recreational boater trip estimates presented in Table 21, the percentages of resident and non-resident boaters in Table 23, and the estimates of per trip expenditures in Tables 24-29. For each region, impact estimates are presented for economic output, employment, and labor income, for NC resident and non-NC resident boat trips separately, followed by estimates of tax impacts for NC resident and non-resident boat trips.

Estimates of the state-wide economic impacts of AIWW recreational boater trips under baseline conditions are presented in Tables 45 to 48. The state-wide impacts are larger than the simple sum of the regional impacts because some purchases made within the state occur outside the coastal region (i.e., gasoline

purchases made by a boater hauling his boat to the coast from an inland residence). In addition, some direct expenditures made within the coastal area have multiplier effects that occur within the state but outside the coastal region. For example, groceries purchased from a retailer within the coastal region may be supplied to the retailer by a distribution center located in the state but outside the coastal region, and some of the employment, wages and taxes attributable to the distribution center are supported by the retail purchases in the coastal region. The economic activity of the distribution center would be included in the state-wide impacts but would be excluded from the coastal region impacts.

The economic impacts of reductions in AIWW recreational boater trips due to reductions in AIWW navigability are presented in Table 49. The economic impacts are based on the percentage reductions in the numbers of trips per boater due to reduced AIWW navigability (from current conditions to an average 4-ft depth) as estimated in the Economic Benefits section of this report. The number of AIWW recreational boating trips made by NC resident boaters is estimated to fall by 45 percent (from 42 to 23 trips per boater per year, on average), and the number of trips made by Non-NC resident boaters is estimated to fall by 30 percent (from 27 to 19 trips per boater per year, on average). Impacts are presented for each coastal region and for the state as a whole. Due to differences in the mix of NC resident and non-resident boaters across regions, the percentage reduction in economic activity varies across regions. Impact estimates are presented for economic output, employment, labor income, and taxes.

In addition to the state-wide economic impacts of changes in boater trips presented in Table 49, there are also state-wide impacts on North Carolina boat manufacturers due to reductions in boat purchases and maintenance by AIWW boaters resulting from reduced AIWW navigability. More than 85 North Carolina boat builders provide quality recreational and commercial vessels for sale in statewide, national, and international markets. Boating industry businesses in

North Carolina provide over 30,000 jobs across the state and are responsible for $500 million in sales of boats, motors, and boating equipment annually (NCSBTDC 2006). Some NC resident boaters utilizing the AIWW purchase boats made in North Carolina.

Thirty-five percent of the 1180 survey respondents (both NC residents and non-residents) who have vessels greater than 16 feet in length and who answered the survey question "If you were unable to take a boat outing on the AIWW due to a decrease in its average depth from 10 feet to 4 feet, what would you do instead?" indicated that they would keep their current vessel and continue boating in other areas (e.g., offshore, in rivers, on lakes, move to other states and continue boating, etc.). Six percent of survey respondents indicated that they would "downsize" to smaller vessels able to navigate the AIWW at a 4 foot depth. Another six percent indicated that they would move their place of residence but did not indicate whether they would continue boating. The remaining fifty-three percent clearly indicated that they would stop boating altogether under reduced AIWW navigability conditions.

Of the survey respondents who are North Carolina residents and have vessels greater than 16 feet in length, fifty-four percent indicated that they would not continue boating under conditions of reduced AIWW navigability (the remaining NC boaters indicated that they would boat in a river or the ocean to avoid the AIWW, move to another state and continue boating, buy a smaller boat that could negotiate shallower AIWW depths, etc.). Extrapolating from the survey data, the population of NC resident AIWW boaters with vessels greater than 16 feet in length is approximately 12,100 (this figure excludes boaters based in Dare and Hyde counties, who generally do not use the AIWW to access estuaries, sounds, inlets, or the ocean); fifty-four percent of this figure produces an estimate of 6,534 NC resident AIWW boaters who would give up boating under conditions of reduced navigability. Not all of these NC boaters own boats manufactured in NC. The IMPLAN model database indicates that in 2003, approximately 11 percent of

small boat (including large recreational yachts, but not large ships) purchases made by North Carolina residents (and approximately 10 percent of small boat purchases made by coastal NC residents) were purchased from small boat manufacturers located within the state. Hence, we estimate that, over time, 0.11 * 6,534 = 718 fewer NC boaters would purchase/maintain boats manufactured in NC. The average value in the survey sample of a boat owned by these boaters was $79, 289; hence, the value of NC-manufactured boats affected by reduced AIWW navigability is approximately 718 * $79,289 = $57 million. Assuming that the typical boat fully depreciates over 20 years, 1/20th of the value of these boats, or $2.85 million, would ordinarily need to be replaced each year. With reduced navigability, this replacement spending would not occur, and NC boat manufacturers would lose an estimated $2.85 million annually in direct sales/economic output, resulting in an estimated loss of $700,000 per year in labor income and 16 jobs in the boat building industry. These lost sales would result in the estimated loss of an additional $3.00 million per year in sales/economic output, $1.08 million in labor income, and 29 jobs in NC industries supplying and servicing the boat building industry. These impacts are summarized in Table 50.

Summary Analysis/Implications

The following summarizes the most significant findings from the Recreational Boaters' Survey component of the study:

1. North Carolina resident AIWW boaters took an average of 38 boat trips on the AIWW during the 12 months prior to the survey interview
2. Non-residents of North Carolina took an average of 12 trips on the AIWW during the 12 months prior to the survey interview
3. The past 12 months was a typical year for 83% of the survey respondents.
4. North Carolina residents stated they would take 42 trips during the 12 month period after the survey interview if the depth of the AIWW remained the same

5. North Carolina residents stated they would take 46 trips during the 12 month period after the survey interview if the depth of the AIWW increased to 12 feet
6. North Carolina residents stated they would take 23 trips during the 12 month period after the survey interview if the depth of the AIWW decreased to 4 feet
7. Non-residents of North Carolina stated they would take 27 trips during the 12 month period after the survey interview if the depth of the AIWW remained the same
8. Non-residents of North Carolina stated they would take 33 trips during the 12 month period after the survey interview if the depth of the AIWW increased to 12 feet
9. Non-residents of North Carolina stated they would take 19 trips during the 12 month period after the survey interview if the depth of the AIWW decreased to 4 feet
10. Seventy-four percent (74%) of North Carolina residents and 60% of non-residents of North Carolina believe that navigability on the AIWW in North Carolina is good, very good or excellent under current conditions
11. Ninety-seven percent (97%) of North Carolina residents and non-residents of North Carolina believe that navigability on the AIWW in North Carolina would be good, very good or excellent with a 12' depth
12. Approximately 74% of North Carolina residents and 69% of non-residents of North Carolina are willing to pay some amount to fund a dredging program to maintain the AIWW in North Carolina at 12 feet
13. The average "willingness to pay" for the permit that would fund the dredging program to maintain the AIWW in North Carolina at 12 feet is $90 for North Carolina residents and $99 for non-residents of North Carolina
14. In February 2003, 355,453 boats were registered in North Carolina. Of these registered boats, 144,135 were less than 16 feet. Of the 211,318

boats with length greater than or equal to 16 feet almost all, 203,953, have zip codes with the range of the boaters in the AIWW survey sample

   a. Based upon these figures, an estimate of the aggregate annual benefits of the AIWW dredging policy permit to North Carolina residents is $18.36 million
   b. The 90% confidence interval for boater “willingness to pay” for the permit that would fund the dredging program to maintain the AIWW in North Carolina at 12 feet for North Carolina residents is $81.59 - $99.40
   c. The 90% confidence interval for aggregate “willingness to pay” for the permit that would fund the dredging program to maintain the AIWW in North Carolina at 12 feet for North Carolina residents is $16.64 million - $20.27 million

15. Non-resident boaters of North Carolina with a boat greater than 16 feet would be willing to pay $98 annually in the form of a surcharge on their boat registration fee to support a dredging policy that would lead to an average 12 foot depth in the North Carolina portion of the AIWW instead of a 4 foot depth
   a. An estimate of the aggregate annual benefits of this policy is $1.44 million
   b. The 90% confidence interval for non-resident boaters of North Carolina “willingness to pay” is $63.35 - $134.23
   c. The 90% confidence interval for non-resident boaters of North Carolina aggregate “willingness to pay” is $0.92 million - $1.96 million
16. An estimated 134,147 recreational boating trips were made along the North Carolina portion of the AIWW by private vessels (non-charter, non-head boat) greater than 16 feet in length during the study period June 16, 2005 to November 19, 2005.

17. About half of these AIWW boater trips occurred in the central part of the coast, a quarter in the northern part of the coast, and a quarter in the southern part of the coast.
18. About 57 percent of the trips in the northern coastal region were made by non-NC residents, while only 5 percent of the trips in the central coast were made by non-residents, and 14 percent of trips in the southern coast region were made by non-residents.
19. For NC resident boaters, average expenditures per trip were $1,430 for the northern coast, $726 for the central coast, and $565 for the southern coast.
20. Non-NC resident boaters spend substantially more per trip, with average trip expenditures of $11,464 for the northern coast, $10,549 for the central coast and $12,036 for the southern coast. However, the amount spent per trip within the survey county was similar to the amount spent per trip within the county by NC residents.
21. Typically, non-NC resident boaters in the northern and southern coastal regions spend more than 90% of their total trip expenditures out of state, whereas non-NC resident boaters visiting the central coastal region spend about 50% of their total trip expenditures in state.
22. Baseline (2005) navigability conditions in the AIWW support recreational boater trips generating $257 million annually in economic output (sales) within North Carolina, over 4000 jobs and $124 million in wages and salaries, $35.6 million in Federal taxes and fees, and $21.4 million in state and local taxes and fees.
23. Baseline navigability conditions also support an additional $2.85 million in annual sales by NC boat manufacturers, generating $5.85 million in state-wide economic output, 45 jobs with $1.78 million in wages and salaries, $516 thousand in Federal taxes and $200 thousand in state and local taxes. The average value in the survey sample of a boat (>16 ft in length) owned by NC resident AIWW boaters was $79, 289. The value of NC-

manufactured boats belonging to NC resident boaters potentially affected by reduced AIWW navigability conditions is approximately $57 million.

24. Under reduced AIWW navigability conditions, the number of AIWW recreational boating trips taken per year by NC resident boaters is estimated to fall by 45 percent, and the number of trips made by non-NC resident boaters is estimated to fall by 30 percent.
25. Fifty-four percent of NC resident survey respondents (equivalent to 6,534 NC resident boaters) indicated that they would not continue boating under conditions of reduced AIWW navigability (the remaining NC resident AIWW boaters indicated that they would boat in a river or the ocean to avoid the AIWW, move to another state and continue boating, buy a smaller boat that could negotiate shallower AIWW depths, etc.).
26. The estimated state-wide annual economic impacts of reduced AIWW navigability due to reductions in the numbers of boater trips are losses of $103 million in economic output, 1,623 jobs and $50 million in wages and salaries, $14 million in Federal tax revenues, and $8.6 million in state and local tax revenues.
27. The additional, estimated state-wide annual economic impacts of reductions in boat purchases from NC boat manufacturers are losses of $5.85 million in state-wide economic output, 45 jobs with $1.78 million in wages and salaries, $516 thousand in Federal taxes and $200 thousand in state and local taxes.

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    - The Atlantic Intracoastal Waterway Association (AIWA) Annual Conference in Wrightsville Beach, NC. November 2006
    - The Southern Economic Association (SEA) Annual Conference in Charleston, SC. November 2006

Newspaper Articles

- Featured and quoted in an article in the Wrightsville Beach Lumina entitled "**First Component of Coastal Economic Study Progresses**" published October 6 – 12, 2005
- Featured and quoted in an article in the Wrightsville Beach Lumina entitled "**Coastal Economic Study Progresses**" published February 2 – 8, 2006

Presentations

- ***AIWW Economic Study***. 2005 North Carolina Beach, Inlet and Waterway Association (NCBIWA) Annual Conference. Carolina Beach, NC. November 14 – 15th [Regional—Invited]
- ***The Atlantic Intracoastal Waterway Economic Impacts and Economic Benefits Study***. 2006 North Carolina Beach, Inlet and Waterway Association Annual Conference—Managing Coastal Sediments. Carolina Beach, NC. November 13 – 14, 2006 [Regional—Invited]
- ***The Atlantic Intracoastal Waterway as an Economic Engine***. Atlantic Intracoastal Waterway Association Annual Conference. Wrightsville Beach, NC. November 15 – 16, 2006 [Regional—Invited]
- ***The Recreation Value and Economic Impact of North Carolina's Intracoastal Waterway and Shallow Draft Inlets***. 76th Annual Southern Economic Association Conference. Charleston, SC. November 18 – 21, 2006 {Regional]

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APPENDIX 1

AIWW North Carolina Recreational and Pleasure Boating Survey

Name of Interviewer: _____

Date of Interview: _____ Time of Interview: _____

Location of Interview: _____

Hello, I'm_____ from the University of North Carolina Wilmington and we are conducting a study regarding recreational and pleasure boating on the Atlantic Intracoastal Waterway in North Carolina. This study is part of a research project undertaken due to the federal government's decision to stop dredging the AIWW. The purpose of the study is to determine the economic effects of various government policies related to the Waterway. Your participation in this survey is entirely voluntary and will likely take less than 10 minutes. All answers will be kept confidential. Would you be willing to answer a few questions? (If they respond YES, go to Question #1. If they respond NO, thank them for their time and terminate the interview)

Q1 Is the individual being interviewed a:

Q1a_____Male Q1b_____Female

Q2 Is the individual being interviewed:

Q2a_____White (Non-Hispanic) Q2b_____Black (Non-Hispanic)

Q2c_____Hispanic Q2d_____Asian/Pacific Island

Q2e_____American Indian/Alaskan Native

Q2f_____Other (Please specify_____)

Q3 In what year were you born?

Q3a_____Year (<u>If under the age of 18, born 1987 or later , thank individual and tell them you are only allowed to interview individuals 18 or older—Proceed to Q4 if individual is at least 18 years old</u>)

Q4 What State do you live in?

Q4a_____State

Q5 What is the zip code of your permanent home residence?

Q5a_____Zip Code

Q6 Where did your boating trip on the AIWW originate?

Q6a_____Zip Code or name of actual location where the boating portion of this trip began

Q7 Have you taken a boat outing on the AIWW in NC during the past 12 months other than this outing?

Q7a_____Yes → go to Q8 Q7b_____No → skip to Q42

Q8 What is your boat's overall length?

Q8a_____Feet → if less than 16 feet, skip to Q42

Q9 What is your boat's normal draft?

Q9a_____Feet

Q10 What is the main form of propulsion for your boat? Is it power, sail, or something else?

Q10a_____Power Q10b_____Sail

Q10c_____Something else (explain_____)

Q11 During the boating season is your boat usually carried by trailer to launch sites, kept at a marina, kept at a private dock at your home, or kept somewhere else?

Q11a_____Carried by trailer to launch sites—go to Q12

Q11b_____Kept at a marina home → skip Q12—go to Q13

Q11c_____Kept at a private dock at your home → skip Q12 and Q13—go to Q14

Q11d_____Kept somewhere else → skip Q12, Q13 and Q14—go to Q15

Q12 How many miles is it from your home to the place where you usually launch your boat for outings on the AIWW in NC?

Q12a_____Miles → skip to Q15

Q13 How many miles is it from your home to the marina where you kept your boat prior to launching for outings on the AIWW in NC?

Q13a_____Miles → skip to Q15

Q14 How many miles is the private dock at your home from the AIWW in NC?

Q14a_____Miles → skip to Q15

Q15 How many separate boat outings on the AIWW in NC did you take on your boat during the past 2 months?

Q15a_____Outings

Q16 On average, what was the length in days of one of these boat outings on the AIWW in NC that you took during the past 2 months?
Q16a_____Days

Q17 How many separate boat outings on the AIWW in NC did you take on your boat during the past 12 months?
Q17a_____Outings

Q18 On average, what was the length in days of one of these boat outings on the AIWW in NC that you took during the past 12 months?
Q18a_____Days

Q19 Was the past 12 months a typical year in terms of the number of boat outings you took on the AIWW in NC?
Q19a_____Yes → skip to Q21
Q19b_____No → go to Q20

Q20 How many boat outings do you normally take on the AIWW in NC during a typical year?
Q20a_____Outings

Q21 How many of these outings were mainly for fishing?
Q21a_____Outings

Q22 How many boat outings on your primary boat do you think you will take during the next 12 months?
Q22a_____Outings

Now think about your <u>typical</u> boat outing on the AIWW in NC during the past 12 months. Please estimate your expenses for the following.

	Total $ Spent on Outing	$ Spent on Outing in NC	$ Spent on Outing in County Interviewed
Car/Truck Transportation to Launch Site (Gas and Oil)			
Boat Launch Fees			
Boat Fuel Costs (Gas and oil)			
Lodging (Hotel, camping, etc.)			
Restaurant Meals			
Other Food and Beverage			
Fishing Supplies (Bait/Tackle)			
Other Supplies			

Q23 Do you own your boat, or do you rent or lease your boat?
Q23a_____Own → go to Q24
Q23b_____Rent/Lease → skip to Q25

Q24 About how much money do you think you could get for your boat if you sold it?
Q24a_____Dollars → skip to Q26

Q25 About how much do you spend in rental/leasing fees on a <u>typical</u> boat outing?
Q25a_____Dollars

Q26 Do you hire a captain and/or crew to operate the boat for you?
Q26a_____Yes → go to Q27
Q26b_____No → go to Q28

Q27 About how much do you spend on a captain and/or crew on a <u>typical</u> boat outing or annually?
Q27a_____Dollars

Q28 The Atlantic Intracoastal Waterway has an authorized navigable depth of 12 feet. It is actually maintained at depths ranging from 7 to 12 feet. The average depth of the North Carolina portion of the Atlantic Intracoastal Waterway is 10 feet. Considering your own boat, what is your opinion of the navigability of the North Carolina portion of the Atlantic Intracoastal Waterway? Is it excellent, very good, good, fair or poor?
Q28a_____Excellent
Q28b_____Very Good
Q28c_____Good
Q28d_____Fair
Q28e_____Poor

Q29 Suppose that dredging of the Atlantic Intracoastal Waterway was increased and the average depth of the North Carolina portion was about 12 feet. Thinking about the number of boat outings that you said you would take on your boat during the next 12 months … if the average depth was 12 feet rather than the current 10 feet would you take more, less, or about the same number of boat outings on your boat?

Q29a_____More → go to Q30
Q29b_____Less → go to Q31
Q29c_____Same → go to Q32

Q30 About how many more boat outings would you take in the next 12 months?

Q30a_____ → Go to Q32

Q31 About how many fewer boat outings would you take in the next 12 months?

Q31a_____ → Go to Q32

Q32 Suppose that dredging of the Atlantic Intracoastal Waterway completely stopped and the average depth of the North Carolina portion was about 4 feet. Thinking about the number of boat outings that you said you would take on your boat during the next 12 months … if the average depth of the Atlantic Intracoastal Waterway was 4 feet rather than the current 10 feet would you take more, less, or about the same number of boat outings on your boat?

Q32a_____More → go to Q33
Q32b_____Less → go to Q34
Q32c_____Same → go to Q35

Q33 About how many more boat outings would you take in the next 12 months?

Q33a_____Outings → go to Q35

Q34 About how many fewer boat outings would you take in the next 12 months?

Q34a_____Outings → go to Q35

Q35 If you were unable to take a boat outing on the Atlantic Intracoastal Waterway due to a decrease in its average depth from 10 feet to 4 feet, what would you do instead? (Specify_____
_____)

Q36 Now suppose that North Carolina was able to implement an Atlantic Intracoastal Waterway dredging and maintenance program. The program would provide enough funding to maintain an average depth of 12 feet. With this program how likely do you think it is that the North Carolina portion of the Atlantic Intracoastal Waterway would be maintained at an average depth of 12 feet? Do you think it is very likely, somewhat likely, or not likely at all?

Q36a_____Very likely
Q36b_____ Somewhat likely
Q36c_____Not likely at all

Q37 Considering your own boat … with an average depth of the Atlantic Intracoastal Waterway in North Carolina of 12 feet, what is your opinion of the navigability of the North Carolina portion of the Atlantic Intracoastal Waterway? Would it be excellent, very good, good, fair or poor?

Q37a_____Excellent
Q37b_____Very Good
Q37c_____Good
Q37d_____Fair
Q37e_____Poor

Federal government funds for dredging of the Atlantic Intracoastal Waterway in NC are threatened. If dredging completely stops, the average depth of the NC portion of the Atlantic Intracoastal Waterway would be about 4 feet. A NC dredging and maintenance program would provide enough funding to maintain an average depth of 12 feet in the NC portion of the Atlantic Intracoastal Waterway. The dredging and maintenance program would be funded by a $**A*** _____ surcharge on your annual boating registration fee. Each registered boater with a boat longer than 16 feet using the NC portion of the Atlantic Intracoastal Waterway would be required to purchase a sticker each year to be placed alongside the registration number on the boat.

Q38 Would you be willing to pay $**A*** _____ in additional annual boating registration fees each year for this program?

Q38a_____Yes → go to Q41
Q38b_____No → go to Q39

*** Note: each respondent is randomly assigned one of five different values for $A. The five possible values are A = $10, $25, $50, $75 or $100.**

Q39 Would be willing to pay $1each year in additional boat registration fees for this program?

Q39a_____Yes → go to Q41
Q39b_____No → go to Q40

Q40 Why would you not be willing to pay $1?

Q40a_____Lack of enforcement/I wouldn't get caught
Q40b_____I'm not affected by a shallow Atlantic Intracoastal Waterway
Q40c_____I don't have enough money
Q40d_____I don't think it is fair to make boaters pay
Q40e_____Commercial boaters should pay
Q40f_____I don't trust government
Q40g_____I don't trust the Army Corps of Engineers
Q40h_____I am not a NC registered boat owner
Q40i_____Other (please explain)_____

[Skip Q41 and go to Q42]

Q41 On a scale of 1 to 10 where 1 is "very unsure" and 10 is "very sure", how sure are you that you are willing to pay for the program?

Q41a_____1 "very unsure"
Q41b_____2
Q41c_____3
Q41d_____4
Q41e_____5
Q41f_____6
Q41g_____7
Q41h_____8
Q41i_____9
Q41j_____10 "very sure"

Now I need to ask a few questions about you to help with the analysis. I promise you again that your responses are confidential.

Q42 How many people, including yourself, normally live in your household?

Q42a_____People → if less than 2, skip to Q44

Q43 How many of these people are under 18 years of age?

Q43a_____People

Q44 Are you married?

Q44a_____Yes
Q44b_____No

Q45 What is your highest level of education completed?

Q45a_____Less than high school graduate
Q45b_____High school graduate
Q45c_____Some college / not a college graduate
Q45d_____Associate degree / community college graduate
Q45e_____Bachelors degree / college graduate
Q45f_____Masters degree
Q45g_____PhD degree
Q45h_____Law school graduate
Q45i_____Medical school graduate

Q46 What is your occupation?

Q46a_____
If retired, please ask what their occupation was_____

Q47 As close as you can recall, what is your household's total annual income before taxes? Is it 15 thousand dollars or less, between 15,001 and 25,000, between 25001, and 30,000, between 30,001 and 35,000, between 35,001 and 40,000, between 40,001 and 45,000, between 45,001 and 50,000, between 50,001 and 60,000, between 60,001 and 75,000, between 75,001 and 100,000 or more than 100,000?

Q47a___$15,000 or less
Q47b___Between $15,001 & $25,000
Q47c___Between $25,001 & $30,000
Q47d___Between $30,001 & $35,000
Q47e___Between $35,001 & $40,000
Q47f___Between $40,001 & $45,000
Q47g___Between $45,001 & $50,000
Q47h___Between $50,001 & $60,000
Q47i___Between $60,001 & $75,000
Q47j___Between $75,001 & $100,000
Q47k___More than $100,000

This concludes our interview. Thank you very much for participating!

Tables

TABLE 1—Variables and Labels

Variable	Label
Length	Boat length in feet
Draft	Boat draft in feet
Trips1	RP trips
Typical	1 if a typical year
Trips1x	RP typical trips
Trips2	SP trips
Trips3	SP trips with 12 feet
Trips4	SP trips with 4 feet
Single	1 if typical trip is a day trip
Perfish	Percent of trips that are for fishing
Travcost	Travel cost to AIWW
Subcost1	Travel cost to Myrtle Beach
Income	Household income
Income2	Household income with zeros for missing
Missinc	1 if missing income
White	1 if white
Male	1 if male
Age	Age
House	Household size
Children	Number of children
Married	1 if married
Educ	Years schooling

TABLE 2—Data Summary

	NC Residents			Non-Residents		
Variable	***Cases***	***Mean***	***Std. Dev.***	***Cases***	***Mean***	***Std. Dev.***
Length	902	28.07	8.98	104	42.36	17.08
Draft	902	3.00	1.36	104	4.11	1.37
Trips1	902	38.43	43.23	104	11.95	16.12
Typical	900	0.83	0.38	104	0.84	0.37
Trips1x	902	41.69	45.13	104	11.00	14.94
Trips2	902	42.33	40.81	104	27.28	58.36
Trips3	902	46.01	45.59	104	33.07	67.60
Trips4	902	23.20	32.99	104	19.23	57.03
Single	902	0.84	0.37	104	0.38	0.49
Perfish	902	0.60	1.28	104	0.19	0.36
Travcost	902	67.40	104.47	104	209.52	542.48
Subcost1	9802	269.58	76.08	104	267.48	15.01
Income	818	85.37	25.16	92	93.23	22.82
Income2	902	77.42	34.50	104	82.48	36.83
Missinc	902	0.09	0.29	104	0.12	0.32
White	900	0.98	0.15	104	1.00	0.00
Male	902	0.87	0.33	104	0.83	0.38
Age	882	46.25	121.26	104	51.61	12.99
House	813	2.73	1.02	90	2.72	1.36
Children	731	0.61	0.89	85	0.53	1.14
Married	896	0.73	0.44	103	0.72	0.45
Educ	896	15.88	2.47	103	15.63	2.49

TABLE 3—Recreation Demand Model (NC Residents)

	Single Day Trips		Multiple Day Trips	
	Coefficient	***t-ratio***	***Coefficient***	***t-ratio***
ONE	3.8785	37.90	3.5609	9.63
TRAVCOST	-0.0016	-6.79	-0.0039	-5.51
SUBCOST1	0.0012	3.98	0.0028	2.95
INCOME2	-0.0022	-2.10	-0.0028	-0.89
MISSINC	-0.1395	-1.31	-0.0940	-0.28
DRAFT	-0.0552	-2.87	-0.1018	-1.97
DEPTH4	-0.5565	-113.96	-0.9871	-103.64
DEPTH12	0.0670	10.07	0.1889	20.04
SP	0.1013	14.90	-0.0756	-4.70
SPTC	-0.0002	-5.94	0.0005	3.63
SPY	-0.0011	-16.15	0.0009	3.88
Alpha	0.5231	18.35	0.6618	7.22
LL	-16,738		-3,285	
Cases	756		146	
Periods	4		4	

Note: Random effects Poisson model

TABLE 4—Willingness to Pay

	NC Residents			Non-Residents		
	Yes	***Cases***	***% Yes***	***Yes***	***Cases***	***% Yes***
Total; Yes1	663	902	73.50%	72	104	69.23%
Total: Yes1sure	606	902	67.18%	67	104	64.42%
$10; Yes1sure	164	188	87.23%	14	19	73.68%
$25; Yes1sure	148	195	75.90%	11	19	57.89%
$50; Yes1sure	112	176	63.64%	12	19	63.16%
$75; Yes1sure	101	170	59.41%	14	28	50.00%
$100; Yes1sure	81	173	46.82%	16	19	84.21%
$1 Follow-up: Yes2	178	239	74.48%	20	31	64.52%

TABLE 5—Sure About Willingness to Pay

	NC Resident				Non-Resident			
	Willingness To Pay $A		***Willingness To Pay $1***		***Willingness To Pay $A***		***Willingness To Pay $1***	
	Frequency	***Percent***	***Frequency***	***Percent***	***Frequency***	***Percent***	***Frequency***	***Percent***
1-very unsure	5	0.75%	15	8.43%	1	1.39%	0	0.00%
2	2	0.30%	2	1.12%	0	0.00%	0	0.00%
3	0	0.00%	1	0.56%	0	0.00%	1	5.00%
4	2	0.30%	2	1.12%	0	0.00%	0	0.00%
5	25	3.77%	9	5.06%	4	5.56%	1	5.00%
6	23	3.47%	4	2.25%	0	0.00%	0	0.00%
7	25	3.77%	6	3.37%	2	2.78%	0	0.00%
8	48	7.24%	6	3.37%	2	2.78%	1	5.00%
9	48	7.24%	9	5.06%	4	5.56%	1	5.00%
10-very sure	485	73.15%	124	69.66%	59	81.94%	16	80.00%

TABLE 6—Why Would You Not Be Willing To Pay $1?

Reason	NC Residents' Frequency	Non-Residents' Frequency
Lack of enforcement/I wouldn't get caught	2	0
I'm not affected by a shallow AIWW	6	0
I don't have enough money	1	0
I don't think it is fair to make boaters pay	23	1
Commercial boaters should pay	1	0
I don't trust government	8	0
I don't trust the Army Corps of Engineers	2	0
I am not a NC registered boat owner	4	9
Other	7	0

TABLE 7—How Likely is a 12 Foot Average Depth?

	NC Residents		Non-Residents	
	Frequency	***Percent***	***Frequency***	***Percent***
Very Likely	167	18.51%	28	26.92%
Somewhat Likely	466	51.66%	53	50.96%
Not Likely at all	269	29.82%	23	22.12%

TABLE 8—Opinions of Navigability

	NC Residents				Non-Residents			
	10 Foot Average Depth		*12 Foot Average Depth*		*10 Foot Average Depth*		*12 Foot Average Depth*	
	Frequency	*%*	*Frequency*	*%*	*Frequency*	*%*	*Frequency*	*%*
Excellent	119	13.19%	639	70.84%	11	10.58%	75	72.12%
Very Good	215	23.84%	179	19.84%	22	21.15%	20	19.23%
Good	337	37.36%	63	6.98%	30	28.85%	6	5.77%
Fair	173	19.18%	19	2.11%	30	28.85%	3	2.88%
Poor	58	6.43%	1	0.11%	11	10.58%	0	0.00%

TABLE 9—Willingness to Pay Model

	NC Residents		Non-Residents	
	Coefficient	*t-stat*	*Coefficient*	*t-stat*
Constant	24.63	1.61		
Income2	0.46	2.90		
Missinc	42.71	2.31		
P_change	0.48	2.15		
Likely2	20.32	2.48		
Scale	81.62	8.76	110.04	2.39
Model $\chi 2$	99.56		5.81	
Cases	902		104	
WTP	90.49	16.50	98.79	4.53

Note: Censored probit regression coefficients

TABLE 10—Survey Locations, Counties and Geographic Regions

Survey Location	County	Geographic Region
1. Coinjock Midway Marina	Currituck	Northern NC Coast
2. Coinjock Marina	Currituck	Northern NC Coast
3. Great Dismal Swamp Visitors' Center	Camden	Northern NC Coast
4. Belhaven River Forest Marina	Beaufort	Northern NC Coast
5. Oriental	Pamlico	Northern NC Coast
6. Beaufort Waterfront	Carteret	Central NC Coast
7. Beaufort Radio Island	Carteret	Central NC Coast
8. Morehead City Hwy 70 West Marina	Carteret	Central NC Coast
9. Swansboro Dudley's Marina	Onslow	Central NC Coast
10. Swansboro Casper's Marina	Onslow	Central NC Coast
11. Scott's Hill Marina	Pender	Southern NC Coast
12. Wrightsville Beach Seapath Yacht Club	New Hanover	Southern NC Coast
13. Carolina Beach State Park	New Hanover	Southern NC Coast
14. Southport Marina	Brunswick	Southern NC Coast

Table 11—Field Surveys (number of surveys) by Location

Location	Weekdays AM	Weekdays PM	Weekends AM	Weekends PM	Total	Percent
1	1	24	1	6	32	2.9%
2	0	18	0	8	26	2.4%
3	0	4	0	0	4	0.4%
4	no surveys	No surveys	no surveys	no surveys	no surveys	no surveys
5	0	0	5	16	21	1.9%
6	27	48	59	108	233	21.2%
7	5	18	65	45	133	12.1%
8	3	15	23	18	59	5.4%
9	0	0	0	14	14	1.3%
10	4	12	2	23	41	3.7%
11	0	37	2	68	107	9.7%
12	0	122	8	96	226	20.5%
13	0	4	0	0	4	0.4%
14	0	61	5	135	201	18.3%
Total	40	363	161	537	1,101	100.0%
Percent	3.6%	33.0%	14.6%	48.8%	100.0	

Table 12—Field Surveys (number of surveys) by Region

Region	Weekdays AM	Weekdays PM	Weekends AM	Weekends PM	Total	Percent
Northern	1	46	6	30	83	7.5%
Central	39	93	140	208	480	43.6%
Southern	0	224	15	299	538	48.9%
Total	40	363	161	537	1,101	100.0%
Percent	3.6%	33.0%	14.6%	48.8%	100.0	

Table 13—Field Surveys by Month

Month	Number of Field Surveys Collected	Percent of Field Surveys Collected
June	97	8.26%
July	228	19.4%
August	218	18.55%
September	307	26.13%
October	295	25.11%
November	30	2.55%
Total	1,175	100.0%

Table 14—Field Surveys by Time of Day

Hour (24-Hour Clock)	Number of Field Surveys	Percent of Field Surveys
0600	4	0.36%
0700	16	1.45%
0800	39	3.54%
0900	38	3.45%
1000	52	4.72%
1100	52	4.72%
1200	56	5.09%
1300	95	8.63%
1400	91	8.27%
1500	113	10.26%
1600	152	13.81%
1700	181	16.44%
1800	125	11.35%
1900	67	6.09%
2000	9	0.82%
2100	5	0.45%
2200	4	0.36%
2300	2	0.18%
Total	1,101	100.0%

Note: Seventy-four (74) of the 1175 field surveys had missing time of day data

Table 15—Sampling Effort (3-hour blocks of time) by Location

Location	Weekdays AM	Weekdays PM	Weekends AM	Weekends PM	Totals	Percent
1	1	4	1	1	7	3.2%
2	0	3	0	2	5	2.3%
3	0	1	0	0	1	0.5%
4	no surveys	no surveys	no surveys	no surveys	no surveys	no surveys
5	0	0	2	4	6	2.8%
6	5	10	11	14	40	18.4%
7	2	3	9	6	20	9.2%
8	1	2	4	5	12	5.5%
9	0	0	0	4	4	1.8%
10	1	5	1	6	13	6.0%
11	0	12	1	12	25	11.5%
12	0	24	2	22	48	22.1%
13	0	2	0	0	2	0.9%
14	0	13	2	19	34	15.7%
Total	10	79	33	95	217	100.0%
Percent	4.6%	36.4%	15.2%	43.8%	100.0	

Table 16—Sampling Effort (3-hour blocks of time) by Region

Region	Weekdays AM	Weekdays PM	Weekends AM	Weekends PM	Total	Percent
Northern	1	8	3	7	19	8.8%
Central	9	20	25	35	89	41.0%
Southern	0	51	5	53	109	50.2%
Total	10	79	33	95	217	100.0%
Percent	4.6%	36.4%	15.2%	43.8%	100.0	

Table 17—Average Number of Surveys per 3-Hour Sampling Effort Unit

Weekdays AM	Weekdays PM	Weekends AM	Weekends PM	Average
4.00	4.59	4.88	5.65	5.07

Table 18—Average Number of Surveys per 3-Hour Sampling Effort Unit by Location

Location	Average	Weekdays AM	Weekdays PM	Weekends AM	Weekends PM
1	4.57	3.60	4.14	4.40	5.09
2	5.20	4.10	4.71	5.00	5.79
3	4.00	3.15	3.62	3.85	4.46
4	no surveys	no surveys	no surveys	no surveys	no surveys
5	3.50	2.76	3.17	3.37	3.90
6	5.83	4.59	5.28	5.60	6.49
7	6.65	5.24	6.02	6.39	7.41
8	4.92	3.88	4.45	4.73	5.48
9	3.50	2.76	3.17	3.37	3.90
10	3.15	2.49	2.86	3.03	3.51
11	4.28	3.37	3.88	4.12	4.77
12	4.71	3.71	4.26	4.53	5.25
13	2.00	1.58	1.81	1.92	2.23
14	5.91	4.66	5.35	5.68	6.59

Table 19a—Average Percent of Vessels Surveyed by Location for Study Period

Location	Percent of Vessels Surveyed
1	37%
2	37%
3	37%
4	no surveys
5	65%
6	25%
7	25%
8	46%
9	23%
10	23%
11	38%
12	29%
13	33%
14	46%

Table 19b—Number of Clear Weather Weekdays and Weekend Days by Geographic Region for Study Period

	Northern	Central	Southern
Weekdays	105	96	89
Weekend Days	40	40	35

Note: For the purposes of this study, a "Clear Weather Day" is defined as a day on which daily precipitation at the primary weather monitoring location within the region is less than 0.5 inches

Table 20—Estimated Total Numbers of Trips by Location for Study Period

Location	Weekdays AM	Weekdays PM	Weekends AM	Weekends PM	Total
1	568	6,811	216	2,595	10,189
2	2,327	6,811	1,081	1,730	11,948
3	1,790	4,541	832	1,927	9,089
4	ND	ND	ND	ND	ND
5	891	2,048	308	985	4,232
6	4,147	7,373	1,455	4,937	17,912
7	1,920	9,216	2,311	4,800	18,247
8	1,252	6,261	1,000	1,252	9,765
9	2,303	5,292	1,171	2,435	11,201
10	3,339	4,007	696	2,667	10,708
11	1,581	2,889	368	2,088	6,925
12	2,278	6,240	966	2,107	11,591
13	850	2,158	408	945	4,361
14	1,803	3,631	380	2,162	7,978
Total	25,050	67,277	11,191	30,629	134,147

ND = No data collected for location 4. It is assumed that trips originating from location 4 passed by locations 3 or 5 and are included in the trips estimates for those locations

Table 21—Estimated Total Numbers of Trips by Region for Study Period

Region	Weekdays AM	Weekdays PM	Weekends AM	Weekends PM	Total
Northern	5,576	20,210	2,437	7,236	35,459
Central	12,962	32,149	6,632	16,091	67,833
Southern	6,513	14,918	2,122	7,302	30,855
Total	25,050	67,277	11,191	30,629	134,147

Table 22—Field Survey, Residency of Survey Respondents by Location

Location	NC Resident Surveys	Non-NC Resident Surveys	Total Surveys	Percent Non-NC Resident
1	6	26	32	81.0%
2	11	15	26	58.0%
3	3	1	4	25.0%
4	no surveys	no surveys	no surveys	no surveys
5	18	9	27	33.0%
6	229	15	244	6.0%
7	131	6	137	4.0%
8	57	2	59	3.0%
9	14	0	14	0.0%
10	38	4	42	10.0%
11	102	5	107	5.0%
12	222	55	277	20.0%
13	4	0	4	0.0%
14	177	24	201	12.0%
Total	1,012	162	1,174	14.0%

Table 23—Field Survey, Residency of Survey Respondents by Region

Region	NC Resident Surveys	Non-NC Resident Surveys	Total Surveys	Percent Non-NC Resident
Northern	38	51	89	57.0%
Central	469	27	496	5.0%
Southern	505	84	589	14.0%
Total	1,012	162	1,174	14.0%

Table 24—Average Recreational Boater Expenditure per Trip
NC Residents—Northern Region

Expenditure Category	Expenditure Location	Obs.	Mean	Std. Dev.	Minimum Value	Maximum Value
Gas to Site	Total	31	$11.81	$21.97	0	100
Gas to Site	Within NC	31	$11.00	$21.15	0	100
Gas to Site	Within County	31	$7.32	$19.99	0	100
Launch Fees	Total	31	$6.61	$35.90	0	200
Launch Fees	Within NC	31	$6.61	$35.90	0	200
Launch Fees	Within County	31	$6.61	$35.90	0	200
Boat Fuel	Total	31	$371.9	$978.12	0	5000
Boat Fuel	Within NC	31	$334.65	$939.77	0	5000
Boat Fuel	Within County	31	$291.42	$935.78	0	5000
Lodging	Total	31	$134.19	$561.5	0	3000
Lodging	Within NC	31	$133.06	$561.75	0	3000
Lodging	Within County	31	$36.29	$180.26	0	1000
Restaurants	Total	31	$115.81	$261.33	0	1200
Restaurants	Within NC	31	$60.15	$134.38	0	600
Restaurants	Within County	31	$28.71	$43.22	0	200
Groceries	Total	31	$122.84	$278.13	0	1200
Groceries	Within NC	31	$63.16	$122.12	0	500
Groceries	Within County	31	$26.39	$31.09	0	100
Bait/Tackle	Total	31	$7.94	$16.80	0	75
Bait/Tackle	Within NC	31	$7.61	$16.85	0	75
Bait/Tackle	Within County	31	$6.55	$16.81	0	75
Other Supplies	Total	31	$180.71	$897.39	0	5000
Other Supplies	Within NC	31	$179.9	$897.48	0	5000
Other Supplies	Within County	31	$16.29	$71.57	0	400
Boat Rental Fees	Total	31	$0.00	$0.00	0	0
Boat Rental Fees	Within NC	31	$0.00	$0.00	0	0
Boat Rental Fees	Within County	31	$0.00	$0.00	0	0
Hired Capt/Crew	Total	31	$327.42	$1,795.36	0	10000
Hired Capt/Crew	Within NC	31	$327.42	$1,795.36	0	10000
Hired Capt/Crew	Within County	31	$0	$0	0	0
Boat Slip Fees	Total	31	$150.77	$282.93	0	1066
Boat Slip Fees	Within NC	31	$128.63	$248.47	0	1008
Boat Slip Fees	Within County	31	$40.39	$67.10	0	296.11
Total Expenditure	Total	31	$1,430.00	$2,931.30	20	11533
Total Expenditure	Within NC	31	$1,252.21	$2,635.23	0	11533
Total Expenditure	Within County	31	$459.97	$1,044.75	0	5325

Table 25—Average Recreational Boater Expenditure per Trip
NC Residents—Central Region

Expenditure Category	Expenditure Location	Obs.	Mean	Std. Dev.	Minimum Value	Maximum Value
Gas to Site	Total	440	$46.33	$58.59	0	300
Gas to Site	Within NC	440	$44.02	$58.35	0	300
Gas to Site	Within County	440	$25.32	$32.61	0	200
Launch Fees	Total	440	$2.47	$8.54	0	100
Launch Fees	Within NC	440	$2.40	$8.52	0	100
Launch Fees	Within County	440	$2.09	$8.01	0	100
Boat Fuel	Total	440	$179.70	$203.83	0	2,000
Boat Fuel	Within NC	440	$158.09	$201.12	0	2,000
Boat Fuel	Within County	440	$146.61	$168.40	0	1,200
Lodging	Total	440	$89.27	$212.35	0	2,500
Lodging	Within NC	440	$88.25	$211.93	0	2,500
Lodging	Within County	440	$86.98	$211.55	0	2,500
Restaurants	Total	440	$56.90	$159.84	0	3,000
Restaurants	Within NC	440	$51.04	$120.40	0	2,000
Restaurants	Within County	440	$48.97	$119.25	0	2,000
Groceries	Total	440	$53.13	$107.38	0	2,000
Groceries	Within NC	440	$48.09	$105.92	0	2,000
Groceries	Within County	440	$41.91	$102.81	0	2,000
Bait/Tackle	Total	440	$61.14	$135.28	0	2,000
Bait/Tackle	Within NC	440	$57.37	$135.98	0	2,000
Bait/Tackle	Within County	440	$53.75	$131.78	0	2,000
Other Supplies	Total	440	$44.93	$266.18	0	5,000
Other Supplies	Within NC	440	$42.98	$265.91	0	5,000
Other Supplies	Within County	440	$38.08	$262.40	0	5,000
Boat Rental Fees	Total	440	$0.02	$0.48	0	10
Boat Rental Fees	Within NC	440	$0.02	$0.48	0	10
Boat Rental Fees	Within County	440	$0.02	$0.48	0	10
Hired Capt/Crew	Total	440	$173.60	$1,312.42	0	20,000
Hired Capt/Crew	Within NC	440	$173.60	$1,312.42	0	20,000
Hired Capt/Crew	Within County	440	$123.83	$1,130.18	0	20,000
Boat Slip Fees	Total	440	$18.86	$120.33	0	2,360
Boat Slip Fees	Within NC	440	$17.93	$119.68	0	2,360
Boat Slip Fees	Within County	440	$15.95	$118.06	0	2,360
Total Expenditure	Total	440	$726.37	$1,623.12	16	23,312
Total Expenditure	Within NC	440	$683.80	$1,621.95	0	23,312
Total Expenditure	Within County	440	$583.51	$1,297.41	0	20,000

Table 26—Average Recreational Boater Expenditure per Trip
NC Residents—Southern Region

Expenditure Category	Expenditure Location	Obs.	Mean	Std. Dev.	Minimum Value	Maximum Value
Gas to Site	Total	463	$36.36	$155.40	0	2,500
Gas to Site	Within NC	463	$33.62	$155.11	0	2,500
Gas to Site	Within County	463	$21.76	$101.04	0	1,250
Launch Fees	Total	463	$19.03	$135.76	0	2,100
Launch Fees	Within NC	463	$25.86	$251.23	0	4,800
Launch Fees	Within County	463	$25.74	$251.24	0	4,800
Boat Fuel	Total	463	$186.24	$359.38	0	3,000
Boat Fuel	Within NC	463	$172.72	$375.76	0	3,000
Boat Fuel	Within County	463	$142.85	$320.28	0	3,000
Lodging	Total	463	$18.13	$129.79	0	2,500
Lodging	Within NC	463	$13.02	$125.28	0	2,500
Lodging	Within County	463	$10.90	$123.81	0	2,500
Restaurants	Total	463	$76.63	$238.04	0	4,000
Restaurants	Within NC	463	$63.14	$233.02	0	4,000
Restaurants	Within County	463	$49.08	$227.47	0	4,000
Groceries	Total	463	$65.10	$174.67	0	3,000
Groceries	Within NC	463	$55.64	$167.29	0	3,000
Groceries	Within County	463	$44.89	$93.97	0	1,000
Bait/Tackle	Total	463	$53.95	$261.51	0	5,000
Bait/Tackle	Within NC	463	$50.79	$260.78	0	5,000
Bait/Tackle	Within County	463	$48.11	$259.97	0	5,000
Other Supplies	Total	463	$47.35	$181.99	0	2,000
Other Supplies	Within NC	463	$43.74	$180.68	0	2,000
Other Supplies	Within County	463	$39.98	$174.68	0	2,000
Boat Rental Fees	Total	463	$0.00	$0.00	0	0
Boat Rental Fees	Within NC	463	$0.00	$0.00	0	0
Boat Rental Fees	Within County	463	$0.00	$0.00	0	0
Hired Capt/Crew	Total	463	$4.51	$38.87	0	500
Hired Capt/Crew	Within NC	463	$3.43	$31.27	0	500
Hired Capt/Crew	Within County	463	$3.43	$31.27	0	500
Boat Slip Fees	Total	463	$57.65	$398.65	0	6,230
Boat Slip Fees	Within NC	463	$40.71	$291.28	0	4984
Boat Slip Fees	Within County	463	$28.33	$192.71	0	3,322.67
Total Expenditure	Total	463	$564.97	$1,029.16	12	9,675
Total Expenditure	Within NC	463	$502.66	$1,001.93	0	9,675
Total Expenditure	Within County	463	$415.07	$883.54	0	9,675

Table 27—Average Recreational Boater Expenditure per Trip
Non-NC Residents—Northern Region

Expenditure Category	Expenditure Location	Obs.	Mean	Std. Dev.	Minimum Value	Maximum Value
Gas to Site	Total	32	$37.50	$176.38	0	1,000
Gas to Site	Within NC	32	$4.84	$15.42	0	70
Gas to Site	Within County	32	$0.31	$1.77	0	10
Launch Fees	Total	32	$0.25	$1.02	0	5
Launch Fees	Within NC	32	$0.09	$0.53	0	3
Launch Fees	Within County	32	$0.09	$0.53	0	3
Boat Fuel	Total	32	$1,266.72	$2,862.00	0	15,000
Boat Fuel	Within NC	32	$453.13	$792.11	0	2,500
Boat Fuel	Within County	32	$301.25	$573.30	0	2,500
Lodging	Total	32	$42.03	$113.70	0	500
Lodging	Within NC	32	$42.03	$113.70	0	500
Lodging	Within County	32	$21.09	$44.72	0	150
Restaurants	Total	32	$321.72	$590.20	0	2,500
Restaurants	Within NC	32	$151.91	$364.46	0	2,000
Restaurants	Within County	32	$55.94	$59.68	0	200
Groceries	Total	32	$203.59	$416.71	0	2,000
Groceries	Within NC	32	$51.09	$104.54	0	500
Groceries	Within County	32	$17.66	$39.94	0	200
Bait/Tackle	Total	32	$9.38	$44.35	0	250
Bait/Tackle	Within NC	32	$9.38	$44.35	0	250
Bait/Tackle	Within County	32	$1.56	$6.28	0	30
Other Supplies	Total	32	$45.31	$119.18	0	500
Other Supplies	Within NC	32	$20.31	$77.84	0	400
Other Supplies	Within County	32		$5.60	0	25
Boat Rental Fees	Total	32	$0.00	$0.00	0	0
Boat Rental Fees	Within NC	32	$0.00	$0.00	0	0
Boat Rental Fees	Within County	32	$0.00	$0.00	0	0
Hired Capt/Crew	Total	32	$9,165.63	$37,570.97	0	200,000
Hired Capt/Crew	Within NC	32	$0.00	$0.00	0	0
Hired Capt/Crew	Within County	32	$0.00	$0.00	0	0
Boat Slip Fees	Total	32	$372.31	$746.94	0	4,130
Boat Slip Fees	Within NC	32	$91.32	$152.89	0	564
Boat Slip Fees	Within County	32	$25.00	$39.71	0	175.88
Total Expenditure	Total	32	$11,464.44	$37,597.76	78	200,900
Total Expenditure	Within NC	32	$824.10	$1,081.96	0	3,993.61
Total Expenditure	Within County	32	$424.47	$634.03	0	2,680

Table 28—Average Recreational Boater Expenditure per Trip
Non-NC Residents—Central Region

Expenditure Category	Expenditure Location	Obs.	Mean	Std. Dev.	Minimum Value	Maximum Value
Gas to Site	Total	23	$154.85	$245.16	0	900
Gas to Site	Within NC	23	$89.22	$134.68	0	500
Gas to Site	Within County	23	$36.57	$51.85	0	175
Launch Fees	Total	23	$0.00	$0.00	0	0
Launch Fees	Within NC	23	$0.00	$0.00	0	0
Launch Fees	Within County	23	$0.00	$0.00	0	0
Boat Fuel	Total	23	$382.26	$536.93	0	2,500
Boat Fuel	Within NC	23	$343.13	$530.24	0	2,500
Boat Fuel	Within County	23	$226.30	$274.02	0	900
Lodging	Total	23	$110	$209.41	0	750
Lodging	Within NC	23	$110	$209.41	0	750
Lodging	Within County	23	$108.70	$210.03	0	750
Restaurants	Total	23	$172.61	$252.50	0	1,000
Restaurants	Within NC	23	$155.09	$251.26	0	1,000
Restaurants	Within County	23	$122.04	$247.66	0	1,000
Groceries	Total	23	$98.48	$113.36	0	500
Groceries	Within NC	23	$78.04	$110.04	0	500
Groceries	Within County	23	$28.91	$27.71	0	75
Bait/Tackle	Total	23	$138.57	$421.03	0	2,000
Bait/Tackle	Within NC	23	$125.09	$421.74	0	2,000
Bait/Tackle	Within County	23	$135.96	$421.59	0	2,000
Other Supplies	Total	23	$41.17	$109.23	0	500
Other Supplies	Within NC	23	$32.48	$103.84	0	500
Other Supplies	Within County	23	$28.57	$103.62	0	500
Boat Rental Fees	Total	23	$230.43	$1,001.56	0	4,800
Boat Rental Fees	Within NC	23	$21.74	$104.26	0	500
Boat Rental Fees	Within County	23	$0.00	$0.00	0	0
Hired Capt/Crew	Total	23	$9,119.57	$29,945.75	0	120,000
Hired Capt/Crew	Within NC	23	$3,728.26	$17,716.95	0	85,000
Hired Capt/Crew	Within County	23	$32.61	$108.30	0	400
Boat Slip Fees	Total	23	$100.87	$178.14	0	696
Boat Slip Fees	Within NC	23	$64.84	$123.27	0	456
Boat Slip Fees	Within County	23	$31.82	$64.11	0	262.07
Total Expenditure	Total	23	$10,548.80	$30,161.17	15.5	121,192
Total Expenditure	Within NC	23	$4,747.88	$18,118.97	0	87,764.87
Total Expenditure	Within County	23	$751.47	$799.82	0	2,650

Table 29—Average Recreational Boater Expenditure per Trip
Non-NC Residents—Southern Region

Expenditure Category	Expenditure Location	Obs.	Mean	Std. Dev.	Minimum Value	Maximum Value
Gas to Site	Total	56	$354.14	$1,652.48	0	12,000
Gas to Site	Within NC	56	$11.25	$35.81	0	250
Gas to Site	Within County	56	$9.38	$34.60	0	250
Launch Fees	Total	56	$61.66	$402.56	0	3,000
Launch Fees	Within NC	56	$4.52	$26.91	0	200
Launch Fees	Within County	56	$4.16	$26.83	0	200
Boat Fuel	Total	56	$3,100.57	$8,419.86	0	50,000
Boat Fuel	Within NC	56	$348.38	$773.41	0	4,000
Boat Fuel	Within County	56	$187.52	$559.54	0	4,000
Lodging	Total	56	$535.93	$1,953.93	0	13,500
Lodging	Within NC	56	$13.70	$71.02	0	500
Lodging	Within County	56	$13.70	$71.02	0	500
Restaurants	Total	56	$805.70	$1,502.82	0	6,000
Restaurants	Within NC	56	$124.38	$212.66	0	1,000
Restaurants	Within County	56	$85.18	$174.71	0	1,000
Groceries	Total	56	$462.21	$992.25	0	5,833
Groceries	Within NC	56	$48.93	$95.19	0	600
Groceries	Within County	56	$33.57	$58.30	0	300
Bait/Tackle	Total	56	$35.38	$149.07	0	1,000
Bait/Tackle	Within NC	56	$14.75	$68.17	0	500
Bait/Tackle	Within County	56	$14.39	$68.19	0	500
Other Supplies	Total	56	$317.91	$808.26	0	5,000
Other Supplies	Within NC	56	$61.30	$198.69	0	1,000
Other Supplies	Within County	56	$59.95	$198.99	0	1,000
Boat Rental Fees	Total	56	$0.00	$0.00	0	0
Boat Rental Fees	Within NC	56	$0.00	$0.00	0	0
Boat Rental Fees	Within County	56	$0.00	$0.00	0	0
Hired Capt/Crew	Total	56	$4,839.29	$19,794.19	0	110,000
Hired Capt/Crew	Within NC	56	$0.00	$0.00	0	0
Hired Capt/Crew	Within County	56	$0.00	$0.00	0	0
Boat Slip Fees	Total	56	$1,523.57	$3,890.17	0	19,690
Boat Slip Fees	Within NC	56	$227.94	$1,146.34	0	8,582.40
Boat Slip Fees	Within County	56	$46.24	$106.56	0	462.18
Total Expenditure	Total	56	$12,036.36	$26,227.77	46	146,060
Total Expenditure	Within NC	56	$855.13	$1,493.10	0	8,782.40
Total Expenditure	Within County	56	$454.08	$854.71	0	4,850

Table 30—Average Property Tax per Dollar of Personal Income for Representative Counties in Each Geographic Region

Region	County	2005 Property Taxes	2004 Personal Income	Average Property Tax per Dollar of Personal Income
Northern	Currituck	$19,306,003	$625,524,000	$0.031
Central	Carteret	$35,931,500	$1,803,484,000	$0.020
Southern	New Hanover	$126,033,004	$5,289,674,000	$0.024

Sources: Personal Income: NCLINK, http://data.osbm.state.nc.us/pls/linc/dyn_linc_main.show
Property Taxes: Currituck County Operating Budget 2005 – 2006, http://www.co.currrituck.nc.us/government/budget/default.aspx
Carteret County Budget 2005 – 2006, http://www.co.carteret.nc.us/budget/budget.htm
New Hanover County Budget Department, http://www.nhcgov.com/BGT/BGTmain.asp

Table 31—Example Calculation: Deriving Direct Spending by Hired Captains and Crew (2005 Dollars)

$123.83	Average wages paid to hired captains and crew in survey county per trip by NC resident boaters interviewed in Carteret County, NC
$37.52	Taxes leaving county = (net federal and state income taxes) + (Social Security and Medicare taxes) = (15% of gross income) + (15.3% of gross income)
$0.02	Average property taxes per dollar of Personal income, Carteret County, NC
$2.48	Local property taxes = 2.0% of Personal income (average for Carteret County, NC
$6.81	Household savings = 5.5% of Gross income (U.S. average for relevant income category)
$77.02	Direct spending = Gross income – All taxes – Household savings

Table 32—Average Captain and Crew Wages per Trip and Resultant Direct Spending by Survey Region and Boater Residency (2005 Dollars)

Survey Region	Boater Residency	Expenditure Location	Average Wages per Trip	Taxes Leaving County	Property Taxes	Household Savings	Direct Spending
Northern	Resident	Total	$327.42	$99.21	$10.15	$18.01	$200.05
Northern	Resident	Within NC	$327.42	$99.21	$10.15	$18.01	$200.05
Northern	Resident	Within County	$0.00	$0.00	$0.00	$0.00	$0.00
Northern	**Non-Resident**	**Total**	**$9,165.63**	**$2,777.19**	**$284.13**	**$504.11**	**$5,600.20**
Northern	Non-Resident	Within NC	$0.00	$0.00	$0.00	$0.00	$0.00
Northern	Non-Residents	Within County	$0.00	$0.00	$0.00	$0.00	$0.00
Central	Resident	Total	173.60	$52.60	$3.47	$9.55	$107.98
Central	Resident	Within NC	$173.60	$52.60	$3,47	$9.55	$107.98
Central	Resident	Within County	$123.83	$37.52	$2.48	$6.81	$77.02
Central	**Non-Resident**	**Total**	**$9,119.57**	**$2,763.23**	**$182.39**	**$501.58**	**$5,672.37**
Central	Non-Resident	Within NC	$3,728.26	$1,129.66	$74.57	$205.05	$2,318.98
Central	Non-Residents	Within County	$32.61	$9.88	$0.65	$1.79	$20.28
Southern	Resident	Total	$4.51	$1.37	$0.11	$0.25	$2.79
Southern	Resident	Within NC	$3.43	$1.04	$0.08	$0.19	$2.12
Southern	Resident	Within County	$3.43	$1.04	$0.08	$0.19	$2.12
Southern	**Non-Resident**	**Total**	**$4,839.29**	**$1,466.30**	**$116.14**	**$266.16**	**$2,990.68**
Southern	Non-Resident	Within NC	$0.00	$0.00	$0.00	$0.00	$0.00
Southern	Non-Residents	Within County	$0.00	$0.00	$0.00	$0.00	$0.00

Table 33—Economic Impacts of Baseline AIWW Boater Trips, Northern Region
NC Resident Boaters (2005 Dollars)

Impact Type	Impact Source	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	Boater Spending on Good and Services	$7,013,256	$876,813	$4,405,790	$12,295,858
Output	Boater Spending on Hired Capt/Crew	$0	----	----	$0
Output	Hired Capt/Crew Spending	----	----	$0	$0
Output	Hired Capt/Crew State Income & Local Property Taxes	----	----	$0	$0
Output	**Total**	**$7,013,256**	**$876,813**	**$4,405,790**	**$12,295,858**
Employment	Boater Spending on Good and Services	$164	$10	$68	$242
Employment	Boater Spending on Hired Capt/Crew	$0	----	----	$0
Employment	Hired Capt/Crew Spending	----	----	$0	$0
Employment	Hired Capt/Crew State Income & Local Property Taxes	----	----	$0	$0
Employment	**Total**	**$164**	**$10**	**$68**	**$242**
Labor Income	Boater Spending on Good and Services	$3,141,284	$263,958	$2,030,829	$5,436,071
Labor Income	Boater Spending on Hired Capt/Crew	$0	----	----	$0
Labor Income	Hired Capt/Crew Spending	----	----	$0	$0
Labor Income	Hired Capt/Crew State Income & Local Property Taxes	----	----	$0	$0
Labor Income	**Total**	**$3,141,284**	**$263,958**	**$2,030,829**	**$5,436,071**

Table 34—Economic Impacts of Baseline AIWW Boater Trips, Northern Region
Non-NC Resident Boaters (2005 Dollars)

Impact Type	Impact Source	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	Boater Spending on Good and Services	$8,578,934	$1,084,078	$5,319,526	$14,982,538
Output	Boater Spending on Hired Capt/Crew	$0	----	----	$0
Output	Hired Capt/Crew Spending	----	----	$0	$0
Output	Hired Capt/Crew State Income & Local Property Taxes	----	----	$0	$0
Output	**Total**	**$8,578,934**	**$1,084,078**	**$5,319,526**	**$14,982,538**
Employment	Boater Spending on Good and Services	$196	$13	$82	$290
Employment	Boater Spending on Hired Capt/Crew	$0	----	----	$0
Employment	Hired Capt/Crew Spending	----	----	$0	$0
Employment	Hired Capt/Crew State Income & Local Property Taxes	----	----	$0	$0
Employment	**Total**	**$196**	**$13**	**$82**	**$290**
Labor Income	Boater Spending on Good and Services	$3,800,058	$323,863	$2,454,678	$6,578,598
Labor Income	Boater Spending on Hired Capt/Crew	$0	----	----	$0
Labor Income	Hired Capt/Crew Spending	----	----	$0	$0
Labor Income	Hired Capt/Crew State Income & Local Property Taxes	----	----	$0	$0
Labor Income	**Total**	**$3,800,058**	**$323,863**	**$2,454,678**	**$6,578,598**

Table 35—Economic Impacts of Baseline AIWW Boater Trips, Northern Region
NC Resident Boaters—Government Tax Revenues (2005 Dollars)

Impact Type	Impact Source				
	Boater Spending on Goods & Services	***Boater Spending on CaptainCrew Wages***	***Captain/Crew Spending***	***Captain/Crew State Income & Property Taxes***	***Total Impact***
Federal Corporate Profits Tax	$102,670	----	$0	$0	$102,670
Federal Indirect Business Tax: Custom Duty	$28,993	----	$0	$0	$28,993
Federal Indirect Business Tax: Exercise Taxes	$92,533	----	$0	$0	$92,533
Federal Indirect Business Tax: Fed Fines, Fees, etc.	$31,431	----	$0	$0	$31,431
Federal Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
Federal Personal Tax: Income Tax	$651,528	$0	$0	$0	$651,528
Federal Personal Tax: Fines, Fees, etc.	$0	----	$0	$0	$0
Federal Social Ins Tax—Employee Contribution	$320,164	$0	$0	$0	$320,164
Federal Social Ins Tax—Employer Contribution	$284,972	----	$0	$0	$284,972
Federal Total	**$1,512,290**	**$0**	**$0**	**$0**	**$1,512,290**
State/Local Corporate Profits Tax	$20,151	----	$0	$0	$20,151
State/Local Dividends	$26,072	----	$0	$0	$26,072
State/Local Indirect Business Tax: Motor Vehicle License	$15,283	----	$0	$0	$15,283
State/Local Indirect Business Tax: Other Taxes	$73,002	----	$0	$0	$73,002
State/Local Indirect Business Tax: Property Tax	$400,527	$0	$0	$0	$400,527
State/Local Indirect Business Tax: Fines, Fees, etc.	$50,551	----	$0	$0	$50,551
State/Local Indirect Bus Tax: Sales Tax	$605,721	----	$0	$0	$605,721
State/Local Indirect Business Tax: Severance Tax	$158	----	$0	$0	$158
State/Local Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
State/Local Personal Tax: Income Tax	$138,456	$0	$0	$0	$138,456
State/Local Personal Tax: Motor Vehicle License	$6,814	----	$0	$0	$6,814
State/Local Personal Tax: Fines, Fees, etc.	$17,893	----	$0	$0	$17,893
State/Local Personal Tax: Other Tax (Fish/Hunt)	$790	----	$0	$0	$790
State/Local Personal Tax: Property Taxes	$2,043	----	$0	$0	$2,043
State/Local Social Ins Tax—Employee Contribution	$4,169	----	$0	$0	$4,169
State/Local Social Ins Tax—Employer Contribution	$13,522	----	$0	$0	$13,522
State/Local Total	**$1,373,153**	**$0**	**$0**	**$0**	**$1,373,153**
Total	**$2,887,442**	**$0**	**$0**	**$0**	**$2,887,442**

Table 36—Economic Impacts of Baseline AIWW Boater Trips, Northern Region
Non-NC Resident Boaters—Government Tax Revenues (2005 Dollars)

Impact Type	Impact Source				
	Boater Spending on Goods & Services	***Boater Spending on Captain/Crew Wages***	***Captain/Crew Spending***	***Captain/Crew State Income & Property Taxes***	***Total Impact***
Federal Corporate Profits Tax	$121,201	----	$0	$0	$121,201
Federal Indirect Business Tax: Custom Duty	$35,427	----	$0	$0	$35,427
Federal Indirect Business Tax: Exercise Taxes	$113,067	----	$0	$0	$113,067
Federal Indirect Business Tax: Fed Fines, Fees, etc.	$38,407	----	$0	$0	$38,407
Federal Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
Federal Personal Tax: Income Tax	$788,776	$0	$0	$0	$788,776
Federal Personal Tax: Fines, Fees, etc.	$0	----	$0	$0	$0
Federal Social Ins Tax—Employee Contribution	$386,953	$0	$0	$0	$386,953
Federal Social Ins Tax—Employer Contribution	$342,860	----	$0	$0	$342,860
Federal Total	**$1,826,691**	**$0**	**$0**	**$0**	**$1,826,691**
State/Local Corporate Profits Tax	$23,788	----	$0	$0	$23,788
State/Local Dividends	$30,777	----	$0	$0	$30,777
State/Local Indirect Business Tax: Motor Vehicle License	$18,675	----	$0	$0	$18,675
State/Local Indirect Business Tax: Other Taxes	$89,202	----	$0	$0	$89,202
State/Local Indirect Business Tax: Property Tax	$489,412	$0	$0	$0	$489,412
State/Local Indirect Business Tax: Fines, Fees, etc.	$61,770	----	$0	$0	$61,770
State/Local Indirect Bus Tax: Sales Tax	$740,143	----	$0	$0	$740,143
State/Local Indirect Business Tax: Severance Tax	$194	----	$0	$0	$194
State/Local Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
State/Local Personal Tax: Income Tax	$167,626	$0	$0	$0	$167,626
State/Local Personal Tax: Motor Vehicle License	$8,249	----	$0	$0	$8,249
State/Local Personal Tax: Fines, Fees, etc.	$21,662	----	$0	$0	$21,662
State/Local Personal Tax: Other Tax (Fish/Hunt)	$956	----	$0	$0	$956
State/Local Personal Tax: Property Taxes	$2,474	----	$0	$0	$2,474
State/Local Social Ins Tax—Employee Contribution	$5,015	----	$0	$0	$5,015
State/Local Social Ins Tax—Employer Contribution	$16,269	----	$0	$0	$16,269
State/Local Total	**$1,676,212**	**$0**	**$0**	**$0**	**$1,676,212**
Total	**$3,502,903**	**$0**	**$0**	**$0**	**$3,502,903**

Table 37—Economic Impacts of Baseline AIWW Boater Trips, Central Region
NC Resident Boaters (2005 Dollars)

Impact Type	Impact Source	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	Boater Spending on Good and Services	$29,622,526	$4,524,120	$23,815,451	$57,962,096
Output	Boater Spending on Hired Captain/Crew	$7,979,806	----	----	$7,979,806
Output	Hired Captain/Crew Spending	----	----	$4,994,515	$4,994,515
Output	Hired Captain/Crew State Income & Local Property Taxes	----	----	$223,888	$223,888
Output	**Total**	**$37,602,332**	**$4,524,120**	**$29,033,853**	**$71,160,305**
Employment	Boater Spending on Good and Services	$733	$54	$391	$1,178
Employment	Boater Spending on Hired Captain/Crew	$177	----	----	$177
Employment	Hired Captain/Crew Spending	----	----	$68	$68
Employment	Hired Captain/Crew State Income & Local Property Taxes	----	----	3	$3
Employment	**Total**	**$910**	**$54**	**$463**	**$1,427**
Labor Income	Boater Spending on Good and Services	$13,325,153	$1,374,663	$13,436,637	$28,136,453
Labor Income	Boater Spending on Hired Captain/Crew	$7,979,806	----	----	$7,979,806
Labor Income	Hired Captain/Crew Spending	----	----	$1,921,620	$1,921,620
Labor Income	Hired Captain/Crew State Income & Local Property Taxes	----	----	$126,325	$126,325
Labor Income	**Total**	**$21,304,959**	**$1,374,663**	**$15,484,582**	**$38,164,204**

Table 38—Economic Impacts of Baseline AIWW Boater Trips, Central Region
Non-NC Resident Boaters (2005 Dollars)

Impact Type	Impact Source	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	Boater Spending on Good and Services	$2,438,166	$357,685	$1,942,923	$4,738,774
Output	Boater Spending on Hired Captain/Crew	$110,602	----	----	$110,602
Output	Hired Captain/Crew Spending	----	----	$69,216	$69,216
Output	Hired Captain/Crew State Income & Local Property Taxes	----	----	$3,088	$3,088
Output	**Total**	**$2,548,768**	**$357,685**	**$2,015,227**	**$ 4,921,680**
Employment	Boater Spending on Good and Services	$61	$4	$32	$97
Employment	Boater Spending on Hired Captain/Crew	$2	----	----	$2
Employment	Hired Captain/Crew Spending	----	----	$1	$1
Employment	Hired Captain/Crew State Income & Local Property Taxes	----	----	$0	$0
Employment	**Total**	**$64**	**$4**	**$33**	**$101**
Labor Income	Boater Spending on Good and Services	$1,093,633	$108,000	$1,095,857	$2,297,489
Labor Income	Boater Spending on Hired Captain/Crew	$110,602	----	----	$110,602
Labor Income	Hired Captain/Crew Spending	----	----	$26,630	$26,630
Labor Income	Hired Captain/Crew State Income & Local Property Taxes	----	----	$1,743	$1,743
Labor Income	**Total**	**$1,204,235**	**$108,000**	**$1,124,230**	**$2,436,464**

Table 39—Economic Impacts of Baseline AIWW Boater Trips, Central Region
NC Resident Boaters—Government Tax Revenues (2005 Dollars)

Impact Type	Impact Source				
	Boater Spending on Goods & Services	***Boater Spending on Captain/Crew Wages***	***Captain/Crew Spending***	***Captain/Crew State Income & Property Taxes***	***Total Impact***
Federal Corporate Profits Tax	$478,221	----	$56,604	$2,017	$536,841
Federal Indirect Business Tax: Custom Duty	$97,782	----	$5,775	$158	$103,715
Federal Indirect Business Tax: Exercise Taxes	$312,082	----	$18,430	$505	$331,016
Federal Indirect Business Tax: Fed Fines, Fees, etc.	$106,007	----	$6,261	$171	$112,439
Federal Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
Federal Personal Tax: Income Tax	$3,308,704	$797,981	$225,350	$14,758	$3,346,793
Federal Personal Tax: Fines, Fees, etc.	$0	----	$0	$0	$0
Federal Social Ins Tax—Employee Contribution	$1,290,184	$1,220,910	$88,118	$5,793	$2,605,006
Federal Social Ins Tax—Employer Contribution	$1,186,053	----	$83,365	$5,694	$1,275,112
Federal Total	**$6,779,034**	**$2,018,891**	$483,902	$29,096	$9,310,923
State/Local Corporate Profits Tax	$93,862	----	$11,110	$396	$105,367
State/Local Dividends	$121,437	----	$14,374	$512	$136,323
State/Local Indirect Business Tax: Motor Vehicle License	$63,273	----	$3,736	$102	$67,111
State/Local Indirect Business Tax: Other Taxes	$302,226	----	$17,848	$488	$320,562
State/Local Indirect Business Tax: Property Tax	$1,658,170	$159,596	$97,922	$2,679	$1,918,368
State/Local Indirect Business Tax: Fines, Fees, etc.	$209,282	----	$12,359	$338	$221,979
State/Local Indirect Bus Tax: Sales Tax	$2,507,668	----	$148,089	$4,053	$2,659,811
State/Local Indirect Business Tax: Severance Tax	$656	----	$39	$1	$696
State/Local Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
State/Local Personal Tax: Income Tax	$714,918	$398,990	$48,708	$3,191	$1,165,807
State/Local Personal Tax: Motor Vehicle License	$35,684	----	$2,431	$159	$38,274
State/Local Personal Tax: Fines, Fees, etc.	$93,824	----	$6,393	$419	$100,635
State/Local Personal Tax: Other Tax (Fish/Hunt)	$4,010	----	$273	$18	$4,301
State/Local Personal Tax: Property Taxes	$11,115	----	$758	$50	$11,922
State/Local Social Ins Tax—Employee Contribution	$8,507	----	$598	$41	$9,146
State/Local Social Ins Tax—Employer Contribution	$27,596	----	$1,940	$133	$29,669
State/Local Total	**$5,852,227**	**$558,586**	**$366.577**	$12,581	$6,789,972
Total	**$12,631,261**	**$2,577,477**	**$850,479**	**$41,677**	**$16,100,894**

Table 40—Economic Impacts of Baseline AIWW Boater Trips, Central Region
Non-NC Resident—Government Tax Revenues (2005 Dollars)

Impact Type	Impact Source				
	Boater Spending on Goods & Services	***Boater Spending on Captain/Crew Wages***	***Captain/Crew Spending***	***Captain/Crew State Income & Property Taxes***	***Total Impact***
Federal Corporate Profits Tax	$39,053	----	$784	$28	$39,866
Federal Indirect Business Tax: Custom Duty	$7,940	----	$80	$2	$8,022
Federal Indirect Business Tax: Exercise Taxes	$25,340	----	$255	$7	$25,602
Federal Indirect Business Tax: Fed Fines, Fees, etc.	$8,607	----	$87	$2	$8,697
Federal Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
Federal Personal Tax: Income Tax	$270,188	$11,060	$3,123	$204	$284,575
Federal Personal Tax: Fines, Fees, etc.	$0	----	$0	$0	$0
Federal Social Ins Tax—Employee Contribution	$105,350	$16,922	$1,221	$80	$123,573
Federal Social Ins Tax—Employer Contribution	$96,791	----	$1,155	$79	$98,025
Federal Total	**$553,270**	**$27,982**	$6,706	$401	**$588,360**
State/Local Corporate Profits Tax	$7,665	----	$154	$5	$7,825
State/Local Dividends	$9,917	----	$199	$7	$10,123
State/Local Indirect Business Tax: Motor Vehicle License	$5,138	----	$52	$1	$5,191
State/Local Indirect Business Tax: Other Taxes	$24,540	----	$247	$7	$24,794
State/Local Indirect Business Tax: Property Tax	$134,638	$2,212	$1,357	$37	$138,244
State/Local Indirect Business Tax: Fines, Fees, etc.	$16,993	----	$171	$5	$17,169
State/Local Indirect Bus Tax: Sales Tax	$203,615	----	$2,052	$56	$205,723
State/Local Indirect Business Tax: Severance Tax	$53	----	$1	$0	$54
State/Local Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
State/Local Personal Tax: Income Tax	$58,380	$5,530	$675	$44	$64,629
State/Local Personal Tax: Motor Vehicle License	$2,914	----	$34	$2	$2,950
State/Local Personal Tax: Fines, Fees, etc.	$7,662	----	$89	$6	$7,756
State/Local Personal Tax: Other Tax (Fish/Hunt)	$327	----	$4	$0	$331
State/Local Personal Tax: Property Taxes	$908	----	$11	$1	$919
State/Local Social Ins Tax—Employee Contribution	$694	----	$8	$1	$703
State/Local Social Ins Tax—Employer Contribution	$2,252	----	$27	$2	$2,281
State/Local Total	**$475,696**	**$7,742**	**$5,080**	**$174**	**$488,692**
Total	**$1,028,966**	**$35,725**	**11,786**	**$575**	**$1,077,052**

Table 41—Economic Impacts of Baseline AIWW Boater Trips, Southern Region
NC Resident Boaters (2005 Dollars)

Impact Type	Impact Source	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	Boater Spending on Good and Services	$10,923,032	$2,090,397	$9,294,483	$22,307,912
Output	Boater Spending on Hired Captain/Crew	$91,016	-----	-----	$91,016
Output	Hired Captain/Crew Spending	----	-----	$71,594	$71,594
Output	Hired Captain/Crew State Income & Local Property Taxes	----	-----	$3,467	$3,467
Output	**Total**	**$11,014,048**	$2,090,397	$9,369,543	$22,473,989
Employment	Boater Spending on Good and Services	$250	$21	$120	$391
Employment	Boater Spending on Hired Captain/Crew	$2	-----	-----	$2
Employment	Hired Captain/Crew Spending	----	-----	$1	$1
Employment	Hired Captain/Crew State Income & Local Property Taxes	----	-----	$0	$0
Employment	**Total**	**$252**	$21	$121	$394
Labor Income	Boater Spending on Good and Services	$4,903,294	$664,916	$3,857,091	$9,425,301
Labor Income	Boater Spending on Hired Captain/Crew	$91,016	-----	-----	$91,016
Labor Income	Hired Captain/Crew Spending	----	-----	$23,812	$23,812
Labor Income	Hired Captain/Crew State Income & Local Property Taxes	----	-----	$1,717	$1,717
Labor Income	**Total**	**$4,994,310**	**$664,916**	**$3,882,620**	**$9,541,846**

Table 42—Economic Impacts Baseline AIWW Boater Trips, Southern Region
Non-NC Resident Boaters (205 Dollars)

Impact Type	Impact Source	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	Boater Spending on Good and Services	$1,961,540	$398,198	$1,622,276	$3,982,014
Output	Boater Spending on Hired Captain/Crew	$0	----	----	$0
Output	Hired Captain/Crew Spending	----	----	$0	$0
Output	Hired Captain/Crew State Income & Local Property Taxes	----	----	$0	$0
Output	**Total**	**$1,961,540**	**$398,198**	**$1,622,276**	**$3,982,014**
Employment	Boater Spending on Good and Services	$44	$4	$21	$69
Employment	Boater Spending on Hired Captain/Crew	$0	----	----	$0
Employment	Hired Captain/Crew Spending	----	----	$0	$0
Employment	Hired Captain/Crew State Income & Local Property Taxes	----	----	$0	$0
Employment	**Total**	**$44**	**$4**	**$21**	**$69**
Labor Income	Boater Spending on Good and Services	$853,913	$125,633	$672,805	$1,652,351
Labor Income	Boater Spending on Hired Captain/Crew	$0	----	----	$0
Labor Income	Hired Captain/Crew Spending	----	----	$0	$0
Labor Income	Hired Captain/Crew State Income & Local Property Taxes	----	----	$0	$0
Labor Income	**Total**	**$853,913**	**$125,633**	**$672,805**	**$1,652,351**

Table 43—Economic Impacts of Baseline AIWW Boater Trips, Southern Region
NC Resident—Government Tax Revenues (2005 Dollars)

Impact Type	Impact Source				
	Boater Spending on Goods & Services	***Boater Spending on Captain/Crew Wages***	***Captain/Crew Spending***	***Captain/Crew State Income & Property Taxes***	***Total Impact***
Federal Corporate Profits Tax	$197,383	----	$825	$34	$198,242
Federal Indirect Business Tax: Custom Duty	$68,747	----	$142	$5	$68,894
Federal Indirect Business Tax: Exercise Taxes	$219,412	----	$455	$15	$219,882
Federal Indirect Business Tax: Fed Fines, Fees, etc.	$74,529	----	$154	$5	$74,689
Federal Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
Federal Personal Tax: Income Tax	$1,220,406	$9,102	$3,077	$221	$1,232,806
Federal Personal Tax: Fines, Fees, etc.	$0	----	$0	$0	$0
Federal Social Ins Tax—Employee Contribution	$554,145	$13,926	$1,408	$103	$569,582
Federal Social Ins Tax—Employer Contribution	$508,707	----	$1,322	$101	$510,129
Federal Total	**$2,843,329**	**$23,027**	**$7,384**	**$483**	**$2,874,224**
State/Local Corporate Profits Tax	$38,741	----	$162	$7	$38,909
State/Local Dividends	$50,122	----	$210	$9	$50,341
State/Local Indirect Business Tax: Motor Vehicle License	$22,524	----	$47	$2	$22,572
State/Local Indirect Business Tax: Other Taxes	$107,585	----	$223	$7	$107,815
State/Local Indirect Business Tax: Property Tax	$590,271	$2,184	$1,224	$40	$593,718
State/Local Indirect Business Tax: Fines, Fees, etc.	$74,499	----	$154	$5	$74,659
State/Local Indirect Bus Tax: Sales Tax	$892,673	----	$1,851	$60	$894,583
State/Local Indirect Business Tax: Severance Tax	$234	----	$1	$0	$234
State/Local Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
State/Local Personal Tax: Income Tax	$250,755	$4,551	$632	$45	$255,983
State/Local Personal Tax: Motor Vehicle License	$12,098	----	$31	$2	$12,131
State/Local Personal Tax: Fines, Fees, etc.	$31,150	----	$79	$6	$31,234
State/Local Personal Tax: Other Tax (Fish/Hunt)	$1,491	----	$4	$0	$1,495
State/Local Personal Tax: Property Taxes	$3,429	----	$9	$1	$3,438
State/Local Social Ins Tax—Employee Contribution	$5,807	----	$15	$1	$5,823
State/Local Social Ins Tax—Employer Contribution	$18,837	----	$49	$4	$18,890
State/Local Total	**$2,100,216**	**$6,735**	**$4,688**	**$187**	**$2,111,826**
Total	**$4,943,545**	**$29,762**	**$12,072**	**$671**	**$4,986,050**

Table 44—Economic Impacts of Baseline AIWW Boater Trips, Southern Region
Non-NC Resident—Government Tax Revenues (2005 Dollars)

Impact Type	Impact Source				
	Boater Spending on Goods & Services	***Boater Spending on Captain/Crew Wages***	***Captain/Crew Spending***	***Captain/Crew State Income & Property Taxes***	***Total Impact***
Federal Corporate Profits Tax	$34,152	----	$0	$0	$34,152
Federal Indirect Business Tax: Custom Duty	$11,940	----	$0	$0	$11,940
Federal Indirect Business Tax: Exercise Taxes	$38,107	----	$0	$0	$38,107
Federal Indirect Business Tax: Fed Fines, Fees, etc.	$12,944	----	$0	$0	$12,944
Federal Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
Federal Personal Tax: Income Tax	$213,987	$0	$0	$0	$213,987
Federal Personal Tax: Fines, Fees, etc.	$0	----	$0	$0	$0
Federal Social Ins Tax—Employee Contribution	$97,095	$0	$0	$0	$97,095
Federal Social Ins Tax—Employer Contribution	$88,953	----	$0	$0	$88,953
Federal Total	**$497,178**	**$0**	**$0**	**$0**	**$497,178**
State/Local Corporate Profits Tax	$6,703	----	$0	$0	$6,703
State/Local Dividends	$8,672	----	$0	$0	$8,672
State/Local Indirect Business Tax: Motor Vehicle License	$3,912	----	$0	$0	$3,912
State/Local Indirect Business Tax: Other Taxes	$18,685	----	$0	$0	$18,685
State/Local Indirect Business Tax: Property Tax	$102,517	$0	$0	$0	$102,517
State/Local Indirect Business Tax: Fines, Fees, etc.	$12,939	----	$0	$0	$12,939
State/Local Indirect Bus Tax: Sales Tax	$155,038	----	$0	$0	$155,038
State/Local Indirect Business Tax: Severance Tax	$41	----	$0	$0	$41
State/Local Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
State/Local Personal Tax: Income Tax	$43,968	$0	$0	$0	$43,968
State/Local Personal Tax: Motor Vehicle License	$2,121	----	$0	$0	$2,121
State/Local Personal Tax: Fines, Fees, etc.	$5,462	----	$0	$0	$5,462
State/Local Personal Tax: Other Tax (Fish/Hunt)	$261	----	$0	$0	$261
State/Local Personal Tax: Property Taxes	$601	----	$0	$0	$601
State/Local Social Ins Tax—Employee Contribution	$1,015	----	$0	$0	$1,015
State/Local Social Ins Tax—Employer Contribution	$3,294	----	$0	$0	$3,294
State/Local Total	**$365,230**	**$0**	**$0**	**$0**	**$365,230**
Total	**$862,408**	**$0**	**$0**	**$0**	**$862,408**

Table 45—Statewide Economic Impacts of Baseline AIWW Boater Trips
NC Resident Boaters (2005 Dollars)

Impact Type	Impact Source	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	Boater Spending on Good and Services	$59,932,054	$13,099,625	$66,022,397	$139,054,076
Output	Boater Spending on Hired Captain/Crew	$16,182,592	----	----	$16,182,592
Output	Hired Captain/Crew Spending	-----	----	$15,310,706	$15,310,706
Output	Hired Captain/Crew State Income & Local Property Taxes	-----	----	$2,058,734	$2,058,734
Output	**Total**	**$76,114,646**	**$13,099,625**	**$83,391,837**	**$172,606,108**
Employment	Boater Spending on Good and Services	$1289	$117	$776	$2182
Employment	Boater Spending on Hired Captain/Crew	$360	-----	-----	$360
Employment	Hired Captain/Crew Spending	-----	-----	$162	$162
Employment	Hired Captain/Crew State Income & Local Property Taxes	-----	-----	$26	$26
Employment	**Total**	$1,649	$117	$964	$2,730
Labor Income	Boater Spending on Good and Services	$26,997,746	$4,346,661	$27,804,962	$59,149,369
Labor Income	Boater Spending on Hired Captain/Crew	$16,182,592	----	-----	$16,182,592
Labor Income	Hired Captain/Crew Spending	----	----	$5,419,692	$5,419,692
Labor Income	Hired Captain/Crew State Income & Local Property Taxes	----	----	$1,014,488	$1,014,488
Labor Income	**Total**	**$43,180,338**	**$4,346,661**	**$34,239,142**	**$81,766,141**

Table 46—Statewide Economic Impacts of Baseline AIWW Boater Trips
Non-NC Resident Boaters (2005 Dollars)

Impact Type	Impact Source	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	Boater Spending on Good and Services	$24,272,884	$5,757,438	$26,204,784	$56,235,106
Output	Boater Spending on Hired Captain/Crew	$13,766,741	----	----	$13,766,741
Output	Hired Captain/Crew Spending	-----	----	$13,025,016	$13,025,016
Output	Hired Captain/Crew State Income & Local Property Taxes	-----	----	$1,751,393	$1,751,393
Output	**Total**	**$38,039,625**	**$5,757,438**	**$40,981,193**	**$84,778,256**
Employment	Boater Spending on Good and Services	$485	$51	$308	$844
Employment	Boater Spending on Hired Captain/Crew	$306	----	-----	$306
Employment	Hired Captain/Crew Spending	-----	----	$138	$138
Employment	Hired Captain/Crew State Income & Local Property Taxes	-----	----	$22	$22
Employment	**Total**	**$791**	**$51**	**$468**	**$1,310**
Labor Income	Boater Spending on Good and Services	$10,511,128	$1,859,695	$11,040,353	$23,411,176
Labor Income	Boater Spending on Hired Captain/Crew	$13,766,741	----	-----	$13,766,741
Labor Income	Hired Captain/Crew Spending	----	----	$4,610,602	$4,610,602
Labor Income	Hired Captain/Crew State Income & Local Property Taxes	----	----	$863,039	$863,039
Labor Income	**Total**	**$24,277,869**	**$1,859,695**	**$16,513,994**	**$42,651,558**

Table 47—Statewide Economic Impacts of Baseline AIWW Boater Trips
NC Resident—Government Tax Revenues (2005 Dollars)

Impact Type	Impact Source				
	Boater Spending on Goods & Services	***Boater Spending on Captain/Crew Wages***	***Captain/Crew Spending***	***Captain/Crew State Income & Property Taxes***	***Total Impact***
Federal Corporate Profits Tax	$1,212,530	----	$165,684	$19,676	$1,397,890
Federal Indirect Business Tax: Custom Duty	$392,293	----	$28,757	$2,390	$423,440
Federal Indirect Business Tax: Exercise Taxes	$1,252,039	----	$91,781	$7,627	$1,351,447
Federal Indirect Business Tax: Fed Fines, Fees, etc.	$425,290	----	$31,176	$2,591	$459,057
Federal Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
Federal Personal Tax: Income Tax	$7,879,641	$1,618,259	$719,743	$134,281	$10,351,924
Federal Personal Tax: Fines, Fees, etc.	$0	----	$0	$0	$0
Federal Social Ins Tax—Employee Contribution	$3,329,522	$2,475,937	$307,430	$58,013	$6,170,901
Federal Social Ins Tax—Employer Contribution	$3,051,257	----	$291,912	$57,085	$3,400,254
Federal Total	**$17,542,571**	**$4,094,196**	**$1,636,483**	**$281,662**	**$23,554,912**
State/Local Corporate Profits Tax	$237,986	----	$32,519	$3,862	$274,367
State/Local Dividends	$307,905	----	$42,073	$4,996	$354,974
State/Local Indirect Business Tax: Motor Vehicle License	$129,230	----	$9,473	$787	$139,491
State/Local Indirect Business Tax: Other Taxes	$617,277	----	$45,250	$3,760	$666,287
State/Local Indirect Business Tax: Property Tax	$3,386,708	$404,565	$248,265	$20,630	$4,060,168
State/Local Indirect Business Tax: Fines, Fees, etc.	$427,445	----	$31,334	$2,604	$461,383
State/Local Indirect Bus Tax: Sales Tax	$5,121,756	----	$375,453	$31,199	$5,528,409
State/Local Indirect Business Tax: Severance Tax	$1,340	----	$98	$8	$1,446
State/Local Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
State/Local Personal Tax: Income Tax	$1,611,413	$809,130	$147,183	$27,458	$2,595,184
State/Local Personal Tax: Motor Vehicle License	$77,486	----	$7,077	$1,320	$85,884
State/Local Personal Tax: Fines, Fees, etc.	$199,203	----	$18,195	$3,394	$220,792
State/Local Personal Tax: Other Tax (Fish/Hunt)	$9,630	----	$880	$164	$10,673
State/Local Personal Tax: Property Taxes	$21,808	----	$1,992	$372	$24,172
State/Local Social Ins Tax—Employee Contribution	$25,549	----	$2,444	$478	$28,471
State/Local Social Ins Tax—Employer Contribution	$82,878	----	$7,929	$1,551	$92,358
State/Local Total	**$12,257,615**	**$1,213,694**	**$970,166**	**$102,584**	**$14,544,059**
Total	**$29,800,186**	**$5,307,890**	**$2,606,649**	**$384,246**	**$38,098,971**

Table 48—Statewide Economic Impacts of Baseline AIWW Boater Trips
Non-NC Resident—Government Tax Revenues (2005 Dollars)

Impact Type	Impact Source				
	Boater Spending on Goods & Services	***Boater Spending on Captain/Crew Wages***	***Captain/Crew Spending***	***Captain/Crew State Income & Property Taxes***	***Total Impact***
Federal Corporate Profits Tax	$483,088	----	$140,949	$16,739	$640,777
Federal Indirect Business Tax: Custom Duty	$156,778	----	$24,464	$2,033	$183,275
Federal Indirect Business Tax: Exercise Taxes	$500,370	----	$78,080	$6,488	$584,938
Federal Indirect Business Tax: Fed Fines, Fees, etc.	$169,965	----	$26,522	$2,204	$198,690
Federal Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
Federal Personal Tax: Income Tax	$3,121,031	$1,376,674	$612,295	$114,234	$5,224,235
Federal Personal Tax: Fines, Fees, etc.	$0	----	$0	$0	$0
Federal Social Ins Tax—Employee Contribution	$1,315,417	$2,106,311	$261,534	$49,352	$3,732,615
Federal Social Ins Tax—Employer Contribution	$1,195,112		$248,333	$48,563	$1,492,008
Federal Total	**$6,941,762**	**$3,482,986**	**$1,392,178**	**$239,613**	**$12,056,538**
State/Local Corporate Profits Tax	$94,817	----	$27,664	$3,285	$125,767
State/Local Dividends	$122,673	----	$35,792	$4,251	$162,716
State/Local Indirect Business Tax: Motor Vehicle License	$51,646	----	$8,059	$670	$60,375
State/Local Indirect Business Tax: Other Taxes	$246,691	----	$38,495	$3,199	$288,385
State/Local Indirect Business Tax: Property Tax	$1,353,479	$344,169	$211,202	$17,550	$1,926,399
State/Local Indirect Business Tax: Fines, Fees, etc.	$170,826	----	$26,656	$2,215	$199,697
State/Local Indirect Bus Tax: Sales Tax	$2,046,880	----	$319,403	$26,542	$2,392,825
State/Local Indirect Business Tax: Severance Tax	$535	----	$84	$7	$626
State/Local Personal Tax: Estate and Gift Tax	$0	----	$0	$0	$0
State/Local Personal Tax: Income Tax	$638,268	$688,337	$125,211	$23,359	$1,475,175
State/Local Personal Tax: Motor Vehicle License	$30,691	----	$6,021	$1,123	$37,836
State/Local Personal Tax: Fines, Fees, etc.	$78,903	----	$15,478	$2,888	$97,269
State/Local Personal Tax: Other Tax (Fish/Hunt)	$3,814	----	$748	$140	$4,702
State/Local Personal Tax: Property Taxes	$8,638	----	$1,694	$316	$10,649
State/Local Social Ins Tax—Employee Contribution	$10,007	----	$2,079	$407	$12,493
State/Local Social Ins Tax—Employer Contribution	$32,462	----	$6,745	$1,319	$40,526
State/Local Total	**$4,890,332**	**$1,032,506**	**$825,333**	**$87,270**	**$6,835,440**
Total	**$11,832,093**	**$4,515,491**	**$2,217,510**	**$326,883**	**$18,891,978**

Table 49—Estimated Annual, Aggregate, Total Economic Impacts of Reductions in AIWW Recreational Boater Trips Due to a Reduction in AIWW Navigability from Baseline to 4-Foot Depth During Study Period (June 17 – November 19, 2005)(1) (2005 Dollars)

	Coastal Geographic Region (See Table 10)			
Impact Type	***Northern NC***	***Central NC***	***Southern NC***	***Statewide (2)***
Economic Output/Business Activity	-$10,001,682	-$33,649,842	-$11,346,661	-$103,203,199
Employment Supported	-196	-675	-199	-1,623
Labor Income (Wages and Salaries Supported	-$4,408,389	-$17,986,674	-$4,806,135	-$49,626,943
Federal Taxes Total	-$1,225,373	-$4,386,413	-$1,447,556	-$14,228,101
Federal Corporate Profits Tax	-$82,358	-$254,669	-$99,800	-$822,238
Federal Indirect Business Tax: Custom Duty	-$23,612	-$49,295	-$34,704	-$245,860
Federal Indirect Business Tax: Exercise Taxes	-$75,361	-$157,331	-$110,761	-$784,684
Federal Indirect Business Tax: Fed Fines, Fees, etc.	-$25,599	-$53,442	-$37,623	-$266,540
Federal Personal Tax: Income Tax	-$528,450	-$2,050,725	-$621,101	-$6,230,935
Federal Social Ins Tax—Employee Contribution	-$259,489	-$1,215,070	-$286,437	-$3,897,558
Federal Social Ins Tax—Employer Contribution	-$230,504	-$605,881	-$257,129	-$1,980,286
State/Local Taxes Total	-$1,118,748	-$3,216,451	-$1,063,566	-$8,604,771
State/Local Corporate Profits Tax	-$16,164	-$49,985	-$19,588	-$161,383
State/Local Dividends	-$20,914	-$64,669	-$25,343	-$208,796
State/Local Indirect Business Tax: Motor Vehicle License	-$12,447	-$31,898	-$11,370	-$80,992
State/Local Indirect Business Tax: Other Taxes	-$59,455	-$152,363	-$54,310	-$386,863
State/Local Indirect Business Tax: Property Tax	-$326,202	-$908,794	-$298,962	-$2,407,528
State/Local Indirect Business Tax: Fines, Fees, etc.	-$41,171	-$105,506	-$37,608	-$267,891
State/Local Indirect Bus Tax: Sales Tax	-$493,318	-$1,264,203	-$450,630	-$3,209,932
State/Local Indirect Business Tax: Severance Tax	-$129	-$331	-$118	-$840
State/Local Personal Tax: Income Tax	-$112,302	-$546,538	-$128,830	-$1,611,101
State/Local Personal Tax: Motor Vehicle License	-$5,526	-$18,188	-$6,116	-$50,063
State/Local Personal Tax: Fines, Fees, etc.	-$14,513	-$47,824	-$15,748	-$128,702
State/Local Personal Tax: Other Tax (Fish/Hunt)	-$641	-$2,044	-$754	-$6,222
State/Local Personal Tax: Property Taxes	-$1,657	-$5,666	-$1,734	-$14,090
State/Local Social Ins Tax—Employee Contribution	-$3,372	-$4,346	-$2,935	-$16,581
State/Local Social Ins Tax—Employer Contribution	-$10,938	-$14,097	-$9,521	-$53,789

Notes:
(1) Private recreational boating only; does not include economic impacts of any changes in charter and head boat activity. Considers vessels 16' in length or longer only
(2) Statewide impacts are larger than the sum of coastal region impacts because some expenditures and multiplier effects occur outside the coastal region.
See text for additional discussion

Table 50—Estimated Annual, Aggregate, Total Economic Impacts of Reductions in Boat Purchases from NC Boat Manufacturers Due to a Reduction in AIWW Navigability from Baseline to 4-Foot Depth During Study Period (June 17 – November 19, 2005)(1) (2005 Dollars)

Impact Type	Direct Impacts	Indirect and Induced Impacts (Multiplier Effect)	Total Impacts
NC Boater Manufacturer Sales	-$2.85 million	-$3.00 million	**-5.85 million**
Employment (Jobs)	-16	-29	**-45**
Labor Income	-$700,000	-$1.08 million	**-$1.78 million**
Federal Taxes	----	----	**-$516,851**
State/Local Taxes	----	----	**-$200,018**

Notes:
(1) Private recreational boating only; does not include economic impacts of any changes in charter and head boat activity. Analysis considers vessels 16' in length or longer only