



Boating Uses, Economic Significance, and Information Inventory for North Carolina's Offshore Area, "The Point"

Volume I: Characterization of Recreational and Commercial Fisheries



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Authors

Mac Currin
Sports Fishing Adventures
Raleigh, North Carolina

Steve Ross
National Estuarine Research Reserve
Wilmington, North Carolina

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ABOUT THE COVER

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INTRODUCTION

North Carolina's position on the east coast, along with the shape and structure of its coastline, and its extensive estuarine system create a diversity of fishing opportunities for the state's fishers. Geographically, North Carolina's coastline is unique compared to other east coast states. Three "capess" (Cape Hatteras, Cape Lookout and Cape Fear) protrude from the mainland. Each of these capes is separated by a "bay" or scalloped feature in the coastline (Figure 1) and sandy shoals extend into the Atlantic for about 20 miles off each cape. The shoals provide shallow-water habitat far offshore and affect coastal currents. These shallow shoals are partly responsible for North Carolina's reputation as the "Graveyard of the Atlantic." The many shipwrecks, artificial reefs, natural rock formations and live bottoms that exist offshore, provide habitat for invertebrates and fishes. Fishers seeking bottomfish and structure orienting pelagics often target these areas.

The northern-most cape, Cape Hatteras, projects eastward into the Atlantic Ocean making it the land-mass closest to the Gulf Stream anywhere north of Florida. This proximity to the Gulf Stream supports large recreational and commercial fisheries for highly desirable pelagic species. A growing offshore charter boat industry has operated on the outer banks since 1937 (Cleveland, 1984), targeting bluewater gamefish such as billfish, tunas, wahoo and dolphin. An ever-growing private boat fleet also seeks the same species.

"THE POINT"

North of Cape Hatteras, approximately 30 miles east of the town of Salvo, exists a steeply sloping bathymetric feature known as The Point. In this area, the southward flowing coldwater Labrador Current meets the northward flowing, warmwater Gulf Stream. The Gulf Stream, one of the largest and most powerful ocean currents, originates in the Gulf of Mexico and generally tracks the 100 fathom (183 m) curve along the east coast of the United States until it reaches the Cape Hatteras area off North Carolina, where it begins a northeastward flow across the Atlantic Ocean. Although the Gulf Stream meanders unpredictably, this northeastward bend generally occurs in the vicinity of The Point.

The convergence of these two major currents, in conjunction with the Western Boundary Undercurrent, has been suggested to cause upwelling of nutrient-rich waters, enhancing the ocean's productivity (Len Pietrafesa, personal communication). The steep slope of the continental shelf, the converging currents and possible nutrient enhancement seem to concentrate small baitfish and squid, which in-turn seasonally attract and aggregate larger predator fishes such as king mackerel, yellowfin tuna, bigeye tuna, dolphin, wahoo, billfish and some of the smaller species of tuna such as blackfin, skipjack and bonito. These species are the targets of recreational and commercial fisheries comprised of charter boats (for hire), privately owned recreational fishing boats, as well as commercial longliners, trollers, netters and other fishers. Much of this effort is reported to occur at and near The Point.

A number of scientific studies have been conducted off North Carolina's northern outer banks. State and federal fisheries surveys have been carried-out mostly in continental shelf waters (see Ross et al., in prep. for a review). Extensive bathymetric and seismic studies were conducted in the vicinity of The Point in conjunction with Mobil Oil Company's plans to explore for petroleum reserves in this region. Much of this information is contained in Mobil's Plan of Exploration (POE) that was filed in 1989 for lease block 467 (see Mobil 1989). Limited

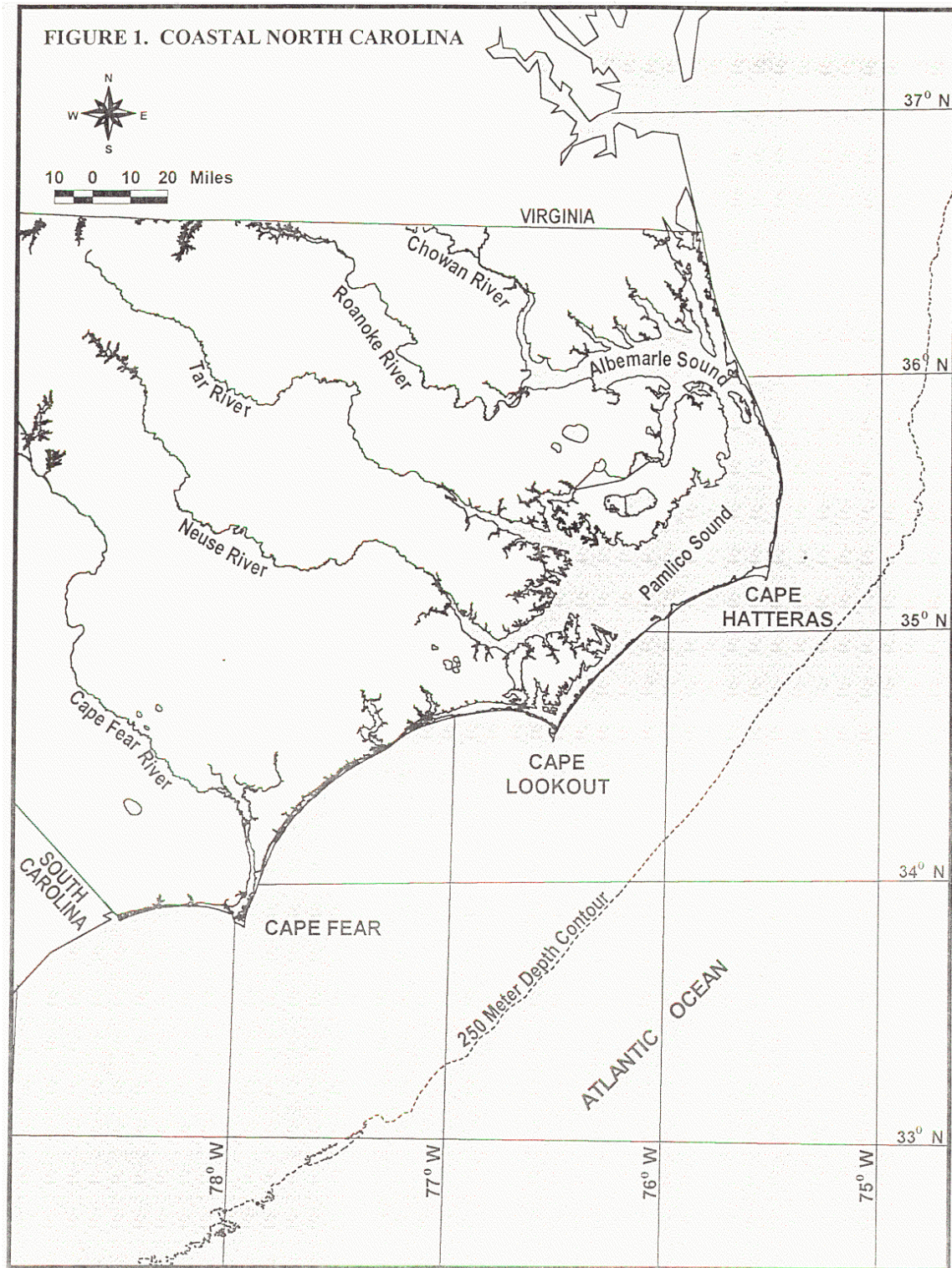


Figure 1. Coastal North Carolina

oceanographic and biological studies were also conducted (see Mobil 1989, MMS 1990, ESRP 1992, Shepard and Hulbert 1993 and Vigil 1998 for reviews). Although the state of North Carolina asked for documentation of the use and value of The Point during their review of Mobil's P.O.E. and the Environmental Report (ER) prepared by the Minerals Management Service (MMS 1990), to date, no one has characterized the users and the extent of their use of this area.

In 1997, Chevron announced its intention to drill an exploratory well in or around lease block 510. Lease block 510 is adjacent to block 467 and includes the area known as The Point. The questions were again raised; who is out there, what are they doing and how much do these groups use this offshore area?

OBJECTIVES

The purpose of this study was to determine the geographic extent of the area known as The Point; to identify and characterize the primary users of The Point, and to determine the extent of, and seasonality of their use. A four pronged approach was chosen to accomplish this task.

First, the likely users of the area were determined by contacting resource agencies and fishers who were known to use the area extensively. Recreational and commercial fishers were identified as the primary user groups. Second, a directed survey was designed to define the area and estimate the use and seasonality of use by commercial fishers and charter boat captains. Thirdly, data from the National Marine Fisheries Service (NMFS), Marine Recreational Fishing Statistics Survey (MRFSS) were obtained to augment the charter boat survey and to characterize the use by private boaters. And fourth, data from the N.C. Division of Marine Fisheries' Trip Ticket Program (TTP) were obtained to augment the survey of commercial fishers.

METHODS

CHARTER BOAT AND RECREATIONAL BOAT FISHERS

Charter boats are concentrated at relatively few marinas on the northern outer banks of North Carolina. A survey and cover letter were mailed to 50 identified charter boat captains docking at Pirate's Cove Marina (Manteo, NC), Oregon Inlet Fishing Center (adjacent to Oregon Inlet), and 25 captains docking at either Oden's Dock, Hatteras Harbor or Teach's Lair marinas in Hatteras, NC (Appendix I). Although, the charter fleet at Hatteras typically does not fish as far north as The Point, under some circumstances, a few of the Hatteras captains will make the long run.

The MRFSS is designed to identify recreational participation in marine fisheries and to assess their impact on fisheries (Appendix III). These data are collected by direct intercepts at known fishing access points and by a random telephone survey. The direct intercepts provide the bulk of the data, because of the relatively small number of marine anglers identified by the randomized telephone survey. For this report, only the results of the direct intercepts of private boat anglers and charter boat clients at eight selected sites in Dare County were used. These sites were located at major marinas and harbors: Oregon Inlet Fishing Center, the Manteo waterfront, Pirate's Cove Marina, Salty Dog Marina (in Manteo area), and Teach's Lair, Hatteras Harbor Marina, Oden's Dock and Hatteras Landing (in Hatteras). Only data from intercepts indicating that anglers fished outside three-miles and either targeted or caught offshore species (e.g.,

yellowfin tuna, bigeye tuna, bluefin tuna, blackfin tuna, skipjack tuna, dolphin, wahoo, blue marlin, white marlin and sailfish) were considered and analyzed.

COMMERCIAL FISHERS

Commercial fishers who are likely to fish in the area of The Point and target offshore species participate in relatively few fisheries. Longliners target primarily swordfish, sharks, tuna and sometimes dolphin. Tuna trollers use either conventional rod and reel trolling gear or the “green stick” method (Wescott 1996). Additionally, some bottom fishing, trawling, fish trapping and gillnetting may occur near The Point, but those fisheries are usually prosecuted shoreward of the shelf break.

CHARTER BOAT AND COMMERCIAL FISHER SURVEY

Survey instruments (Appendix I, p. 1-7) were distributed to charter boat captains and commercial fishers to: geographically define The Point; ascertain their use and temporal patterns of use; determine conditions affecting their use; and to identify the species targeted or caught on a seasonal basis. The surveys for each group were similar but designed to seek information unique to each activity.

After the initial response period had passed, additional responses were gathered with the assistance of Captain Jeff Ross (charter boat “OBSESSION” at Pirate’s Cove Marina) who redistributed 15 additional surveys to charter captains who had not originally responded.

Because of the vagaries of identifying and locating individual commercial fishers who might fish offshore, an attempt was made to identify fish dealers who provide services for, and buy from, fishers targeting offshore species. After telephone conversations with three of the area’s larger dealers, the identified dealers were called and surveys were mailed to the four fish houses in the Manteo / Wanchese area and one in Morehead City that “pack-out” commercial fishers who landed offshore species. All five dealers indicated they would distribute the surveys and encourage the fishers to participate. A total of 70 surveys were mailed to the five dealers — 65 to Manteo/Wanchese and 5 to Morehead City (Appendix I).

A low initial response rate from commercial fishers was followed by subsequent contact with the five dealers to further encourage participation by their fishers. An additional mailing was made to 23 individual commercial fishers in the Manteo / Wanchese area who were identified by the NC-DMF as participants in offshore fisheries. At a later date, NC-DMF staff assisted in the hand-delivery of additional surveys to individual fishers. A total of over 100 surveys were distributed to commercial fishers.

Each survey included a map (Appendix I, p. 7) with two concentric circles drawn around loran C coordinates 26795 and 40590. The coordinates were identified as The Point on a commonly used fishing chart of the area (Nautical Publications, Raleigh, NC). We defined Zone A with a radius of approximately 8 kilometers (five miles) and Zone B, a radius of approximately 16 kilometers (ten miles) around the above stated coordinates. Zone C was considered to be any location outside Zone B.

The area of Zone A (approximately 202 km²- 78 square miles) covers a portion of the shelf from about 48 m (26 fathoms), on the west, out to a depth of around 1200 m (700 fathoms). Zone B has an area of approximately 611 km² (236 square miles, extending onto the shelf to a depth of about 48 m (25 fathoms) and offshore to over 1,829 m (1000 fathoms). There is one charted shipwreck in the north-northeastern part of Zone A in about 91 m (50 fathoms) of water.

Zone B also has a single shipwreck in the northwestern sector in about 64 m (35 fathoms) of water (see Appendix I, p. 7).

Responses from the charter boat and commercial fisher surveys were tabulated to determine means or ranges of the values provided. Other than *question number 1*, on the location of The Point, and *question number 8*, on seasonal catch (see Appendix I), when respondents answered with a range of values, the mean of that range was used in the calculations. For example, if a fisher estimated that he lost 10 to 20 days due to weather, we used a value of 15 to calculate the average annual number of days the fleet lost to bad weather.

Question number 8 (Appendix I), on the seasonality of catch, sought a numeric estimate of the average number of fish caught per trip during each month. Two respondents did not provide seasonal catch estimates. Several respondents provided a range of values while others indicated by a check-mark only that they landed that species during that month. To handle the range values, we chose to use the lowest (most conservative) value in the range, except when the lowest value was zero. When zero was the lowest value of the range, we noted that the species was caught, but it was not used in the calculation of a mean. Analysis was done only on those answers that provided a numeric value or when we could establish a conservative value by the method above.

Participants were also asked to provide comments about the survey or the possibility of exploratory drilling off North Carolina's coast. The comments of those who responded are summarized in Appendix II.

MARINE RECREATIONAL FISHING STATISTICS SURVEY (MRFSS) DATA

The MRFSS data from eight survey sites in Dare County were summarized. The sites were selected based on the advice of the state's MRFSS coordinator (Doug Mumford) to provide the most complete coverage of anglers potentially fishing offshore areas. The sites included five locations that access the ocean through Oregon Inlet and three locations at Hatteras, NC. Only anglers who either targeted or landed any of 10 offshore species (yellowfin tuna, bigeye tuna, bluefin tuna, blackfin tuna, skipjack tuna, dolphin, wahoo, blue marlin, white marlin and sailfish) typically caught in and near the Gulf Stream, were included in the data-set. Both charter boat and private boat intercepts were used in the summary but treated separately.

For purposes of analysis, the distribution of private boat fishers targeting offshore species is assumed to mirror that of the charter fleet. Anecdotal information and personal observation of small boaters following charter boats to the fishing grounds, and observations of small boaters fishing in close proximity to the charter fleet suggest that this is a reasonable and valid assumption. Queries of charter captains and others knowledgeable of the fishery also support the validity of this assumption.

NC-DIVISION OF MARINE FISHERIES TRIP TICKET DATA

Additional data on commercial fishers was obtained from the North Carolina Division of Marine Fisheries' (NC-DMF) Trip-Ticket Program (TTP) to augment the directed surveys (Appendix IV). The TTP is designed to record and track effort and landings of commercial fishers in the state. Only data from offshore species landed in Dare County were considered and analyzed.

The data collected by the TTP are landings (in pounds) by gear and waterbody. The landings are tabulated by the county in which the catch is purchased. For offshore fisheries, the categories are broken down to "less than three miles offshore" and "greater than three miles offshore."

Before mid-1995, all offshore data were collected coastwide (i.e., for the entire state). Beginning in 1995, landings were tabulated “north of Hatteras” and “south of Hatteras. Only the landings north of Hatteras were tabulated for this report. The TTP data were derived by applying a proportional constant (the % of the total caught north of Hatteras) to the “unknown” landings to estimate the proportion of “unknown” landings occurring north of Hatteras — these were added to the landings north of Hatteras (Allison Ferreira, NC-DMF Statistics Section). A small proportion of the data for 1996 and 1997 required the above manipulation.

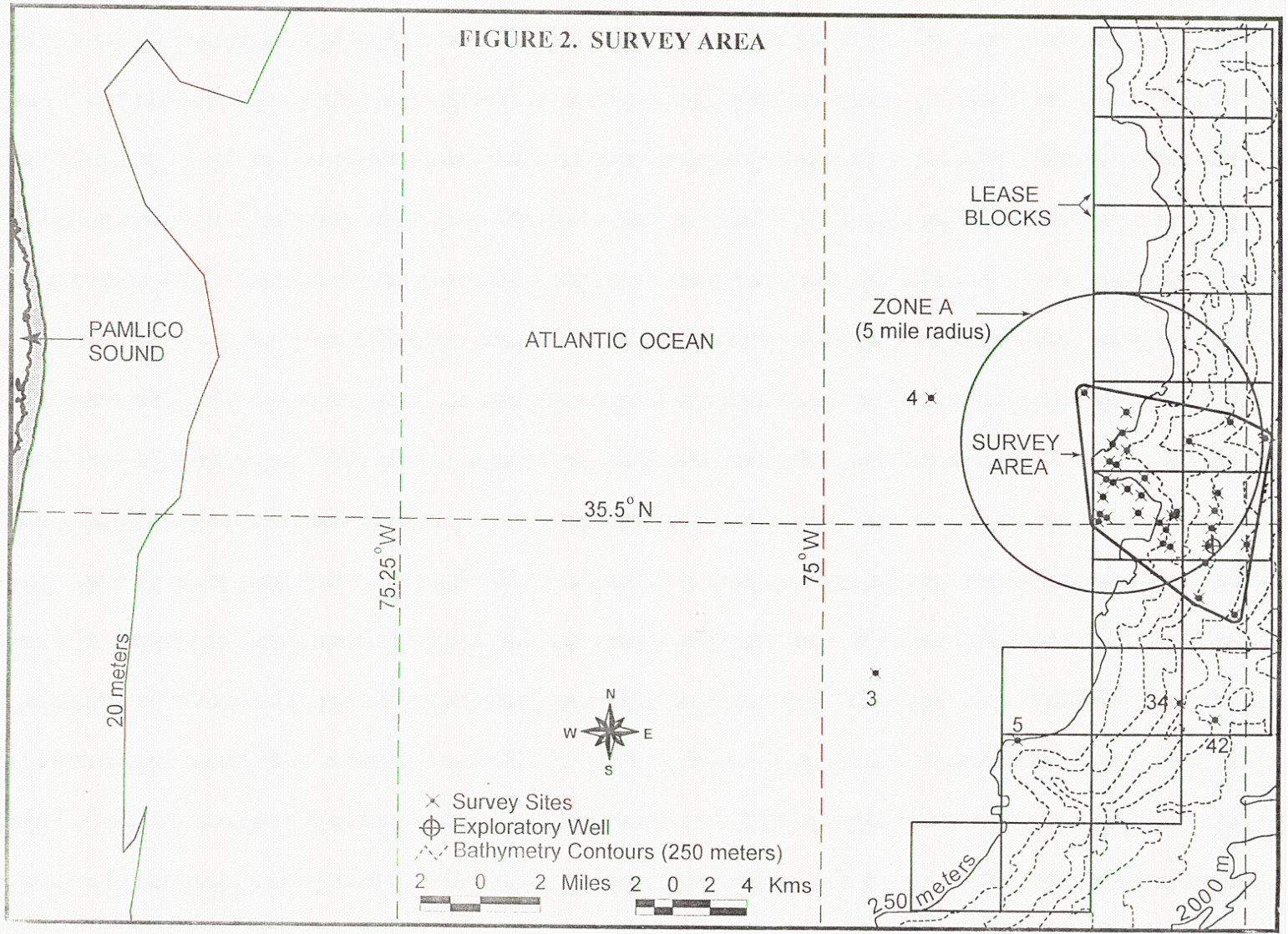
Under some circumstances, the trip ticket data are deemed confidential. For example, when fewer than three fishers account for all the landings of a species or species group during a given time-frame, the landings and value become proprietary and can not be reported. Such data are noted in the tables and charts.

RESULTS

LOCATION OF THE POINT

The coordinates provided in response to *question number 1* were used to establish boundaries for the area called The Point. All respondents were asked to locate The Point with loran TDs (time delays) or coordinates of latitude and longitude. Responses were uniformly provided in loran TDs which were converted to latitude and longitude. Several respondents provided a range of loran TDs (time delays) and each set of coordinates was included. One respondent provided two loran “lines” (40570 - 40600) which could not be plotted without corresponding 26000 lines. All other values received (charter and commercial) were plotted and fall within loran TDs of 26775-26820 and 40500-40610 (Figures 2 and 3). Elimination of the obvious outliers defines a polygon with an area of approximately 89.8 km² (34.7 square miles). Only five of the 48 coordinates were not contained in the polygon outlined in Figures 2 and 3. The coordinates from the fishing chart used to establish the center of Zone A, coincided with the coordinates of number 13 on Figure 3.

Figure 2. Survey Area



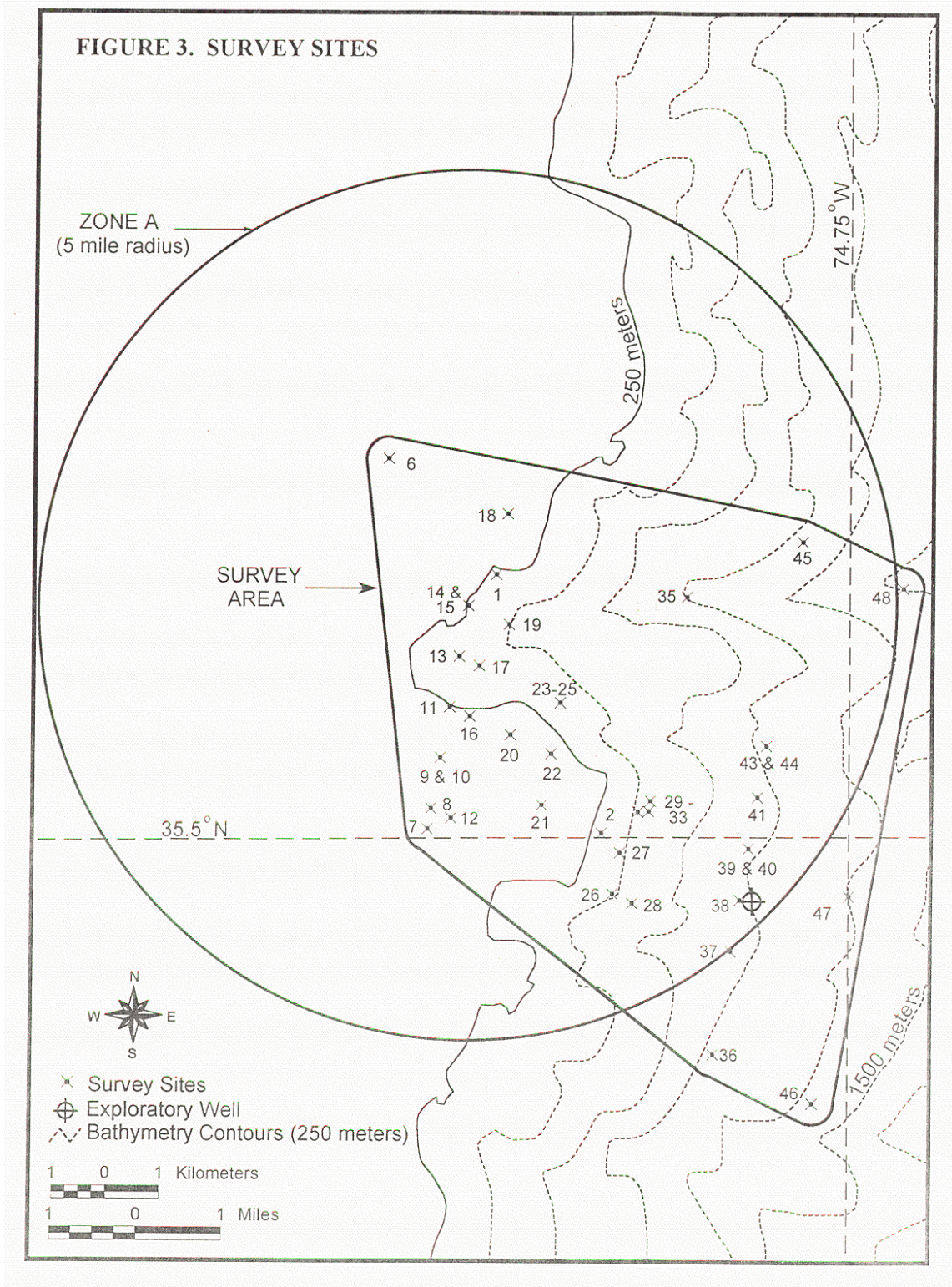


Figure 3. Survey Sites.

RECREATIONAL FISHERS

Charter Boat Captain's Response to Survey Instrument

Of the 75 surveys mailed to charter captains, 24 were returned for an overall response rate of 32%. Twenty completed surveys from the Manteo fleet and four from Hatteras fleet were returned. This sample size was deemed adequate to characterize the population of charter boats from Manteo. Except where noted, the information from the Hatteras fleet is treated separately.

Use of The Point by Charter Boats

Manteo Charter Fleet

Overall, 20 of the 50 Manteo captains (40%) responded to the survey. Only one of 20 respondents from the Manteo fleet spent no days in Zone A. The number of days fished annually by charter boats accessing the ocean through Oregon Inlet, ranged from 0 to 200 for Zone A, from 0 to 200 for Zone B and from 0 to 170 for Zone C (Table 1). The average number of days spent in Zone A was 89.4, in Zone B, 85.3 days, and in Zone C, 64.3 days. The percentage of time spent in each Zone was 37% in Zone A, 36% in Zone B and 27% in Zone C. The sum of the time spent in all zones was 239 days. This summed value provides one estimate of the annual number of days spent fishing.

Table 1. Average Number of Days Charter Boats Fish in Zones A, B and C

MANTEO FLEET n = 20				
	Zone A	Zone B	Zone C	Total
Days Fished	89.4	85.3	64.3	239
Percent Time in	37.4%	35.7%	26.9%	
Range	0 - 200	10 - 200	0 - 170	
HATTERAS FLEET n = 4				
	Zone A	Zone B	Zone C	Total
Days Fished	6.3	10.6	152.5	169.4
Percent Time in	3.7%	6.3%		90.0%
Range	0 - 20	0 - 40	0 - 200	

Seasonal use of Zones A and B is similar among the respondents. The average number of days fished in Zones A and B each month is found in Table 2. Most captains estimate they spend a greater part of the months of April, May, June, July, October and November fishing Zones A and B. During August and September, and December through March, charter captains spend fewer days fishing in Zones A or B. August and early September are prime months for white marlin fishing which usually takes place considerably north of The Point. But from December to March, those charter captains who commercially fish for yellowfin tuna and king mackerel will fish near The Point (Beth Burns, personal communication). Of the charter captains who indicated that they commercially fished, 12 boats spent between 6 and 11 days per month in Zone A or B during December to February. Those charter captains who indicated they do not commercially fish, spend little if any time in Zones A or B during December through March.

Several charter captains do not fish during December and at least two, leave the area in winter and spring to fish in Florida and Mexico.

During January to mid-March the past few years (1996 - 1999), many of the Manteo captains have relocated to Hatteras to participate in the bluefin tuna fishery. This new fishery has no-doubt affected the winter-time pursuit of yellowfin tuna by a number of the charter captains.

Hatteras Charter Fleet

The overall response rate for the Hatteras fleet was 16% (four of 25). As expected, Hatteras captains spent little time fishing near The Point and this may have affected their willingness to respond. Only about 10% of their fishing time was spent in either Zone A or Zone B. The average number of days fished in Zone A was 6.3 and in Zone B, the estimate was 10.6 days per year (Table 1). These estimates include the days (50) spent commercially fishing by a single captain — interestingly, all this time was in Zones A and B.

Other Hatteras captains fish the area on occasion, but many either do not have the fuel capacity to run that far or choose not to make the long run on an average charter trip. Seasonally, the Hatteras captains fished Zones A and B in May, June, July and September to December (Table 2). At least one Hatteras captain will move his boat to Manteo to fish the white marlin season during August and September.

We know of other charter captains who occasionally fish The Point, but the proportion of respondents that fish there (2 of 4, or 50%) is likely not representative of the proportion of all Hatteras captains that spend some time fishing The Point.

Table 2 Seasonal Distribution of Charter Boat Effort in Zones A and B

MANTEO FLEET n = 20													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Average days/mon.	3.8	3.8	5.3	15.3	21.2	22.6	19.4	8.6	11.1	19.4	15.2	7.5	153.2
Range of Values	0-10	0-15	0-12.5	0-30	0-31	0-30	0-30	0-25	0-23	0-31	0-30	0-25	
MANTEO FLEET n = 3													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Average days/mon.	0	0	0	0	5	1.7	1.7	0	3.3	5	5	0.3	22
Range of Values	0	0	0	0	0-10	0-5	0-5	0	0-10	0-15	0-15	0-1	

Factors Influencing Fishing Location - Manteo and Hatteras Captains

Respondents were asked to indicate the most important factors affecting whether or not they chose to fish in Zones A or B (*question number 4*). They were given a choice of “Season, Species of Fish Available/Targeted, Oceanographic Conditions, Wind Direction or Other,” with a rank of “1” being most important and “5” being least important. It appeared that some respondents (11) viewed the question as a “rank order” question and responded likewise. We suspect that some may also have reversed the order of importance but were unable to determine that for certain. Despite these possible misinterpretations, the data were tabulated as received.

The highest ranking factor affecting whether or not charter captains fished in Zone A or B was the species of fish targeted or available (Table 3). The species of fish available is closely linked to season, which was next most important, followed by oceanographic conditions. Least important was wind direction. Other factors listed as affecting their choice of where to fish were presence of bait (mentioned twice), bottom contour and ocean currents.

Table 3. Rank of Factors Affecting Whether Manteo Captains Fish in Zones A or B, Ranked 1 to 5 with 1 being most important and 5, least important. n = 20

	Sea Conditions	Fish Species Available	Oceanographic Conditions	Wind Speed	Other
Average Rank	2.4	1.6	2.55	3.55	4.89

Other factors mentioned were: presence of baitfish (2) and bottom contour (1).

Effort by the Charter Fleets

The survey results provide two estimates of annual effort by the charter boats. First, *question number 2* asked for the average number of days fishers spent in each of the three Zones. Table 1 summarizes these responses. Second, *question number 5* directly asked the captains to estimate the number of days spent charter fishing each year. In response to *question number 5*, the Manteo boats indicated they fished between 100 and 240 days per year, with an average of 170 days. The respondents from the Hatteras fleet averaged 145 days per year with a range of 120 to 200 days per year (Table 1).

Summing the estimated days spent in Zones A, B and C (from *question number 2*) by the Manteo fleet yields an average of 239 days fished per year (Table 1). This value should approximate the total number of days spent charter fishing given in response to *question number 5*, but only if the entire day was spent in a single Zone. Comparing Table 1 and the responses to *question number 5*, one sees that these values are quite different.

For the Hatteras fleet the two values are more similar. The summed value from the three Zones is 169.4 days (Table 1) and the average estimated value is 145 (*from question number 5*), an overestimate of around 17%. The values for the Manteo fleet are 239 days for the summed value (Table 1), versus 170 days for the estimated average (*from question number 5*), an overestimate of 40.6%.

Number of Customers - Manteo and Hatteras Captains

The estimated average number of customers per trip was 4.5 for the Hatteras boats and 5.5 for the Manteo boats. Though all the boats are licensed to carry up to 6 customers (there is one exception at Pirate's Cove), this difference is not surprising considering the smaller average size of Hatteras boats and the higher average charter fee for the Manteo boats.

Combining estimates of the number of days fished with the average number of clients, we can estimate the number of clients/anglers participating in offshore charter fishing from the two ports. Using a conservative estimate of 50 boats for the Manteo fleet and the average number of days spent charter fishing, yields an estimated 46,750 angler-days per year (Table 4). The estimate for the smaller Hatteras fleet (25 boats) is 16,312 angler days per year. The total angler-trips for the two fleets is slightly over 63,000 per year.

Table 4. Estimated Number of Angler Days per Year

	Boats in Fleet	Average Number Trips per Year *	Average Clients per Trip	Angler Days per Year
Manteo Fleet	50	170	5.5	46,750
Hatteras Fleet	25	145	4.5	16,312

* from *question number 5*

Tournaments

There are 17 bluewater tournaments held in North Carolina each year. Seven of these are held in Dare County. All the tournaments are held from late April through September. Tournaments have a large economic impact on the local communities. Reportedly, data exists on the economic impact of the Pirate's Cove Billfish Tournament, but we were unable to obtain the information. As an illustration of the impact that tournaments have, the state of South Carolina estimates that the seven billfish tournaments comprising their Governor's Cup have a \$1.5 million economic impact (1998 Press Release. Pete Laurie, SC-DNR). The expenditures per boat for those events range from \$6,070.00 to nearly \$8,000.00, with 127 boats entering at least one of the seven tournaments. By comparison, the Pirate's Cove Billfish Tournament, held in Manteo, on average hosts over 91 boats each year. The economic benefit from tournaments is greater than from a typical charter trip. Charter captains routinely receive a higher daily rate for tournaments and receive added compensation if they win or place in the competition.

The Manteo charter fleet averages six days per year fishing tournaments. The estimate from the four Hatteras respondents averaged 7.25 days. The average number of days per year that boats spend fishing in either Zone A or B during tournaments is approximately two for the Manteo boats and 0.75 for the Hatteras boats. Only one of the Hatteras captains indicated that he fished during tournament(s) in Zones A or B.

Other Users

Captains were asked if they make additional trips taking bird-watchers or marine mammal watchers — two identified user groups. No one from the Hatteras fleet acknowledged such trips. Two of the responding Manteo boats noted trips for birding and marine mammal watching. One boat makes 2 trips per year on average and the other boat makes 6 trips per year. Approximately 60 people each year charter vessels for birdwatching off the northern outer banks (Dave Lee, personal communication). Several captains noted that seeing birds and marine mammals was of interest to many of their fishing clients.

When asked to identify other users, besides fishers, only four of 24 respondents offered suggestions. The charter captains mentioned sailors, divers (likely inshore of Zone A) and merchant ships, which no doubt were in transit.

COMMERCIAL FISHING BY CHARTER BOATS

Charter captains were asked whether they spent additional time at sea commercially fishing. One stated that all his time at sea was commercial fishing — a reflection of his perception of his work. Two others answered yes but did not estimate the time spent commercially. Eighteen indicated that they did spend time commercial fishing. Six of the twenty-four respondents did no commercial fishing during the year.

The captains were also asked how many days per year they fished commercially in Zones A or B. Fourteen respondents provided numerical estimates ranging from 10 to 50 days. The average number of days spent commercially fishing in Zones A or B was 30 days per year for the Manteo fleet. Although three of the four captains from Hatteras indicated that they fished commercially, only one provided an estimate of 50 days per year. As mentioned previously, all those days were in Zone A or B.

Weather-Related Cancellations

All but one captain gave a numerical estimate of the fishing days lost annually due to “bad weather.” The average number of days lost to the Manteo fleet was 22.6 and Hatteras averaged 25.8. The estimates ranged from 10 to 50 days per year.

Seasonal Catch

The responses to seasonal catch generally reflected the difficulty in estimating monthly catch from memory. A few captains apparently maintained detailed records of daily or monthly catch, providing values to the nearest tenth. Most provided an estimate of the average number caught and others chose to indicate by a check-mark whether or not they landed a species during a particular month. The seasonal catch data are summarized in Table 5 where the provided numbers were averaged and the “check-marked “ (caught but no estimate provided) responses were tallied.

Yellowfin Tuna

Yellowfin tuna are a highly migratory species that typically travel in schools. When the water cools in the fall, yellowfin tuna are thought to migrate south from their northeast summering grounds. Offshore North Carolina is where these fish typically encounter suitable water temperatures and food resources. Based on the consistent commercial catches, yellowfin tuna apparently remain off North Carolina all winter. The size of yellowfin tuna caught in the recreational fishery ranges from under 20 to over 100 pounds. The estimated recreational catch of yellowfin tuna was over 172,000 fish weighing over 4.7 million pounds in 1997; nearly 95% by number were caught in Dare County (Doug Mumford, personal communication, MRFSS 1997).

Catch estimates of yellowfin tuna by the Manteo charter captains are greater than 10 per vessel, per day for 10 months of the year — October through June. The highest average catch is in January (20 per day for the Manteo boats). This is likely dominated by commercial catches, as few sportfishing charters are taken in the Manteo area from December through March. Much of the effort for yellowfin tuna reportedly occurs in the vicinity of The Point although yellowfin are certainly caught elsewhere. Some charter captains in the Manteo fleet fish almost exclusively at The Point regardless of season (Jeff Ross, personal communication) seeking primarily yellowfin tuna either for their clients or for the commercial market.

The Hatteras fleet’s yellowfin tuna catch peaks in April at 11 per boat, per day. The Hatteras boats average seven per day in May, but the catch during other months averages less than three per day (note: one boat reported 14 per day in February — the others reported 0). Yellowfin tuna catch by the Hatteras boats is consistently lower than the catch by the Manteo fleet, which averages over 15 per boat per day from October through June.

Table 5. Estimated Average Daily Catch of Selected Species, Manteo Fleet

	SPECIES				
	Yellowfin Tuna	Dolphin	Wahoo	Billfish	Bluefin Tuna
JANUARY					
Mean Number	20	0.06	0.12	0.0	3.8
Range	0-150	0-1	0-1	0	0-12
(n)	(16)	(18)	(17)	(18)	(15)
*No. "check-marked"	2	0	1	0	3
FEBRUARY					
Mean Number	13.7	0.69	0.12	0.0	3.93
Range	0-60	0-1	0-1	0	0-14
(n)	(16)	(18)	(17)	(18)	(14)
*No. "check-marked"	2	0	1	0	4
MARCH					
Mean Number	12.33	0.41	0.12	0	4.23
Range	0-30	0-4	0-1	0	0-12
(n)	(16)	(18)	(17)	(18)	(14)
*No. "check-marked"	2	0	0	0	4
APRIL					
Mean Number	15.17	3.98	0.59	0.04	0.8
Range	0-24	0-16.7	0-2	0-0.5	0-6
(n)	(15)	(15)	(15)	(15)	(15)
*No. "check-marked"	2	2	2	2	2
MAY					
Mean Number	14.78	21.5	0.71	0.43	0.14
Range	0-24	0-60	0-2	0-1	0-2
(n)	(15)	(14)	(14)	(15)	(14)
*No. "check-marked"	2	3	2	2	2
JUNE					
Mean Number	12.25	34.57	0.81	0.89	0.01
Range	0-20	0-60	0-2	0-2	0-0.2
(n)	(16)	(15)	(15)	(14)	(17)
JULY					
Mean Number	5.94	42.53	0.75	1.41	0
Range	0-20	0-60	0-3	0-4	0
(n)	(16)	(15)	(15)	(14)	(18)
*No. "check-marked"	3	4	4	5	1
AUGUST					
Mean Number	2.22	47.67	0.56	2.68	0
Range	0-12	0-125	0-2	0-7.5	0
(n)	(16)	(15)	(14)	(14)	(19)
*No. "check-marked"	3	4	4	5	0

Table 5. Estimated Average Daily Catch of Selected Species, Manteo Fleet (continued)

	SPECIES				
	Yellowfin Tuna	Dolphin	Wahoo	Billfish	Bluefin Tuna
SEPTEMBER					
Mean Number	3.74	36.67	0.38	2.0	0
Range	0-13.3	0-60	0-2	0-4	0
(n)	(15)	(15)	(15)	(14)	(19)
*No. "check-marked"	4	4	4	5	0
OCTOBER					
Mean Number	13.07	10.86	0.59	0.25	0
Range	0-25	0-40	0-2	0-0.1	0
(n)	(15)	(14)	(13)	(15)	(18)
*No. "check-marked"	3	3	4	2	0
NOVEMBER					
Mean Number	15.87	1.39	0.11	0	0
Range	0-30	0-10	0-1	0	0
(n)	(15)	(15)	(14)	(14)	(13)
*No. "check-marked"	3	4	3	1	2
DECEMBER					
Mean Number	21.87	0.83	0.11	0	0
Range	0-66.6	0-10	0-1	0	
(n)	(11)	(12)	(11)	(12)	(10)
*No. "check-marked"	3	4	1	1	3

* No. "check-marked" is the number of captains reporting a catch but no value given

Dolphin

In the 1980's, the charter fleets of North Carolina self-imposed a limit of 60 dolphin (also known as dorado or mahi-mahi) per boat. This seasonal visitor is a fast growing, short-lived species. At smaller sizes, schools of dolphin will aggregate under *Sargassum* weed or other floating material, making them easy to locate and quite vulnerable to anglers. North Carolina anglers landed an estimated 4.8 million pounds of dolphin in 1997; 89% by number were landed in Dare County (Doug Mumford, personal communication, MRFSS 1997).

Dolphin occur from May through December, but the average catches are highest during the summer months, ranging from over 20 to around 45 fish per day. Dolphin become scarce during the late fall and winter as reflected in the average catch per day — less than one per day from December through March. Dolphin catches, seasonally and in number, are quite similar for the charter fleets.

Wahoo

Wahoo appear to be an incidental catch throughout the year but are slightly more common in the catches during April to October. Unlike dolphin and tuna, wahoo are not typically a schooling species, although smaller fish will sometimes aggregate under floating objects, yielding multiple fish days for lucky anglers. Average numbers of wahoo caught annually by the charter fleets are small and similar. North Carolina anglers landed over 570,000 pounds of

wahoo in 1997; 69% by number were caught in Dare County (Doug Mumford, personal communication, MRFSS 1997).

Billfish

Billfish appear to be present only during the warmer months. Although they have been caught in every month of the year off North Carolina, most are caught from May to September. Blue marlin are more frequently caught from June to August. There is a consistent fishery for white marlin to the east and northeast of Oregon Inlet during August and part of September each year, as these fish leave cooler northern waters in the fall. Billfish catches peak in August at an average of about two per boat, per day for the Manteo fleet. Daily catches of over 10 white marlin per boat occur with some regularity during August to September. Sailfish and spearfish are a relatively minor component of the billfish catch, but do occur here. Very few billfish are retained by recreational anglers — most are released.

Bluefin Tuna

Bluefin tuna catch peaks during January to March. This recent fishery is primarily prosecuted from the port of Hatteras, where many of the Manteo fleet will dock during that period. The fishing grounds are generally south of Diamond Shoals. This winter fishery is composed of fish generally weighing from 100 to over 600 pounds. Incidental catches of bluefin tuna occur out of Oregon Inlet (and elsewhere off N.C.) during the spring and early summer. These are primarily smaller “school” size fish weighing less than 100 pounds, but “giants” (over 350 pounds) are encountered. One or two Manteo captains recorded bluefins among their catch each month from April through July.

Other Species

Species such as bigeye tuna, blackfin tuna, skipjack tuna, bonito and false albacore are occasionally caught while pursuing the above most targeted species. Sharks will also infrequently appear in the catches. Some charter boats will also bottom fish periodically in shallower shelf waters, but pelagic species like tunas, dolphin, wahoo and billfish are the most frequently targeted and/or landed fish species.

MRFSS Data

The MRFSS data are collected statewide to estimate the effort and catch of recreational anglers in the state. These data are collected by the NC-DMF under a cooperative agreement with the National Marine Fisheries Service (NMFS) and are entered into a national statistical database on fisheries. It is important to note that much of the statewide sampling effort is concentrated in Dare County because a large proportion of the recreational effort occurs there — especially for offshore fishing.

For this report, the MRFSS data were tabulated based on criteria selected to isolate those trips or anglers who had the potential to fish offshore and in the vicinity of The Point. Target species that typically occur only in the warmer Gulf Stream water (or near its edge) were selected: blue marlin, white marlin, sailfish, wahoo, dolphin, yellowfin tuna, bluefin tuna, bigeye tuna, skipjack tuna and blackfin tuna.

Of the charter and private boat anglers seeking or landing any of the 10 “target” species, a total of 3,980 interviews were conducted in 1995, 6,668 in 1996 and 6,227 in 1997 (Table 6). Of

those interviewed in 1995, 15% (n=592) were fishing on private boats; the remainder (n=3,388, or 85%) were on charter boats. In 1996, 15% (n=988) fished on private boats and 85% (n=6,668) were on charter boats. In 1997, 13% (n=827) fished on private boats and 87% (n=5,400) were on charter boats.

A large proportion of the offshore trips in North Carolina originate from the eight selected sites in Dare County. Eighty-one percent of all charter trips in the state originated from these sites in 1995 (Table 6). Eighty-six percent of the charter trips taken in North Carolina during 1996 were from these sites and in 1997, 92.2% of the charter trips sailed from Dare County. Private boaters sailing from the Dare County marinas accounted for an estimated 30% (1995), 75% (1996) and 65.4% (1997) of the state's offshore trips (Table 6).

There are an estimated 212,269 annual offshore angler-trips taken on charter boats in the state each year (1995 - 1997). The Dare County sites accounted for over 118,000 of these. Private boaters from Dare County who targeted offshore species, made an average of 120,920 angler-trips during those same years; an effort about equal to that of the charter fleet.

The target species of the charter and private boat anglers were similar, both between groups and among years (Table 7). "Tuna" (unspecified) was the primary target species for both groups during 1995 to 1997. Dolphin was the second target species for all groups. The third most sought after species for the charter boats was blue marlin, while private boaters targeted wahoo.

Table 6. Estimated Charter and Private Boat Angler Trips, 1995 – 1997, from MRFSS

	1995	1996	1997
Charter Boats			
No. Interviews	3,388	5,680	5,400
Statewide Angler Days	187,187	216,543	245,078
Dare Co. Angler Days	152,333	187,980	225,837
Percent of All Trips from Dare County	81.4%	86.8%	92.2%
Private Boats			
No. Interviews	592	988	827
Statewide Estimates	231,183	212,730	203,977
Dare Co. Estimates	69,910	159,547	133,442
Percent of All Trips from Dare County	30.24%	75.0%	65.4%

Table 7. Target Species and Percent Targeting that Species, Charter and Private Boats, 1995 – 1997, from MRFSS

	1995	1996	1997
Charter Boats			
1st Target Species	Tuna (74.3%)	Tuna (74.4%)	Tuna (76.8%)
2nd Target Species	Dolphin (43.9%)	Dolphin (48.2%)	Dolphin (69.7%)
Private Boats			
1st Target Species	Tuna (41.0%)	Tuna (61.8%)	Tuna (61.4%)
2nd Target Species	Dolphin (51.3%)	Dolphin (37.3%)	Dolphin (40.5%)

Despite the fact that both charter boats and private boats “targeted” tuna, the number one ranking catch (by number) for both groups was dolphin (Table 8). The estimated number of dolphin caught by charter boats at the eight surveyed sites was 377,264 in 1995, 238,848 in 1996 and 391,679 in 1997. Private boats landed 44,153 dolphin in 1995, 49,039 in 1996 and 94,010 in 1997, from the Dare County sites. The estimated number of dolphin landed from these eight Dare County sites represented around 90% of the state total for all charter boats and around 70-75% of the state total for private boats during each of the three years under consideration (Table 8). Anglers landed lower numbers of yellowfin tunas than dolphin, but the percentage of the state’s catch was slightly higher — 90-95% for charter boats and 97-98% for private boats. The charter boats from the eight Dare County sites landed over 75% of the state’s catch of all offshore species, including over 90% of the state’s blue marlin and 85-97% of the white marlin.

Table 8. Estimated Catch of Charter and Private Boat Anglers Fishing from Dare County Sites and Percentage of the Estimated Total State Harvest by Each Group, 1995 – 1997, from MRFSS

	1995	1996	1997
Charter Boats			
Dolphin	377,264(88.3%)	238,848(89.2%)	391,679(89.2%)
Yellowfin Tuna	152,806(93.4%)	218,361(95.0%)	131,458(95.0%)
Wahoo	17,054(81.8%)	8,455(65.3%)	16,602(65.3%)
White Marlin	3,529(93%)	6,361(97.1%)	1,777(97.1%)
Blue Marlin	1,064(95.4%)	1,315(90.1%)	911(90.1%)
Private Boats			
Dolphin	44,153(54.8%)	49,039(69.6%)	94,010(76.0%)
Yellowfin Tuna	4,678(41.3%)	59,316(96.9%)	31,630(97.5%)
Wahoo	1,683(25.8%)	3,641(65.2%)	2,196(70.6%)
White Marlin	—(—)	835(100%)	200(100%)
Blue Marlin	—(—)	341(100%)	—(—)

The percentage of the state’s catch landed from private boats in Dare County was more variable than the catch from charter boats. For example in 1995, private boats landed only 25.8% of the wahoo caught by the state’s private boat anglers, while in 1996, boats from the

eight sites landed 50% of the estimated 1,275 wahoo landed by private boats. But in 1997, the Dare County boats caught 70.6% of the state's wahoo landed by private boat. Private boats from Dare County caught an estimated 60-99.9% of the white marlin during the three years and 100% of the blue marlin in 1996 (none were reported caught in the 1995 or 1997 interviews). It is important to note that blue marlin are a relatively rare catch and the survey is likely to miss some catches of uncommon species in all parts of the state. Other billfish (sailfish and spearfish) are relatively rare and also unlikely to be encountered in the intercepts.

Commercial Fishers

Commercial Fishers Response to the Survey

Although disappointing, a low response rate (5 of 70 or 7%) from the commercial industry was not totally unexpected. Commercial fishers are renowned for their independence, and those seeking offshore species may spend large blocks of time away from home. Also, because of threats to their livelihood, including low abundance and strict regulation of some target species, this group seems distrustful of regulatory and governmental agencies, perhaps making them less inclined to participate in a survey sponsored by such groups.

Regardless of the low number of responses, it appears that a cross-section of fishers responded. Those responding targeted a variety of fish, from sharks (usually caught on longlines), to tuna and dolphin (usually caught trolling or on longlines) and croakers and gray trout (usually caught in gillnets, trawls, or flynets).

Use of The Point

The responses to questions concerning the total days at sea and the days spent in the various Zones are summarized in Table 9. The average number of days spent commercially fishing was 172 days per year (response to *question number 5*) with a range of 60 to 225 days at sea each year. The summed value of the number of days annually spent in either Zone A, B or C was 167, resulting in a difference of only 3% in the total days fished. The sum of the average estimated days fished each month in either Zone A or Zone B (response to *question number 3*) was 104 days, or roughly 62% of the total time spent fishing (Table 10). This value compared quite favorably with the sum of the average number of days spent in Zone A and B (101 days; response to *question number 2*). There is only a 3% difference in the two values. The average number of days spent fishing in Zone A was 53 days, in Zone B, 48 days and in Zone C, the average was 66 days.

The effort in Zones A and B by the commercial sector resembled that of the charter fleets. More time was spent fishing near The Point from March to June, with reduced effort in July and August, increasing again in September, October and November. The highest average number of days fished in Zones A and B was 15 days in October (Table 10). The least average effort was in January (2.5 days) and February (2.75 days).

Only one commercial fisher indicated that he spent additional days (30 days) at sea recreationally fishing and none mentioned taking birders or marine mammal watchers.

Table 9. Average Number of Days Commercial Boats Fish in Zones A, B and C (n = 4)

	Zone A	Zone B	Zone C	Total
Number of Days in	53.7	47.5	66.2	167.4
Percent Time in	32.1%	28.4%	39.5%	
Range	0 - 100	25 - 75	40 - 100	

From *Question #5*- The Average Annual Days Spent Commercial Fishing

Table 10 Seasonal Distribution of Commercial Effort in Zones A and B

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Average days/mon.	2.5	2.75	10	11.25	12.5	13.75	5.0	5.5	8.5	15.0	12.5	5.0	104.25
Range of Values	0-10	0-10	0-15	0-15	0-20	0-20	0-10	0-15	0-15	0-20	0-15	0-10	

Factors Influencing Fishing Location

Four of the five respondents appeared to have answered *question number 4* with a rank-ordered response. It was difficult to determine the most important factor because the average rank of each factor was between 2.8 and 3. Water temperature and season were clearly the most important factors affecting their use of Zones A and B. These closely correlated factors were ranked number 1 in three of five responses.

Days Lost to Bad Weather

Commercial fishers estimate that they lose an average of 110 days per year to bad weather. This is more than the average indicated by the charter fleets (22 days), however, many commercial fishers attempt to remain active in the winter months, when seas are usually rougher, and this could account for more lost days. As noted, there is little charter fishing in the winter.

Target Species by Month

The respondents represented several different commercial fisheries, and therefore, their target species exhibited a diverse seasonal pattern (Table 11). Three of the five fishers showed catches in January, targeting sharks, tuna, swordfish, black sea bass and king mackerel. Sharks and swordfish are typically caught on longlines fished off the continental shelf. Tuna may be longlined or trolled but are sometimes caught on longlines used for swordfish and sharks. Mackerel are either netted or trolled and black sea bass are typically caught using pots, but may be caught using baited hooks on hydraulic or electric reels.

There were some differences in seasonal activity between the commercial and recreational fishers. Commercial activity in Zones A and B was greatest in May, June, October and November, averaging 10-15 days per month. Two of the five commercial fishers did not fish in Zones A or B during December, January or February. Commercial effort in January and February averaged two days per month and during July and August, effort was around 4 days per month. All the averages include a number of “0-day” estimates by fishers who either target inshore species or did not fish during those months. Two of the fishers, targeting tuna and king mackerel, averaged 10 days per month in Zone A or B during December and January. A

longliner, who did not provide seasonal effort, indicated that three-fourths of his entire effort occurred in Zones A and B.

Target species in February and March included tuna, sharks, swordfish, king mackerel and black sea bass, plus bluefish, croaker and gray trout which are usually caught with either gill nets, trawls or flynets (Table 11). In April and May, four fishers listed tuna as a target. Two listed mackerel, while only one listed sharks, bluefish and seabass. One of the fishers also included dolphin as a target, beginning in May.

June and July target species were similar among the fishers, with four of them targeting tuna. One targeted sharks and swordfish in addition to tuna while another sought mackerel in addition to tuna. The other fisher targeted bluefish and seabass. Tuna, sharks and swordfish were the only target species mentioned for August and September, except one fisher also targeted king mackerel. October, November and December target species were similar for each of four commercial fishers. With the exception of October, three fishers targeted tuna and mackerel all three months, while one of those also sought swordfish. One fisher switched from mackerel to seabass in December while still targeting tuna and swordfish. Another fisher targeted only croakers in October and November, apparently not fishing in December (Table 11).

Other Users

Ships or ship traffic were noted as users other than fishers. Only two fishers mentioned other users.

Table 11. Species Targeted by Commercial Fishers (n = 5)

Month	Species	Frequency	Month	Species	Frequency
JANUARY-	Sharks	2	JULY-	Sharks	2
	Tuna	3		Tuna	3
	King mackerel	1		Swordfish	1
	Swordfish	1		Black Seabass	1
	Black Seabass	1		Bluefish	1
	Dolphin	1	AUGUST-	Sharks	2
	FEBRUARY-	Sharks		1	Tuna
Tuna	2	Swordfish		1	
Swordfish	1	SEPTEMBER-		Sharks	1
Black Seabass	3			Tuna	3
Bluefish	2		Swordfish	1	
Gray Trout	1		King Mackerel	1	
MARCH-	Sharks		1		
Tuna	3				
King mackerel	1				
Swordfish	1				
Black Seabass	3				
Bluefish	3				

Table 11. Species Targeted by Commercial Fishers (n = 5)

Month	Species	Frequency	Month	Species	Frequency
APRIL-	Gray Trout	1	OCTOBER	- Tuna	3
	Croaker	1		King	3
	Sharks	1		Mackerel	
	Tuna	4		Swordfish	1
	King mackerel	2		Croaker	1
	Swordfish	1			
	Black Seabass	1			
MAY-	Bluefish	1	NOVEMBER-	Tuna	4
	Sharks	1		King Mackerel	4
	Tuna	4		Swordfish	1
	King mackerel	2		Croaker	1
	Swordfish	1			
	Black Seabass	1			
	Bluefish	1			
JUNE-	Dolphin	1	DECEMBER-	Tuna	4
	Sharks	1		King Mackerel	3
	Tuna	4		Swordfish	1
	King mackerel	1		Black Seabass	1
	Swordfish	1			
	Black Seabass	1			
	Bluefish	1			
	Dolphin	1			

Trip Ticket Data

North Carolina’s Trip Ticket Program (TTP) was established in 1984 to track the landings and effort of commercial fishers in the state. This program is the envy of many coastal states in terms of the volume and extent of fisheries data collected. The TTP is not without limitations, however, and is periodically changed to gather better data for use by the state’s fisheries managers and policy makers. One limitation is due to the issue of confidential data mentioned earlier (Page 5, Trip Ticket Data). Another limitation that may be changed soon, deals with the location of harvest effort. Presently, the NC-DMF asks for harvest locations on a broad scale — inside or outside three miles and north or south of Cape Hatteras (only since mid-1995). Such data are of limited use in establishing the actual location of effort by the commercial industry “potentially” fishing in the vicinity of The Point or elsewhere offshore. The data do provide a

good estimate of the seasonal catch of species that occur offshore and those data are reported here.

Selected commercial landings of offshore species collected through the TTP are noted in Appendix V and in Figures 4 and 5. These data are only for fish landed in North Carolina. It must be noted that boats from other states (and perhaps boats from NC) do fish the area and may land their catch in other states. Obtaining accurate information on these landings is difficult but this fact should cause one to view the landings data as conservative estimates of the catches that are made in the various fisheries.

Yellowfin tuna, king mackerel and bluefish dominate the commercial landings. Yellowfin tuna harvest generally peaks in the fall, but is high all year. Peak landings of yellowfin were in December 1995, October 1996 and June 1997. Annual landings of yellowfin tuna were lower in 1997 than the previous years. The “tuna” category includes unclassified tunas (i.e., unidentified to the species level) as well as the minor species like blackfin, skipjack, false albacore and bigeye tuna. Bigeye tuna and false albacore make up the majority of this category, which can be significant in the fall and winter. Like yellowfin tuna, unclassified “tuna” landings were also high in June of 1996 and 1997. King mackerel landings also peak in the fall, but the data contain a high percentage of “confidential” landings. Bluefish landings are highest in the fall, continuing into the spring — primarily from November through April. Appendix V also includes data on bottom fish (e.g., gray tilefish and snowy grouper) which are deepwater species found near the shelf break and on irregular bottom offshore. These fisheries are prosecuted near The Point (and elsewhere), as is the black seabass fishery (Beth Burns, personal communication). The black seabass fishery generally occurs from the shelf break, inshore.

Commercial landings of wahoo and dolphin are typically incidental, occurring as “bycatch” while pursuing tunas or other species. There are reports of a blossoming surface longline fishery targeting dolphin off northeastern North Carolina but to date, landings have remained at a fraction of the recreational catch.

The mako shark landings are almost entirely from the longline fishery. Makos are pelagic species that are most often found near schools of other fish. The seasonality of their landings support this contention. Their landing peaks generally coincide with those of bluefish, mackerel and tuna — mostly in the fall and winter. Other shark species are landed offshore, but they also occur seasonally nearshore and landings are difficult to attribute to either nearshore or offshore fisheries.

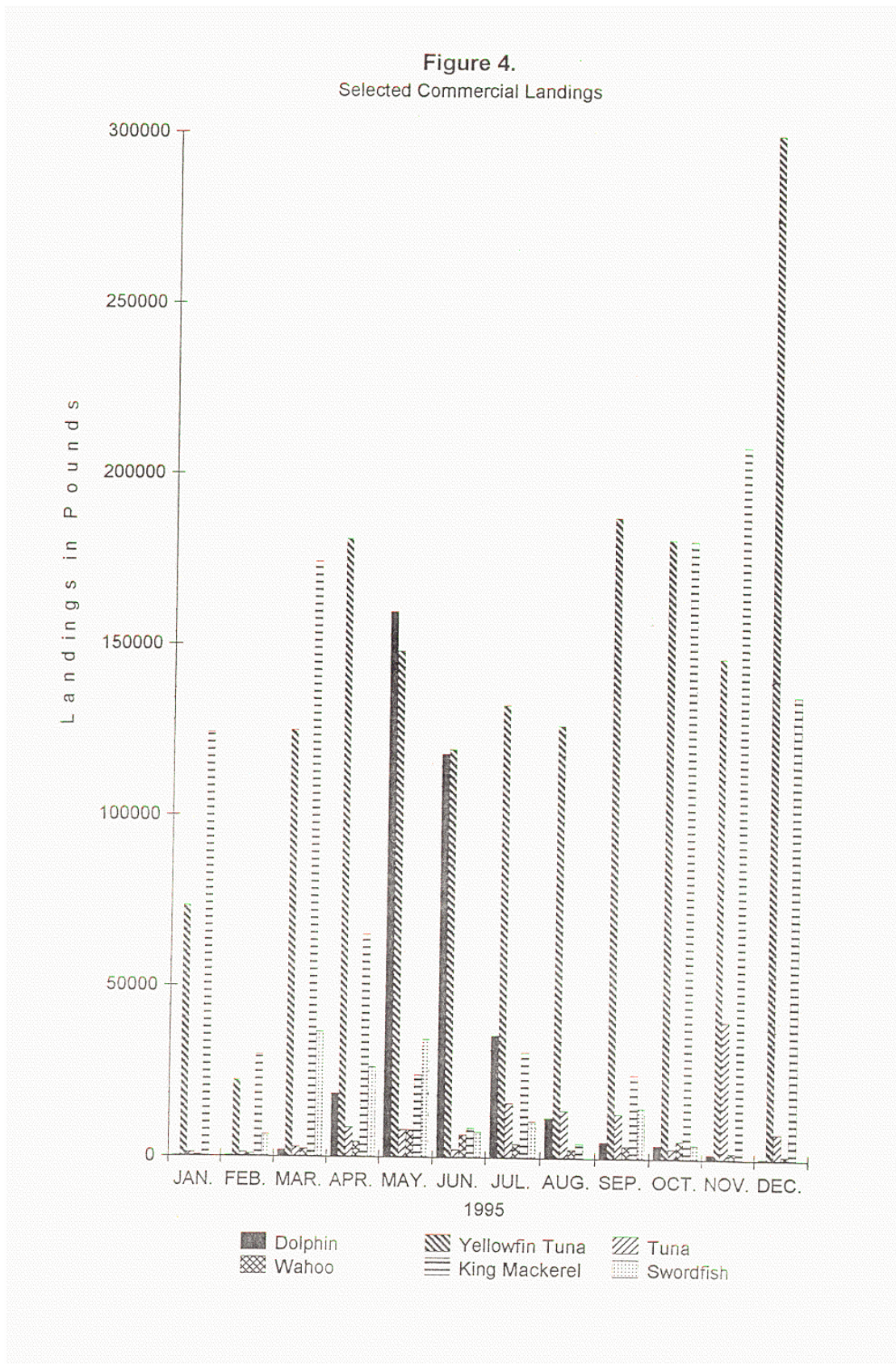


Figure 4. Selected Commercial Landings.

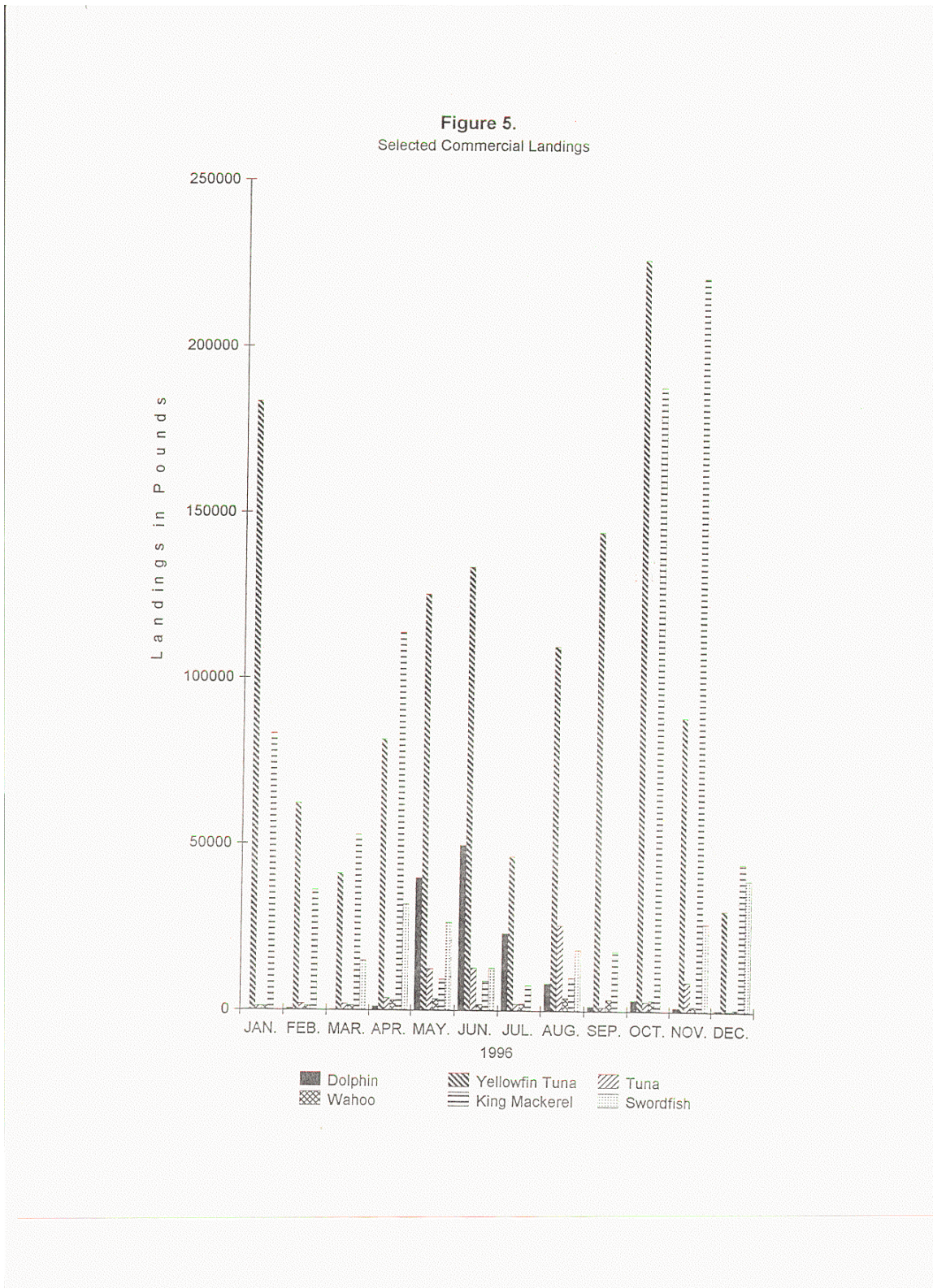


Figure 5. Selected Commercial Landings.

DISCUSSION

VALUE OF NORTH CAROLINA'S FISHERIES

North Carolina's marine fisheries are important to the state. The American Sportfishing Association estimates the value of North Carolina's marine recreational fisheries as \$1.28 billion annually, accounting for over 19,000 jobs in North Carolina (Maharaj and Carpenter, 1997). A large and highly respected charter fleet exists on our coast. An estimated 1.3 million anglers fish for saltwater species in North Carolina each year. Those anglers made nearly 4.8 million trips and landed over 19 million pounds of fish in 1997 (Doug Mumford, personal communication, MRFSS, 1997). Over 840,000 of these anglers were from out-of-state. Anglers made an estimated 295,000 trips on boats for hire, 1.5 million trips on private boats and the balance of trips (over 2.9 million) were from piers or from the shore.

North Carolina's charter fleet is concentrated in Dare County, with between 75 and 100 boats for hire, and is one of the larger fleets on the east coast of the U.S. Charter fishing is a relatively expensive activity with boats costing between \$700.00 and \$1,200.00 per day. Manteo area boats charter for \$975.00 per day and on average take five clients. The average cost for an individual to charter fish one day is \$195.00. This value does not include other costs associated with fishing such as travel, food, lodging and gratuities.

North Carolina ranks 9th in the U.S. in the commercial harvest of marine resources, landing nearly 229,000,000 pounds of product in 1997 valued at over 44 million dollars (Diaby, 1998). This figure does not include the economic impact of those revenues, which would be several times higher. There are over 6,000 licensed commercial fishermen employed in the state, with roughly an additional 21,000 either assisting in the harvest, working in seafood processing, distribution or related jobs (Diaby, 1998). The state's commercial fishers participate in a broad array of fisheries, including trawl fisheries, longline fisheries, gill net fisheries, pound net and pot fisheries as well as tong and dredge fisheries for molluscs and crustaceans.

Dare County was second in the state (behind Carteret County) in the total value of seafood landed in North Carolina. Dare County's commercial landings of the primary offshore species (i.e., tunas, dolphin and king mackerel) averaged 73.4% of the state's catches of those species during 1994 — 1998 (NC-DMF statistics).

THE SURVEY

The survey relied principally on the memory of the respondents to estimate a number of factors about their fishing operations, including their average participation in fisheries conducted in relatively well defined areas (Zones A, B and C). Such surveys are not without inaccuracies, and it is not possible to calculate errors around the means. The survey results do provide a good geographical definition of The Point from the fishers' viewpoint. The data also provide reasonable estimates of the seasonality of the fishers' use, the seasonality of their catches and the targeted species. In the case of charter and private boaters, the data provide estimates of the relative amounts of time these users spend offshore of northeastern North Carolina, including areas within eight and sixteen kilometers of The Point.

The low response rate by the commercial users severely limits the ability to accurately characterize this group's temporal use of specific offshore locations. We hesitate to extrapolate the responses of five individuals to draw conclusions about how much time this industry as a whole spends in a particular area of the ocean. Although anecdotal information (and information

from the surveys) suggests that commercial activity is heavy near The Point, the discussion of the commercial users will be limited primarily to the seasonality of their catch.

Location of The Point

One of the major objectives of this project was to better define the geographical area of The Point. Commercial and recreational fishers were consistent in locating The Point. This consistency was not in identifying a single location or “spot,” but in the broadness of the area. The “region” identified by the users as The Point is large, encompassing an area of at least 89.8 km² (34.7 square miles). The area defined by the users as The Point is contained almost entirely in Zone A established by this survey with only five of the 48 coordinates provided by the fishers falling outside the polygon defining The Point. These are the first data that define The Point fishing grounds and document that The Point is indeed a large variable expanse of ocean, rather than a single location as the name implies.

The exact physical and biological mechanisms that control and influence fish aggregations at The Point are unclear and have not been defined. These unknown mechanisms that attract bait and the target fishery species (as well as seabirds, turtles and marine mammals) apparently can change on very short time scales (daily or even within a day), resulting in shifts in the distribution of the fishes sought. The fishing grounds, used by the fishers, appear to be defined by unpredictable sets of dynamic oceanographic and biological factors that may interact with fixed bathymetric contours. The criteria selected or identified as important by the fishers in our survey — temperature, currents, wind, bottom and the presence of bait fish — are integrated by the fishers on a daily basis to determine where they actually ply their trade. The bottom in this area does have some rugged, mini-canyon bathymetry and is the region where major current systems collide (Sulak and Ross, 1996). Determining if or how the currents, bathymetry and biology interact to concentrate productivity over a relatively small area of open ocean is an important task remaining for scientific investigation.

This fishing ground is quite different from those defined by the position of a fixed or floating tower, or buoy that may aggregate pelagic species, and is also different from fishing grounds associated with fixed bottom features such as shoals, wrecks and reefs. The results of the user survey support the contention that it would be quite difficult to mark anything more than the center (perhaps) of the area called The Point.

Use of The Point

When compared to their estimates of the total number of days fished each year, the charter captains tended to overestimate the actual number of days spent in each Zone. The commercial fishers estimates were more similar to each other. These disparate values could result from a simple error in estimation by the charter captains, but could also result from fishers spending part of a day in different Zones. The latter is expected for the Hatteras fleet, which likely spends every day fishing in Zone C, including those days when they fish in Zones A and B. And the Manteo fleet is likely to spend at least some days fishing in several Zones, resulting in overlap of the “zones” fished in a single day. In fact, several respondents indicated that they spent equal numbers of days in all three zones with each of those estimates equaling the total number of days chartered annually. This fact could easily inflate the sum of the number of days spent in each Zone. In our judgement, the answers provided to *question number 5* are likely a more accurate estimate of the fishers’ annual days at sea. But regardless of the obvious inaccuracies associated

with adding the days spent in each zone to estimate total annual effort, we believe that the relative percentages of time the fishers estimated they fished in the three zones are accurate.

Dare County is the site of an unusually high proportion of North Carolina's sportfishing effort and much of that is directed at offshore species. The annual number of offshore angler-trips on charter boats for the Dare County (NC-DMF, MRFSS data for the years 1995 — 1997) are slightly less than two times the number of trips we estimated in our survey. The MRFSS estimates around 100 offshore charter, inshore charter, headboat and guide boats in Dare County. Even though the MRFSS includes headboats, and inshore boats that may make occasional offshore trips, the number of trips they estimate are acknowledged as being somewhat high (Doug Mumford, NC-DMF, personal communication). Apparently, the overestimated values are a result of the methods used to deal with the relationship of the telephone intercepts and the high proportion of out-of-state anglers who fish in Dare County. The value may also be skewed by the high proportion of total statewide sampling effort from Dare County. The actual number of charter boat trips is likely higher than those estimated by our survey, but less than the MRFSS estimate. We believe our estimates are slightly conservative.

The MRFSS estimates that around 400,000 angler trips (private and charter) are made in the state each year seeking pelagic species found in and near the Gulf Stream and the number appears to be increasing over time. Our survey suggests that these absolute numbers may be inflated by a factor of almost two. Regardless of the accuracy of the absolute number of anglers, the MRFSS estimates that a large percentage (86-92%) of the state's charter trips and of the private boat trips (65-75%) targeting offshore species originate in the Dare County ports using Oregon and Hatteras inlets as access. These percentages should not suffer from the methodological inaccuracies, because they are based on the proportion of actual intercepts.

The number of private boats fishing offshore in Dare County is also large. Like the charter trips, this number is increasing each year. The average number of private boat angler-trips taken in Dare County each year (120,920; 1995-1997 MRFSS data) is approximately equal to the number taken on charter boats. The data for private boat anglers are expanded using the same methods used to treat charter trips and, therefore, may be also overestimated. We assume that the overestimation is of the same magnitude as that of the charter fleet — about two times — but that the relative proportion of private boat trips is accurate (i.e., the number of private boat angler-trips is essentially equal to the number of charter boat angler-trips).

Using our value of 75 as the number of offshore charter boats from the five Dare County marinas, we estimate that over 63,000 angler trips are made on charter boats each year — over 46,000 from the Manteo area alone. About 72% or 33,000 angler-days per year are spent by Manteo-based charter boats fishing within 16 km of The Point. There is a small but unknown amount of additional effort at The Point by the Hatteras charter captains. So the addition of Manteo-area private boat anglers doubles that estimate to over 66,000 angler-days that are spent within 16 km of The Point, with roughly 24,600 angler-days (37%) spent within in 8 km of The Point.

Seasonal Effort

Fishing effort near The Point is extensive but varies seasonally for recreational anglers. First, effort varies with demand for charter services and the population of private boaters, both of which are highest during the warmer months. Secondly, effort at The Point varies within season according to the availability of fish, both at The Point and at other locations. Charter captains from Manteo spend most of April through June and October and November fishing in Zones A

and B. These months coincide with peak catches of yellowfin tuna for most of the fleet. The exceptions are the high yellowfin catches in December and January that likely represent commercial fishing activity by charter boats, an alternative chosen when the availability of charter clients is low.

Some charter captains reportedly fish consistently at The Point. They and/or their parties, choose not to pursue white marlin during August and September. These captains will fish all season targeting tuna and dolphin in the vicinity of The Point, while most of the other captains and their parties will travel to the northeast during much of August and early to mid-September primarily in search of white marlin.

Assuming that the private fleet's distribution mirrors that of the charter fleet, places large numbers of recreational anglers near The Point during most of the months of April, May, June, October and November. These are the months of maximum participation in the fishery and when the primary target species are most available. Fifty-one percent of the charter fleet's annual trips in Zones A and B occur during those five months. Because of unpredictably stormy and cold weather, and the smaller numbers of charter clients, recreational fishing is greatly reduced during the winter. But as evidenced by commercial catches, yellowfin tuna are present near The Point at this time and a few captains do take occasional charters.

The abundance of "tuna" — primarily yellowfin tuna — seems to attract offshore anglers to the northern outer banks and The Point. "Tuna" was the number one target species of both charter and private boat anglers. During the spring and again in the fall, most of the charter fleet's effort is directed at yellowfin tuna, and they experience a high degree of success. Over 90% of the state's recreational (charter and private boat) catch of yellowfin tuna (almost 200,000 fish per year) occurs in Dare County and the most consistent and productive yellowfin tuna fishing reportedly occurs at The Point.

Commercially, tuna are landed primarily by long-line, by trolling and using the "green stick," a method recently adopted from Japanese fishers and modified by local fishers (Wescott, 1996). Yellowfin tuna landings are consistently higher in Dare County than anywhere else in the state. North Carolina's reported commercial harvest of yellowfin tuna in 1997 was lower than the two previous years, yet nearly 720,000 pounds were landed, and the catch was worth \$1,134,717.00. Of the 1997 catch, over 662,000 pounds, or 92% were landed in Dare County. Peak tuna catches for the Dare County commercial fishers occurred during June, July and September through December. Except for December, these are the same months when participation in recreational and charter fisheries peaks.

Other species also appear to be abundant at The Point. Large numbers of dolphin are caught in the late spring and summer when effort at The Point is highest. Although commercial catches of bigeye tuna are high in June, the recreational catch occurs primarily in the fall. One of the reported "hotspots" for bigeye tuna is near the edge of Zone A, but bigeye are often caught further offshore and in the deeper canyons to the north (Jeff Ross, personal communication). Offshore species caught/targeted by recreational and commercial fisheries generally track their seasonal availability. Dolphin and billfish are consistently available only during the warmer months (May through September), while wahoo offer spring to fall availability. Because of the relatively constant temperature of Gulf Stream water, virtually all pelagic species "can" be caught every month of the year.

Species like yellowfin tuna are often caught in "blended" water — water that is a mixture of greenish coastal water and clear Gulf Stream water. Under some weather and climatic conditions, the Gulf Stream can move a considerable distance offshore and pelagic species that

require or desire consistent temperatures will move offshore with that water-mass. Of course, the opposite can be true where climatic conditions move Gulf Stream water inshore and typically offshore species can be caught very close to shore. For example, in 1996, dolphins were reportedly caught in the estuary at Morehead City (Joe Shute, personal communication).

The movement of the Gulf Stream (inshore and offshore) greatly influences where the fishers ply their trade. For example, if the Gulf Stream consistently tracked the 183 m (100 fathom) contour, the area defined by the fishers as The Point would likely be much smaller. In actuality, the edge of the Gulf Stream meanders, greatly influencing either the distribution of the target species or where they are more easily targeted by the fishers. And with the movement of the interface of the Gulf Stream and coastal water, so moves The Point.

CONCLUSIONS

A large portion of the commercial and recreational offshore fishing effort on North Carolina's northern outer banks takes place near The Point. For reasons that are not totally understood, this area aggregates and holds a diverse assemblage of fish for a large part of the year. Commercially, these fishes tend to be species of high value like tunas, dolphins, king mackerel, swordfish, and sharks and Dare County commercial catches of offshore species dominate the state's landings. Many of these same species, along with billfish, are highly prized by recreational anglers for their size, strength and food value and catches from Manteo area charter and private boats also dominate the state's recreational landings.

Although our knowledge of the region called The Point needs to be more complete, we now have a good idea of the geographical extent of this area used so extensively by recreational and commercial fishers. We have determined that The Point is effectively a large area defined perhaps by the interaction of poorly understood biological and oceanographic parameters. We also have a better idea of the extent and timing of the fisher's use. And we know what species of fishes attract fishers to the area. With the appropriate economic data, we may now be able to estimate the impact that recreational fishing at The Point has on the outer bank's economy.

Other research has clearly documented the uniqueness of the oceanography, geology and biology, especially on the bottom near the proposed exploratory well (see Vigil, 1998). Evidence suggests that this region could contain one of the most productive sections of water-column along the U.S. east coast. The Point's productivity and uniqueness need to be more explicitly verified and quantified and we need to better understand how and what mechanisms control the dynamic biological activity at The Point.

RECOMMENDATIONS

1. **Collect better data on the distribution of fishers using The Point and better characterize their catches.** This survey was able to characterize the use of The Point by the recreational fishing community and their average catches over a season. In the short time-frame and scope of this project, we were not able to gather details on the small-scale spatial distribution of the fishers. Such data, if needed in the future, might be gathered in conjunction with ongoing sampling efforts of the NC-DMF (e.g., MRFSS). Certainly, data collected from such an on-site intercept survey would be more accurate, eliminating the vagaries associated with recall of past activities and events. This type of direct-intercept based study should provide better data on the fine-scale distribution of fishers and their associated catches.

2. **Investigate other means of collecting information on the users of The Point.** A more accurate picture of the fishers spatial distribution might also be derived using more sophisticated means, such as satellite imagery or aerial photographs of vessel distributions. Defense Department satellites should have the high resolution needed to distinguish between vessel types. If these images are available at regular intervals and at a reasonable cost, good information could be obtained on the temporal distribution of various types of fishing effort. Satellite imagery could not, however, yield data on catch.

3. **Activities that restrict usage of The Point should be closely evaluated and avoided.** The establishment of exclusion zones associated with offshore oil exploration and/or development in the vicinity of The Point would certainly impact commercial and recreational fisheries. Longline fisheries use passive sets of large amounts of gear that drift with the currents. Storms or sudden changes in currents could cause unpredictable and unavoidable interactions with stationary drilling operations.

Such impacts would be most severe in the April to November time-frame with the exception of the months of August and September when many fishers are working to the north of The Point. There is, however, a segment of the charter and private fleet, as well as commercial trollers, long-liners and green-stickers, who continue to target tunas near The Point during the summer. In fact, some of the highest commercial tuna landings occur during August and September. If exploration goes forward, the oil companies should not establish an exclusion zone in this area or at least work out a safe plan that is acceptable to the fishers. Furthermore, an assessment of the economic impact on these fishers and risks to the fishery resources at The Point should be adequately considered in decisions regarding exploratory drilling off North Carolina's coast.

4. **Collect better data on the commercial fishers.** Commercial fishers are an important segment of the offshore fishing community on the northern outer banks and the pelagic species are a valuable component of the commercial landings in Dare County. Unfortunately, this survey effort did not capture the quantity of information needed to adequately characterize the commercial users. We were initially concerned that some of the survey questions might threaten commercial fishers, thereby affecting their participation. Upon first distributing the surveys, we asked for feedback on the structure and content of the survey questions. No input was received, so we assumed that none of the questions were threatening or offensive to the fishers. Still, the response rate was too low to extrapolate the data to the entire group of approximately 70 fishers.

We believe that an individual with direct ties to the industry or someone within the industry would garner the trust and cooperation of that group and perhaps be able to gather information that could better characterize commercial activity near The Point. The North Carolina Fisheries Association — an industry trade group — has a Commercial Fisherman's Auxiliary composed primarily of fishers wives. There is not an active group in the Manteo/Wanchese area (Susan West, personal communication). However, the group from the Hatteras/Ocracoke area could be helpful in a future survey of the commercial users. The Auxiliary might be approached about conducting a study.

5. **We strongly recommend additional scientific research that can elucidate the mechanisms controlling productivity at The Point.** Mechanisms that aggregate fish, that in turn attract fishers on a daily basis, are poorly understood. Studies of biological productivity and oceanography could provide insight to the biological and physical interactions that are responsible for aggregations of fishes. Such data might also be invaluable in evaluating whether (or how) this area should be protected or preserved.

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APPENDIX I

Charter Boat and Commercial User Survey Instruments

No. _____

TO: Charter Boat Captains
FROM: Mac Currin
801 Westwood Drive
Raleigh, NC 27607
(919) 881-0049
SUBJECT: CHEVRON and a Survey of the Users of the Area Known as “The Point.”
DATE: July 20, 1998

You are no doubt aware that CHEVRON has proposed to drill an exploratory well near the area known as “The Point.” This area is the site of important charter, recreational and commercial fishing. Up to now, exactly who and how much people use this important fishing area has not been documented. The state of North Carolina (Division of Coastal Management) is funding a study to characterize and document the major users of “The Point.” I am under contract to gather and analyze information about the users.

As a user, your cooperation and input can finally provide information that our state has been requesting since MOBIL Oil proposed to drill an exploratory well back in the 1980’s.

Please take the time to answer as accurately as possible, the 14 questions on the enclosed survey. You DO NOT have to sign your name and **your identity will not be revealed** to either the state or other potential users of this information. This survey is ***NOT DESIGNED TO EITHER PROVIDE SUPPORT FOR OR AGAINST SITING A WELL OFF NORTH CAROLINA.*** I hope only to fill in a large gap in the information our state needs to determine whether oil drilling is “consistent” with our Coastal Management Plan and good for the future of our state.

If you have questions, comments or concerns about the survey, please call me collect at the above telephone number — 7 am to 10 pm. I hope you will take the short amount of time needed to help your state gather information about the importance of “The Point” to North Carolina.

Thank you in advance for your cooperation.

Please return the survey in the post-paid envelope Before September 1, 1998.

Mac Currin 801 Westwood Drive Raleigh, NC 27607 (919) 881-0049

SURVEY OF CHARTER FLEET CAPTAINS
CHARACTERIZATION OF FISHERIES AT “THE POINT”

1. Please provide either the Loran Coordinates or LAT / LONG that you use to identify, locate or navigate to “The Point.” .
Loran coordinates: _____.
GPS coordinates: _____.
2. Using the attached map (Figure 1.) estimate the number of days per year that you either charter fish or commercially fish in:
Zone A (within 5 miles of “coordinates”) _____
Zone B (within 10 miles of “coordinates”) _____
Zone C (outside 10 miles of “coordinates”) _____
3. Please estimate the number of days in each month that you on average fish in either Zone A or Zone B in a typical year.
JAN ___ FEB ___ MAR ___ APR ___ MAY ___ JUN ___ JUL ___ AUG ___ SEP ___
OCT ___ NOV ___ DEC ___.
4. What factors determine whether or not you will fish in the Zones A and B versus elsewhere. Please rank these factors 1 to 5, 1 being most important to 5, being least important.
 - a. Season (month)- _____
 - b. Species available/sought _____
 - c. Oceanographic conditions _____
 - d. Wind direction _____
 - e. Others (please list) _____
5. Estimate the average number of days each year you spend at sea charter fishing.
_____ days.
6. Do you spend additional days at sea commercially fishing? _____ Yes. _____ No.
If so on average, how many days do you commercially fish in either Zone A or Zone B.
_____ days
7. Estimate the number of days that you will on average suffer charter cancellations due to weather. _____ days.

SURVEY OF CHARTER FLEET CAPTAINS

Page 2.

8. Please characterize your typical catch in each month and its seasonal variation. If you can, estimate the average number of each species caught PER TRIP during each month.

MONTH	SPECIES			
	Yellowfin tuna	Dolphin	Wahoo/Billfish	Bluefin tuna
January	_____	_____	_____	_____
February	_____	_____	_____	_____
March	_____	_____	_____	_____
April	_____	_____	_____	_____
May	_____	_____	_____	_____
June	_____	_____	_____	_____
July	_____	_____	_____	_____
August	_____	_____	_____	_____
September	_____	_____	_____	_____
October	_____	_____	_____	_____
November	_____	_____	_____	_____
December	_____	_____	_____	_____

9. During an average year, how many fishing trips will you run (charter & fun)? _____ trips.
10. Estimate the average number of charter customers you serve per trip. _____ people
11. Do you fish any tournaments from your home port? ____ Yes. ____ No.
If Yes on average, how many days a year do you tournament fish? _____ days
12. If you fish in tournaments, how many days will you fish during tournaments in either Zone A or Zone B? ____ days
13. Do you take charters for bird-watching (____ Yes) or marine mammal-watching (____ Yes)? If so on average, how many bird (____) or mammal-watching (____) trips will you take per year?
14. Are you aware of recreational or commercial users other than fishers, who spend time in Zones A or B? If so, please list. _____

No. _____

TO: Commercial Fishing Captains, Fishing Offshore Waters
FROM: Mac Currin
801 Westwood Drive
Raleigh, NC 27607
(919) 881-0049
SUBJECT: CHEVRON and a Survey of the Users of the Area Known as “The Point.”
DATE: July 20, 1998

You are no doubt aware that CHEVRON has proposed to drill an exploratory well near the area known as “The Point.” This area is the site of important charter, recreational and commercial fishing. Up to now, exactly who and how much people use this important fishing area has not been documented. The state of North Carolina (Division of Coastal Management) is funding a study to characterize and document the major users of “The Point.” I am under contract to gather and analyze information about the users.

As a user, your cooperation and input can finally provide information that our state has been requesting since MOBIL Oil proposed to drill an exploratory well back in the 1980’s.

Please take the time to answer as accurately as possible, the 10 questions on the enclosed survey. You DO NOT have to sign your name and **your identity will not be revealed** to either the state or other potential users of this information. This survey is ***NOT DESIGNED TO EITHER PROVIDE SUPPORT FOR OR AGAINST SITING A WELL OFF NORTH CAROLINA***. I hope only to fill in a large gap in the information our state needs to determine whether oil drilling is “consistent” with our Coastal Management Plan and good for the future of our state.

If you have questions, comments or concerns about the survey, please call me collect at the above telephone number — 7 am to 10 pm. I hope you will take the short amount of time needed to help your state gather information about the importance of “the Point” to North Carolina.

Thank you in advance for your cooperation.

Please return the survey in the post-paid envelope Before September 1, 1998.

Mac Currin 801 Westwood Drive Raleigh, NC 27607 (919) 881-0049

SURVEY OF COMMERCIAL FISHING
CHARACTERIZATION OF OF FISHERIES AT “THE POINT”

1. Please provide either the Loran Coordinates or LAT / LONG that you use to identify, locate or navigate to the area known as “The Point” offshore of Salvo. .
Loran coordinates: _____.
GPS coordinates: _____.
2. Using the attached map (Figure 1.) please estimate the number of days per year that you fish in:
Zone A (within 5 miles of “coordinates”) _____
Zone B (within 10 miles of “coordinates”) _____
Zone C (outside 10 miles of “coordinates”) _____
3. Please estimate the number of days in each month that you on average fish in either Zone A or Zone B in a typical year.
JAN _____ FEB _____ MAR _____ APR _____ MAY _____ JUN _____ JUL _____
AUG _____ SEP _____ OCT _____ NOV _____ DEC _____.
4. What factors determine whether or not you will fish in the Zones A and B versus elsewhere. Please rank these factors 1 to 5, 1 being most important to 5, being least important.
 - a. Season (month)- _____
 - b. Species available/sought _____
 - c. Oceanographic conditions _____
 - d. Wind direction?? _____
 - e. Others (please list) _____
5. Estimate the average number of days each year you spend at sea commercial fishing.
_____ days.
6. Do you spend additional days at sea fishing recreationally? _____ Yes. _____ No.
If so on average, how many days do you recreationally fish in either Zone A or Zone B.
_____ days
7. Estimate the number of days each year that you lose commercially fishing due to weather.
days.

APPENDIX II

Comments from Fishers

SUMMARY OF COMMENTS FROM SURVEY RESPONDENTS

1. **Commercial Fisher.** Bottom structure is what keeps the bait and habitat conducive to good fishing.
2. **Commercial fisher.** Many boats fish in the area. With an oil rig, it would not be the same. Expressed concern about changed aesthetics and possible accidents.
3. **Charter fisher.** Concerned about spills and amount of current affecting safe operation. Statement about the uniqueness of the area. Expressed that public trust waters should not be subject to private company exploitation.
4. **Charter fisher.** Serious concern about bird life. Arguments for or against drilling need to be factually based. Opposition to having a platform there is illogically based from a fishing perspective. Feels an oil platform would result in better fishing — operating like a FAD (fish attracting device).
5. **Charter fisher.** Keep oil rigs out of the area. Pollution is bad enough. This is the best fishing location on the east coast and a breeding area for small fish.
6. **Charter fisher.** Please leave the Point alone. It is a major fishing ground for charter, commercial and recreational fishers. Fishers deserve such an area free of potential environmental disasters. Concerned that structure could change the nature of fish (use) patterns.

APPENDIX III

Marine Recreational Fishing Statistics Survey Form

2. ASSIGNMENT NO. 1 *Cross the "1" out & write 2 if second assignment*

3. INTERVIEWER ID

4. YR/MO/DAY

5. INTERVIEW NUMBER

6. INTERVIEW TIME (use 2400 clock) *Time interview was completed*

3 7

7. STATE CODE 8. COUNTY CODE 9. SITE CODE

10. INTERVIEW STATUS 1 Questionnaire complete

2 Refused Non-Key Item

5 Refused Key Item

*11. Would you say you were fishing from..

1 Pier, Dock 2 Jetty, Breakwater
 SH 3 Bridge, Causeway 4 Other Man-made
 5 Beach or Bank

CH 7 Charterboat PR 8 Private Boat

11A. Were you tournament fishing today?
 1 yes 2 no 9 refused

11B. Did you see any sea turtles while fishing today?
 1 yes, alive 2 yes, dead 3 no

*12. Was most of your (specify mode) fishing effort today in the Atlantic Ocean or another waterbody. (If other probe, use DMF waterbody code)

1 Atlantic Ocean
 Other. (use DMF waterbody code) _____

BOX A. Refer to q. 11. If response is SH code q. 13 as 1/3 miles or less

*13. Was that..

1 Three Miles or Less
 2 More Than Three Miles

13A. Were you fishing near an Artificial Reef?
 01 no 88 SH If yes enter reef code. 98=unknown.

13B. What was the length of the boat used in feet?
 Boat Length

*13C. Is vessel on DMF List?
 1 yes 2 no 3 non-coop. 8 SH

14. What type of gear was primarily used?

01 Hook & Line 05 Seine 09 Hand
 02 Dip Net 06 Trawl 10 Other
 03 Cast Net 07 Trap 98 Unknown
 04 Gill Net 08 Spear 99 Refused

15. To the nearest half-hour, how many hours have you spent specify mode fishing today? That is how many hours have you actually spent with your gear in the water?
 . No. of hours

Box B. Refer to q. 11.

Beach/Bank. Using incomplete trip method go to 16.
 Other - Skip to q. 17.

16. How many additional hours do you expect to fish from shore today? That is, how many more hours will you actually have your gear in the water?
 . Additional BH hours

17. Were you fishing for any particular kinds of fish today? If yes, what kinds?
 No Particular Species/Anything.

1st Target
 2nd Target

18. Not counting today, within the past 12 months, that is since (insert month) of last year, how many days have you gone saltwater sport finishing in NC or from a boat launched in NC

No. of days 998 Don't know
 999 Refused

19. Not counting today, within the past 2 months how many days?
 No. of days 98 Don't know
 99 Refused

*20. What is your state and county of residence? If county unknown ask: What city or town do you live in?

State code: Name _____
 County code: Name _____

21. What is the zip code of your residence?

Zip code
 99998 Don't know 99997
 99999 Refused Foreign Country

22. Do you live in a private residence, or in some type housing such as a dorm, barracks, nursing home or rooming house?

1 Private Residence 8 Don't know
 2 Institutional Housing 9 Refused
 (Skip to q. 23a)

23. Does your home have a telephone?

1 yes 2 no 9 Refused

23a. Sex

1 Male
 2 Female

23b. How old were you on your last birthday?

Years 99 Refused

24. In the event my supervisor wishes to verify that I have been conducting interviews here today, may I have a name and phone number? Day Night

- -

*33. UNAVAILABLE CATCH. Did you land any fish that are not here for me to look at? For example, any that you may have thrown back or used for bait? IF YES, COMPLETE TYPE 2 RECORD FOR THIS INDIVIDUAL ANGLER, NOT GROUP CATCH. NOTE: FILLETS ARE UNAVAILABLE CATCH

TYPE 2 RECORDS

	2	SPECIES CODE				DISP	# OF FISH
1							
2							
3							
4							
5							

DISPOSITION CODES	
1	Thrown back alive/legal
2	Thrown back alive/not legal/ legality ref
3	Eaten/plan to eat
4	Used for bait/plan to use for bait
5	Sold/plan to sell
6	Thrown back dead/plan to throw back
7	Some other purpose _____
8	don't know
9	refused

*34. Did you catch any fish while you were fishing that I might look at?

- 1 Yes
- 2 No Skip to Box D
- 3 Fish on another anglers form - Fill in interview # where fish are listed Skip to Box D

*35. Did you catch these yourself or did someone else catch some of them

- 1 All caught by angler - Skip to Box D
- 2 Other contributors

*36. Can you separate out your individual catch?

- 1 Yes Skip to Box D
- 2 No

*37. How many anglers including yourself have their catch here? Please do not include anyone who did not catch fish No. of contributors

*38. How many people fished on your boat today?

No. of people

BOX D. If q.11 SH mode skip to q.39. Is this the first angler from this boat that I have interviewed?

- 1 Yes
- 2 No Record interview # of 1st angler in the fishing party

* 39. AVAILABLE CATCH. COMPLETE TYPE 3 RECORD BY ASKING: May I look at your fish? What do you plan to do with the MAJORITY of the (species)

TYPE 3 RECORDS

	3	SPECIES CODE				# OF FISH	LENGTH	WEIGHT(kg)	DISP
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

BLUEFIN ONLY

40. TYPE 8 RECORD

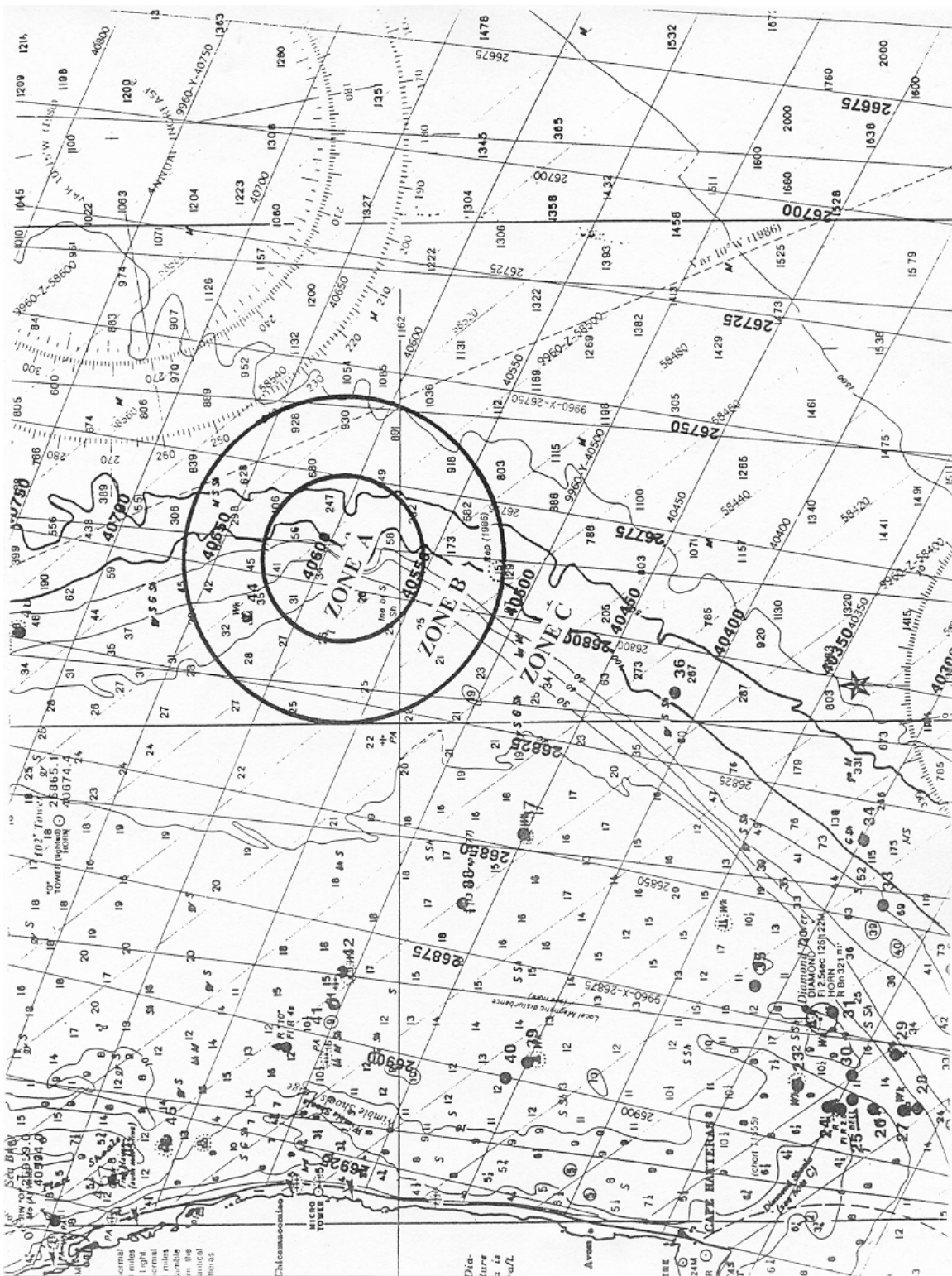
- 41. Total Landed
- 42. Total Release
- 43. Handling Time
- 44. Method

Response to "Bluefin Only" questions must be the same for all members of the party

- 45. Hook Type
- 46. Fishing Location
- 47. Number Vessels
- 48. Tag Fish

- 49. Any Tag
- * 50. Permit
- * 51. State Fish

52. Permit Number



APPENDIX IV

NC-Department of Marine Fisheries Commercial Fishing Trip Ticket Form

NC-Department of Marine Fisheries Commercial Fishing Trip Ticket Form — 53

FISHERMAN NAME: _____ FISH DEALER # _____

FISHERMAN LIC. # _____ 1 CHECK IF NO VESSEL USED

COMM. FISH. VESSEL REG. # _____ NO. OF CREW: _____

TRIP START DATE MO. | DAY | YR. UNLOADING DATE MO. | DAY | YR.

2-
NORTH CAROLINA TRIP TICKET (REEFFISH/PELAGIC)
TRANSACTION # _____

CIRCLE ALL GEARS USED		CIRCLE ONE WATERBODY WHERE MOST OF CATCH WAS MADE	
610	Bottomfishing (Bandits/Rod-n-reel)	20	Ocean 0-3 miles (North of Cape Hatteras)
660	Trolling/Lightline (Bandits/Rod-n-reel)	21	Ocean 0-3 miles (South of Cape Hatteras)
675	Longline Surface	22	Ocean greater than 3 miles (North of Cape Hatteras)
676	Longline Bottom	23	Ocean greater than 3 miles (South of Cape Hatteras)
677	Longline Shark	480	Gill Net Set (Sink)
943	Spears (Diving)		
345	Fish Pots		

KIND	CODE	POUNDS	UNIT PRICE	TOTAL PRICE
Beeliner	½-1	6462		
	1-2	6463		
	2-4	6464		
	4+	6465		
Pink Snapper	½-1	4862		
	1-2	4863		
	2-4	4864		
Black/Gag Grouper	Whole	3100		
Black/Gag Grouper	Gutted	3110		
Scamp		3160		
Red Grouper		2910		
Strawberry/Red Hind		2760		
Snowy Grouper	Small	2812		
	Med.	2813		
	Lg.	2814		
Mixed Grouper		2610		
Red Snapper		6410		
Mutton Snapper		6360		
Hogfish Gutted		3860		
Grunts		3500		
Amberjack	Gutted	1060		
	Whole	1050		
Jolthead (Knobbed) Porgy		5000		
Triggerfish		7200		
Conger (Offshore) Eels		2250		

KIND	CODE	POUNDS	UNIT PRICE	TOTAL PRICE
Sea Bass	Small	5152		
	Med.	5153		
	Lg.	5154		
	Jumbo	5155		
Kelp/Rock Bass	Mixed	5180		
Spottail/Ringtail Pinfish		5100		
Octopus	(LB)	9200		
Gold Tilefish	Small Gutted	7062		
	Med. Gutted	7063		
	Lg. Gutted	7064		
Gray Tilefish	Small Gutted	7112		
	Med. Gutted	7113		
King Mackerel	Snake Gutted	3962		
	Med. Gutted	3963		
	Lg. Gutted	3964		
Dolphin	Small Gutted	2062		
	Lg. Gutted	2064		
Wahoo	Gutted	7610		
Cobia	Gutted	1610		
Sharks	Carcass	5410		
Shark Fins		5420		
Blacktip Shark	Carcass	5510		
Thresher Shark	Carcass	5610		
Sandbar Shark	Carcass	5710		
Mako Sharks	Carcass	5560		
Swordfish Mixed	Carcass	6910		
Little Tunny Whole (F. Alb.)		7300		
Blackfin Tuna	Carcass	7570		
Bigeye Tuna	Carcass	7520		
Yellowfin Tuna	Mixed Whole	7450		
	Mixed Gutted	7460		
	Small Gutted	7462		
	Mixed Carcass	7470		
	Small Carcass	7472		
	Lg. Carcass	7474		

FISHERMAN COPY

North Carolina Division of Marine Fisheries, PO Box 769, Morehead City, NC 28557-0769

NC-Department of Marine Fisheries Commercial Fishing Trip Ticket Form — 55

FIS FISHERMAN NAME: _____ FISH DEALER # _____
 FIS FISHERMAN LIC. # _____ 1 CHECK IF NO VESSEL USED
 COMM. FISH. VESSEL REG. # _____ NO. OF CREW : _____
 TRIP START DATE MO. DAY YR. UNLOADING DATE MO. DAY YR.

4-
 NORTH CAROLINA TRIP TICKET (FISH TRAWL)
 TRANSACTION # _____

CIRCLE ALL GEARS USED		CIRCLE ONE AREA WHERE MOST OF CATCH WAS MADE	
210	Flounder Trawl	20	Ocean 0-3 miles (North of Cape Hatteras)
230	Flynet	22	Ocean greater than 3 miles (North of Cape Hatteras)
215	Shrimp Trawl	21	Ocean 0-3 miles (South of Cape Hatteras)
		23	Ocean greater than 3 miles (South of Cape Hatteras)

CIRCLE IF CATCH MADE OFF STATE OTHER THAN NORTH CAROLINA

35	New York	49	Virginia
33	New Jersey		Other:

KIND	CODE	POUNDS	UNIT PRICE	TOTAL PRICE
Bait	7900			
Black Drum	2100			
Bluefish Small	1352			
Med.	1353			
Lg.	1354			
Lg. Gutted	1354			
Boston Mackerel	4100			
Butterfish	1550			
Croaker Small	1952			
Med.	1953			
Lg.	1954			
Conchs/Whelks Shell Weight	9160			
Dogfish (Spiny) Whole	5950			
Flounder (Fluke) Small	2302			
Med.	2303			
Lg.	2304			
Jumbo	2305			
Flounder Gray Sole	2400			
Flounder Blackback	2350			
Gray Trout Pan	5252			
Med.	5253			
Lg.	5254			
Hakes/Ling	3650			
Sea Herring	3730			
Menhaden Bait (I.B.)	4200			

KIND	CODE	POUNDS	UNIT PRICE	TOTAL PRICE
Monk Livers Mixed	1170			
Monktails Rat/Mice	1161			
Small	1162			
Lg.	1164			
Monkfish Whole Mixed	1150			
Small	1152			
Lg.	1154			
Porgies Mixed	4800			
Puffers Dressed (Sea Chickens)	6860			
Puppy/Red Drum Redfish	2150			
Scup Mixed	4750			
Sea Bass Mice	5151			
Small	5152			
Med.	5153			
Lg.	5154			
Jumbo	5155			
Sea Mullet Small	4002			
Lg.	4004			
Sharks Mixed Carcass	5410			
Shark Fins	5420			
Sheepshead	6000			
Shrimp Heads On Mixed	8800			
Skates	6050			
Squid Loligo	9450			
Squid Illex	9450			
Spanish Mackerel	6700			
Speckled Trout	5300			
Spot	6750			
Starbutters	3700			
Striped Bass	6800			
Tautog	6950			

Dealer/Fisherman Use

APPENDIX V

Table of Seasonal Commercial Catch

Selected Commercial Landings 1995 – 1997 - from TTP (Dare County – Outside 3 Miles North of Cape Hatteras)

1995

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
DOLPHIN	*	*	*	*	*	*	*	7970	3903	2690	977	113	15653
YF TUNA	*	*	*	*	*	*	*	124911	183124	177840	146027	295699	927601
TUNA	*	*	*	*	*	*	*	*	11113	2687	39872	4945	58617
WAHOO	*	*	*	*	*	*	*	616	971	2751	1097	436	5871
KING MAC	*	*	*	*	*	*	*	*	884	89513	115058	41434	246889
SWORDF.	*	*	*	*	*	*	*	*	14458	4041	*	*	18499
BLUF.	*	*	*	*	*	*	*	*	*	682	1952	59452	62086
MAKO	*	*	*	*	*	*	*	*	*	*	*	4508	4508
GRD. FISH	*	*	*	*	*	*	*	*	*	*	2451	8117	10568

1996

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
DOLPHIN	*	*	*	157	4787	13623	10945	3634	775	735	454	*	35110
YF TUNA	179834	59351	12905	29797	96274	107219	41381	94992	139138	223774	85334	29493	1099492
TUNA	*	355	882	*	3184	11684	*	15697	942	1593	8445	*	42782
WAHOO	*	*	*	244	369	226	403	141	610	1262	337	*	3592
KING MAC	*	*	*	7084	232	507	*	*	4983	86432	98394	*	197632
SWORDF.	*	*	*	*	10965	4367	*	10353	*	*	14423	32069	72177
BLUF.	203311	405831	258810	262630	22708	*	0	*	*	1073	56914	186085	1397362
MAKO	0	*	14064	*	10846	3827	2027	1888	*	4330	2526	6916	46424
GRD. FISH	15344	52873	24932	10144	38407	8247	1390	5543	404	1069	2080	10974	171407

1997

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
DOLPHIN	0	*	159	1697	15175	52881	8179	5359	5088	756	121	*	89415
YF TUNA	3857	40609	19085	10374	31546	119038	68134	41791	85883	66695	95964	43150	626126
TUNA	15188	25042	11224	1598	6644	14967	9594	1202	309	24504	16032	8491	134795
WAHOO	0	*	154	288	509	309	192	700	207	91	906	*	3356
KING MAC	1692	21575	60965	8088	6099	945	742	260	976	83520	83520	15045	283427
SWORDF.	*	*	566	*	12434	22018	*	*	*	5798	*	17493	58309
BLUF.	147864	214334	228910	193345	3187	133	0	*	1678	1324	245826	276999	1313600
MAKO	*	9248	68280	5684	32056	11758	925	*	*	2828	1866	8756	141401
GRD. FISH	16856	15910	23479	28993	46399	16508	16391	31952	8444	4514	6286	10929	226661

* = Confidential data

bold = confidential data not included in value



The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.



The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.