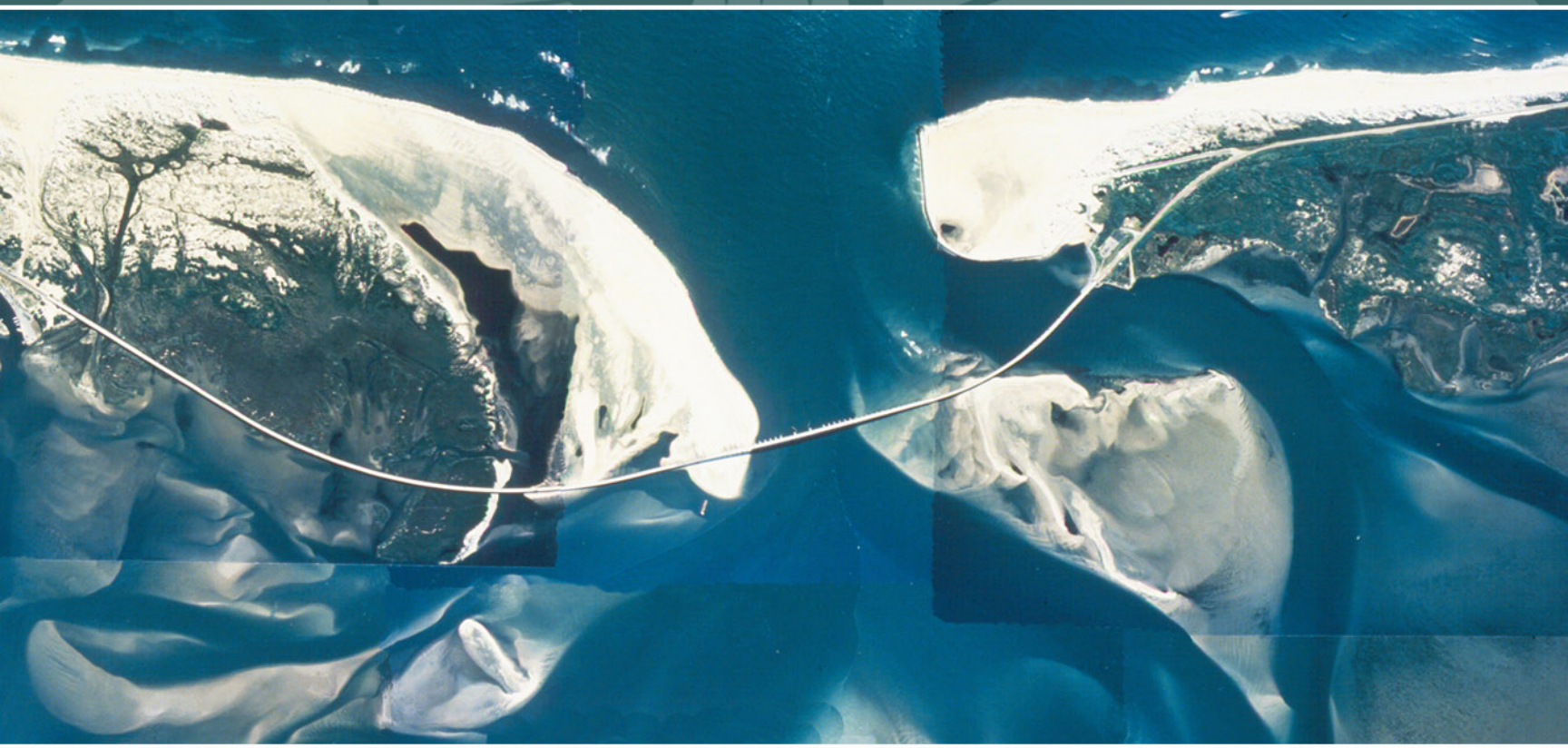
JULY 2006

A Study of the Benefits of Oregon Inlet to the Economy of Dare County and the Surrounding Region

Dare County, North Carolina



MOFFATT & NICHOL

COUNTY OF DARE
1870
NORTH CAROLINA

EXECUTIVE SUMMARY

The objective of this study was to examine the economic benefits of Oregon Inlet navigability to Dare County, North Carolina and the surrounding region, including northeastern North Carolina and southeastern Virginia. This study involved a thorough literature review and data collection effort, on-site interviews with individuals knowledgeable of inlet usage and related economic impacts, and detailed economic modeling and analyses. Various economic sectors were considered in the economic analyses including:

- Commercial Fishing
- Seafood Packing/Processing
- Boat Building and Support Services
- Recreational Fishing and Tourism

For each benefit category listed above, several measures of economic benefits were calculated:

- Employment
- Economic output / business activity
- Wages/salaries/sole proprietor income/partnership income
- Rental income and corporation income
- Government tax and fee revenues

For each of the economic benefit measures listed above, benefits are sub-divided into several sub-categories:

- Direct Impacts (the direct benefits of the activity itself)
- Indirect Impacts (the benefits associated with business activities supporting the direct activity)
- Induced Impacts (benefits 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)

Together, the indirect and induced impacts are known as "economic multiplier effects". Multiplier effects track the "trickle down" effect of direct impact activities in the regional economy. These economic impacts were calculated using the widely accepted IMPLAN model utilizing results from the field interviews and published data.

Commercial Fishing

Oregon Inlet is considered one of the most commercially vital inlets along coastal North Carolina with fishermen from the communities of Wanchese, Manteo, Manns Harbor, and Stumpy Point in Dare County and communities in other coastal counties (e.g. Hyde, Pamlico)

using the inlet. The commercial fishing industry has seen a decline in the region over the past 30-40 years due to several factors, which includes the declining condition of Oregon Inlet. It was noted that in the 1960s there were approximately 40-50 different commercial seafood businesses in Dare County. However, presently there are approximately only 10-20.

Present day commercial boats are significantly larger than those used historically. Due to shallow and dangerous inlet conditions, fewer fishermen choose to operate through Oregon Inlet. Potential trips are frequently lost or shortened due to dangerous inlet conditions, resulting in reduced catch. Also, shallow draft conditions force commercial boats to lighten tonnage so that they can pass through the inlet safely. If the navigability of Oregon Inlet is not maintained, the field interview results indicate that most commercial fishing vessels would choose to remain in the fishing business but would relocate their fishing operations to other ports, most likely located in Virginia.

Commercial fishing provides a total annual economic benefit of 90 jobs and $7.2 million to Dare County and the surrounding region.

Seafood Packing & Processing

A number of support businesses have located in Dare County to service and supply the commercial fishing vessels. Once fish are landed, seafood packing and processing businesses prepare the catch for market. In fact, several commercial fishermen also have packing and processing operations within their businesses. All of these activities generate jobs, wages, and profits for local workers and business owners, as well as tax revenues to support local government services. It is assumed that if Oregon Inlet is closed, Oregon Inlet dependent fishery landings would be lost.

Seafood packing and processing provides a total annual economic benefit of 238 jobs and $33.4 million to Dare County and the surrounding region through Oregon Inlet dependent landings.

Boat Building & Support Services

The boat building business has a significant impact on the Dare County economy. Boat building businesses represented seven of the top ten manufacturing employers in Dare County in 2005, accounting for approximately 500 of the 800 manufacturing jobs in the County (NCESC, 2005). An additional 88 business located in northeastern NC counties provide marine-related supplies and direct support services to the boat building and boatyard industries (NCwaterways.com). The boat building sector supports directly or indirectly supports about 5% (956 jobs) of off season county employment. An estimated 266 additional jobs are supported in surrounding counties within the region.

This region boasts the birthplace of “Carolina Style” boat building, a style which originated to withstand the incomparable Oregon Inlet waters and rough seas offshore of Bodie and Pea Islands. Local boat builders are directly dependent on Oregon Inlet, as the valuable reputation of the boats for strength and durability is maintained by continuous research and testing in the

uniquely rough waters offshore. Based on the field interviews, if Oregon Inlet were to close, these businesses would as well.

Boat building and support services provide a total annual economic benefit of 1,222 jobs and $139.8 million to Dare County and the surrounding region.

Recreational Fishing & Tourism

The area offshore of the northern Outer Banks is considered one of the prime sportfishing regions along the East Coast due to its close proximity to the Gulf Stream and extended seasons of abundant fishing opportunities (e.g. marlin, tuna). The recreational sport fishery is vast and varied, including large "headboat" recreational fishing vessels, smaller "for-hire" charter fishing vessels, and private fishing boats.

In addition to general recreational fishing, sportfishing tournaments are thriving in the Oregon Inlet region. Approximately 14 known tournaments take place annually in the County originating mainly at Pirates Cove marina, in Manteo or at various locations in Hatteras Village. In summary, more than 500 boats annually are expected to participate in sportfishing tournaments dependent on passage through Oregon Inlet. These tournaments draw significant economic benefits to the County ranging from expenditures on fishing gear, lodging, food, retail to custom boat sales, marine maintenance, and/or boat storage. These recreational fishing activities generate additional economic benefits for the region, in particular for the tourism industry. A significant number of jobs in the tourism industry are related to sport fishing, which is dependent on the inlet for access to the ocean fishing grounds which contain the fish species prized by sport fishermen.

Recreational fishing and tourism provide a total annual economic benefit of 8,288 jobs and $502.3 million to Dare County and the surrounding region. In addition to these benefits, a consumer surplus benefit of $8 -$12 million dollars was also estimated.

Overall Summary of Economic Benefits

The economic benefit of Oregon Inlet to Dare County and the surrounding region is very significant and far outweighs the costs necessary to keep the inlet passable through dredging. In fact, the economic benefit to the Federal Government alone is more than 6 times the recent annual expenditures for dredging. The following table shows the overall total annual economic benefit of Oregon Inlet to Dare County and the surrounding region.

Impact Category	Commercial Fishing	Seafood Packing & Processing	Boat Building & Support Services	Recreational Fishing & Tourism	Total Impact
Output[1]	$7,152,357	$33,425,367	$139,841,567	$502,286,350	$682,705,641
Employment[2]	90	238	1,222	8,288	9,838
Wages/Salaries/ Proprietor Profits[3]	$2,720,657	$7,112,340	$46,260,044	$209,700,831	$265,793,872
Rent/Corp Profits[4]	$1,344,828	$1,384,746	$22,569,207	$69,361,720	$94,660,501
Fed Govt[5]	$895,555	$2,149,376	$11,670,156	$34,978,165	$49,693,252
State/Local Govt[5]	$488,250	$890,092	$4,242,724	$37,460,831	$43,081,897

[1] Output/Business Activity Impacts (2005 $'s).
[2] All jobs, full-time and part-time.
[3] Wages/Salaries/Sole Proprietorship/Partnership Income Impacts (2005 $'s).
[4] Rental Income and Corporation Income Impacts (2005 $'s).
[5] Government Tax and Fee Revenue Impacts (2005 $'s).

The four study sectors combined provide a total annual economic benefit of 9,838 jobs and $682.7 million to Dare County and the surrounding region.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

I. INTRODUCTION AND STUDY OVERVIEW

Introduction

This report was prepared for the Dare County Oregon Inlet and Waterways Commission and details the final results of a study examining benefits of Oregon Inlet to the economy of Dare County, North Carolina, and the surrounding region. This study was commissioned in December 2005, with the expectation that the economic findings could be used to assist lobbying efforts for inlet dredging on both state and national levels.

The Oregon Inlet and Waterways Commission was formed in 1983 by the Dare County Board of Commissioners and oversees county dredging projects and waterway related issues. The primary objective of the Commission is to promote efforts for the stabilization of Oregon Inlet. Additionally, the Commission monitors other waterways in the County and recommends necessary dredging, maintains public boat ramps and no wake zones, and lastly administers local dredging projects.

Dredging is vital to the maintenance of transportation routes through state waterways and for providing safe, reliable access to the Atlantic Ocean along the coast. Without the clearing of shoals from navigation channels by dredging, mariners would face serious problems in navigation along the North Carolina coast. Authorized shallow draft navigation channels in North Carolina include many inlets and inlet crossings (including Oregon Inlet), sound and river channels, the Atlantic Intracoastal Waterway (AIWW), and numerous small harbors. While the duty and cost of maintaining these shallow draft waterways has traditionally been undertaken by the United States Army Corps of Engineers (USACE) as part of the maintenance of federal channels, it is becoming apparent that the funding for such efforts is declining. In fact, over the last two years, initial federal budgets have had little to no funding allotted to shallow draft navigation projects, including Oregon Inlet.

Study Area and Economic Setting

Dare County is located in northeastern North Carolina along the Atlantic seaboard. The County contains much of North Carolina's island "Outer Banks" beach resort and vacation area. Although the County covers 800 square miles, only 391 square miles is land; the remainder is bay, waterway and estuary. Of the County's 250,200 acres, only a small proportion, approximately 16,000 acres, located primarily on Bodie Island, Pea Island and Roanoke Island (situated just behind the Outer Banks islands), are available for development. The County has no rail service, no interstate highway service, and only a small regional airport providing general aviation service (the closest airport providing commercial air service is Norfolk (Virginia) International Airport, approximately 100 miles away). These factors limit the ability of the region to attract general industry and employers who do not require access to beaches or the ocean. It is not surprising that coastal recreation and tourism is the leading service industry in the region, and boat building is the leading manufacturing industry.

Dare County's permanent resident population was estimated at 35,000 in 2005 (NCESC, 2005). In the summer tourist season, the population swells to an estimated 150,000 to 250,000 (Dare County, 2005). County unemployment is usually very low (typically 2.5%) during the summer tourist season but is much higher in the winter season (typically 10%) (NCESC, 2005). Employment in the winter season was 19,771 in December 2005. Because Oregon Inlet-dependent commercial fishing occurs primarily in the winter season, and boat building is a year-round business, these industries are very important regional employers in the winter off season.

Oregon Inlet was formed in 1846 and is the only barrier island break in the northern part of the Outer Banks (~100 miles of coastline), providing access to boats between the Atlantic Ocean and the Albemarle-Pamlico Sound (Figure I-1). Many marine-related sectors help to build the economy of Dare County and, in doing so, rely on safe and navigable passage through Oregon Inlet.

Figure I-1. Location Map

Oregon Inlet is considered one of the most commercially vital inlets along coastal North Carolina. Commercial fishermen from the communities of Wanchese, Manteo, Manns

Harbor, and Stumpy Point in Dare County and communities in other coastal counties (e.g. Hyde, Pamlico) have been using Oregon Inlet for generations to access the rich fishing grounds off the coast of the Outer Banks. In addition to the commercial fishing operations, a number of support businesses have located in the county to service and supply the commercial fishing vessels. Once the fish are landed, seafood packing and processing businesses prepare the catch for market. All of these activities generate jobs, wages, and profits for local workers and business owners, as well as tax revenues to support local government services.
Along with commercial traffic, Oregon Inlet receives significant boat traffic from recreational boaters who are drawn to the region's unique and abundant sportfishing opportunities including world renown fishing tournaments. The recreational sport fishery is vast and varied, including large "headboat" recreational fishing vessels, smaller "for-hire" charter fishing vessels, and private fishing boats. Many tourists who visit the beaches on the Outer Banks islands of Dare County include a recreational fishing trip through Oregon Inlet on their vacation itinerary. Dare County also hosts world famous sport fishing tournaments that draw still more visitors to the region. These recreational fishing activities generate additional economic benefits for the region.

The recreation and tourism industry was the largest provider of service jobs in Dare County in 2005, providing approximately 5,000 of 17,500 service jobs in the county (NCESC, 2005). Although many of these jobs are related to beach tourism and recreation, which is not dependent on Oregon Inlet navigability, a significant number of jobs in the industry are related to sport fishing, which is dependent on the inlet for access to the ocean fishing grounds which contain the fish species prized by sport fishermen.

There were a total of approximately 800 manufacturing jobs in Dare County in 2005 (NCESC, 2005). The average weekly wage of manufacturing jobs in Dare County ($582 per week) is significantly higher than the mean weekly wage in the County ($456 per week) (NCESC, 2005). Boat building businesses represented seven of the top ten manufacturing employers in the County in 2005 (NCESC, 2005). This region boasts the birthplace of "Carolina Style" boat building, a style which originated to withstand the incomparable Oregon Inlet waters and rough seas offshore of Bodie and Pea Islands. Numerous local boat builders are directly dependent on Oregon Inlet, as the valuable reputation of the boats for strength and durability is maintained by continuous research and testing in the uniquely-rough waters offshore. These boat builders provide jobs and purchase supplies from local and regional marine supply businesses.

Study Objective

The objective of this study was to examine the economic benefits of Oregon Inlet navigability to Dare County, North Carolina and the surrounding region, including northeastern North Carolina and southeastern Virginia. This study involved a thorough literature review and data collection effort, on-site interviews with individuals knowledgeable of inlet usage and related economic impacts, and detailed economic modeling and analyses. Various economic sectors including commercial fishing, recreational fishing, marine trades industries, and tourism industries were considered in the economic analyses. The economic modeling and analyses

organized economic sectors to appropriately reflect inter-connected economic groups. For example, tourism impacts were considered as those derived from recreational sport-fishing dependent on Oregon Inlet. Following a discussion of methodologies (Chapter II) and previous related studies (Chapter III), subsequent chapters will present economic analyses and associated data for the following sectors:

- Commercial Fishing
- Seafood Packing/Processing
- Boat Building and Support Services
- Recreational Fishing and Tourism

II. STUDY METHODOLOGY

This study involved a thorough literature review and data collection effort, on-site interviews with individuals knowledgeable of inlet usage and related economic impacts, and detailed economic modeling and analyses. The following details the methodologies employed in each portion of this study.

Data Collection & Literature Review

A thorough data and literature review was conducted to identify existing data and reports describing the economic benefit of Oregon Inlet to Dare County. Many historical economic studies of Oregon Inlet have been completed by the U.S. Army Corps of Engineers (USACE), Dare County, and others. In a recent study completed in December 2005, Moffatt & Nichol (M&N) evaluated the economic benefit of NC's shallow draft navigation channels to the State. For this study, extensive data and information was obtained for five key economic sectors, namely commercial fishing, recreational fishing/boating, marine trades, tourism, and commercial shipping. Previous studies are summarized in Chapter III, and data obtained and utilized in the economic analyses are presented in subsequent chapters for each economic sector analyzed.

Field Interviews

As part of the extensive data collection effort, field surveys and interviews were conducted with individuals knowledgeable of the economic significance of Oregon Inlet to the County or region. An initial list of interview contacts was made following the project kickoff meeting, through coordination with Commission members and others involved on this study. Contacts were provided for key economic sectors and included commercial fishermen, boat-builders, charter boat captains, marina operators, other business officers and local tourism offices. Survey questionnaires were developed for various sectors seeking to obtain information on inlet usage and related economic indicators (e.g. sales, expenditures). All questionnaires and interview responses are included in Appendix A.

The field interviews attempted to cover a large geographic area, to develop a better understanding of inlet usage from various geographic regions. Figure II-1 shows the general locations where field interviews were conducted. Along with providing modeling assumptions and supporting existing data used in the economic analyses, the field interviews were used to gain personal insight and perspective on how the declining condition of Oregon Inlet has impacted individuals and businesses and the expected repercussions of potential inlet closure. Information and insight gained from these interviews are discussed in subsequent chapters for each economic sector analyzed.

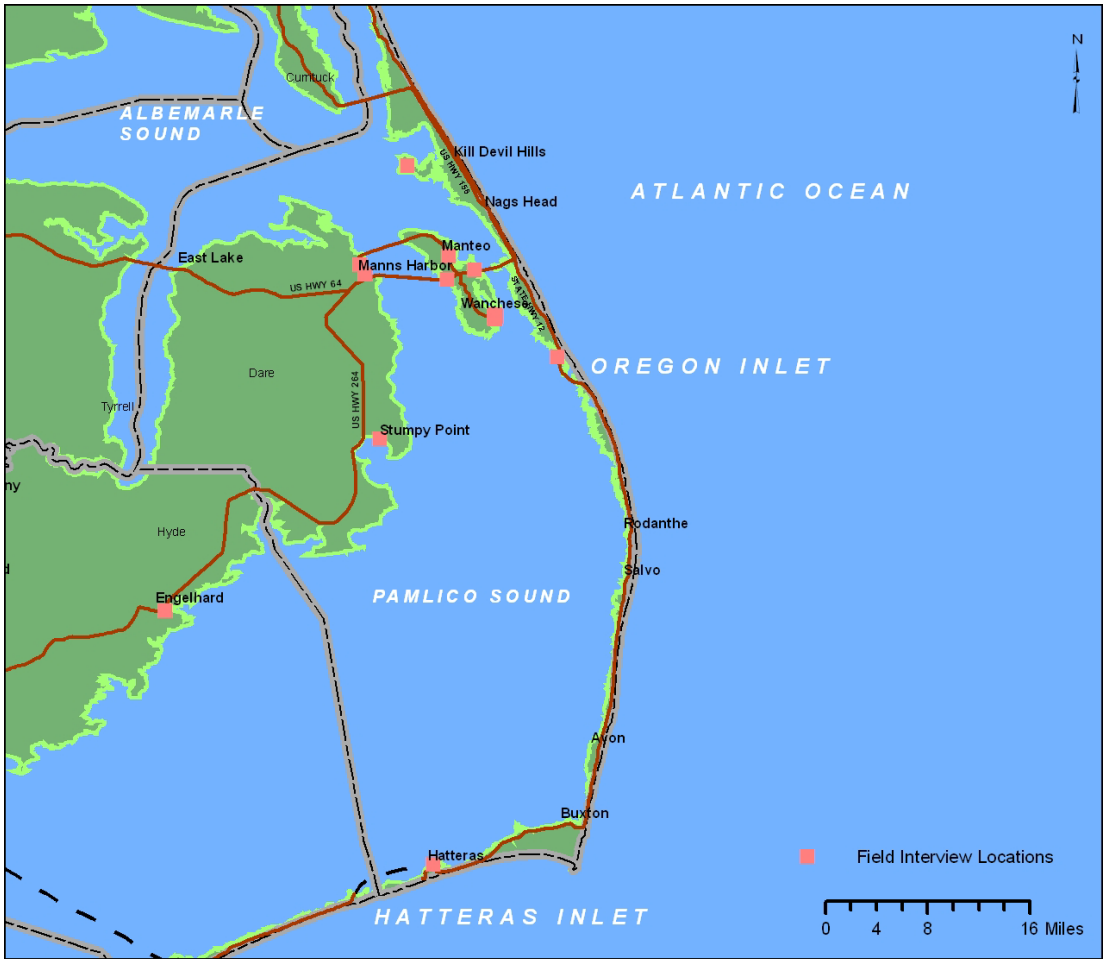


Figure II-1. Field Interview Locations

Economic Analysis Methods

The following describes methodologies and assumptions employed in the economic benefit modeling and analyses. As discussed previously, for the purposes of the economic benefits analysis, the economic benefits associated with Oregon Inlet navigability were classified into the following categories:

- Commercial Fishing and Support Services (fuel, nets, repair, dry dock, etc.)
- Seafood Packing/Processing and Support Services
- Boat Building and Support Services
- Recreational Fishing (including tournament fishing) and Support Services (lodging, food service, fuel, etc.)

For each benefit category listed above, several measures of economic benefits were calculated:

- Employment
- Economic output / business activity
- Wages/salaries/sole proprietor income/partnership income
- Rental income and corporation income
- Government tax and fee revenues

For each of the economic benefit measures listed above, benefits are sub-divided into several sub-categories:

- Direct Impacts (the direct benefits of the activity itself)
- Indirect Impacts (the benefits associated with business activities supporting the direct activity)
- Induced Impacts (benefits 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)

Together, the indirect and induced impacts are known as "economic multiplier effects". Multiplier effects track the "trickle down" effect of direct impact activities in the regional economy. Multiplier effects are calculated using the widely accepted industry standard economic input-output model methodology.

Input-output analysis 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 in 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) was used in this study to conduct the 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. Appendix B contains additional information on the IMPLAN model and the model settings used in this study.

Five types of economic impacts are considered within IMPLAN:

(1) changes in employment,
(2) changes in economic output / business activity,
(3) changes in workers' wages, salaries, and benefits, and small business (sole proprietorship and partnership) income/profits,
(4) changes in rents and corporate profits, and
(5) changes in government tax receipts at the Federal, State and local levels.

Employment results are reported as total number of jobs supported, including both full-time and part-time jobs (the data are not sufficient to distinguish full-time from part-time jobs). Results for economic impact categories (2)-(5) are reported on an annual basis.

Each of the five types of economic impacts listed above is composed of three components:

(i) the direct impact component,
(ii) the indirect impact component, and
(iii) the induced impact component.

The direct impact component measures the immediate impacts of an initial change in the economy, for example, a decrease in sales by a particular industry, or an increase in employment. 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" which 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". The term "total economic impact" refers to the total of the direct, indirect and induced impact components. The impacts reported in this study are "total economic impacts", including all multiplier effects.

In addition to the economic impacts described above, another economic benefit calculated by using other methods is the value that recreational sport fishermen receive from the experience of Oregon Inlet-related sport fishing, value beyond what is spent on goods and services needed to make the trip. This "value of the sport fishing experience" is the difference between what a fisherman would be willing to pay to take the fishing trip and what he actually paid to take the trip. This difference is known as "consumer surplus" value, because it measures the surplus value consumers receive from an experience beyond what is actually paid for the experience. This value is real and arises in many economic situations. The amount that a sport fisherman would be willing to pay for an Oregon Inlet-related fishing trip is limited by the opportunity to take other, though perhaps less satisfying, substitute trips to alternative fishing destinations. For example, although a sport fisherman might be willing to pay more for an Oregon Inlet-related sport fishing trip, due to the Oregon Inlet sport fishery's unique characteristics, the sport fisherman would not be willing to pay an infinite amount more, due to the availability of substitute fishing opportunities. This study develops an

estimate of the loss in consumer surplus value of recreational sportfishing that would occur with the loss of Oregon Inlet navigability.

Following Chapter III, which discusses previous related studies, succeeding chapters of the report provide detailed descriptions of the study methodology and benefit estimate results for the commercial fisheries, seafood packing/processing, marine trades (boat building), and recreational fisheries sectors of the economy using the analysis procedures outlined above.

III. PREVIOUS ECONOMIC STUDIES

Previous Studies Related To Oregon Inlet

As stated before, numerous studies have evaluated the economic impact of Oregon Inlet to Dare County or other regions. In particular, a majority of historical studies attempted to reconcile complex economic issues related to the proposed navigation channel and jetties, part of a project which was authorized by Congress in 1970 and later vetoed (2003). Summaries of pertinent previous work which includes studies done by USACE, Dare County, and private consultants are discussed herein.

USACE studies of Oregon Inlet have been ongoing between 1970 – 2001, including various project designs for the proposed navigation channel and jetties, four environmental impact statements, and at least four updates of the District's economic analyses. Opposition to the project has revolved around environmental concerns from Federal agencies. The Department of the Interior (DOI) denied special use permits for the proposed project citing that it would be incompatible with the existing management philosophy and guidelines for their lands adjacent to the inlet. Economic impact studies were repeatedly reanalyzed due to questioning of the viability of data utilized and key assumptions made for the cost-benefit analyses. Key limitations noted in the economic analyses included 1) data used was outdated and incomplete, 2) analyses did not adequately examine inherent risk and uncertainty in key variables, and 3) certain assumptions did not have adequate support. The estimated average annual benefits of the proposed project were determined to be $7.2 million, yielding a benefit-to-cost ratio of 1.6. In 2003, plans to stabilize the inlet with the proposed jetties and dredging, were laid to rest through a joint agreement between the USACE, National Park Service (NPS), and U.S. Fish and Wildlife Service (USFWS).

In 1985, a study was completed by the Dare County Economic Commission evaluating the impact of Oregon Inlet to the Pamlico Sound region by comparing the current value of the inlet to a future projected value with jetty construction. Economic sectors considered included commercial fishing, fish packing, and recreational fishing (including charter fishing). At the time of the study, it was noted that approximately 401 commercial boats used Oregon Inlet on an annual basis, including 289 transient boats and 112 full-time boats. The economic value of the inlet based on these factors and all of the related businesses was estimated to be $30 million at that time. The study then evaluated how much economic benefit would be added if the inlet were jettied, which was estimated at $70 million (in addition to the existing benefit of $30 million). Additionally, the report noted economic impacts which occurred during 1982-1983, when Oregon Inlet closed to navigation due to poor conditions. During this time, it was noted that six businesses closed, unemployment during the winter rose from 20% to 42%, packing houses reduced operations, and local ice companies laid off workers.

An additional economic assessment was performed in 1995 by The Horizon Planning Group, evaluating the regional economic benefits of the Oregon Inlet stabilization project. This study updated a previous USACE study (1990), describing expected economic benefits derived

from commercial and recreational fishing with the proposed stabilization project in place. Key findings included that approximately 50% of the 312 commercial fishing vessels which previously used Oregon Inlet were landing their harvests in the Hampton Roads, Virginia area. The study noted other related impacts such as loss of packing house jobs and truck driving jobs due to regional shifts in the commercial fishing industry. The study determined that the proposed stabilization project would have a benefit-to-cost ratio of 1.7. With the stabilization project in place, numerous national, state, and regional benefits were also described, such as increasing inlet usage, local jobs, and providing a safe and reliable access to harbors of refuge.

Other/Regional Economic Studies

Numerous other studies, while not directly related to Oregon Inlet, are notable. Summaries are presented herein.

Economic Study of Wanchese Seafood Industrial Park (2005)

In July 2005, a detailed economic study of the Wanchese Seafood Industrial Park was completed by Miley, Gallo & Associates, LLC. The purpose of the study was to develop a better understanding of the business environment in the Park and to determine the economic impact of the Park on three regions. The regions analyzed included Dare County, the area comprised within the Northeast Regional Partnership (16 counties in northeastern North Carolina), and the State. The study evaluated the economic activity impact, or the impact upon the respective region from the current levels of employment and production occurring in the Park.

Findings of the study defined six primary categories of businesses in the Park, including:

- Boatbuilding and Related Companies
- Marinas and Related Companies
- Charter Fishing
- Fish Packing
- Broadcasting
- Regulation and Administration

The study employed the IMPLAN (Impact Analysis for Planning) to generate a set of balanced economic/social accounts and multipliers. The analysis evaluated the direct, indirect, and induced economic effects. The economic impact of the Park was determined to be $98 million for Dare County, $101 million for the Northeast region, and $113 million to the State.

Economic Study of Pirate's Cove Big Game Tournaments (1999)

In 1999, a comprehensive study of the Pirate's Cove Big Game Tournaments near Oregon Inlet, Dare County (Ditton, 1999) was conducted under a research contract with North Carolina Sea Grant and Texas A&M University. The study focused on two tournament

events, namely the Pirate's Cove Billfish Tournament (PCBT) and the Alice Kelly Ladies Only Memorial Billfish Tournament (AKMBT). The goals of the study were to develop a better knowledge of angler expenditures and associated economic impacts on the local area. Expenditures for tournament participants from Dare County were separated from non-resident participants, in order to derive only new monies coming into Dare County. Likewise, expenditures of North Carolina residents were separated from out-of-state participants to evaluate state level impacts. A summary of pertinent statistics derived from the study are presented in Table III-1. Results presented represent direct economic impacts. Additionally, the study considered secondary or indirect economic impacts from the tournaments, resulting from additional demands for goods and services. These analyses were based on economic multipliers which in summary, determined approximately $3 million in total economic output from the tournaments.

Table III-1. Statistics from Economic Study of Pirates Cove Big Game Tournaments (Ditton, 1999)

Statistic	PCBT	AKMBT
Number of registered anglers	655	540
Percentage of anglers from locations outside of Dare County	79%	51%
Number of days fished	86% fished 3-4 days	97% fished 1 day
Average number of nights staying in area	10 nights	3 nights
Major categories of expense	Lodging, charter fees, gas and oil for boat – 59% of total direct purchases	Charter fees – 26% of total direct purchases
Total expenditures spent in Dare County by non-Dare County residents	$1.6 million	$189,949

Economic Study of Offshore Recreational Fishing Region (2002)

Finally, in 2002, a study of a prime recreational fishing area northeast of Cape Hatteras, known as "The Point" was performed to evaluate economic impacts that would result from the proposed construction of exploratory wells for potential oil and gas production by Chevron Corporation. Although not directly related to Oregon Inlet, the goals of the study included providing information on the value of recreational fishing at "The Point", and estimating the potential losses to recreational fishing if an oil spill were to occur in this area. Given the location of "The Point", it is likely a large percentage of anglers fishing in this area come from Dare County through Oregon Inlet. The study used MRFSS data from 1990 and NMFS statistics on trip numbers to estimate losses, in dollars, to recreational anglers due to various closure scenarios. The total number of trips involving private and charter boats originating in Dare County and traveling to a location greater than 3 miles offshore was estimated at approximately 97,800 for 1990. Determined economic losses from various scenarios involving closure of the site and for some scenarios prolonged reduction in available

catch (e.g. 50% reduction in probability of success for a 6-month period) ranged from as low as $1300 for off-season periods to $460,000 for peak periods and worst-case scenarios. Based on the available recreational fishing data and information described in this section, the goals for the field survey interviews and economic analyses were defined. The MRFSS data formed the basis of the economic analysis. In support of the MRFSS data, field interviews targeted major marinas and recreational fishing centers and attempted to determine usage of Oregon Inlet from areas both North and South of the inlet. Furthermore, the field surveys targeted the significance of local sportfishing tournaments and typical expenditures for recreational anglers either fishing independently or in local tournaments.

Tourism Studies

Finally, studies of the economic impact of tourism to Dare County are ongoing. In particular, these studies provide valuable information revealing the significance of fishing and boating opportunities to the tourism industry and the overall economy of Dare County.

Outer Banks Visitors Bureau "Wave" Studies (2006)

The Outer Banks Visitors Bureau, located in Manteo, recently initiated a year-long study detailing visitors and their experiences on the Outer Banks, in an effort to aid in marketing of the area and increase visitation. The study is analyzing seasonal differences. Findings for the 2005 summer and fall season were published in Januray 2006. This research, while regionally focused, has significant findings of use on this study of Oregon Inlet, including percentage of visitors pursuing recreational boating activities, and trip specifics (e.g. duration of stay, expenditures, etc.). The study involved surveying approximately 4100 visitors, yielding an accuracy of ±3.2%. First, when asked about various motivations to travel to the Outer Banks, approximately 5% of visitors noted fishing opportunities as the most important factor for both the summer and fall seasons. Additionally, the findings reported that 36% and 25%, of visitors reported that one of the activities during their stay was to "go fishing", during summer and fall, respectively. A significant percentage, 11% in summer and 4% in fall, reported that they went charter fishing during their stay. Table III-2 details trip specifics including length of stay, party sizes, and typical expenditures either taken directly or computed from results given in the report. While not specific to Oregon Inlet users, these data may prove useful in determining related tourism impacts from recreational boating.

Table III-2. Outer Banks Visitor Profile Findings

Finding	Summer	Fall
Average length of trip	6 nights	5.4 nights
Average party size	7 people	5 people
Percentage of Visitors Staying in Dare County North of Oregon Inlet	63%	69%
Percentage of Visitors Staying in Dare County South of Oregon Inlet	30%	27%
Average total expenditures per party per trip	$2691	$1641
Average expenditures per person per day	$61	$61
Expenditures on lodging per party per trip	$1468	$827
Expenditures on meals per party per trip	$471	$340
Expenditures on entertainment per party per trip	$57	$23
Expenditures on shopping per party per trip	$284	$228
Expenditures on transportation per party per trip	$253	$139

Dare County Transient Boating Study (1995)

In 1995, Dare County initiated a study geared at understanding transient boater trends through the area in an effort to attract more boaters to Dare County ports (Professional Management Group, Inc, 1995). In the context of the study, transient boaters were defined as those using the Atlantic Intracoastal Waterway (AIWW) to travel between Northern and Southern states. Since the AIWW is within a few hours by boat to Dare County ports, the goal of the study was to profile transient boaters and determine strategies to attract boaters along an alternative route through the Pamlico Sound. The study profiled various marinas throughout NC and in other States for comparison and surveyed boaters themselves, collecting data on boaters' perceptions and typical expenditures. On average, boaters surveyed indicated average expenditures of $340 per day. For power boaters only, 40% stated they spent $500 to $700 per day including fuel and dockage while approximately 25% indicated they spent $100 to $200 per day. Of those surveyed, only 6-8% indicated they had docked previously at either Roanoke Island or Hatteras. Finally, the economic analysis portion of the study summarized previous work including a 1994 study of the Pirates Cove Big Game tournaments looked at visitor expenditures on fuel, supplies, lodging, meals, shopping, and entertainment. For the summer tournaments, it was determined that average expenditures per boat per day ranged from $1,100 to $1,500. There were on average 6 people per boat. For the Fall tournaments, expenses per boat per day ranged from $750 to $1,000.

Summary

As can be seen from the above studies, the local economy of Dare County is very dependent on tourism, recreational and commercial fishing, and boat building. Please note that various items from the above studies were used within this study to supplement field interviews and survey questionnaires when needed.

IV. COMMERCIAL FISHING

Commercial fishing is a prominent sector of the North Carolina coastal economy. In 2001, there were approximately 5800 commercial fishing vessels, 4600 commercial fishermen, and 670 fish dealers in the State (Bianchi, 2003). Oregon Inlet is considered one of the most commercially vital inlets along coastal NC with fishermen from the communities of Wanchese, Manteo, Manns Harbor, and Stumpy Point in Dare County and communities in other coastal counties (e.g. Hyde, Pamlico) using the inlet. First, this chapter presents pertinent information and perspectives gained from field interviews conducted with commercial fishermen. Then the modeling methodology and analysis results for Oregon Inlet-dependent commercial fishing and support services are presented.

Commercial Fishing Interviews

Field interviews were conducted with five individuals knowledgeable about the economic significance of Oregon Inlet to Dare County's commercial fishing industry. Three interviewees are presently working as commercial fishermen and use Oregon Inlet on a regular basis. The other two interviewees are retired from the commercial fishing industry, but previously worked in the Dare County region, using Oregon Inlet frequently. The fishermen are or were previously based in the communities of Wanchese and Stumpy Point in Dare County, and Engelhard in Hyde County.

In general, all interviewees noted that the commercial fishing industry has seen a decline in the region over the past 30-40 years due to several factors, which includes the declining condition of Oregon Inlet. It was noted that in the 1960s there were approximately 40-50 different commercial seafood businesses in Dare County. However, presently there are approximately only 10-20. The small community of Stumpy Point was once a thriving commercial fishing industry in the late 1960s, with a harbor full of trawler boats. However, as years passed and the jetties at Oregon Inlet were not built, fishermen in Stumpy Point moved away from the area or simply took up other occupations. Today, an interviewee noted that only two fishermen live in the community, but operate out of Wanchese.

Present day commercial boats are significantly larger than those used historically. Due to the shallow and dangerous inlet conditions, fewer fishermen choose to operate through Oregon Inlet. Potential trips are frequently lost or shortened due to dangerous inlet conditions, resulting in a reduced catch. Also, shallow draft conditions force commercial boats to lighten tonnage so that they can pass through the inlet safely.

When asked whether they have lost income due to declining conditions of Oregon Inlet, all of the interviewees who are presently working responded that they had lost income. Two commercial seafood businesses moved a portion of their operations to Virginia in the 1980s following closing of the inlet during the winter of 1982-1983. However, current regulations enforced by National and State level Marine Fisheries make it difficult to obtain permits in other states. Summaries of the interview responses can be found in Appendix A. Overall

trends or business costs provided by the interviewees were used in the economic modeling and analyses.

Economic Modeling & Results – Commercial Fishing

Since 1994, the North Carolina Division of Marine Fisheries (NCDMF) has administered the Trip Ticket Program, a mandatory tracking initiative whereby trip level fish dealers report information about the fisherman, the dealer purchasing the product, the transaction date, the number of crew, area fished, gear used and the quantity of each species landed for each trip. NCDMF (Bianchi, 2006) provided information on Oregon Inlet-dependent commercial fishery ex-vessel value (dollar value of fish landings at dockside) from 1994 through 2005. These data are presented on Table IV-1 and Figure IV-1.

Table IV-1. Ex-vessel Value of North Carolina Commercial Fishery Landings Dependent on Oregon Inlet, 1994-2005

Year	Oregon Inlet-Dependent Value (nominal $'s)	Oregon Inlet-Dependent Value (real, inflation-adjusted $'s, 2005 base year)[1]
1994	$9,718,793	$11,646,019
1995	$12,918,800	$15,185,528
1996	$11,530,934	$13,314,374
1997	$10,040,703	$11,401,548
1998	$9,805,336	$11,011,412
1999	$10,386,236	$11,495,614
2000	$12,394,381	$13,410,938
2001	$12,068,668	$12,751,236
2002	$12,666,722	$13,181,809
2003	$10,841,628	$11,080,015
2004	$12,992,721	$12,992,721
2005	$12,910,057	$12,910,057
Average 1994-2005	$11,522,915	$12,531,773

[1] Inflation adjustment based on GDP deflator (USDC 2005).

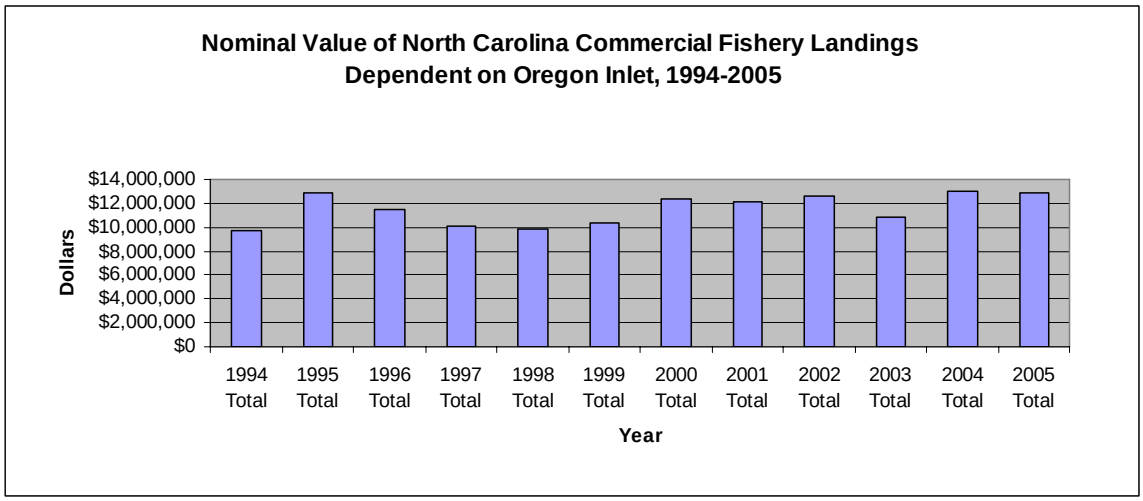


Figure IV-1. Nominal Value of North Carolina Commercial Fishery Landings Dependent on Oregon Inlet, 1994-2005

For the purposes of this analysis, value was considered "Oregon Inlet-dependent" if the following criteria were met:

- Catch was from the ocean (rather than Pamlico Sound)
- Vessel outfitted with ocean fishing gear (either trawl, longline, troll, gill net, fish pot, sea scallop dredge, or rod-n-reel)
- Vessel landings in Dare or Hyde counties (In Hyde county, one-half of the landings from Engelhard are assumed to be dependent on Oregon Inlet, while the remainder are assumed to depend on Ocracoke or Hatteras Inlets, based on interviews. All other Hyde county landings south of Engelhard are assumed to depend on Ocracoke or Hatteras Inlets.)

Landings meeting the criteria above occurred at the following North Carolina commercial fishing ports:

- Kill Devil Hills
- Kitty Hawk
- Manns Harbor
- Manteo
- Nags Head
- Rodanthe
- Stumpy Point
- Wanchese
- Englehard (1/2 of landings)

It is important to note that some NC fishing businesses based in the ports listed above also maintain boats in Virginia (Hampton, Newport News, Little Boat Harbor) or utilize other

North Carolina ports that do not use Oregon Inlet to access the ocean. For the purposes of this analysis, it is assumed that income from Virginia or non-Oregon Inlet based vessels would not be affected by the closure of Oregon Inlet.

However, the ex-vessel value data do include the landings made by vessels based outside North Carolina that traverse Oregon Inlet to land their catch at the North Carolina ports listed above. With the closure of Oregon Inlet, these out-of-state vessels would presumably land their catch elsewhere. Any losses to out-of-state vessel owners attributable to the increased costs of landing catch elsewhere are not included in the analysis. Any losses to North Carolina port cities, seafood processors, etc., resulting from the loss of North Carolina landings made by out-of-state vessels *are* included in the analysis.

As evident from the data presented in Table IV-1 and Figure IV-1, both nominal and real ex-vessel values have remained relatively constant over the last twelve years. As a result, for the purposes of this study we will use the 1994-2005 average of real (inflation adjusted) Oregon Inlet-dependent ex-vessel value, $12,500,000, as our estimate of annual, Oregon Inlet-dependent commercial fishery revenues.

Commercial Fishing Revenues, Costs, and Returns

As stated previously, field survey information was collected in February and March 2006 to determine the revenues, costs and returns of Oregon Inlet-dependent commercial fishing vessels. Owners of representative trawl and sea scallop fishing vessels were identified and interviewed. Although vessels utilizing other types of fishing gear (e.g., pots, longlines) contribute to Oregon Inlet-dependent landings, for the purpose of this analysis, the information from the trawl and scallop fishing vessel interviews is assumed to be representative. This information was supplemented by information from other studies of trawl fishing in the southeastern United States, presented in Appendix C.

For this analysis, two fishing seasons are considered based on the interviews: the traditional winter trawl season and the sea scallop season. The trawl season typically runs from November through March (165 days). Based on the interviews, the typical trawl fishing trip lasts three days. Dividing 165 days per season by 3 days per trip yields an estimate of 55 trawl fishing trips per vessel per fishing season.

The scallop fishing season typically runs from May through August, or about 120 days. Based on the interviews, the typical scallop fishing trip lasts 10 days. Dividing 120 days per season by 10 days per trip yields an estimate of 12 scallop fishing trips per season.

Commercial fishing revenues per vessel were determined for two types of vessels, trawl vessels and scallop vessels (Table IV-2 and Table IV-3). For each type of vessel, revenue per season per fishing vessel was determined by multiplying pounds landed in 2005 (as reported by the surveyed vessel owners) by average ex-vessel price/lb. in 2005 (NCDMF) for the top three species landed and summing across species. The interviews provided estimates in

pounds of the top three species landed per vessel per season (year 2005) for Oregon Inlet-dependent trawl vessels and sea scallop vessels.

Commercial fishing costs per vessel were also determined for two types of vessels, trawl vessels and scallop vessels (Table IV-2 and Table IV-3). Costs were divided into variable costs, costs that vary with the number of fishing trips, and fixed costs, overhead costs that do not vary with the number of trips. Cost information for Oregon Inlet-dependent vessels was provided by Dare County commercial fishermen who participated in the survey. Additional detail is provided below on two, more complicated aspects of vessel costs which include crew and skipper wages and vessel loan payments and depreciation.

Crew and hired skipper wages are components of variable costs. Fishing vessel crew and skippers are paid according to the "lay" or "share" system, in which crew/skippers are paid a percentage of ex-vessel revenue less other variable costs. Field interviews with local trawl vessel owners indicated that each trawl vessel carries three crew members plus a skipper. Each crew member typically receives 9% of ex-vessel revenue less variable costs, while each skipper typically receives 14%. That is, crew and skipper wages for trawl vessels are determined by the following formulas:

> Wage per trawl vessel crew member = 0.09*(Ex-vessel Revenue – Fuel Costs – Ice Costs – Grocery Cost – Other Variable Costs)
>
> Wage per trawl vessel skipper = 0.14*(Ex-vessel Revenue – Fuel Costs – Ice Costs – Grocery Cost – Other Variable Costs)

Each scallop vessel typically carries six crew members plus a skipper based on the interviews. It was assumed that a scallop vessel crew of six receives in total the same share of ex-vessel revenue less variable costs as received by trawl vessel crews, so for scallop vessel crews the share is divided by six crew members, such that each crew member receives 4.5% of ex-vessel revenue less variable costs. It was assumed that scallop vessel skippers are compensated similarly to trawl vessel skippers, 14% of ex-vessel revenue less variable costs. Therefore, crew and skipper wages for scallop vessels are determined by the following formulas:

> Wage per scallop vessel crew member = 0.045*(Ex-vessel Revenue – Fuel Costs – Ice Costs – Grocery Cost – Other Variable Costs)
>
> Wage per scallop vessel skipper = 0.14*(Ex-vessel Revenue – Fuel Costs – Ice Costs – Grocery Cost – Other Variable Costs)

An estimate of the average interest paid by a fishing boat owner on a fishing vessel loan per year is equal to the sum of 12 average monthly interest payments on a $400,000 vessel loan amortized at a 10% interest rate over 10 years. Average vessel value in the region is assumed to be $400,000 based on the interviews. It is important to note that only the interest portion of

the vessel loan payment is included as a cost. The portion of the payment going to principal results in an offsetting increase in equity on the boat owner's balance sheet and is not a "cost;" rather, it is a transfer of boat owner wealth from the form of cash to the form of vessel equity. It is assumed that depreciation is offset by maintenance costs, so effective depreciation is assumed to be zero (that is, depreciation is equal to maintenance costs, and since maintenance costs are included as a cost, depreciation is not). It is reasonable to assume that maintenance can offset depreciation because many active commercial fishing vessels in the region are thirty years old or more and are still in good operating condition with good resale value.

Returns to fishing vessel owners were estimated as revenues per season minus all costs per year. Annual fishing revenues may be underestimated if the vessel is used in other fisheries. However, the present analysis seeks to capture only Oregon Inlet-fishery dependent revenue. If the fishing vessel engages in other fishing activity in the year, then part of the fixed costs should be attributed to that other fishing activity, which would make the estimate of returns to owners from Oregon Inlet-dependent fishing somewhat higher. However, apportioning costs to non-Oregon Inlet-dependent fisheries was beyond the scope of this analysis. As a result, estimates of returns to vessel owners should be viewed as conservative.

Table IV-2. Average Revenues, Costs, and Returns per Trawl Vessel (2005 $'s)

	Value Category	Value per 3-day trip	Number of trips per season	Value per year	Annual Costs and Returns as Percentages of Annual Revenue
Revenue		$20,000	55	$1,100,000	
Variable Costs	crew share (total wages for 3 crew members)	3,483	55	191,565	17.4%
	hired skipper share	1,806	55	99,330	9.0%
	fuel	6,000	55	330,000	30.0%
	ice	400	55	22,000	2.0%
	groceries	300	55	16,500	1.5%
	other	400	55	22,000	2.0%
Fixed costs	gear			20,000	1.8%
	dry dock			10,000	0.9%
	maintenance			10,000	0.9%
	insurance			25,000	2.3%
	interest			23,432	2.1%
	permits & fees			1,000	0.1%
Annual Returns to Vessel Owner				329,173	29.9%

Table IV-3. Average Revenues, Costs, and Returns per Scallop Vessel (2005 $'s)

	Value Category	Value per 10-day trip	Number of trips per season	Value per year	Annual Costs and Returns as Percentages of Annual Revenue
Revenue		$89,250	12	$1,070,996	
Variable Costs	crew share (total wages for 6 crewmembers)	17,968	12	215,621	20.1%
	hired skipper share	9,317	12	111,803	10.4%
	fuel	18,000	12	216,000	20.2%
	ice	1,200	12	14,400	1.3%
	groceries	1,000	12	12,000	1.1%
	other	2,500	12	30,000	2.8%
Fixed costs	gear			20,000	1.9%
	dry dock			10,000	0.9%
	maintenance			10,000	0.9%
	insurance			25,000	2.3%
	interest			23,432	2.2%
	permits & fees			1,000	0.1%
Annual Returns to Vessel Owner				381,739	35.6%

Determining Proportion of Fleet Revenue Attributable to Scallop Vessels

It is important to determine the likely proportion of fleet activity and revenue attributable to scallop vessels because returns to vessel owners vary across trawl and scallop vessels, and recent trends in Dare County indicate a decrease in trawl fishing and an increase in scallop fishing. The documentation for Framework Adjustment 18 to the Atlantic Sea Scallop Fishery Management Plan (NEFMC/MAFMC 2005) provided information on the value of sea scallop landings by port. Sea scallop landings value data for 1994-2004 for Wanchese and Engelhard are presented in Table IV-4. Landings appear to be increasing but are quite variable. Only 23 percent (on average) of the sea scallops caught by North Carolina scallop vessels are landed in North Carolina. M&N survey respondents indicated that most North Carolina scallop vessels land their catch in Virginia.

Table IV-4. Value of Scallops Landed in Oregon Inlet-Dependent Ports, 1994-2004

	Value of Landings Made By North Carolina Vessels in North Carolina		Value of Landings Made By North Carolina Vessels in All States	
Year	**Wanchese**	**Englehard**	**Wanchese**	**Englehard**
1994	$0	$0	$46,000	$0
1995	$0	$0	$14,000	$0
1996	$0	$0	$3,000	$0
1997	$70,000	$0	$1,000	$0
1998	$0	$0	$485,000	$0
1999	$31,000	$3,000	$1,000	$0
2000	$64,000	$2,000	$816,000	$0
2001	$1,350,000	$56,000	$2,769,000	$122,000
2002	$1,023,000	$0	$3,378,000	$136,000
2003	$262,000	$140,000	$4,401,000	$285,000
2004	$2,000	$0	$577,000	$0
Average 1994-2004	$254,727	$18,273	$1,135,545	$49,364

As of 2004, there were 6 vessels with *limited entry* sea scallop fishery permits based in Wanchese and 1 based in Engelhard (NEFMC/MAFMC 2005). In that same year, there were 32 vessels with *general* sea scallop permits based in Wanchese and 11 in Engelhard. From 1994 to 2004, it appears that only 10 percent, at most, of the value of Oregon Inlet-dependent commercial fishery landings in North Carolina is attributable to sea scallops. However, the number of North Carolina vessels with sea scallop permits is increasing, and these vessels may land a larger proportion of their catch in North Carolina if Oregon Inlet conditions were adequate. Nonetheless, at most (2003), even if all scallops caught by NC vessels were landed in NC, only 41 percent of the value of Oregon Inlet-dependent landings would be attributable to scallops. Taking all of these factors into consideration**, for the purposes of this analysis we assume that, on average, and based on more recent trends, 25 percent of the Oregon Inlet-dependent commercial fishery revenue is attributable to scallops.**

Determining Oregon Inlet-Dependent Fleet Revenues, Costs, and Returns

Under the assumptions that (1) the average value of Oregon Inlet-dependent commercial fisheries landings is $12,500,000 (2005 $'s) and (2) twenty-five percent of the value of Oregon Inlet-dependent commercial fishery revenues are attributable to the scallop fishery, with the remaining seventy-five percent attributable to the trawl fishery, the per-vessel revenue, costs and returns figures presented in Table IV-2 and Table IV-3 are expanded to aggregate, fleet-level values for each of the two fisheries and the two fisheries combined (using the percentage calculated in Table IV-2 and Table IV-3). The resulting values are presented in Table IV-5 (for trawl vessels only), Table IV-6 (for scallop vessels only), and Table IV-7 (for trawl and scallop vessels combined).

Table IV-5. Annual Oregon Inlet-Dependent Trawl Vessel Fleet Revenues, Costs, and Returns

	Value Category	Annual Costs and Returns as Percentages of Annual Revenue	Value (2005 $'s)
Revenue			$9,375,000
Variable Costs	crew share (total wages for 3 crew members)	17.4%	$1,632,656
	hired skipper share	9.0%	$846,563
	fuel	30.0%	$2,812,500
	ice	2.0%	$187,500
	groceries	1.5%	$140,625
	other	2.0%	$187,500
Fixed costs	gear	1.8%	$170,455
	dry dock	0.9%	$85,227
	maintenance	0.9%	$85,227
	insurance	2.3%	$213,068
	interest	2.1%	$199,708
	permits & fees	0.1%	$8,523
Annual Returns to Vessel Owners		29.9%	$2,805,449

Table IV-6. Annual Oregon Inlet-Dependent Scallop Vessel Fleet Revenues, Costs, and Returns

	Value Category	Annual Costs and Returns as Percentages of Annual Revenue	Value (2005 $'s)
Revenue			$3,125,000
Variable Costs	crew share (total wages for 6 crew members)	20.1%	$629,148
	hired skipper share	10.4%	$326,225
	fuel	20.2%	$630,254
	ice	1.3%	$42,017
	groceries	1.1%	$35,014
	other	2.8%	$87,535
Fixed costs	gear	1.9%	$58,357
	dry dock	0.9%	$29,178
	maintenance	0.9%	$29,178
	insurance	2.3%	$72,946
	interest	2.2%	$68,372
	permits & fees	0.1%	$2,918
Annual Returns to Vessel Owners		35.6%	$1,113,856

Table IV-7. Annual Oregon Inlet-Dependent Total Fleet (Trawl and Scallop Combined) Revenues, Costs, and Returns

	Value Category	Annual Costs and Returns as Percentages of Annual Revenue	Value (2005 $'s)
Revenue			$12,500,000
Variable Costs	crew wages	18.1%	$2,261,805
	skipper wages	9.4%	$1,172,788
	fuel	27.5%	$3,442,754
	ice	1.8%	$229,517
	groceries	1.4%	$175,639
	other	2.2%	$275,035
Fixed costs	gear	1.8%	$228,811
	dry dock	0.9%	$114,406
	maintenance	0.9%	$114,406
	insurance	2.3%	$286,014
	interest	2.1%	$268,080
	permits & fees	0.1%	$11,441
Annual Returns to Vessel Owners		31.4%	$3,919,305

IMPLAN Modeling Analysis

The full economic impacts of Oregon Inlet-dependent commercial fishing activity are estimated using the IMPLAN model to conduct regional input-output analysis (see Chapter II, Economic Analysis Methods). Input-output analysis requires a defined study region. Dare and Hyde counties, North Carolina, comprise the study region considered in the commercial fishery impacts portion of this analysis. For Dare County, the ports of Kill Devil Hills, Kitty Hawk, Manns Harbor, Manteo, Nags Head, Rodanthe, Stumpy Point, and Wanchese are included. For Hyde County, only the Oregon Inlet-dependent landings occurring in the port of Engelhard are included. It is assumed that one-half of the value of the ocean commercial fishery landings in Engelhard are Oregon Inlet-dependent. The remaining value is assumed dependent on Ocracoke and/or Hatteras Inlets. Landings at other Hyde county ports are assumed fully dependent on Ocracoke and/or Hatteras Inlets.

As discussed in Chapter II, Economic Analysis Methods, the economic analysis considers five types of impacts:

1. Changes in employment
2. Changes in economic output / business activity
3. Changes in workers' wages, salaries, and benefits, and small business (sole proprietorship and partnership) income/profits
4. Changes in corporate profits
5. Changes in government tax receipts at the Federal, State and local levels

Employment results are reported as total number of jobs supported, including both full-time and part-time jobs (the data are not sufficient to distinguish full-time from part-time jobs). Results for economic impact categories (2)-(5) listed above are reported on an annual basis.

Please recall that for each of the five types of impacts, direct, indirect, and induced economic impact components are calculated. The direct impact component measures the immediate impacts of direct fishery revenues. The indirect impact component measures the economic "ripple effects" on industries that supply/service the directly-impacted industries. For example, 24 marinas and boatyards that service the fishing industry are located in Dare County, NC (NCWaterways.com). The induced impact component measures "consumer spending feedback effects", or additional consumer spending by the employees and owners of the businesses affected by the direct and indirect impacts. Again, the indirect and induced impacts together are sometimes called "economic multiplier effects." The term "total economic impact" refers to the total of the direct, indirect and induced impact components. The impacts reported in this study are "total" impacts, including all multiplier effects.

Direct Economic Impacts of Crew Wages, Skipper Wages, and Vessel Owner Returns

Direct economic impacts of wages and vessel owner returns are estimated by subtracting estimated taxes (except local property taxes) and savings from wages and vessel owner (sole proprietor) income. The direct impact dollars are then run through the input-output economic impact model to estimate indirect and induced impacts (i.e., economic "multiplier effects"). The reason that taxes (except local property taxes) and savings are removed from wages and owner income before calculating economic impacts is because most tax dollars and savings dollars leave Dare County and are not re-spent within the county. However, local property taxes are directed to the local government sector to be re-spent within the region. (Note: Local sales taxes paid by crew, skippers and vessel owners are also included since they remain to be re-spent within the region. However, local sales taxes are not calculated based on household income. Rather, sales taxes are calculated later in the IMPLAN modeling process, based on the goods and services purchased in the local region by crew, skippers and vessel owners.)

For the purpose of accounting for savings, we assume that crew, skippers and vessel owners have household incomes between $25,000/yr and $150,000/yr. The average savings rate for U.S. households with household incomes between $25,000/yr and $150,000/yr is approximately 5.5% of pre-tax household income (USBEA-REIS 2002).

For tax purposes, we assume that crewmembers have household incomes between $25,000/yr and $75,000/yr while skippers and vessel owners have household incomes greater than $75,000/yr. The average tax rate (including Federal, state and local taxes, but excluding Social Security, Medicare, and local property taxes) for Dare County households with household incomes between $25,000/yr and $75,000/yr is approximately 15.6% of household income, whereas the average net tax rate for Dare County households with household incomes

greater than $75,000/yr is approximately 27.3% of household income (USBEA REIS 2002). The Internal Revenue Service (Sec. 3121(b)(20), I.R.C.) considers fishing boat crew and skippers who are compensated under the lay/share system and who work on vessels with a crew size of less than 10 to be self-employed. As a result, crew members and skippers pay the full 15.30% in self-employment Social Security and Medicare taxes. Vessel owners as sole proprietors also pay the full 15.30% in self-employment Social Security and Medicare taxes. The typical local property tax rate for unincorporated areas of Dare County in 2003 was $0.82 per $100 valuation (Dare County 2006), or approximately $0.034 per dollar of pre-tax county household income.

Of the $12.5 million in Oregon Inlet-dependent total fleet revenues, it is estimated that $2,261,805 is paid in crew wages, $1,172,788 in skipper wages, and $3,919,305 remains as income to vessel owners (see Table IV-7). For the purposes of this analysis, we assume that vessel owners are sole proprietors. Estimated wages, vessel owner income, savings, taxes leaving the county, and taxes remaining in the county (property taxes), and remaining disposable income (net of savings) by household income category are presented in Table IV-8.

Table IV-8. Annual Oregon Inlet-Dependent Commercial Fishing Income, Taxes, Savings, and Disposable Income (2005 $'s)

Household Category	Household Income Range	Gross Annual OI-Dependent Fishing Income	Taxes[1] Leaving County	Local Property Taxes Remaining In County[2]	Household Savings[3]	Household Direct Spending[4]
Crew	$25,000-$75,000	$2,261,805	$698,898	$76,901	$124,399	$1,361,606
Hired Skippers	Greater than $75,000	$1,172,788	$499,608	$39,875	$64,503	$568,802
Vessel Owners	Greater than $75,000	$3,919,305	$1,669,624	$133,256	$215,562	$1,900,863
	Totals	$7,353,897	$2,868,129	$250,032	$404,464	$3,831,271

[1] Taxes Leaving County = (net Federal and state income taxes) + (Social Security and Medicare taxes) = (15.6% (crew) or 27.3% (skippers & owners) of Gross Annual Income) + (15.3% of Gross Annual Income)
[2] Local Property Taxes = 3.4% of Gross Annual Income. (Average for Dare County, NC)
[3] Household Savings = 5.5% of Gross Annual Income. (U.S. average for relevant income categories.)
[4] Household Direct Spending = Gross Annual Income - All Taxes - Household Savings.

It is assumed that household direct spending (gross income less taxes and savings) is spent by commercial fishermen on various goods and services according to average household expenditure patterns by household income category as measured by the U.S. Consumer Expenditure Survey (USBLS 2002). Some of these expenditures will occur inside Dare County, and some will occur outside Dare County. The IMPLAN database (MIG 2005)

contains information on the percentages of expenditures by Dare County residents occurring inside vs. outside Dare County for each product category. Expenditures occurring inside Dare County contribute to the county multiplier effect, whereas expenditures occurring outside the County do not.

Direct Economic Impacts of Non-Wage Fishing Vessel Expenditures

The direct economic impacts of non-wage fishing vessel expenditures (i.e., expenditures on fuel, ice, dry dock, etc.) are equal to the non-wage variable costs and fixed costs shown in Table IV-7.

Direct Economic Impacts of Local Property Taxes

Although Federal and state income taxes, such as Social Security taxes and Medicare taxes, largely leave the study region, property taxes are paid to local government, which in turn uses the property tax revenue to provide goods and services to the region. Hence, local property taxes contribute to the local multiplier effect. The direct property taxes paid by Oregon Inlet-dependent fishing crew, skippers and vessel owners are estimated at $250,032 annually, based on an average of 3.4% of gross annual household income paid in property taxes in Dare County, NC, in 2003 (Dare County 2006). It is assumed that property taxes are deposited into the county government general fund, and it is assumed that the distribution of local government expenditures across government functions is approximated by the State and Local Government Non-Education Institution expenditure profile for Dare County in the IMPLAN database.

Indirect, Induced and Total Economic Impacts

The direct spending by fishing households, plus local property taxes paid by fishing households, plus the direct non-wage expenditures of fishing vessels (i.e., expenditures on fuel, ice, dry dock, etc.) give rise to indirect and induced economic impacts (multiplier effects). The IMPLAN economic input-output model is used to estimate the multiplier effects (i.e., the indirect and induced impacts) arising from direct spending. Output tables resulting from IMPLAN with direct, indirect, induced, and total economic impacts by industry are lengthy and are therefore included in Appendix D on Tables D-1 through D-4. The total impacts on government tax revenues are included on Table D-5. All dollar-denominated results are reported in year 2005 dollars. As stated previously, impact estimates are provided for five impact categories:

- Employment
- Economic output / business activity
- Wages/salaries/sole proprietor income/partnership income
- Rental income and corporation income
- Government tax and fee revenues

Economic Impacts Summary

If the navigability of Oregon Inlet is not maintained, then interview responses indicate that most commercial fishing vessels would choose to remain in the fishing business but would relocate their fishing operations to other ports, most likely located in Virginia. Vessel owners would need to pay relocation costs for their vessels and for their families if moved to a new port. Crew and skippers would also pay relocation costs for themselves and their families. Once in the new port, vessel owners may incur additional costs if their vessels require different types of fishing gear. Vessel owners may also need to purchase different fishing permits if different fish species are available in the new ports or if different state permits are required by the new port state. Vessel owners may also suffer a loss of value if they are forced to surrender valuable North Carolina fishing permits or are forced to pay higher prices for North Carolina permits because they are now "out-of-state" residents. Due to the multiplicity of factors involved and the lack of data to estimate the effects, it is difficult to assess the net losses of relocation to fishermen themselves. Instead, we focus on the loss to Dare County. If the fishermen were to relocate due to a loss of navigability in Oregon Inlet, Dare County would lose the employment, wages, and profits of the crew, skippers and vessel owners. The total of direct losses to Dare County (taken from Tables D-1 through D-5 in Appendix D) are reported on
Table IV-9.

Other Dare County employees and businesses owners would also suffer reductions in employment, wages, rents and profits due to economic multiplier effects. These total losses are also reported on
Table IV-9 in the indirect and induced impacts columns (taken from Tables D-1 through D-4 in Appendix D). Finally, the combined effects of direct, indirect and induced impacts are presented as total impacts in
Table IV-9 (sum of total columns on Tables D-1 through D-4 in Appendix D). In terms of impacts on government tax and fee revenues (taken from Table D-5 in Appendix D), only the total impacts are presented, as the IMPLAN modeling software produces estimates of total impacts only for taxes and fees. If we assume that the Federal government would receive similar revenues and fees if the vessels relocate to another state, then the Federal government portion of the impacts should not be included in the overall impact estimate. However, should vessels relocate, the Dare County and State of North Carolina governments would face reductions in tax collections and revenues. The economic impacts on the Dare County and North Carolina state governments are given by the "State/Local Govt" values only in
Table IV-9.

Table IV-9. Summary of Oregon Inlet-Dependent Commercial Fishing Economic Impacts

	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output[1]	$4,120,644	$577,588	$2,454,129	$7,152,357
Employment[2]	49.1	7.7	32.8	89.6
Wages/Salaries/ Proprietor Profits[3]	$1,466,157	$198,206	$1,056,291	$2,720,657
Rent/Corp Profits[4]	$824,766	$126,880	$393,182	$1,344,828
Fed Govt[5]				$895,555
State/Local Govt[5]				$488,250

[1] Output/Business Activity Impacts (2005 $'s)
[2] All jobs, full-time and part-time
[3] Wages/Salaries/Sole Proprietorship/Partnership Income Impacts (2005 $'s)
[4] Rental Income and Corporation Income Impacts (2005 $'s)
[5] Government Tax and Fee Revenue Impacts (2005 $'s)

V. SEAFOOD PACKING & PROCESSING

A number of support businesses have located in Dare County to service and supply the commercial fishing vessels. Once fish are landed, seafood packing and processing businesses prepare the catch for market. In fact, several commercial fishermen also have packing and processing operations within their businesses. All of these activities generate jobs, wages, and profits for local workers and business owners, as well as tax revenues to support local government services. There were no field interviews performed that specifically addressed the seafood packing and processing industry. However, interviews with commercial fisherman and others emphasized the presence and significance of this industry. For example, five days a week, Wanchese Fish Company's trucks deliver seafood caught by their boats and other North Carolina companies across the East Coast. Their trucks go to Boston, Baltimore, Philadelphia and New York markets. They send at least five trucks a week to New York and sometimes as many as 10 to 15. This chapter presents detailed information on modeling methodology and analysis results for the Oregon Inlet-dependent seafood packing and processing sector of the Dare County economy.

Economic Modeling & Results – Seafood Processing & Packing

Based on the interview responses and for the purposes of this analysis, it was assumed that there are 6 commercial seafood packing and processing businesses located in Wanchese, with 4 or 5 located within the Wanchese Seafood Industrial Park, all located in Dare County. The IMPLAN database has average employment, wages, profits, taxes, etc., per dollar of industry sales revenue for over 500 industries, based on US government surveys of the industries. Since direct survey data is limited for the seafood packing and processing sector, the IMPLAN database is used to estimate direct employment and wages/salaries.

IMPLAN Modeling Analysis

The full economic impacts of Oregon Inlet-dependent seafood packing/processing activity were estimated using the IMPLAN model to conduct regional input-output analysis (see Chapter II, Economic Analysis Methods). Appendix B contains the specific IMPLAN modeling assumptions made for the seafood packing/processing sector. Input-output analysis requires a defined study region. As all known seafood packing/processing businesses of interest are located in Wanchese, Dare County was used as the study region.

As discussed in Chapter II, Economic Analysis Methods, the economic analysis considers five types of impacts:

1. Changes in employment
2. Changes in economic output / business activity
3. Changes in workers' wages, salaries, and benefits, and small business (sole proprietorship and partnership) income/profits
4. Changes in rents and corporate profits
5. Changes in government tax receipts at the Federal, state and local levels

Employment results are reported as total number of jobs supported, including both full-time and part-time jobs (the data are not sufficient to distinguish full-time from part-time jobs). Results for economic impact categories (2)-(5) are reported on an annual basis. Each of the five types of economic impacts listed above is composed of three components: (i) the direct impact component, (ii) the indirect impact component, and (iii) the induced impact component.

Direct Economic Impacts

To determine the direct impacts, emphasis was placed on the portion of the seafood packing/processing business in Dare County that is dependent on Oregon Inlet. As a result, the analysis of Oregon Inlet-dependent seafood packing/processing was based on the estimates of Oregon Inlet-dependent commercial fishery landings detailed in Chapter IV, Commercial Fishing. It was assumed that 100% of the Oregon Inlet-dependent trawl and scallop fishery catch is packed and processed in Dare County. Although some of the scallop catch is currently landed in Virginia, it was assumed that all would be landed in Dare County under baseline conditions (i.e., if the inlet were properly maintained). It was also assumed that the average annual value of Oregon Inlet-dependent commercial fisheries landings in Dare County is $12,500,000 (2005 $'s), as per commercial fishing section of this study (see Table IV-7).

Indirect, Induced and Total Economic Impacts

Since detailed cost and earnings data for the seafood processing sector in Dare County are not readily available, assumptions were made based on data for the seafood processing sector in the IMPLAN database and prior studies (see Appendix B for IMPLAN modeling assumptions). The IMPLAN database provides average cost and earnings information for the national seafood processing sector (IMPLAN sector 71) of the U.S. economy in 2002. On average, the cost of raw fish alone accounts for $0.285033 of every sales dollar. However, on average, the U.S. seafood industry produces a product that is more highly processed than the typical whole fish and fish fillet products produced in Dare County. Trow (1985) found that the cost of raw fish accounted for $0.73 of every sales dollar for fish packing houses in Dare County in the early 1980s, where fish were simply weighed, separated by species, graded by size, iced down, and packaged in cartons. The National Fisheries Education and Research Foundation (NFERF 1989) found that raw fish accounted for $0.42 to $0.52 of every sales dollar for whole flounder, filleted flounder, and scallop seafood processors in the South Atlantic region of the U.S. in the late 1980s. **For the purposes of this study, a value of $0.50 was used as the average cost of raw fish per dollar of seafood packer/processor sales revenue.** This value lies midway between the IMPLAN value of $0.285033 (representing more highly-processed seafood) and the Trow value of $0.73 (representing less highly-processed seafood) and close to the NFERF values of $0.42-$0.52. The IMPLAN model parameters were adjusted to reflect this assumption.

The IMPLAN database indicates that on average, across the U.S. seafood processing sector in 2002, employee wages and benefits account for $0.16 of every sales dollar, while business owner profits account for $0.01, and indirect business taxes account for $0.01. Under the

assumption of $0.50 as the average cost of raw fish per dollar of sales revenue, the NFERF study found that wages and benefits were $0.06-$0.14 per sales dollar in the South Atlantic region in the late 1980s, while profits were $0.04-$0.06 per sales dollar, and indirect business taxes were $0.005-$0.02 per sales dollar. **For the purposes of this study, it was assumed that employee wages and benefits account for $0.12 of every sales dollar, with profits and indirect business taxes accounting for $0.03 and $0.01, respectively, per sales dollar.** The IMPLAN model parameters were adjusted to reflect these assumptions.

Assuming that (1) $12,500,000 in Oregon Inlet-dependent commercial fishery landings are purchased by Dare Co. seafood processors as raw fish input, and (2) $0.50 in raw fish input is purchased for every dollar of sales revenue, an estimate of $25,000,000 is derived for annual Oregon Inlet-dependent seafood packing/processing sales in Dare Co. (2005 $'s). The multiplier effects of the $12,500,000 in raw fish input are presented in Chapter IV, reporting the economic impacts of the commercial fishing sector. The multiplier effects of the remaining $12,500,000 in seafood processing sales revenue are calculated using IMPLAN model sector 71 (seafood product preparation and processing) by telling the model that all raw fish input is imported from outside the region (this last assumption ensures that IMPLAN does not double-count the regional multiplier effects of the raw fish input, reported in the commercial fishing section of this study).

Output tables resulting from IMPLAN with direct, indirect, induced, and total economic impacts by industry are lengthy and are therefore included in Appendix E on Tables E-1 through E-4. The total impacts on government tax revenues are included on Table E-5. All dollar-denominated results are reported in year 2005 dollars. As with commercial fishing, impact estimates are provided for five impact categories:

- Employment
- Economic output / business activity
- Wages/salaries/sole proprietor income/partnership income
- Rental income and corporation income
- Government tax and fee revenues

Economic Impacts Summary

A summary of the economic impact of the Dare County seafood packing/processing industry within Dare County is presented in Table V-1. It is assumed that if Oregon Inlet is closed, Oregon Inlet-dependent fishery landings would be lost, and the associated economic impacts presented in Table V-1 would be lost. The seafood packer/processors might remain in business, depending on the volume of non-Oregon Inlet-dependent fishery landings available for packing/processing, but the economic benefits to the region would be reduced by the amounts shown in
Table V-1Table V-1 were the Oregon Inlet-dependent landings to be lost.

Within Dare County, an estimated $33,425,367 in economic output is supported by the seafood packing/processing industry, including multiplier effects. An estimated 238 total jobs are supported. Total wages, salaries, rents and profits supported in the county amount to more than $8.4 million. The Federal government receives $2.1 million in taxes and fees, and local and state governments receive approximately $0.9 million, from seafood packing/processing industry activity and that of supplying businesses and supported household spending.

Table V-1. Summary of Oregon Inlet-Dependent Seafood Packing/Processing Economic Impacts

Impact Category	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output[1]	$25,000,000	$3,463,326	$4,962,043	$33,425,367
Employment[2]	132	38	68	238
Wages/Salaries/ Proprietor Profits[3]	$3,757,228	$1,220,714	$2,134,399	$7,112,340
Rent/Corp Profits[4]	$0	$510,112	$874,634	$1,384,746
Fed Govt[5]				$2,149,376
State/Local Govt[5]				$890,092

[1] Output/Business Activity Impacts (2005 $'s).
[2] All jobs, full-time and part-time.
[3] Wages/Salaries/Sole Proprietorship/Partnership Income Impacts (2005 $'s).
[4] Rental Income and Corporation Income Impacts (2005 $'s). Note: All seafood processors assumed to be sole proprietorships or partnerships rather than corporations for the purposes of calculating direct impacts. Any corporation profits included in direct impacts are included under the "Wages/Salaries/Proprietor Profits" category.
[5] Government Tax and Fee Revenue Impacts (2005 $'s).

VI. BOAT BUILDING & SUPPORT SERVICES

The boat building business has a significant impact on the Dare County economy. Boat building businesses represented seven of the top ten manufacturing employers in Dare County in 2005, accounting for approximately 500 of the 800 manufacturing jobs in the County (NCESC, 2005). An additional 88 business located in northeastern NC counties provide marine-related supplies and direct support services to the boat building and boatyard industries (NCwaterways.com). Given an estimated winter employment in Dare County of 19,771 jobs (NCESC 2005), the boat building sector directly or indirectly supports about 5% (956 jobs) of off season county employment. An estimated 266 additional jobs are supported in surrounding counties within the region.

This region boasts the birthplace of "Carolina Style" boat building, a style which originated to withstand the incomparable Oregon Inlet waters and rough seas offshore of Bodie and Pea Islands. Local boat builders are directly dependent on Oregon Inlet, as the valuable reputation of the boats for strength and durability is maintained by continuous research and testing in the uniquely rough waters offshore.

This chapter will present pertinent information and perspectives gained from field interviews conducted with several local boat-builders followed by modeling methodology and analysis results for Oregon Inlet-dependent boat building and support services.

Boat Building & Support Services Interviews

Field interviews were conducted with five individuals including four current owners of boat-building businesses and one individual owner of numerous support service businesses. All boat-builders interviewed built custom sport-fishing yachts (typically 60-70 feet). In general, all interviewees stressed the significance of the boat-building industry to the local and regional economies. Interviewees noted that previous economic studies had not considered the importance of this industry.

As noted, local boat builders are directly dependent on Oregon Inlet, as the valuable reputation of the boats for strength and durability is maintained by continuous research and testing in the uniquely rough waters offshore. When asked, "*If Oregon Inlet were not navigable, would your annual sales increase, decrease, or not change? If an increase or decrease, estimate the percentage change*", interviewees consistently responded that their business would see a decrease in annual sales. The estimated percentage change ranged from 50% to 100%. Boat-builders further noted that a significant amount of their business and exposure arises from local fishing tournament participants who are drawn to the area's unique sport-fishing yachts.

Despite the range in expected revenue decreases, a majority of interviewees noted that if Oregon Inlet were not navigable, they would likely close their business. One interviewee noted that trying to pick up and move their boat-building business to another location other

than Dare County (Oregon Inlet), would be comparable to trying to grow Vidalia onions somewhere other than Vidalia, Georgia. It was noted that employees in the boat-building businesses would likely relocate to another inlet North or South where they could use their trade in the boat-building industry.

Loss of navigability of Oregon Inlet would also have a significant impact on marine support service businesses located in the area, as noted by one interviewee who owned three marine related businesses in the area. These businesses which directly support the boat-building businesses, among other marine related sectors, included a marine maintenance facility, a marina and dry storage facility and a welding business, supplying aluminum and stainless steel products for charter and private boats, fishing rod racks, and performing all types of marine fabrication. With the exception of the marina (dry storage facility), this interviewee noted that the businesses would all experience a devastating loss of revenue if Oregon Inlet were not navigable. Since the marina accommodates smaller boats, which may be able to navigate the inlet at shallower depths, this business would see the least impact, however still significant.

Economic Modeling & Results – Boat-Building & Support Service Industries

Based on the field interviews, it was assumed that 16 boat building companies exist in Dare County producing custom sport fishing yachts. These companies directly employ a total of 500-600 workers. From April 2005 through February 2006, 17 boats were built. As of March 2006, approximately 37 boats were under construction. The sales price per boat ranges from $2 million to $4 million, with an average sales price of $2.5 million in 2005 dollars. Dare County boat builders buy some of their materials locally, including glass, electronics, fuel and water tanks, and miscellaneous small tools and hardware items. For example, Harbor Welding provides fuel tanks and water tanks to boat builders. Many other production inputs are purchased from vendors located outside Dare County; however, several large boat building materials supply companies (e.g. Lewis Marine (marine supply), located in Edenton, NC, Paxton (marine supply), located in Norfolk, VA, and World Panel Products (wood supply), located in Windsor, NC) have moved into the region to service Dare County.

IMPLAN Modeling Analysis

The full economic impacts of Oregon Inlet-dependent boat building activity are estimated using the IMPLAN model to conduct regional input-output analysis (see Chapter II, Economic Analysis Methods). Appendix B includes specific IMPLAN modeling assumptions and settings for the boat building sector. Input-output analysis requires a defined study region. As the boat building businesses of interest are located in Dare County, NC, this county is included in the study region. In addition, surrounding counties in northeastern North Carolina (Beaufort, Bertie, Camden, Carteret, Chowan, Currituck, Dare, Gates, Hertford, Hyde, Martin, Pamlico, Pasquotank, Perquimans, Tyrrell, Washington) and southeastern Virginia (Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, Suffolk, and Virginia Beach)

are included in the study region, as businesses in these counties supply and service the boat builders located in Dare County (see Figure VI-1).

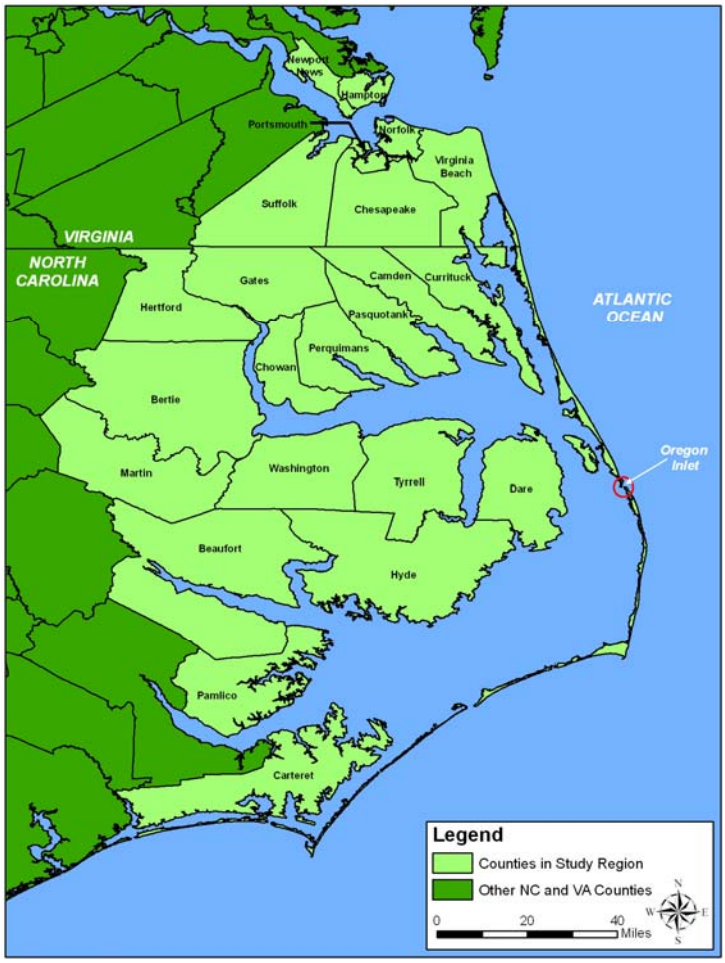


Figure VI-1. NC and VA Counties Included in Economic Analysis of Boat-Building Sector

As discussed in Chapter II, Economic Analysis Methods, the economic analysis considers five types of impacts:

1. Changes in employment
2. Changes in economic output / business activity
3. Changes in workers' wages, salaries, and benefits, and small business (sole proprietorship and partnership) income/profits
4. Changes in rents and corporate profits
5. Changes in government tax receipts at the Federal, state and local levels

Employment results are reported as total number of jobs supported, including both full-time and part-time jobs (the data are not sufficient to distinguish full-time from part-time jobs).

Results for economic impact categories (2)-(5) are reported on an annual basis. Each of the five types of economic impacts listed above is composed of three components:
(i) the direct impact component, (ii) the indirect impact component, and (iii) the induced impact component.

Direct Economic Impacts

Based on the foregoing information, for the purposes of this analysis, we assume that 30 boats/yr will be built in Dare County at an average sales price of $2.5 million per boat, producing a direct impact of $75 million in output/business activity for the boat building sector of the economy.

Indirect, Induced and Total Economic Impacts

Multiplier effects (indirect and induced impacts) were calculated for two geographic regions, (1) Dare County, and (2) a larger region consisting of Dare County and the surrounding counties in northeastern North Carolina and southeastern Virginia (see Figure VI-1). The larger regional analysis is performed to capture the economic impacts of a reduction in Dare County boat building activity on boat building materials and service-supplying companies in the region. The indirect impact component measures the economic "ripple effects" on industries that supply/service the directly-impacted industries. The induced impact component measures "consumer spending feedback effects".

Output tables resulting from IMPLAN with direct, indirect, induced, and total economic impacts by industry are lengthy and are therefore included in Appendix F on Tables F-1 through F-10. The total impacts on government tax revenues are included on Table F-5 and F-10, where F-5 considers only North Carolina impacts and Table F-10 includes North Carolina and Virginia impacts. All dollar-denominated results are reported in year 2005 dollars. Impact estimates are provided for five impact categories:

- Employment
- Economic output / business activity
- Wages/salaries/sole proprietor income/partnership income
- Rental income and corporation income
- Government tax and fee revenues

<u>Economic Impacts Summary</u>

Summaries of the economic impacts of the Dare County boat building industry within Dare County and on the region are presented in
Table V-1 and Table VI-2, respectively. It is assumed that since these businesses are dependent on access to Oregon Inlet for testing their craft and maintaining the reputation of their brands for toughness and durability, if Oregon Inlet is closed, these businesses would close, and their economic impacts on the region would be lost. This is consistent with responses received in the field interviews.

Within Dare County, an estimated $110,523,231 in economic output is supported by the boat building industry, including multiplier effects. A total of 956 jobs are supported. Total wages, salaries, rents and profits supported in the region amount to more than $50 million. The Federal government receives $10.1 million while the local and state governments receive $3.2 million in taxes and fees from the Dare County boat building industry, supplying businesses, and supported household spending.

Accounting for regional economic impacts outside Dare County increases impact estimates by approximately 27%. Taking the differences of the indirect and induced impacts numbers across Table VI-1 and Table VI-2 provides estimates of the regional economic impacts occurring outside Dare County. For example, an additional $29,318,036 ($139,841,567 - $110,523,231) in regional economic output is supported outside Dare County by the purchases of Dare County boat building businesses.

Table VI-1. Summary of Oregon Inlet-Dependent Boat Building and Support Services Economic Impacts (Dare County Only)

Impact Category	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output[1]	$75,000,016	$7,203,796	$28,319,415	$110,523,231
Employment[2]	508	80	368	956
Wages/Salaries/ Proprietor Profits[3]	$18,106,164	$2,567,350	$11,618,812	$32,292,326
Rent/Corp Profits[4]	$12,285,552	$1,535,627	$4,689,862	$18,511,042
Fed Govt[5]				$10,110,119
State/Local Govt[5]				$3,235,075

[1] Output/Business Activity Impacts (2005 $'s)
[2] All jobs, full-time and part-time
[3] Wages/Salaries/Sole Proprietorship/Partnership Income Impacts (2005 $'s)
[4] Rental Income and Corporation Income Impacts (2005 $'s)
[5] Government Tax and Fee Revenue Impacts (2005 $'s)

Table VI-2. Summary of Oregon Inlet-Dependent Boat Building and Support Services Economic Impacts (Northeastern NC, Including Dare County and Southeastern VA)

Impact Category	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output[1]	$75,000,016	$17,850,501	$46,991,050	$139,841,567
Employment[2]	508	141	573	1,222
Wages/Salaries/ Proprietor Profits[3]	$18,106,164	$5,700,022	$22,453,857	$46,260,044
Rent/Corp Profits[4]	$12,285,552	$3,438,722	$6,844,933	$22,569,207
Fed Govt[5]				$11,670,156
State/Local Govt[5]				$4,242,724

[1] Output/Business Activity Impacts (2005 $'s).
[2] All jobs, full-time and part-time.
[3] Wages/Salaries/Sole Proprietorship/Partnership Income Impacts (2005 $'s).
[4] Rental Income and Corporation Income Impacts (2005 $'s).
[5] Government Tax and Fee Revenue Impacts (2005 $'s).

VII. RECREATIONAL FISHING & TOURISM

The area offshore of the northern Outer Banks is considered one of the prime sportfishing regions along the East Coast due to its close proximity to the Gulf Stream and extended seasons of abundant fishing opportunities (e.g. marlin, tuna). The recreational sport fishery is vast and varied, including large "headboat" recreational fishing vessels, smaller "for-hire" charter fishing vessels, and private fishing boats. Many tourists who visit the beaches on the Outer Banks islands of Dare County include a recreational fishing trip through Oregon Inlet on their vacation itinerary.

In addition to general recreational fishing, sportfishing tournaments are thriving in the Oregon Inlet region. Approximately 14 known tournaments take place annually in the County originating mainly at Pirates Cove marina, in Manteo or at various locations in Hatteras Village. Appendix G contains a list of these tournaments and estimates of the length of each tournament (days) and the number of participants. In summary, more than 500 boats annually are expected to participate in sportfishing tournaments dependent on passage through Oregon Inlet. These tournaments draw significant economic benefits to the County ranging from expenditures on fishing gear, lodging, food, retail to custom boat sales, marine maintenance, and/or boat storage.

These recreational fishing activities generate additional economic benefits for the region, in particular for the tourism industry. The recreation and tourism industry was the largest provider of service jobs in Dare County in 2005, providing approximately 5,000 of 17,500 service jobs in the county (NCESC, 2005). Although many of these jobs are related to beach tourism and recreation, which is not dependent on Oregon Inlet navigability, a significant number of jobs in the industry are related to sport fishing, which is dependent on the inlet for access to the ocean fishing grounds which contain the fish species prized by sport fishermen.

Recreational Fishing & Tourism Interviews

Various interview contacts provided invaluable information and data related to the recreational fishing and related tourism industry. Interviews were held with managers of major fishing centers or marinas in the areas as well as an individual overseeing a majority of sport fishing tournaments in the area. In particular, the interview questionnaires attempted to estimate inlet usage, typical expenditures for boaters, and the expected reaction of boaters if the average depth of the inlet were shallower or deeper than current depths. There was also a specific portion of the questionnaire that addressed fishing tournaments. The questionnaires and responses can be seen in Appendix A.

In general, interviewees noted the astounding number of boats, both private and charter, that regularly utilize Oregon Inlet. They also emphasized the attraction of the inlet to locals and tourists who flock to the Oregon Inlet Fishing Center, located on the North side of Oregon Inlet, to simply watch catch come in. Numbers of recreational fishing trips, including charter

and private were estimated using National Marine Fisheries data, as will be discussed in the following section. However, interviewees at the Oregon Inlet Fishing Center alone noted the magnitude of fishing trips originating from the Center and the adjacent public boat ramp maintained by the National Park Service. It was noted that on a typical peak season day, the public boat ramp parking lot adjacent to Oregon Inlet Fishing Center, is filled to double the parking lot capacity which is approximately 80 spaces at any given time of day. Trips from the Center are at minimum 40 per day. This amounts to at least 200 boat fishing trips per day originating from one location in Dare County.

For those marinas or fishing centers located North of Oregon Inlet, interviewees noted that all boaters traveling into the Atlantic Ocean use Oregon Inlet for access. In order to evaluate whether boaters south of the inlet typically use Oregon Inlet or Hatteras Inlet, an interview was conducted at Oden's Dock in Hatteras. Hatteras is the closest village to the south with substantial marinas. The interviewee noted that almost all boats traveling to the Atlantic Ocean from locations in Hatteras would use Hatteras Inlet, due to its close proximity to the inlet.

All of these boaters traveling through Oregon Inlet spend a considerable amount of money in the County on lodging, food, gas, fishing supplies etc. Interviewees generally found it difficult to estimate expenditures; however, best judgment was given where possible. The economic analysis utilized these estimates along with expenditure estimates from previous related studies to evaluate the economic impact of the recreational fishing and related tourism industries.

When asked about the present inlet condition (e.g. current depths), interviewees generally noted that the inlet condition was "poor" at best. Several interviewees noted concern over the general safety of recreational boaters using the inlet. In particular, as private recreational boaters are more likely to be less aware of present inlet conditions and/or less experienced at handling the rough waters, the safety of these boaters was a significant and prevalent concern.

In terms of inlet usage and corresponding economic impacts, interviewees generally expected that if the present channel depth was increased and maintained at a depth of 14 feet, the condition would be viewed as fair to excellent for recreational usage (e.g. smaller non-commercial vessels) and the economic response would be an increase in the number of fishing trips through the inlet and a resulting increase in revenues at major fishing centers. If inlet dredging was to cease, and the average depth of the inlet channel were only 7 feet, interviewees generally responded that the economic impact would be devastating to the recreational fishing sector and related support businesses in Dare County. It was noted that most charter boats would not be able to pass through the inlet at an average depth of 7 feet. An exception to this response came from the interviewee located in Hatteras Village who estimated that marinas and businesses located near Hatteras Inlet may see an increase in usage of Hatteras Inlet and related revenues.

Finally, a specific portion of the interview questionnaires addressed fishing tournaments originating in the area. Almost all fishing tournaments (approximately 14 known in the County) are run out of Pirate's Cove marina, in Manteo, therefore the fishing tournament director at Pirates Cove provided invaluable information on the economic significance of these tournaments to Dare County. These tournaments draw significant numbers of visitors to the region increasing revenues for supporting businesses in the tourism and fishing industries. Additionally, it should be noted that interviewees in the boat-building industry commented that a large percentage of their sales came from fishing tournament participants drawn to the area's unique sport-fishing yachts and that many of these sales were from repeat customers. Therefore, it is clear the fishing tournament industry alone has a tremendous ripple effect on supporting businesses and the local economy.

In terms of inlet usage, ocean fishing tournaments originating from Pirates Cove are usually required under tournament regulations to use Oregon Inlet for ocean access. During one recent tournament, however, tournament participants were re-routed to Hatteras Inlet due to bad weather and dangerous inlet conditions at Oregon Inlet. While tournament participation was generally high for all tournaments, it was noted that the big Billfish tournament dropped in participants from 2004 to 2005 due to "perceived" inlet conditions. Additionally, 32 boats ran aground in Oregon Inlet during the 2005 Billfish tournament. Of these, 3 boats were replaced because damages caused by running aground were too severe to continue in the tournament. Typical expenditures from fishing tournament participants were best accounted for in a previous study of the Pirate's Cove Big Game Tournaments (Ditton, 1999) as summarized in Chapter III.

Economic Modeling & Results – Recreational Fishing & Tourism

The National Marine Fisheries Service (NMFS) collects recreational fishing data annually with the Marine Recreational Fishery Statistics Survey (MRFSS). The MRFSS is a creel survey with information on fishing location, mode, target species, catch and harvest, and 2-month and 12-month fishing days. MRFSS data is collected by telephone and intercept surveys of anglers. The telephone surveys provide limited data on numbers of fishing trips, mode and area fished. The intercept surveys are more detailed and target anglers who are either 1) fishing from a charter or headboat, 2) fishing from a private or rented boat or 3) fishing along the shore (e.g. pier, banks). There are approximately 51 intercept sites in Dare County, including marinas, public boat ramps, and fishing piers or beach accesses. **It is important to note that recreational sportfishing tournament trips are not included in the MRFSS database and required a separate analysis that will be discussed later.**

Periodically, the NMFS collects additional data from anglers with economic add-on surveys. In the southeast region, economic add-ons have taken place in 1997, 1999 and 2000. An expenditure add-on is being conducted in 2006. The most comprehensive of the MRFSS southeastern add-on surveys was in 1997 when data on expenditures, household income, location-specific trips, mode-specific trips, target species-specific trips and willingness to pay for various management measures were collected with on-site and telephone follow-up surveys. The 1997 data supports analysis of economic impacts (Gentner, Price and Steinback,

2001) and recreational demand (Haab, Whitehead and McConnell, 2000). In 1999, expenditures data were collected that supports economic impact analysis. In 2000, income and other data were collected that supports recreational demand analysis.

The 1997 and 2000 MRFSS follow-up data were used to estimate the economic impacts and value of Oregon Inlet-dependent recreational fishing trips of residents and tourists. Oregon Inlet-dependent recreational fishing trips are defined as trips in which (1) the angler was interviewed in Dare County, (2) most of the fishing effort occurred in the ocean and (3) the angler fished from a charter or private/rental boat (the MRFSS does not include head boat anglers in North Carolina). Further, we consider only hook and line anglers to avoid the potential double counting of commercial fishermen impacts.

Recreational Fishing Trips and Expenditures

The economic impacts of Oregon Inlet-dependent recreational fishing and tourism are a function of the product of fishing trips and expenditures. Aggregate trips are obtained from NMFS estimates based on the MRFSS surveys (personal communication, NMFS, 2006). The results of this web-based query are presented in Table VII-1. It should be noted that the number of trips reported in Table VII-1 are people-trips. **For example, if a boat makes a trip carrying three people, this trip will amount to 3 individual trips in the NMFS count**. As shown, NMFS estimates of charter fishing trips in North Carolina range from 291,000 in 1997 to 171,000 in 2004 (the last available year for estimates). Private/rental boat trips range from 700,000 in 1997 to 1,300,000 in 2004.

Aggregate estimates of Dare County fishing trips were not available from NMFS and were developed using MRFSS primary data. Dare County trips are estimated by applying a scale factor to the North Carolina trips. The 1997 MRFSS add-on telephone survey collected data on fishing days by location, location and mode, and location, mode and target species. For the purposes of this analysis, fishing days by location (Dare County) and mode (charter and private/rental boat) were needed.

Since the telephone survey data is likely subject to non-response and/or sample selection bias the fishing days estimates from the intercept survey and the telephone follow-up survey were compared. Indeed, the number of days fished by anglers intercepted on-site is about one fewer than anglers who participated in the telephone follow-up survey. The number of days fished were adjusted by multiplying by the average number of days fished by telephone follow-up anglers and dividing by the average number of days fished by intercept interview anglers. With this adjustment, the days fished by the telephone follow-up anglers are not different than the days fished by the intercept interview anglers.

The number of Dare County charter and private/rental boat mode fishing trips in Table VII-1 are equal to the North Carolina fishing trips scaled down by the fraction of trips that take place in Dare County according to the primary MRFSS data adjusted as described above. The scale factor for charter boats is 0.174 and for private/rental boats is 0.61. As shown, the

number of charter fishing trips in Dare County range from 51,000 in 1997 to 30,000 in 2004. Private/rental boat trips range from 427,000 in 1997 to 795,000 in 2004.

Table VII-1. Charter and Private/Rental Boat (Per Person) Fishing Trips

	North Carolina Boat Mode		Oregon-Inlet Dependent	
Year	**Charter**	**Private/Rental**	**Charter**	**Private/Rental**
1997	291,439	700,266	50,710	427,162
1998	230,657	607,675	40,134	370,682
1999	217,127	888,731	37,780	542,126
2000	190,193	1,056,258	33,094	644,317
2001	196,976	881,096	34,274	537,469
2002	176,353	702,515	30,685	428,534
2003	169,491	939,886	29,491	573,330
2004	170,917	1,304,093	29,740	795,497
Averages	**205,394**	**885,065**	**35,739**	**539,890**

Expenditure estimates were obtained from the 1997 intercept interview add-on MRFSS survey and reported per person trip. A summary of expenditures for charter and private/rental fishing trips is presented in Table VII-2. Three categories of per trip expenditures are elicited.

Travel expenditure data were collected with the question: *"How much did you, personally, spend to travel from your residence to the fishing or boat launch site (round-trip costs)? Please consider expenditures on gas, tolls, ferry fees, parking, etc."* Travel expenditures for charter boat and private/rental boat anglers were $107 and $297 per trip, respectively. These expenditures were broken down into fuel and food by applying weights developed from Gentner, Price and Steinbeck (2001).

Anglers who spent at least one night away from home were asked: *"How much will you, personally, pay for lodging?"* Lodging expenditures for charter boat and private/rental boat anglers are $300 and $63 per trip, per person, respectively. Charter boat lodging expenditures are significantly higher than private/rental boat lodging expenditures because private boat owners tend to stay fewer nights than charter boat passengers.

Fishing-related expenditure data were collected with the question: *"How much did you, personally, spend to purchase or rent fishing equipment, and for bait, licenses, gas and launch fees for your boat for this trip? Please do not include charter/guide services and boat rental fees."* Fishing expenditures for charter boat and private/rental boat anglers are $51 and $2 per trip, per person, respectively. The per trip, per person charter fees, obtained from Gentner, Price and Steinbeck (2001), are $151.

Table VII-2. Per Trip (Per Person) Fishing Expenditures (2004 dollars)

Expenditures	Dare County Boat Mode Fishing Trips	
	Charter	Private/Rental
Travel	$107.68	$297.08
Fuel	$39.15	$108.03
Food	$68.52	$189.05
Lodging	$300.22	$63.00
Fishing	$51.28	$1.91
Charter fees	$151.15	

The total direct expenditures for all trips were then computed as the product of the average number of trips from 1997-2004 (see Table VII-1) and per trip expenditures (Table VII-2). These total direct expenditures are reported in Table VII-3. As shown, we estimate that charter boat anglers annually spend $3.8 million on travel, $11 million on lodging, $1.8 million on fishing and $5.4 million on charter fees. Private/rental boat anglers spent $160 million on travel, $34 million on lodging and $1 million on fishing.

Table VII-3. Total Direct Expenditures – All Trips (2004 dollars)

Expenditures	Dare County Boat Mode Fishing Trips	
	Charter	Private/Rental
Travel	$3,848,151	$160,388,690
Fuel	$1,399,328	$58,323,160
Food	$2,448,824	$102,065,530
Lodging	$10,729,279	$34,013,156
Fishing	$1,832,774	$1,032,053
Charter fees	$5,401,886	$0

As stated previously the MRFSS database does not include sportfishing tournament trips. These tournaments are dependent on Oregon Inlet because vessels fishing in the tournaments must use Oregon Inlet to access offshore ocean waters where trophy fish species, such as the billfish species, are located.

Recreational fishing tournaments for trophy fish caught in ocean waters off Cape Hatteras bring significant additional recreational fishing revenues to the region. Appendix G presents a list of the annual fishing tournaments dependent on Oregon Inlet. Although the tournaments are relatively short in duration, from one to four days in length, they occur throughout the summer and fall fishing season, from May through December. The number of boats participating in a tournament ranges from 15 to 130, with a total of approximately 500 vessels participating each season (excluding the Manteo Rotary Rockfish Tournament, where fishing is allowed from the surf and in the sound, making the tournament not wholly Oregon Inlet-dependent).

It was assumed that the number of tournament fishing boat trips is equal to the sum of the number of vessels participating in each of the tournaments listed in Appendix G, or 500 trips.

Most tournament fishermen reported that they fished with family and friends during the tournament. Most charter fishing vessels accommodate six passengers. Estimates of the number of tournament fishermen were made by multiplying the number of participating fishing vessels, 500, by six passengers per vessel, yielding an estimate of 3,000 tournament person trips per year.

The best recent information on tournament fisherman expenditures in the study region is given by Ditton, et al. (2000). On average, each tournament fisherman spent $5,219 per tournament trip in 1999, of which 94% was spent in Dare County. The expenditures are distributed across various goods and services as shown in Table VII-4. Table VII-4 also presents these tournament expenditures in year 2005-equivalent dollars (adjusted for inflation). It should be noted that the values in Table VII-4 are reported per person over the entire trip which included multiple fishing days as well as days spent in Dare County before and after the individual tournament.

Table VII-4. Tournament Fisherman Expenditures, Per Tournament (Over Entire Length of Trip), 1999

Source: Ditton, et al. (2000)

Expenditure Category	Average Expenditure Per Fisherman Per Tournament (1999 $'s)	Average Expenditure Per Fisherman Per Tournament (2005 $'s)
Auto Transport	$77.48	$89.10
Other Transport	$342.88	$394.31
Gas for boat	$677.56	$779.19
Slip/Dock fees	$276.53	$318.01
Charter fees	$645.93	$742.82
Bait	$142.91	$164.35
Fishing Tackle	$168.62	$193.91
Boat repairs	$280.53	$322.61
Lodging	$723.74	$832.30
Restaurants	$390.28	$448.82
Groceries	$280.79	$322.91
Ice	$48.32	$55.57
Tips	$144.81	$166.53
Other	$1,018.15	$1,170.87
Total	$5,218.53	$6,001.31

The category "Other transport" includes mostly air transportation and is approximately 6% of total expenditures. As Dare County does not have a major airport, it was assumed that the "Other transport" expenditures are the approximately 6% of expenditures occurring outside Dare county, and all other expenditures occur inside Dare county.

Charter and Sportfishing Fishing Industry Revenues, Costs, and Income

Charter fees (i.e., revenues) were broken down into charter boat owner expenditures and profit (Table VII-5). This breakdown is based on the field interviews of charter captains and Holland, Fedler and Milon (1999). Variable costs, those expenditures that depend on the number of charter trips, were estimated to be $1.9 million annually. Fixed costs, those costs that must be paid regardless of the number of charter trips, were estimated at $1 million. The return to the charter vessel owner (i.e., profit or net revenue) was estimated to be $2.5 million annually.

Table VII-5. Charter Fishing Industry Revenues, Costs, and Profits

Charter Revenues, Costs and Profit	
Revenues	$5,401,886
Variable Costs	
Crew wages	$450,157
Fuel costs	$1,035,361
Bait costs	$356,033
Ice	$81,847
Fixed Costs	
Engine maintenance	$160,005
Other maintenance and repair	$195,018
Insurance	$75,026
Interest on Vessel Loan	$207,176
Other	$378,920
Return to Vessel Owner	$2,462,341

The dispersal of charter trip gross annual income earned by the vessel crew and owner is reported in Table VII-6. The charter fees going to crew wages and owner profits were broken down into taxes, savings and spending. The portion of taxes leaving Dare County includes federal, state and other taxes (further explanation can be found in Chapter IV, Commercial Fishing). The portion of taxes staying in Dare County includes property taxes and amounts to $99,000 for crew and owners. Household savings, estimated at the national average savings rate, are assumed to leave the county. Household spending, $271,000 for crew and $1,200,000 for owners, are assumed to stay within the county.

Table VII-6. Dispersal of Charter Fishing Trips Income

Household Category	Household Income Range	Gross Annual Fishing Income	Taxes[1]		Household Savings[3]	Household Direct Spending[4]
			Leaving County	Remaining In County[2]		
Crew	$25,000-$75,000	$450,157	$139,099	$15,305	$24,759	$270,995*
Vessel Owners	Greater than $75,000	$2,462,341	$1,048,957.45	$83,720	$135,429	$1,194,236*
Totals		$2,912,499	$1,188,056	$99,025*	$160,187	$1,465,230

[1] Taxes Leaving County = (net Federal and state income taxes) + (Social Security and Medicare taxes) = (15.6% (crew) or 27.3% (skippers & owners) of Gross Annual Income) + (15.3% of Gross Annual Income)
[2] Local Property T axes = 3.4% of Gross Annual Income. (Average for Dare County, NC)
[3] Household Savings = 5.5% of Gross Annual Income. (U.S. average for relevant income categories.)
[4] Household Direct Spending = Gross Annual Income - All Taxes - Household Savings.
*Money staying within the region.

Using the same methods as those outlined above, the revenues, costs, and profits for sportfishing tournaments could be calculated. The $909.35 in combined Charter fees and Tips listed in Table VII-4 are distributed as follows:

Table VII-7. Expenditure Pattern for Charter Fees and Tips Paid By Tournament Fishermen

Expenditure Category	Average Expenditure Per Fisherman Per Tournament (1999 $'s)
Crew wages	$76
Fuel costs	$174
Bait costs	$60
Ice	$14
Engine maintenance	$27
Other maintenance and repair	$33
Insurance	$13
Interest on Vessel Loan	$35
Other fixed cost ("business services" sector)	$64
Return to Vessel Owner	$415

All expenditures in Table VII-7 are assumed to be spent within the region, except crew wages and returns to vessel owners, which must be adjusted for taxes and savings that leave the

region. After adjusting for taxes and savings, $46 of crew wages, $201 in vessel owner profits and $17 in local property taxes are spent within the region.

IMPLAN Modeling Analysis

The full economic impacts of Oregon Inlet-dependent recreational fishing and tourism activities were estimated using the IMPLAN model to conduct regional input-output analysis (see Chapter II, Economic Analysis Methods). Appendix B contains the specific IMPLAN modeling assumptions made for the recreational fishing and related tourism sector. Input-output analysis requires a defined study region. As the industries supporting recreational fishing are located in Dare County, Dare County was used as the study region.

As discussed in Chapter II, Economic Analysis Methods, the economic analysis considers five types of impacts:

1. Changes in employment
2. Changes in economic output / business activity
3. Changes in workers' wages, salaries, and benefits, and small business (sole proprietorship and partnership) income/profits
4. Changes in rents and corporate profits
5. Changes in government tax receipts at the Federal, state and local levels

Employment results are reported as total number of jobs supported, including both full-time and part-time jobs (the data are not sufficient to distinguish full-time from part-time jobs). Results for economic impact categories (2)-(5) are reported on an annual basis. Each of the five types of economic impacts listed above is composed of three components: (i) the direct impact component, (ii) the indirect impact component, and (iii) the induced impact component.

Direct Economic Impacts

The direct economic impacts of recreational fishing are equal to the direct spending by private/rental anglers, plus the non-charter fee direct spending by charter fishermen and sportfish tournament fishermen, plus a portion of the charter fee direct spending by charter fishermen and sportfish tournament fishermen. The portion of charter fees contributing to direct impacts is equal to the household direct spending by charter vessel owners and crew, plus local property taxes paid by charter vessel owners and crew, plus the direct non-wage expenditures of charter fishing vessels (i.e., expenditures on fuel, ice, dry dock, etc.). The direct impacts reported in Table VII-8, Table VII-9, and Table VII-10 are somewhat less than the sum of these numbers due to adjustment for the fractions of these expenditures spent on regional imports.

Indirect, Induced and Total Economic Impacts

The direct spending by recreational anglers, plus local property taxes paid by charter fishing crew and vessel owners, plus the direct non-wage expenditures of fishing vessels (i.e., expenditures on fuel, ice, dry dock, etc.) give rise to indirect and induced economic impacts

(multiplier effects). The IMPLAN economic input-output model is used to estimate the multiplier effects (i.e., the indirect and induced impacts) arising from direct spending.

Output tables resulting from IMPLAN with direct, indirect, induced, and total economic impacts by industry are lengthy and are therefore included in Appendix H on Tables H-1 through H-15, separated by charter fishing, private/rental fishing vessels, and sportfish tournaments. The total impacts on government tax revenues are included on Tables H-5, H-10, and H-15. All dollar-denominated results are reported in year 2005 dollars. Impact estimates are provided for five impact categories:

- Employment
- Economic output / business activity
- Wages/salaries/sole proprietor income/partnership income
- Rental income and corporation income
- Government tax and fee revenues

Economic Impacts Summary

If the navigability of Oregon Inlet is not maintained, recreational anglers would have various options. First, they might use the same Outer Banks or Albemarle or Pamlico Sounds boat launch site but use Hatteras Inlet or Ocracoke Inlet for their ocean fishing trips. Second, they might use the same boat launch sites but fish in the sounds instead of the ocean. Third, they might use different launch sites in North Carolina (i.e., the southern North Carolina coast from Brunswick County to Carteret County) for ocean fishing trips. More extreme decisions would involve switching to shore mode fishing, choosing another state for fishing or choosing a recreation activity other than fishing.

Due to the lack of data available to estimate the various effects, it is difficult to assess the net losses of alternative fishing decisions. Instead, focus was placed on the potential losses to Dare County. If the Oregon Inlet anglers were to relocate due to a loss of navigability in Oregon Inlet, Dare County would lose employment, wages, and profits in industries that directly receive fishing-specific spending. These direct losses to Dare County are measured by the direct impact columns of Table VII-8, Table VII-9, and Table VII-10.

Other Dare County employees and businesses owners would also suffer reductions in employment, wages, rents and profits due to economic multiplier effects. These losses are measured by the Indirect and Induced economic impacts presented in Table VII-8, Table VII-9, and Table VII-10. The combined effects of Direct, Indirect and Induced Impacts are presented in the Total Impact columns of these tables.

Only the total impacts of government tax and fee revenues are presented since the IMPLAN modeling software produces estimates of total impacts only for taxes and fees. If we assume that the Federal government would receive similar revenues and fees if overall fishing trips remain constant, then the Federal government portion of the impacts should not be included in the overall impact estimate. However, should anglers relocate outside of Dare County or the

State of North Carolina, the Dare County and State of North Carolina governments would face reductions in tax collections and revenues.

The total annual economic impact of Oregon Inlet dependent charter fishing trips on output is $39.3 million (Table VII-8). Wages, salaries and proprietor profits are $16.7 million and rent and corporation profits are $7.2 million. Oregon Inlet dependent charter fishing trips are responsible for 596 jobs. The impact on the Federal and State/Local government is $2.9 and $3.3 million, respectively.

The total annual economic impact of Oregon Inlet dependent private/rental boat fishing trips on output is $431.9 million (Table VII-9). Wages, salaries and proprietor profits are $179.9 and rent and corporation profits are $57.7 million. Oregon Inlet dependent private/rental boat fishing trips are responsible for 7,212 jobs. The impact on the Federal and State/Local government is $29.9 and $32.0 million, respectively.

The total annual economic impact of Oregon Inlet dependent sportfish tournament fishing trips on output is $31.0 million (Table VII-10). Wages, salaries and proprietor profits are $13.1 and rent and corporation profits are $4.4 million. Oregon Inlet dependent private/rental boat fishing trips are responsible for 480 jobs. The impact on the Federal and State/Local government is $2.1 and $2.0 million, respectively.

Table VII-8. Summary of Oregon Inlet-Dependent Recreational Charter Fishing Economic Impacts (2005 dollars)

Impact Category	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	$18,188,973	$3,219,655	$17,921,211	$39,329,840
Employment[1]	341	32	224	596
Wages/Salaries/Proprietor Profits	$6,783,936	$1,084,838	$8,809,572	$16,678,346
Rent/Corp Profits	$4,043,258	$644,720	$2,525,913	$7,213,812
Federal Government				$2,901,280
State/Local Government				$3,333,445

[1]All jobs, full-time and part-time.

Table VII-9. Summary of Oregon Inlet-Dependent Recreational Private/Rental Fishing Economic Impacts (2005 dollars)

Impact Category	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	$195,433,869	$56,329,209	$180,164,803	$431,927,890
Employment[1]	4,427	538	2,247	7,212
Wages/Salaries/Proprietor Profits	$75,020,759	$17,715,100	$87,142,710	$179,878,568
Rent/Corp Profits	$20,065,901	$11,451,744	$26,192,251	$57,708,174
Federal Government				$29,940,838
State/Local Government				$32,087,169

[1]All jobs, full-time and part-time.

Table VII-10. Summary of Oregon Inlet-Dependent Recreational Sportfish Tournament Fishing Economic Impacts (2005 dollars)

Impact Category	Direct Impact	Indirect Impact	Induced Impact	Total Impact
Output	$14,441,558	$3,531,799	$13,055,262	$31,028,620
Employment[1]	281	37	162	480
Wages/Salaries/Proprietor Profits	$5,637,297	$1,242,678	$6,263,942	$13,143,917
Rent/Corp Profits	$1,876,100	$654,452	$1,909,183	$4,439,734
Federal Government				$2,136,047
State/Local Government				$2,040,217

[1]All jobs, full-time and part-time.

Consumer Surplus

In addition to the economic impacts described above, another economic benefit calculated by using other methods is the value that recreational sport fishermen receive from the experience of Oregon Inlet-related sport fishing, value beyond what is spent on goods and services needed to make the trip. This "value of the sport fishing experience" is the difference between what a fisherman would be willing to pay to take the fishing trip and what he actually paid to take the trip. This difference is known as "consumer surplus" value, because it measures the surplus value consumers receive from an experience beyond what is actually paid for the experience. This value is real and arises in many economic situations. The amount that a sport fisherman would be willing to pay for an Oregon Inlet-related fishing trip is limited by the opportunity to take other, though perhaps less satisfying, substitute trips to alternative fishing destinations. For example, although a sport fisherman might be willing to pay more for an Oregon Inlet-related sport fishing trip, due to the Oregon Inlet sport fishery's unique characteristics, the sport fisherman would not be willing to pay an infinite amount more, due to the availability of substitute fishing opportunities.

The travel cost method is used to provide an estimate of the consumer surplus loss associated with the lost navigability of Oregon Inlet. The traditional single-site travel cost model focuses on the number of trips taken and can be used to estimate a downward sloping demand curve. In contrast, a random utility model uses information from multiple recreation sites and explains the recreation site selection decision. Individuals choose a recreation site based on differences in trip costs and site characteristics (e.g., historic catch rate) between the alternative sites. Statistical analysis of the relationship between site characteristics and anglers site choices using logistic regression allows estimation of changes in consumer surplus arising from many changes in site availability or site characteristics (Haab and McConnell, 2002).

Both types of travel cost method can be used to estimate the consumer surplus values of marine recreational fishing trips. Consumer surplus is the angler's willingness to pay for a change in fishing conditions. In the case of a loss of Oregon Inlet navigability, consumer surplus is the angler's willingness to pay to avoid the loss of access to the inlet. Consumer surplus values are real economic values. For example, a boater that can not travel to the ocean via Oregon Inlet would spend time and money boating or driving to Hyde County to make the trip via Hatteras Inlet. This angler would be willing to pay the additional time and money costs in order to avoid closure of Oregon Inlet. In contrast to the economic impact estimates presented above, which are estimates of the effects of closure on the local economy, consumer surplus is the economic effect over and above changes in expenditures and revenues.

Nested random utility models (NRUM) allow for sequential choices required for the analysis. For example, in the standard NMFS travel cost marine recreational fishing model anglers are assumed to choose (1) target species and fishing mode and (2) fishing sites based on their attributes (Haab, Whitehead and McConnell, 2000). The mode-site choice NRUM developed here is based on the standard NMFS model. First, the angler chooses among three fishing modes (shore, charter boat, and private/rental boat fishing). Conditional on the mode choice from the first stage decision, the angler chooses the fishing site. The fishing sites are North and South Carolina counties with multiple counties included together due to limited observations at some sites. In addition, according to the field interviews, boaters in southern Dare County (Buxton, Frisco and Hatteras) tend to use Hatteras Inlet instead of Oregon Inlet. These and shore mode anglers in the same part of the county are reassigned from Dare County to Hyde County within the model.

The theory behind the NRUM is that anglers consider fishing sites based on the utility (i.e., happiness) that each site provides. Anglers will tend to choose fishing sites that provide the most utility. The utility function depends on the costs and benefits of the fishing trip. Fishing costs include travel costs. Travel costs are equal to the product of round trip travel distance and an estimate of the cost per mile. In addition, a measure of lost income is included for anglers who lost wages during the trip. Benefits of the fishing trip include catch rates. The measured catch rate is set in the standard NMFS NRUM model by the historic targeted harvest of big game fish (e.g., tunas), bottom fish (e.g., spot, groupers), flat fish (e.g., flounders), and small game fish (e.g., mackerels). (*Note: The independent variables are the same as in the standard NMFS model with one exception: anglers that do not target species*

do not have a proxy for site quality. In the standard model, the small game catch rate is used as the quality measure for respondents who do not target species. In effect, no target anglers choose fishing site based entirely on travel cost.) Five year (1995-1999) targeted historic catch and keep rates are calculated using MRFSS data at each of the zones to measure site quality. The NRUM exploits the empirical observation that anglers tend to choose fishing sites with relatively low travel costs and relatively high chances at fishing success.

The data used for the analysis was the 2000 MRFSS Southeast economic add-on as collected from North and South Carolina anglers. Focus was placed on shore, charter boat and private/rental boat hook-and-line anglers that fish the ocean. There were 2,292 anglers interviewed at North Carolina sites and 1,413 anglers at South Carolina sites.

The MRFSS add-on survey requests additional information so that the travel cost method can be employed with the intercept creel survey data. Key information collected is on single-day vs. multiple-day trips and if fishing is the primary purpose of the trip. The travel cost method typically employs only single-day fishing trips (i.e., trips in which the respondent did not spend any nights away from the permanent residence) because overnight trips usually have multiple purposes. This excluded 1692 and 791 anglers from North and South Carolina. Also excluded were single-day fishing trips in which the respondent would have taken the trip without fishing. Twenty-six and 55 North and South Carolina anglers were deleted for this reason.

Travel costs were computed using "great circle" distance (i.e., "as the crow flies") from the home zipcode to the zipcode of the primary coastal city in the nine county zones with the "ZIPFIP" adjustment for twists and turns in the road. (*Note: The ZIPFIP software was developed by the USDA with a purpose of, among others, estimating travel distance between any two zipcodes. See http://www.ers.usda.gov/data/archive/93015/.)* After all these exclusions, only those anglers with a one-way travel distance of 400 miles or less to at least one of the fishing sites were considered. There were 574 and 567 North and South Carolina hook and line single-day trip anglers with complete data available for analysis.

Most of the remaining 1,121 anglers fish from private or rental boats (40 percent). Thirty-four percent fish from charter boats and 26 percent fish from shore. Most anglers do not target any fish species (61 percent of all anglers). Twenty-two percent target small game fish species. Seven percent target both bottom fish and flat fish species. Three percent target big game fish species. The most popular fishing sites were Dare County (17% of all trips), Carteret County (24%) and Charleston County (34%). Each of the 1121 anglers faced 24 possible mode/site choices. Shore fishing at two sites in South Carolina and charter fishing in Brunswick County, NC were excluded because these choices were not represented in the data.

The travel cost variable was calculated as in previous NMFS studies (Haab, Whitehead and McConnell, 2001) with travel cost including the opportunity cost of time if the angler gave up wages to take the trip. Time costs are calculated using estimated travel times (assuming an average speed of 40 miles per hour) and the wage rate. Transportation costs are calculated at

$0.30 per mile traveled. The household wage rate was used as the opportunity cost of travel time. Only those respondents who reported that they lost income during the trip are assigned a time cost in the travel cost variable, $tc = \$0.30 \times d + \delta(w \times d / 40)$, where d is the round trip distance for each individual to each site. The wage, w, is measured as household income (in thousands) divided by 2.08 (the number of fulltime hours potentially worked annually, in thousands). The average travel cost to the nine zones, one of which was chosen by the angler, was $366.

The NRUM was estimated using the full information maximum likelihood PROC MDC in SAS and presented in Table VII-11. The full information maximum likelihood routine estimates the two stages of choice jointly. The model likelihood ratio statistic indicates that all parameters are jointly significantly different from zero.

The likelihood that an angler would choose a county fishing zone is negatively related to the travel cost. The likelihood that an angler would choose a county fishing zone is positively related to the historic targeted small game fish catch rates. In addition to the variables described above, the model includes the log of the number of MRFSS intercept sites as an independent variable. The log of the number of interview sites is positively related to the site choice.

The mode choice is specified to depend on an index of utility at each mode (i.e., inclusive value). The parameter estimates on the mode-specific inclusive values are between 0 and 1 and statistically different from zero. The coefficients on the inclusive values are not statistically different from 1 which indicates that a non-nested (i.e., one stage site choice model) model may also be appropriate.

Table VII-11. Nested Random Utility Model

	Coefficient	T-statistic
Travel cost	-0.021	-25.03
Big game fish	0.844	1.63
Bottom fish	0.003	0.01
Flat fish	0.100	0.50
Small game fish	0.301	6.19
Log(intercept sites)	1.172	13.08
Inclusive value		
Shore	0.817	2.66
Charter	0.615	2.05
Private/Rental	0.886	3.09
Number of anglers	1121	
Number of choices	27	
Sample Size	26,904	
Likelihood Ratio	3315	
Likelihood Ratio Index	0.47	

A wide range of consumer estimates can be developed from the NRUM model including the loss of access to fishing sites and changes in catch rates. It was assumed that the loss of Oregon Inlet navigability reduces the likelihood that charter and private/rental boaters will fish off the northern Dare County coast (north of Cape Hatteras). Instead, these anglers might travel through Hatteras Inlet and fish off the southern Dare County and Hyde County coasts. The consumer surplus estimate is equal to the difference in the potential angler utility with the full range of choices available, V^o, and with constrained choices, V', divided by the coefficient on the travel cost variable (i.e., the marginal utility of income): $CS = (V^o - V')/\beta_{tc}$. Haab and McConnell show that for the consumer surplus loss of site access in a NRUM is:

$$CS_{j|m} = \ln\left((1-\pi_{j|m})^{\theta m}\pi_m + (1-\pi_m)\right)/\beta_{TC}$$

where θ_m is the mode-specific inclusive value, $\pi_{j|m}$ is the probability that site *j* is chosen, $j = 1,...,9$, conditional on the choice of mode *m*, $m = 1,2,3$, and π_m is the probability that mode *m* is chosen.

Using this formula, the consumer surplus lost per angler trip for each mode at the northern Dare County ocean fishing site is:

- charter mode: $CS_{j=1|m=2}$ = $0.53
- private/rental mode: $CS_{j=1|m=3}$ = $1.53

An estimate of the lost consumer surplus per angler trip for both modes is the sum of the two values: $CS_{j=1|m=2,3}$ = $2.05 (the $0.01 difference is due to rounding above). This value is an underestimate since independent valuation retains a counterfactual substitute. For example, estimating the lost consumer surplus for the charter mode retains the opportunity of Dare County ocean fishing from the private/rental boat mode. A simultaneous loss of both charter and private/rental boat modes, as would occur with lost navigability of Oregon Inlet, would eliminate an additional substitute and lead to higher consumer surplus losses.

The computed consumer surplus loss of $2.05 was for each trip taken to North and South Carolina. Aggregating over only North Carolina trips provided a lower bound estimate since South Carolina anglers are assumed to be unharmed from a loss of Oregon Inlet navigability. Aggregating over all trips, single-day trips and multiple-day trips, may be an overestimate or underestimate of total consumer surplus. Estimation of consumer surplus values for overnight trips using the standard NMFS methodology tends to produce upwardly biased estimates of consumer surplus (McConnell and Strand, 1999). However, the standard NMFS methodology employs the assumption that the purpose of the entire trip is fishing when only a fraction of the multi-day trip may be devoted to this activity (e.g, a family vacation).

Aggregated consumer surplus values over North Carolina ocean fishing trips (personal communication, National Marine Fisheries) are shown in Table VII-12 and are presented on an annual and 2-month survey wave values basis. Wave 2 is March and April, wave 3 is May and June, wave 4 is July and August, wave 5 is September and October and wave 6 is November and December. The MRFSS add-on data does not include cases from wave 1 (January and February) so values were not agreggated over these months. The consumer surplus loss is largest in wave 3 when 1,398,000 trips produce an aggregate economic loss of $2,866,000. The 90% confidence intervals are developed using the proportional standard errors on trips from the NMFS and the point estimate of consumer surplus. The confidence interval in wave 3 ranges from $2,428,000 to $3,304,000. Aggregate consumer surplus across all five waves is $10,139,000 with a 90% confidence interval ranging from $8,231,000 to $12,047,000.

Table VII-12. Aggregate Consumer Surplus

Wave	NC Ocean Trips	PSE*	90% Confidence Interval		Consumer Surplus		
			Lower	Upper	Mean	Lower	Upper
2	605,470	19.8	410,660	800,280	$1,241,214	$841,853	$1,640,574
3	1,398,144	9.4	1,184,578	1,611,710	$2,866,195	$2,428,384	$3,304,007
4	1,215,825	10.6	1,006,399	1,425,251	$2,492,441	$2,063,118	$2,921,764
5	1,124,359	11.4	916,071	1,332,647	$2,304,936	$1,877,947	$2,731,925
6	602,105	10.7	497,414	706,796	$1,234,315	$1,019,699	$1,448,932
Total	4,945,903		4,015,122	5,876,684	$10,139,101	$8,231,000	$12,047,202
*Proportional standard error is the standard error of an estimate as a percentage of the estimate.							

The NRUM held fishing trips constant. That is, with the closure of a fishing site anglers are assumed to substitute other sites or fishing modes. This assumption may be fine for many events and policies that have a minor impact on the fishing experience. But for loss of navigability of Oregon Inlet, it can be expected that the aggregate number of fishing trips might decline. A practical approach to estimating this effect is with a trip intensity model in which angler trips are regressed on an index of site-mode utility values, which is constructed for each angler from the parameters of the NRUM, and other individual angler characteristics (Haab and McConnell, 2002). If trips are positively related to the utility of fishing then a change in fishing conditions which lowers utility will lead to fewer trips taken.

In Table VII-13 the results of this analysis for single-day trippers who were intercepted in northern Dare County and the rest of North Carolina are presented. The regression is a negative binomial model estimated with PROC GENMOD in SAS. The negative binomial model accounts for the integer values of the dependent variable. The dependent variable in the negative binomial trip intensity model is the annual number of fishing days. Note that these are not necessarily equivalent to single-day trips since single-day trippers may also take multiple-day fishing trips over the course of a year. This makes comparison to the economic impact and consumer surplus analyses difficult, but the analysis does provide some further perspective on the potential effects of Oregon Inlet navigability on fishing activity. The average number of days fished by northern Dare County anglers is 38. The average number of days fished by anglers interviewed in the rest of North Carolina is 33.

Both models do a reasonable job of explaining the variation in fishing days according to the model chi-squared statistic. Both northern Dare County and the rest of North Carolina anglers increase trips as the inclusive value increases. More intuitively, trips increase as travel costs decrease and catch rates increase. Anglers who fish from the shore fish more days than boaters. Anglers interviewed after a charter boat trip in the rest of North Carolina fish fewer days than shore or private/rental boat anglers. Boat owners and anglers with more years of fishing experience fish more days. The dispersion coefficient is statistically different from zero which suggests the negative binomial distribution fits the data well.

Table VII-13. Negative Binomial Trip Intensity Model

	Northern Dare County		Rest of North Carolina	
	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	0.901	2.509	2.433	12.966
Inclusive value	0.310	8.209	0.096	4.435
Shore mode	0.968	2.978	0.370	2.089
Charter mode	-0.319	-0.864	-1.213	-4.553
Boat owner	1.031	3.763	0.464	2.926
Years fished	0.016	2.314	0.012	2.750
Dispersion	1.636	9.750	1.425	13.972
Model chi-squared	253		486	
Number of anglers	188		372	

These regression models are used to simulate the number of fishing days that each group of anglers would experience with the loss of the opportunity to take charter and private/rental boat fishing trips via Oregon Inlet (Table VII-14). The number of fishing days falls from a baseline of 38 to 27 for northern Dare County anglers. These fishing days are not reallocated to the rest of North Carolina. Anglers intercepted there (rest of NC) experience almost no change in the number of fishing days. The 27% loss of fishing days in northern Dare County with the loss of navigability of Oregon Inlet would translate into an approximate loss of 27% of economic activity in the fishing sector of the local economy.

Table VII-14. Predicted Annual Number of Days Fished

	Northern Dare County	Rest of North Carolina
With Oregon Inlet	37.74	33.73
Without Oregon Inlet	27.22	33.50
Number of anglers	188	372

VIII. STUDY FINDINGS

The objective of this study was to examine the economic benefits of Oregon Inlet navigability to Dare County, North Carolina and the surrounding region, including northeastern North Carolina and southeastern Virginia. This study involved a thorough literature review and data collection effort, on-site interviews with individuals knowledgeable of inlet usage and related economic impacts, and detailed economic modeling and analyses. Various economic sectors were considered in the economic analyses including:

- Commercial Fishing
- Seafood Packing/Processing
- Boat Building and Support Services
- Recreational Fishing and Tourism

Commercial Fishing

- Oregon Inlet is considered one of the most commercially vital inlets along coastal NC with fishermen from the communities of Wanchese, Manteo, Manns Harbor, and Stumpy Point in Dare County and communities in other coastal counties (e.g. Hyde, Pamlico) using the inlet.

- The commercial fishing industry has seen a decline in the region over the past 30-40 years due to several factors, which includes the declining condition of Oregon Inlet. It was noted that in the 1960s there were approximately 40-50 different commercial seafood businesses in Dare County. However, presently there are approximately only 10-20.

- Present day commercial boats are significantly larger than those used historically. Due to shallow and dangerous inlet conditions, fewer fishermen choose to operate through Oregon Inlet. Potential trips are frequently lost or shortened due to dangerous inlet conditions, resulting in reduced catch. Also, shallow draft conditions force commercial boats to lighten tonnage so that they can pass through the inlet safely.

- If the navigability of Oregon Inlet is not maintained, the field interview results indicate that most commercial fishing vessels would choose to remain in the fishing business but would relocate their fishing operations to other ports, most likely located in Virginia.

- Commercial fishing provides a total annual economic benefit of 90 jobs and $7.2 million to Dare County and the surrounding region.

Seafood Packing & Processing

- A number of support businesses have located in Dare County to service and supply the commercial fishing vessels.

- Once fish are landed, seafood packing and processing businesses prepare the catch for market. Several commercial fishermen also have packing and processing operations within their businesses. There are an estimated 6 commercial seafood packing and processing businesses located in Wanchese, with most located within the Wanchese Seafood Industrial Park.

- It is assumed that if Oregon Inlet is closed, the seafood packer/processors might remain in business, but the economic benefits to the region would be reduced by the amount of Oregon Inlet dependent fishery landings.

- Seafood packing and processing provides a total annual economic benefit of 238 jobs and $33.4 million to Dare County and the surrounding region through Oregon Inlet dependent landings.

Boat Building & Support Services

- Sixteen boat building companies exist in Dare County producing custom sport fishing yachts. These companies directly employ a total of 500-600 workers and represent 7 of the top 10 manufacturing employers in the County. As of March 2006, approximately 37 boats were under construction. The sales price per boat ranges from $2 million to $4 million, with an average sales price of $2.5 million in 2005 dollars.

- An additional 88 business located in northeastern NC counties provide marine-related supplies and direct support services to the boat building and boatyard industries (NCwaterways.com).

- The boat building sector directly or indirectly supports about 5% (956 jobs) of off season county employment. An estimated 266 additional jobs are supported in surrounding counties within the region.

- This region boasts the birthplace of “Carolina Style” boat building, a style which originated to withstand the incomparable Oregon Inlet waters and rough seas offshore of Bodie and Pea Islands. Local boat builders are directly dependent on Oregon Inlet, as the valuable reputation of the boats for strength and durability is maintained by continuous research and testing in the uniquely rough waters offshore. Based on the field interviews, if Oregon Inlet were to close, these businesses would as well.

- Boat building and support services provide a total annual economic benefit of 1,222 jobs and $139.8 million to Dare County and the surrounding region.

Recreational Fishing & Tourism

- The area offshore of the northern Outer Banks is considered one of the prime sportfishing regions along the East Coast due to its close proximity to the Gulf Stream and extended seasons of abundant fishing opportunities (e.g. marlin, tuna).

- The number of charter fishing trips (person trips) in Dare County range from 51,000 in 1997 to 30,000 in 2004. Private/rental boat trips range from 427,000 in 1997 to 795,000 in 2004.

- Sportfishing tournaments are also thriving in the Oregon Inlet region. Approximately 14 known tournaments take place annually in the County originating mainly at Pirates Cove marina, in Manteo or at various locations in Hatteras Village. In summary, more than 500 boats annually are expected to participate in sportfishing tournaments dependent on passage through Oregon Inlet. These tournaments draw significant economic benefits to the County ranging from expenditures on fishing gear, lodging, food, retail to custom boat sales, marine maintenance, and/or boat storage.

- While tournament participation was generally high for all tournaments, it was noted that the big Billfish tournament dropped in participants from 2004 to 2005 due to "perceived" inlet conditions. Additionally, 32 boats ran aground in Oregon Inlet during the 2005 Billfish tournament. Of these, 3 boats were replaced because damages caused by running aground were too severe to continue in the tournament.

- Interviewees in the boat-building industry commented that a large percentage of their sales came from fishing tournament participants drawn to the area's unique sport-fishing yachts and that many of these sales were from repeat customers. Therefore, it is clear the fishing tournament industry alone has a tremendous ripple effect on supporting businesses and the local economy.

- Recreational fishing and tourism provide a total annual economic benefit of 8,288 jobs and $502.3 million to Dare County and the surrounding region. In addition to these benefits, a consumer surplus benefit of $8 -$12 million dollars was also estimated. The consumer surplus benefit is a measure of the value that recreational sport fishermen receive from the experience of Oregon Inlet-related sport fishing, value beyond what is spent on goods and services needed to make the trip.

Overall Summary of Economic Benefits

The economic benefit of Oregon Inlet to Dare County and the surrounding region is very significant and far outweighs the costs necessary to keep the inlet passable through dredging. In fact, the annual economic benefit to the Federal Government alone is more than 6 times the recent annual expenditures for dredging. Table VIII-1 summarizes the overall total economic benefit of Oregon Inlet to Dare County and the surrounding region. The four study sectors combined provide a total annual economic benefit of 9,838 jobs and $682.7 million to Dare County and the surrounding region.

Table VIII-1. Overall Total Economic Benefit of Oregon Inlet to Dare County and the Surrounding Region

Impact Category	Commercial Fishing	Seafood Packing & Processing	Boat Building & Support Services	Recreational Fishing & Tourism	Total Impact
Output[1]	$7,152,357	$33,425,367	$139,841,567	$502,286,350	$682,705,641
Employment[2]	90	238	1,222	8,288	9,838
Wages/Salaries/ Proprietor Profits[3]	$2,720,657	$7,112,340	$46,260,044	$209,700,831	$265,793,872
Rent/Corp Profits[4]	$1,344,828	$1,384,746	$22,569,207	$69,361,720	$94,660,501
Fed Govt[5]	$895,555	$2,149,376	$11,670,156	$34,978,165	$49,693,252
State/Local Govt[5]	$488,250	$890,092	$4,242,724	$37,460,831	$43,081,897

[1] Output/Business Activity Impacts (2005 $'s).
[2] All jobs, full-time and part-time.
[3] Wages/Salaries/Sole Proprietorship/Partnership Income Impacts (2005 $'s).
[4] Rental Income and Corporation Income Impacts (2005 $'s).
[5] Government Tax and Fee Revenue Impacts (2005 $'s).

IX. REFERENCES

Adams, Chuck, David Mulkey and Alan Hodges. 2000. An Assessment of the Economic Importance of the San Carlos Island Shrimp Processing Industry to the Lee County Economy. Food and Resource Economics Department, Institute of Food and Agriculture Department, University of Florida. Gainesville, FL.

Bianchi, Alan. Personal communication. North Carolina Division of Marine Fisheries, License and Statistics Section. Morehead City, NC. May 2006.

Bianchi, A. (2003). An Economic Profile Analysis of the Commercial Fishing Industry of North Carolina Including Profiles for the Coastal Fishing Counties, Prepared for NC Department of Environment and Natural Resources, North Carolina Marine Fisheries. 120 p.

Carroll, S. (2005). "Dare County Economic Indicators". Pers. Comm.

Dare County. 2005. Dare County Finance Department. Manteo, NC.

Dare County. 2006. Dare County Annual Report. Dare County Finance Department. Manteo, NC.

DeBellis, J. (2001) Travel and Tourism Industry Study, Prepared for NC Small Business and Technology Development Center. 25 p.

Ditton, R.B., Anderson, D.K., Thigpen, II, J.F., Bohnsack, B.L., and S.G. Sutton. (1999). "Pirate's Cove Billfish Tournament Socio-Economic Survey"

Ditton, R.B., Anderson, D.K., Thigpen, II, J.F., Bohnsack, B.L., and S.G. Sutton. (1999). "10th Alice Kelly Ladies Only Memorial Billfish Tournament Socio-Economic Survey"

Gabriel, Jr.,J.S. (2005) "Waterway Economics and the Boater Voter", Presentation to the NMMA Inaugural East Coast Waterways and Beaches Symposium, August 12, 2005.

Gentner, Brad, Michael Price and Scott Steinback, Marine Angler Expenditures in the Southeast Region, 1999, NOAA Technical Memorandum NMFS-F/SPO-48, August 2001.

Haab, Timothy C., and Kenneth E. McConnell, Valuing Environmental and Natural Resources: The Econometrics of Non-Market Valuation, Edward Elgar, 2002.

Haab, Timothy C., John C. Whitehead, and Ted McConnell. The Economic Value of Marine Recreational Fishing in the Southeast United States: 1997 Southeast Economic Data Analysis. Final Report for NMFS Contract No. 40WCNF802079 (353 kb PDF file), National Marine Fisheries Service, Southeast Regional Office, St. Petersburg, FL. 2000.

Henry, Mark S., and Queen Vo. 2001. Possible Effects of the Shrimp-Baiting Fishery on the Economic Performance of the South Carolina Shrimp Trawling Industry and Related Economic Impacts. Research Report RR-01-01. Department of Agricultural and Applied Economics, Clemson University. Clemson, South Carolina.

Holland, S. M, A. J. Fedler, and J. W. Milon. The operations and economics of the charter and head boat fleets of the Eastern Gulf of Mexico and South Atlantic Coasts. University of Florida, Gainesville, FL. MARFIN grant number NA77FF0553. 1999.

Leary-Smith, P. (2005) "Economic Significance of Shallow Draft Channels", Prepared by The Dismal Swamp Canal Welcome Center, August 2005.

McConnell, Kenneth E., and Ivar E. Strand, Overnight Trip Choice for Marine Anglers, Report on NMFS contract number 40ANF804203, August 8, 1999.

Miley, Gallo & Associates, LLC (2005) An Economic Analysis of the Wanchese Seafood Industrial Park, 18 p.

Miller, R. E., and P. D. Blair. 1985. *Input-Output Analysis: Foundations and Extensions*. Prentice Hall. 464 pp.

Minnesota IMPLAN Group, Inc. 2005. IMPLAN System, Version 2.0.1025 (data and software). Stillwater, MN. http://www.implan.com

Moffatt & Nichol. 2006. Field survey of commercial fishermen, recreational fishermen, seafood processors, and boat builders, conducted by Moffatt and Nichol in Dare County, NC, January-April, 2006.

North Carolina Department of Environment and Natural Resources (2005). *Annual Fisheries Bulletin: 2004 Commercial and Recreational Statistics*. Issued by the NCDENR, NC Division of Marine Fisheries, through participation in the National Marine Recreational Fishery Statistics Survey of the National Marine Fisheries Service.

North Carolina Department of Environment and Natural Resources (2005). *Fish Dealer Report*. Issued by the NCDENR, NC Division of Marine Fisheries.

North Carolina Department of Environment and Natural Resources (2005). "Annual Statistics on Commercial Landings for 1995 to 2004". Available at <www.ncfisheries.net/statistics>

National Marine Fisheries Service, Fisheries Statistics Division. Personal Communication. URL: http://www.st.nmfs.gov/st1/recreational/queries/index.html, 2006.

North Carolina Division of Marine Fisheries. 2006. Commercial Fishery Statistics. North Carolina Division of Marine Fisheries. Available: http://www.ncfisheries.net/statistics/comstat/index.html

NCESC. 2005. North Carolina Employment Security Commission. Raleigh, NC.

NC LINK. 2005. Data Services Unit, North Carolina Office of State Budget and Management. Raleigh, NC. Available: http://data.osbm.state.nc.us/

NCWaterways.com. 2005. North Carolina Marine Trade Services, a program of the Small Business and Technology Development Center of the University of North Carolina. Program office located in Beaufort, NC. Available: http://www.ncwaterways.com.

NEFMC. 2000. Atlantic Sea Scallop Fishery Management Plan Stock Assessment and Fishery Evaluation (SAFE) Report. New England Fishery Management Council. Newburyport, MA. Available: http://www.nefmc.org/documents/scallops/scallop_safe-2000.htm.

NEFMC/MAFMC. 2005. Framework Adjustment 18 to the Atlantic Sea Scallop Fishery Management Plan. New England Fisheries Management Council and Mid-Atlantic Fishery Management Council.

NFERF. 1989. Economic Activity Associated with Fishery Products in the United States. National Fisheries Education and Research Foundation, Inc. Report by Kearney/Centaur Division, A.T. Kearney, Inc. Chicago, IL.

Outer Banks Chamber of Commerce (2005). "The Outer Banks Economy". <www.outerbankschamber.com/economics2.cfm>

Palmquist, R.B., J.W. Schumann and J.A. Michael. (2002) "Boating Uses, Economic Significance, and Information Inventory for North Carolina's Offshore Area, 'The Point'" U.S. Department of Interior, Minerals Management Service, Gulf of Mexico OCS Region, New Orleans, August 2002.

Small Business and Technology Development Center (SBTDC) (2005). "Marine Trades", <www.sbtdc.org/services/marine_trade.asp>

Strategic Marketing & Research, Inc. (2006) "Visitor Research – Wave 1&2 – Summer/Fall 2005" Prepared for Outer Banks Tourist Bureau, January 2006.

Trow, Eve. 1985. The Economic Impact of Oregon Inlet on the Pamlico Sound Region. Dare County Oregon Inlet Commission. Manteo, NC.

USBEA-REIS. 2002. Regional Economic Information System (REIS) Data. Bureau of Economic Analysis, U.S. Department of Commerce. Washington, DC.

USBLS. 2002. Consumer Expenditure Survey. Bureau of Labor Statistics, U.S. Department of Commerce. Washington, DC.

USDC. 2005. Gross Domestic Product: Implicit Price Deflator. U.S. Department of Commerce, Bureau of Economic Analysis. Washington, DC.

Moffatt & Nichol

1616 East Millbrook Road, Suite 160

Raleigh, North Carolina 27609

tel 919.781.4626 fax 919.781.4869

www.moffattnichol.com