NOAA TECHNICAL MEMORANDUM NMFS-SEFSC-458

Characterization of North Carolina Commercial Fisheries with Occasional Interactions with Marine Mammals

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1. Introduction

In accordance with the Marine Mammal Protection Act (MMPA, 16 U.S.C. *et seq.*), the National Marine Fisheries Service (NMFS) is required to publish an annual List of Fisheries (LOF) which categorizes U.S. commercial fisheries based on their level of interaction with marine mammals. The objective of this document is to provide a characterization of the six 2001 MMPA Category II commercial fisheries (*i.e.*, those with occasional interactions with marine mammals) in North Carolina (NC). This report outlines the history, fishing method and gear configurations (using the U.S. system of measurement), primary target species, temporal and spatial characteristics including trip and landing statistics, and monthly variations in species composition for each fishery for a five-year period (1995 - 1999).

A. Marine Mammal Protection Act

The MMPA was enacted in 1972 in response to concerns about the lack of consistent or adequate marine mammal protection. Because one of the major issues driving the enactment of this law was the depletion of marine mammals due to human activities, one goal of the MMPA is to conserve and manage marine mammals at optimum sustainable population levels (OSP) (Baur *et al.*, 1999). At OSP, a given species or stock is at or above a size that results in maximum net productivity, which is the level at which that population has the greatest net annual increase in population numbers (MMPA Section 3 (9)).

Except where otherwise specifically authorized, the MMPA established a moratorium on taking or importing marine mammals. To afford broad protection, a "take" is widely defined as to harass, hunt, capture, or kill any marine mammal or attempt any of these activities. The law specifically authorizes takes for some activities by means of permits or regulations. Some of these activities include scientific research, public display, enhancement of a species or stock, commercial/educational photography, Alaskan native subsistence and the incidental take of marine mammals during commercial fishing operations (NMFS, 1996a). The jurisdiction over all cetaceans (whales, dolphins and porpoises) and most pinnipeds (seals and sea lions) is assigned to NMFS.

The MMPA was reauthorized in 1994 to include one component specific to stock assessments (Section 117; 60 FR 31666, June 17, 1995). Section 117 requires that NMFS prepare a Stock Assessment Report (SAR) for each marine mammal stock which occurs in waters under U.S. jurisdiction (NMFS OPR, 2000a). The SAR includes information on the distribution and abundance of the stock, population trends, estimates of human-caused mortality from all sources, descriptions of the fisheries that interact with the stock, and the status of the stock. The information contained in the SAR provides the basis for determining whether a population or stock may be subject to unsustainable levels of human-caused mortality (NMFS OPR, 2000a). Each stock is designated as strategic or non-strategic. A strategic stock is one that is declining and likely to be listed as a threatened species under the Endangered Species Act (ESA) or is listed as endangered or threatened under the ESA. Also, a stock is strategic if it is designated as depleted under the MMPA or if the level of direct human-caused mortality exceeds the potential biological removal (PBR) level for that stock (50 CFR 229.2). The PBR is the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its OSP (MMPA Section 3 (20)).

The 1994 amendments to the MMPA and their implementing regulations also outlined three provisions governing the incidental mortality or serious injury of marine mammals during the course of commercial fishing operations (Section 118; 60 FR 45086, August 30, 1995) where serious injury is defined as any injury that will likely result in mortality (50 CFR 229.2). One provision of Section 118 is the

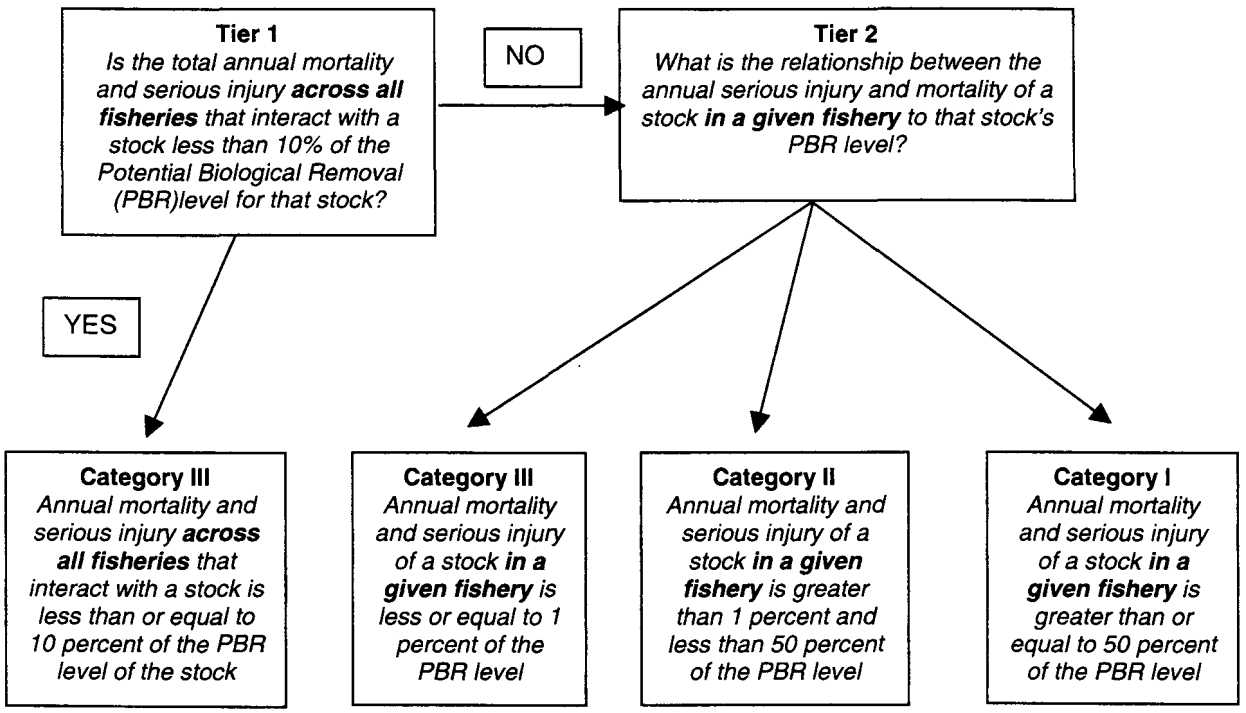

Figure 1.1 Fishery Classification Criteria. Section 118 of the MMPA requires NMFS to publish a list of commercial fisheries and classify each fishery based on whether it has a frequent (Category I), occasional (Category II), or remote (Category III) likelihood of incidental mortality and serious injury of marine mammals. The criteria developed consists of a two-tiered, stock-specific approach, that first addresses the total impact of all fisheries on each marine mammal stock, and then addresses the impact of individual fisheries on each stock by comparing the total annual mortality and serious injury of a stock of marine mammals with that stock's PBR level.

establishment of a fisheries classification system (Figure 1.1). The MMPA fisheries classification system consists of a two-tiered, stock-specific approach that initially assesses the cumulative impact of all fisheries on each marine mammal stock; then assesses the impact of individual fisheries on each stock. Commercial fisheries are put into one of three categories based on the annual rate of incidental mortality and serious injury relative to the PBR level for each stock (65 FR 24,448, April 26, 2000). Category I designates commercial fisheries with frequent incidental mortalities or serious injuries of marine mammals; Category II designates fisheries with occasional incidental mortalities or serious injuries of marine mammals and Category III designates fisheries with a remote likelihood or no known mortalities or serious injuries (50 CFR 229.2). NMFS is required to annually publish an updated List of Fisheries (LOF) that classifies all US commercial fisheries as Category I, II, or III (65 FR 24,448, April 26, 2000).

In recognition that the levels of takes have to be measured and monitored, an additional provision of Section 118 includes an authorization and reporting program (Marine Mammal Authorization Program - MMAP) and a monitoring or observer program. Both programs are administered by NMFS. The MMAP exempts Category I, II and III commercial fishers from MMPA prohibitions of taking marine mammals provided that they abide by certain regulations. For example, fishers in Category I, II and III are required to report to NMFS any incidental mortality or serious injury to marine mammals that occur. Also, Category I and II fishers must register with the MMAP and may be required to carry an observer upon request by NMFS (MMPA Section 118 (c)(d)).

Incidental takes are also recorded independently by means of the observer program. One objective of the NMFS observer program is to obtain statistically reliable estimates of incidental mortality and serious

injury of marine mammals in commercial fisheries. Another objective is to identify fishing methods or technology that may affect incidental mortality and serious injury (MMPA Section 118 (d)(2)).

A final provision of Section 118 requires NMFS to develop take reduction plans (TRP). These plans are developed by Take Reduction Teams (TRTs), whose membership is comprised of various stakeholders, including fishers, scientists, and the environmental community. The goals of a TRP are to reduce serious injury and mortality of marine mammal stocks to less than PBR within six months of its implementation and to insignificant levels approaching a zero rate within five years. These efforts should take into account the economics of the fishery, the available existing technology and existing state or regional management plans (MMPA Section 118 (f)(2)).

B. MMPA Category II Fisheries of North Carolina

In North Carolina there are six Category II commercial fisheries (*i.e.*, those with occasional interactions with marine mammals) in the 2001 MMPA LOF. These fisheries include the mid-Atlantic coastal gillnet, NC inshore gillnet, mid-Atlantic haul/beach seine, NC long haul seine, NC stop net and the Atlantic blue crab trap/pot fisheries (Table 1.1) (65 FR 24,448, April 26, 2000 and 66 FR 6545, January 22, 2001). The mid-Atlantic haul/beach seine fishery also includes the inshore haul seine and swipe net fisheries. The term mid-Atlantic refers to the geographic area south of Long Island, landward to the 72° 30' W. line, and north of the line extending due east from the North Carolina/South Carolina border (66 FR 6545, January 22, 2001).

North Carolina has a complicated and dynamic fisheries structure. The NC Category II commercial fisheries span the entire coastline of North Carolina with several major ports (Figure 1.2). Fishing effort varies significantly between ports, seasons, target species, gear configurations and fishing locations. The Category II fisheries are located throughout the inshore (estuarine waters or landward of the 72 COLREGS line (International Regulations for Preventing Collisions at Sea, 1972)), nearshore (State jurisdiction, < 3 miles from shore) and offshore (Federal jurisdiction, > 3 miles from shore) waters of North Carolina (Figure 1.2). Also, there are monthly variations in the type of fishery pursued (Table 1.2).

Commercial fishers in North Carolina are adaptable and wide-ranging. This is due to a diverse fishing ethic and the utilization of multi-rigged vessels that host a variety of fishing gear to maximize catch. An additional factor that influences the flexibility of NC fishers is the State's strategic zoogeographic location that allows the capture of seasonally migrant fish, including northern species, southern species and continental shelf/Gulf stream species (Manooch, 1984).

Table 1.1 Category II commercial fisheries in North Carolina.

Fishery Description	Marine mammal species/stocks incidentally injured/killed
Category II	
Mid-Atlantic coastal gillnet	Humpback whale,WNA; Minke Whale, CEC; Bottlenose dolphin, WNA offshore; Bottlenose dolphin, WNA coastal; Harbor porpoise, GME/BF
North Carolina inshore gillnet	Bottlenose dolphin, WNA coastal
Mid-Atlantic haul/beach seine [1]	Bottlenose dolphin, WNA coastal; Harbor porpoise, GME/BF
North Carolina long haul seine	Bottlenose dolphin, WNA coastal
North Carolina stop net	Bottlenose dolphin, WNA coastal
Atlantic blue crab trap/pot	Bottlenose dolphin, WNA coastal; West Indian Manatee, FL

[1] Mid-Atlantic Beach/Haul Seine includes the inshore haul seine and swipe net fisheries.
WNA refers to Western North Atlantic stock; GME/BF refers to Gulf of Maine/Bay of Fundy stock; CEC refers to Canadian East Coast stock.

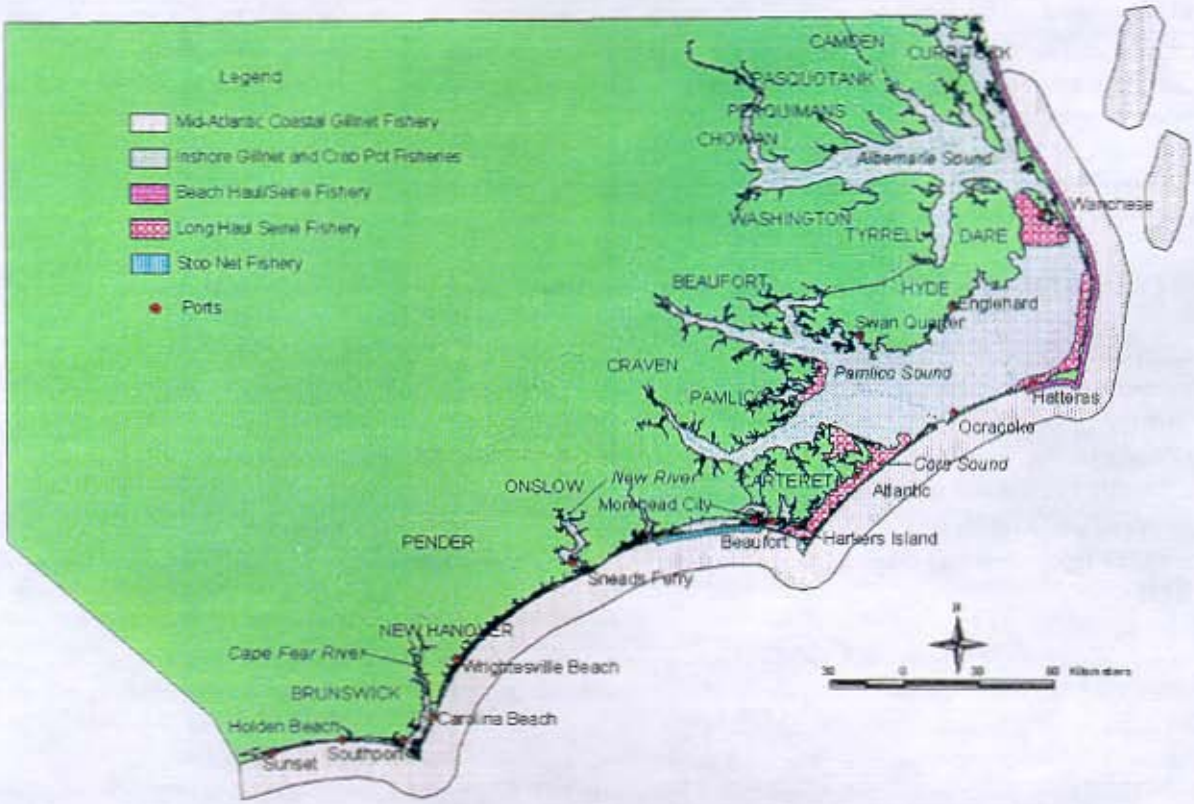

Figure 1.2 Coastal counties, predominant ports and spatial occurrence of Category II commercial fisheries in North Carolina, USA.

Table 1.2 Predominant months of fishing activity for Category II commercial fisheries in North Carolina.

	Mid-Atlantic Coastal Gillnet	NC Inshore Gillnet	Mid-Atlantic Haul/Beach Seine	NC Long Haul Seine	NC Stop Net	Atlantic Blue Crab Pot
January	X					
February	X					
March	X	X				
April		X	X			
May		X	X			X
June				X		X
July				X		X
August				X		X
September		X	X	X		
October	X	X	X	X	X	
November	X	X	X		X	
December	X		X			

C. Trip Ticket Program of the North Carolina Division of Marine Fisheries

Since 1994, the North Carolina Division of Marine Fisheries (NCDMF) has administered a mandatory trip ticket-reporting program to help manage State commercial fisheries. All sales of seafood to licensed dealers by licensed fishers are reported to the NCDMF via the Trip Ticket Program (TTP). Trip tickets are completed by licensed seafood dealers at the time/point of landing. The types of data collected include fisher's license number, date of landing, water body fished (inshore, nearshore and offshore), gear used, species landed and quantity of landings (NCDMF, 1997). This information is available to the public, although some data may be confidential. The data are confidential when the number of seafood dealers or the number of participants (fishers) is less than three at the level of detail requested for a particular report (NCDMF, 1997).

For the purpose of this document, summary statistics from landings data were obtained from the NCDMF for Category II fisheries. When available, figures are provided for each Category II fishery depicting monthly variations in landings and trips over a five-year period (1995 - 1999). Fishery data are organized by gear, county, water body fished (inshore, nearshore and offshore), month and year. Also, the monthly composition of species over a five-year period for each gear type was compiled using total landings (> 2.8 metric tons) by gear and species per county. Only those counties with significant fishing effort were included for each fishery; therefore county-specific data differ among gear types. Since monthly compositions were summarized by landings over a five-year period, year to year variations cannot be assumed from this data set. Throughout this document species are referred to by their common name as listed in the American Fisheries Society reference manual to common and scientific names of fishes (Robins *et al.*, 1991). A complete list of the scientific names is summarized in Appendix 1. Furthermore, because the State regulates fishing gear using the U.S. system of measurement, those units have been maintained throughout this document except in landings data, which are measured in metric tons.

2. Gillnet Fisheries

The gillnet fisheries of North Carolina are important commercial fisheries which harvest a variety of inshore and coastal (includes near and offshore waters) finfish (Street, 1996). Within the State, fishers employ several types of gillnets falling under three categories: set net gillnets, drift gillnets and run-around gillnets (Figure 2.1). A gillnet is a vertical wall of monofilament netting in which fish are caught in the webbing (NCDMF, 2000a). Fish swim into the net and the twine slips behind the gill cover preventing the fish from escaping (Figure 2.2) (Dumont and Sundstrom, 1961). In NC, stretched mesh size of all gillnets must be greater than or equal to 2 1/2 inches (Rule 15A NCAC 3J .0103 (a) in NCMFC, 2001). The NC coastal gillnet fisheries are classified as Category II under the mid-Atlantic coastal gillnet fishery and the NC inshore gillnet fishery is classified as a Category II (65 FR 24,448, April 26, 2000).

The primary gillnet method used in North Carolina is set net gillnet. The set net gillnet is a stationary net that may or may not be anchored (NCDMF, 2000a). In North Carolina, the majority of set nets are fished without anchors (Street, 1996). The set net category can be further stratified into sink or float gillnets. A sink set gillnet is one in which the top line (*i.e.*, float line) of the net is submerged below the surface of the water. While the majority of sink gillnets are not anchored, there are exceptions including the monkfish and shark fisheries (*i.e.*, dogfish) (Figure 2.3). A float set gillnet is one in which the top line of the net floats on the surface of the water (NCDMF, 2000a).

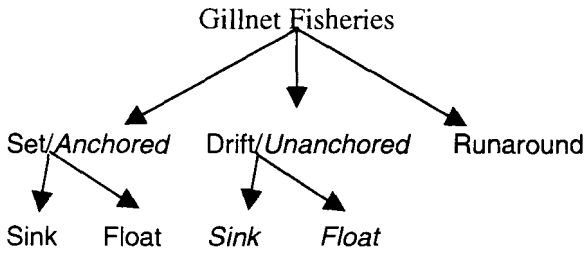

Figure 2.1 Three main types of gillnets used in North Carolina as defined by North Carolina Division of Marine Fisheries and National Marine Fisheries Service. Italicized titles refer to NMFS definitions. The NCDMF definition of set may include anchored or unanchored whereas the NMFS definition refers to anchored only.

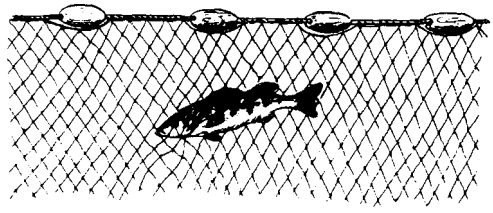

Illustration taken from Dumont and Sundstrom (1961)

Figure 2.2 Fish entanglement in a gillnet.

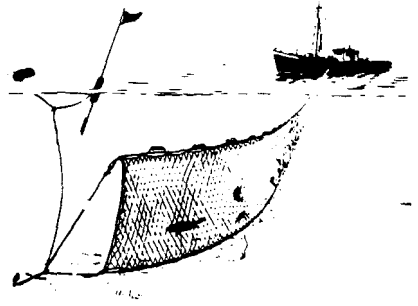

Illustration taken from Dumont and Sundstrom (1961)

Figure 2.3 Set net, sink gillnet fishery. This illustrates a sink gillnet with an anchor although most sink gillnets in NC are not anchored. The net has a weighted leadline that allows the float line to remain submerged.

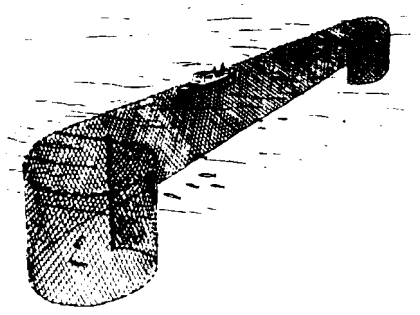

Illustration taken from Dumont and Sundstrom (1961)

Figure 2.4 Drift Gillnet Fishery. Drift nets are unanchored and allowed to drift with the current; the top line of the net may either be floating at the surface or submerged.

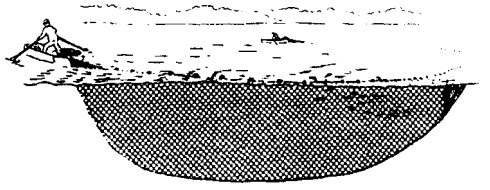

Illustration taken from Dumont and Sundstrom (1961)

Figure 2.5 Runaround gillnet fishery. This gillnet method is used to encircle schools of fish. In NC one boat is used to encircle fish.

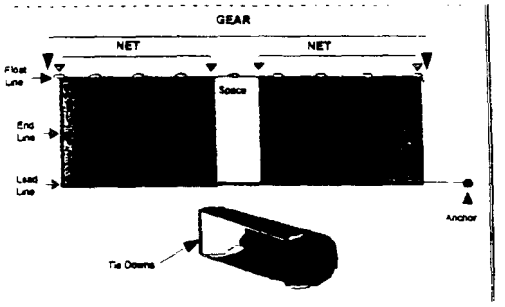

Illustration taken from Fisheries Sampling Branch Observer Manual, NMFS (1996b)

Figure 2.6 The sink gillnet is submerged below the water line and consists of several net panels attached together as a string. This gear can be modified through the use of tie-downs to target bottom-dwelling fish.

A drift gillnet is an unanchored net that is allowed to drift with the current (Figure 2.4). The NCDMF trip ticket program does not differentiate between sink and float nets within this category. The runaround gillnet is used to encircle schools of fish (Figure 2.5) (NCDMF, 2000a). Of the three methods described, the type of method used is dictated by the location of the set (either coastal or inshore) and the species or family of fish targeted.

While definitions of gear types differ between State and Federal agencies, this document refers exclusively to the NCDMF definitions so the NCDMF trip ticket statistics presented can be correctly interpreted. NMFS categorizes the gillnet fisheries into anchored versus unanchored/drift, which are further stratified by sink and float configurations (Figure 2.1).

A. Coastal Gillnet Fishery

1.) Set Net (Sink Gillnets)

The coastal (nearshore and offshore waters) commercial gillnet fishery of North Carolina is dominated by the set net fishery which comprises over 99% of the total trips and landings. According to available NCDMF trip ticket statistics, the sink gillnet sector of the coastal gillnet fishery comprises 99.6% of trips and landings nearshore, and 100% of the offshore set nets (NCDMF, 2000b). Therefore, float gillnets are not discussed in this section. Furthermore, beach-based gillnet fisheries which theoretically fall under "coastal gillnets" are discussed in the haul/beach seine summary (Figure 3.2) (Section 3). This classification is due to NCDMF regulations which allow beach-based gillnets (*i.e.,* gillnets attached to the beach and deployed from the beach using dories) 500 yd. or less with soak lengths less than 2 hours to be considered a beach seine (Rule 15A NCAC 3O .0302 in NCMFC, 2001).

In North Carolina, the sink gillnet fishery began in Hatteras and dates back to the 1920's (Ross, 1989). The typical gillnet gear was a stretched cotton, small-mesh net that was set by hand. Since then, the fishery has evolved into a monofilament gillnet with mesh sizes ranging from small to large (2.5 – 14 in. stretched mesh), which are set using hydraulically powered net reels (Ross, 1989). The sink gillnet is a vertical wall of netting with a weighted leadline that allows the net to hang in the water column just above the ocean floor (NMFS, 1996b). The net is designed to capture mid-water or bottom-dwelling fish.

Commercial sink gillnets vary in length and the number of meshes deep the net sits in the water column. Sink gillnets consist of several net panels (also called shots) which are 300 - 1500 ft. long. These net panels are tied together and set as a "string" over an area where fish are suspected to be and can range in length from 600 – 9000 ft. (Table 2.1) (Ross, 1989). Nets are set over the transom of the boat using a net reel. Large buoys and/or "high fliers" are attached to one or both ends by enough line to allow the net to sink below the surface of the water. If the target is a bottom-dwelling species, the float and leadline are tied closer together with "tie downs" to efficiently target bottom-dwelling species (Figure 2.6). The nets are either retrieved after a short soak or left overnight or up to several days. Soak length of the net is determined by weather conditions and the type of target species caught depending on how fast the species degrades or whether soak time increases catch with little damage to net. A crew of one or two will pick the net as it is hauled in over the transom and onto the net reel. The catch may be stored in iced baskets to be offloaded at the ports' seafood dealers (Ross, 1989).

Typical target species include bluefish, weakfish (gray trout), Atlantic croaker, kingfish (sea mullet), Spanish mackerel, spiny and smooth dogfish and monkfish among many others. Gillnet fishers use various mesh sizes to capture different species and at different life cycle stages (Table 2.1). Typically gillnet fishers have an inventory of nets constructed of various mesh sizes. Net selections are dictated by season, water depth, location and target species.

Table 2.1 Characterization of gillnet gear for coastal fisheries in North Carolina. This table was created from Street (1996) and information from State fishers and biologists. The coastal gillnet fishery is dominated by sink gillnets.

County	Target Species	Major Season	Stretched Mesh (inches)	Net Length (feet)	Net Depth (feet)	Soak Length (hours)
Dare & Hyde	Weakfish	Dec-Apr	3.75 - 4.5	1800 - 7500	8	< 4
	Croaker	Oct-Mar	3.75 - 4.5	1800 - 7500	8	< 4
	Bluefish	Nov-Mar	3.0 - 4.0 or 5.5 - 6.0	600 - 3000	20	1 - 2
	Spiny Dogfish	Dec-Mar	5.5 - 6.5	600 - 3000	12	< 8 or 12-24
	Smooth Dogfish	Dec-Mar	5.5 - 6.6	600 - 3000	12	< 8 or 12-24
	Monkfish	Jan-Apr	8 -14	2700 - 7500	3	24 - 72
	Spanish Mackerel	Jun-Oct	3.125 - 4.0	1200 - 7200	10 - 20	< 6
	King Mackerel	Sep-Nov	5 - 6	1200 - 7200	12 - 20	< 6
	Striped Bass	Jan (Quota)	7 - 10	1200 - 2400	10 - 12	.5 - 2.5
	Kingfish	Year round	2.5 - 3.5	1800 - 7500	8	< 4
Carteret	Spot	Oct-Apr	2.875 - 3.125	2400 - 6000	5 - 10	6 - 12
	Croaker	Oct-Apr	2.875 - 3.126	2400 - 6000	8	< 4
	Weakfish	Oct-Apr	2.875 - 3.127	2400 - 6000	8	< 4
	Kingfish	Oct-Apr	2.5 - 3	2400 - 6000	8	< 4
Onslow & Pender	Kingfish	Mar-May & Aug-Nov	2.5 - 3	1800 - 4800	8	< 4
	Spot	Mar-May & Aug-Nov	2.875 - 3.125	1800 - 4800	5 - 10	6 - 12
	Mullet	Mar-May & Aug-Nov	4 - 5	1800 - 4800	8	< 4
	Croaker	Mar-May & Aug-Nov	2.875 - 3.125	1800 - 4800	8	< 4
	Bluefish	Mar-May & Aug-Nov	2.5 - 3.25	1800 - 4800	20	1 - 2
	Spanish Mackerel	Mar-May & Aug-Nov	2.5 - 3.25	1800 - 4800	10	< 6
New Hanover & Brunswick	Spot	Sept-Nov	2.75 - 3	1200 - 3600	5 - 10	6 - 12
	Kingfish	Apr-May & Oct-Nov	2.5 - 3.0	5400 - 7200	5 - 10	< 24
	American Shad	Jan-Apr	5.25 - 5.5	1500 - 9000	15 - 25	< 24
	Striped Mullet	Sept-Jan	2 5/8 - 4	600	12 - 25	0 - 1
	Spanish Mackerel	Mar-Sept	2.75 - 3	2400	10 - 12	2 - 4
	Bluefish	Mar-Sept	2.75 - 3	2400	10 - 12	2 - 4

The coastal gillnet fishery includes many recreational participants that fish in nearshore waters. As of January 2001, there is no standardized reporting system for recreational gillnetters; thus the number of participants and intensity of fishing activity is difficult to assess (Wilson, 1997). Despite the lack of a reporting system for recreational gillnets, there are statewide rules governing participation. An individual participant is allowed to fish a maximum of 100 yd. of gillnet (> 2 1/2 in. stretched mesh) per person or 200 yd. per operation (*i.e.*, two participants per vessel). For mesh sizes less than 5 1/2 in. stretched mesh, attendance is required at all times. For mesh sizes greater than or equal to 5 1/2 in. stretched mesh, attendance is required one hour after sunrise through one hour before sunset (Rule 15A NCAC 3O .0302 in NCMFC, 2001).

a. Nearshore Component

Since its origin in Hatteras, the sink gillnet fishery has expanded to include most nearshore waters of North Carolina (Figure 1.2). Varying levels of effort currently occur throughout the State (Appendix 5, Figure 1). While sink gillnet fishing effort may be distributed among many ports, approximately 99% of the total trips take place in six counties: Dare (51%), Hyde (7 %), Carteret (16%), Onslow (8%), New Hanover (4%) and Brunswick (14%) Counties (NCDMF, 2000b). Within these six counties, 91 % of the sink gillnet landings occur in Dare (63%), Hyde (16%) and Carteret (12%) Counties (NCDMF, 2000b). The majority of nearshore sink gillnet activity takes place in Dare County, with Hatteras and Wanchese as the primary ports (Figure 1.2).

The fishery out of Dare County is most active from December through April, but different areas of the State experience peaks in effort at other times of the year (Ross, 1989). Hyde closely resembles the Dare County fishery and participants share fishing grounds, whereas Carteret County gillnet activity is highest October through February (Appendix 5, Figure 1). Also, more southern counties such as Onslow, New Hanover and Brunswick have sink gillnet peaks in the fall (Oct. – Nov.) and spring (Mar. – Apr.) (Street, 1996). Throughout the State, the lowest sink gillnet activity occurs during the summer (May – Aug.) (Appendix 5, Figure 1).

Bluefish, Atlantic croaker, spiny and smooth dogfish, striped bass and weakfish dominate the winter nearshore fishery (Dec. – Apr.) (Appendix 4, Table 1a). In Dare County, Spanish mackerel is the main summer catch while spot, bluefish and Spanish mackerel dominate the fall (Oct. – Nov.) fishery (Appendix 4, Table 1a). In Carteret County, spot, Atlantic croaker and kingfish are the primary catch in the fall, whereas weakfish, Atlantic croaker and spiny dogfish dominate winter landings. In Hyde County, the primary fishery is during the winter for target fish similar to Dare County. Southern counties such as New Hanover and Brunswick have a fall (Sept. - Oct.) spot fishery, which uses anchors, that dominates effort and landings for these regions (Burns, 1997).

b. Offshore Component

The offshore (> 3 mi.) sink gillnet fishery consists predominately of fishers originating from ports in Dare County. Sink gillnet trips in Dare County comprise 87% of the total trips followed by Carteret (9%) and Hyde (3%) Counties (NCDMF, 2000b). This fishery is most active in winter (Jan. – Apr.) (Appendix 5, Figure 2).

Offshore sink gillnet target species include typical nearshore fish such as Atlantic croaker, bluefish and weakfish, but monkfish and spiny dogfish have been significant fisheries in recent years (Appendix 4, Table 1b). Both these fisheries use large mesh sizes (5.5 – 6.0 in. stretched mesh for dogfish and 10 – 12 in. stretched mesh for monkfish) and anchors (Table 2.1). As of the May 1, 2000, to April 30, 2001, fishing season, the spiny dogfish and monkfish fisheries have been subject to provisions reducing annual quotas and trip limits (MAFMC, 1998; NEFMC, 1998). The spiny dogfish fishery's annual quota was reduced to 4.0 million pounds for the entire Atlantic coast compared to approximately 4.5 million pounds landed in North Carolina the previous season (MAFMC, 1998; NCDMF, 2000b). This reduction in allowable catch, combined with reduced trip limits of 600 pounds for the first half of the fishery (May 1 – Oct. 30) and a 300 pound trip limit for the second half (Nov. 1 – Apr. 30), may prevent a directed fishery for dogfish to continue. This could potentially reduce the amount of spiny dogfish gear in Federal waters off North Carolina (MAFMC, 1998). The monkfish fishery regulations also reduced vessel quotas to 1,000 pounds of whole fish per trip and reduced total effort for the season to a 40 days at sea (DAS) limit (NEFMC, 1998).

2.) Runaround Gillnets

The runaround gillnet fishery traditionally has been used to encircle schools of fish in North Carolina estuarine systems. However, a small sector is active nearshore along the coastal beaches. This activity takes place in the fall when the striped mullet migrate in and out of the inlets during their spawning season (Carol Etheridge, North Carolina Division of Marine Fisheries, Wanchese, NC, pers. comm.). There is little written documentation of this fishery (although it is a reporting option with NCDMF). In addition to the striped mullet fishery, runaround gillnets are used in the southern counties to target Spanish mackerel, bluefish and spot (Dave Beresoff, Holden Beach, NC, pers. comm.).

Depending on weather conditions, fishers exit the sounds and search the nearshore for schools of striped mullet. Once a school is sighted, one end of the runaround gillnet is deployed with a buoy and a small

weight (< 3 lb.). The weight creates drag, which enables the rest of the net to be fed out as the fisherman encircles the school of fish. The net is set in a closed circle and fishes the entire water column. Nets are typically 100 - 1000 yd. in length with a stretched mesh of 3 1/2 - 4 in. used in northern counties and 2 5/8 - 4 in. used in southern counties such as New Hanover (Dave Beresoff, Holden Beach, NC, pers. comm.). The primary nearshore retrieval technique is the open retrieve method where the net is immediately hauled back into the boat starting with the terminal end. A second retrieval technique involves setting only part of the net in a circle and then 'corkscrewing' the remainder of the net around inside the circle. This method compresses the fish into smaller areas that forces them to hit the net. In order to avoid washing up onto the beach, fish are picked in calmer waters or at the dock (Carol Etheridge, North Carolina Division of Marine Fisheries, Wanchese, NC, pers. comm.).

The main nearshore target species is the striped mullet, but there can be a small bycatch of bluefish or spotted seatrout (speckled trout). Typically, there is little or no bycatch involved in the nearshore runaround gillnet fishery (Carol Etheridge, North Carolina Division of Marine Fisheries, Wanchese, NC, pers. comm.). The majority of the effort takes place off of Carteret County where 70% of the total nearshore trips occur (NCDMF, 2000b). This fishery is active almost exclusively in the fall with the highest activity in October and November (Appendix 5, Figure 3). The rest of the nearshore trips occur in southern counties including New Hanover (19%) and Onslow (11%). In these counties, the primary target species is striped mullet during the late summer and early fall (July – Sept.) (Dave Beresoff, Holden Beach, NC pers. comm.).

B. Inshore Gillnet Fishery

The inshore (estuarine) gillnet fishery is a multi-species fishery which varies by region depending on the species targeted and the type of gillnet used. This fishery operates year round with peaks of activity in the spring, late summer and fall (Wilson, 1997). It employs all three gillnet techniques: set (both float and sink net), runaround and drift gillnets.

The inshore gillnet fishery is more diverse than the coastal component because the different gear configurations are used more frequently. Set net gear comprises 93% of the total inshore gillnet trips as opposed to 99% of total coastal gillnet trips. Within the set net category there is a higher percentage of float gear (34%) and a lower percentage of sink gillnet gear (66%) when compared to the coastal gillnet fishery (NCDMF, 2000b). Also, there is a higher percentage of runaround gillnets which comprise 6% of the total trips. Drift gillnets are used in the final 1% of the trips (NCDMF, 2000b).

The inshore gillnet fishery includes many recreational participants. Like the recreational gillnet fishery in the nearshore, the amount of fishing effort is difficult to assess (Wilson, 1997). Inshore recreational fisheries are subject to the same regulations as outlined in the coastal gillnet summary (Section 2.A).

1.) Set Net (Sink and Float Gillnets)

The primary gillnet method used inshore is set net gillnet (sink and float). The inshore set net fishery has six times the number of statewide nearshore set net trips from 1995 – 1999 (NCDMF, 2000b). The sink gillnets are deployed and retrieved using the same methods as described in the coastal gillnet summary (Section 2.A. 1.). The float nets are also set using this same method, but they fish the upper water column with the top line floating at the surface (NCDMF, 2000a; Wilson, 1997). The inshore fishery uses different mesh sizes based on the seasonal variations in fish size. The mesh sizes can range from small (less than 5 in. stretched mesh) to large mesh (greater than or equal to 5 in. stretched mesh) (Wilson, 1997).

The inshore sink gillnet fishery comprises 66% of the total set net trips in North Carolina (NCDMF, 2000b). This fishery targets a variety of species depending on the season, including bluefish, Atlantic croaker, spot, striped mullet, weakfish, spotted seatrout, Spanish mackerel, striped bass and southern flounder (Wilson, 1997). The fishery for southern flounder reports the highest annual landings (Appendix 4, Table 2). Larger mesh sizes (5.5 – 6.0 in. stretched mesh) and tie-downs are used in this fishery. Tie-downs are lines used to tie the float and leadline together to reduce the height of the net and create a pocket in the webbing. Weakfish and bluefish have the second and third highest landings (Appendix 4, Table 2). The fisheries in Onslow and New Hanover Counties also target spot in addition to southern flounder (Appendix 4, Table 2).

The inshore fishery extends throughout Pamlico and Core (Dare, Hyde, Carteret, Beaufort Counties) and Albemarle (Pasquotank, Perquimans, Tyrell Counties) Sounds and their major tributaries including the New River (Onslow County) and Cape Fear River (New Hanover County) (Figure 1.2). Dare County (45%) dominates the total trips followed by Pasquotank (16%), Onslow (8%), Perquimans (5%), Carteret (5%), Beaufort (5%), New Hanover (4%), Hyde (3%) and Tyrell (3%) Counties (NCDMF, 2000b). The counties bordering Pamlico and Core Sounds have a peak in activity during the fall (October) and a secondary peak in the spring (Appendix 5, Figure 4). Counties surrounding Albemarle Sound peak earlier in the fall (Appendix 5, Figure 4). Trips from Onslow County peak in late spring and again in the fall. New Hanover County has increasing activity throughout the summer and fall, and also peaks in October (Appendix 5, Figure 4).

The inshore float gillnet fishery comprises 34% of the total set net trips (NCDMF, 2000b). The main catch using this gear type are southern flounder, striped mullet, spot, spotted seatrout, weakfish and bluefish (Appendix 4, Table 3). Use of inshore float nets is concentrated in counties surrounding Pamlico and Core Sounds including Dare (19%), Pamlico (19%), Hyde (18%), Carteret (16%), Beaufort (7%) and Craven (6%) Counties (NCDMF, 2000b). There is also a float gillnet fishery in Onslow (16%) County. In the counties that border Pamlico Sound, there are peaks in the spring and fall with variation between counties (Appendix 5, Figure 5). Onslow County has the highest float net activity which occurs through the summer into late fall (Appendix 5, Figure 5).

2.) Runaround Gillnets

The inshore runaround gillnet fishery is concentrated in the estuarine waters of the Pamlico, Core and Albemarle Sounds. Effort has increased significantly in recent years. Following the Florida net ban in 1995, many of the Florida runaround gillnetters emigrated to North Carolina and bought existing licenses (James Francesconi, North Carolina Division of Marine Fisheries, Morehead City, NC, pers. comm.). The fishery takes place primarily during the summer and fall. The length of the net can vary from 100 – 1200 yd. with stretched mesh sizes ranging from 3 – 4 1/2 in. in northern counties and from 2 5/8 – 4 in. in southern counties due to smaller fish sizes in these areas (Carol Etheridge, North Carolina Division of Marine Fisheries, Wanchese, NC, pers. comm.; Dave Beresoff, Holden Beach, NC, pers. comm.).

Inshore runaround gillnets are deployed the same way as coastal runaround gillnets, however, there can be three different methods of retrieval: open retrieve, ring haul and corkscrew. The open retrieve and corkscrew methods are described in the coastal runaround gillnet summary (Section 2.A. 2.) The ring-haul retrieval method involves tying the lead end of the net to the boat and slowly hauling the terminal end into the boat. The circle is compressed until the fish are forced to gill when trying to escape (Carol Etheridge, North Carolina Division of Marine Fisheries, Wanchese, NC, pers. comm.). All of these methods have very short soak times (< 1 hour) and are employed on visible schools of fish. Because the inshore waters are calm and shallow, the fishers pick their nets at the location of the haul. The predominant target species are striped mullet. Other target species include spotted seatrout, spot and prior

to current restrictions, red drum. Bycatch includes summer flounder, Atlantic croaker and bluefish (Appendix 4, Table 4).

The majority (75%) of the runaround activity takes place in county waters that border Pamlico and Core Sounds including Dare (30%), Carteret (27%), Pamlico (13%) and Hyde (5%) (NCDMF, 2000b). The runaround gillnet season begins in June and lasts through December (Appendix 5, Figure 6). The highest month of activity is October with striped mullet dominating the landings (Appendix 4, Table 4). The rest of the runaround activity is located in Onslow (19%) and New Hanover (5%) Counties, in the New and Cape Fear Rivers and their major tributaries (NCDMF, 2000b). Again, striped mullet has the highest trips and landings with an October peak (Appendix 4, Table 4).

3.) Drift Gillnets

There is a small drift gillnet fishery which comprises 1% of the total inshore gillnet trips (NCDMF, 2000b). The drift gillnet is deployed in a similar fashion to the set net but the drift gillnet does not have a heavy enough leadline to remain stationary and anchors are not used. This net is designed to drift with the current. Drift gillnets can be constructed of various mesh sizes and must follow the same gear regulations as set gillnets (Wilson, 1997).

The drift gillnet fishery takes place primarily in the Pamlico and Core Sounds with 83% of the trips landed in Carteret County (NCDMF, 2000b). The main species landed are striped mullet, spot and southern flounder (large mesh) (Appendix 4, Table 5). Other species landed by drift gillnets include Spanish mackerel and herring (Wilson, 1997). New Hanover County comprises 15% of the total inshore drift gillnet trips which includes a shad fishery (greater than 5 in. stretched mesh.) in winter and a spot fishery in the fall (Appendix 4, Table 5). For both counties, drift gillnet fishing is highest in the fall with October having the peak landings and trips (Appendix 5, Figure 7).

3. Haul Seine Fisheries

Haul seines are traditionally used to encircle or encompass fish and consist of a bunt or bag and wing section (Dumont and Sundstrom, 1961). In earlier years, seines were constructed with natural materials (*i.e.*, cotton) but over time synthetic materials have been used (*i.e.*, nylon; Dumont and Sundstrom, 1961). There are three main types of haul seine fisheries in North Carolina. The haul/beach seine fishery involves setting and hauling the seine from the beach (Figure 3.1). The long haul seine fishery is conducted inshore by pulling a seine between two motorized vessels, and in the swipe net fishery one end of the net is staked while pulling the other end with a motorized vessel (Figures 3.1). Due to differences in gear characteristics and areas fished, each of these fisheries will be described separately.

A. Haul/Beach Seine Fishery (includes beach-anchored gillnets and dory-set nearshore gillnets)

The haul/beach seine fishery presently occurs along the northeastern coast of North Carolina (Figure 1.2). This beach-based fishery utilizes both haul/beach seines and beach-anchored gillnets to target nearshore migrating fish populations. The haul/beach seine fishery is listed under the mid-Atlantic haul/beach seine fishery as a Category II fishery under the MMPA's LOF. Both gear types are described together because of NCDMF regulations which allow beach-based gillnets (*i.e.*, gillnets attached to the beach and deployed from the beach using dories) 500 yd. or less with soak lengths less than 2 hours to be considered a beach seine (NCDMF Proclamation FF-14-2001). Also, beach fishermen often alternate between beach seines and beach-anchored gillnets; their landings and effort are usually reported as beach haul seines in the

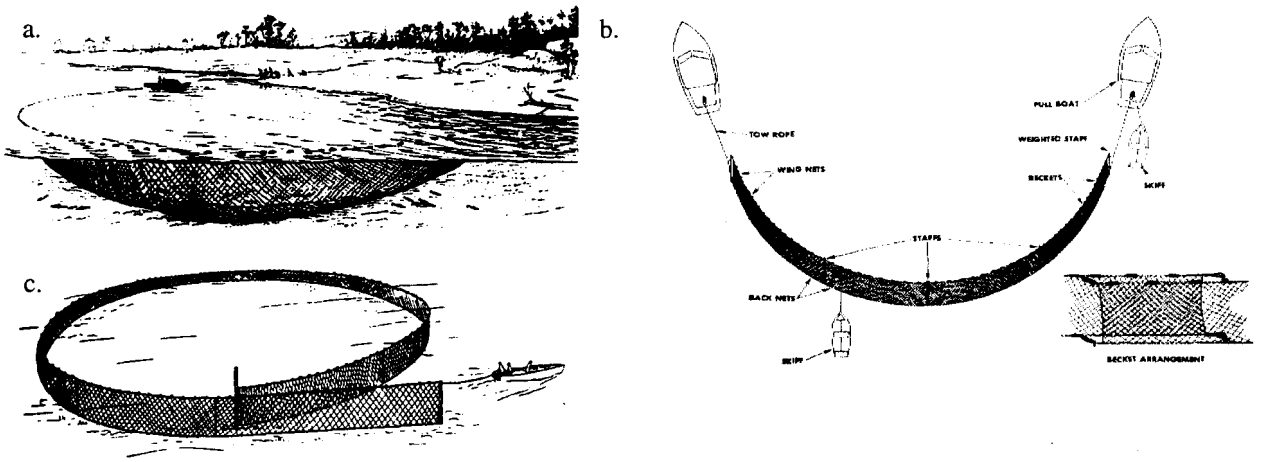

Illustration taken from Dumont and Sundstrom (1961)

Illustration taken from Guthrie *et al.* (1973)

Figure 3.1 Haul seine fisheries of North Carolina. Haul/beach seine (a), long haul seine (b) and swipe net (c).

NCDMF Trip Ticket Program (Beth Burns, North Carolina Division of Marine Fisheries, Wanchese, NC, pers. comm.). Although construction and characteristics of these gears differ, similar setting and hauling techniques are used. The haul/beach seine may consist of a wash net, bunt and wing (Figure 3.2). These seines are constructed of both monofilament-nylon and multifilament-nylon nets (Bowman and Tork, 1998; Daniels, 1998). Generally, the wash net and wing are constructed of monofilament net while the bunt is constructed of multifilament net. Beach-anchored gillnets are constructed of a monofilament-nylon gillnet without a bunt or wash net (Figure 3.2). The type of gear used depends on the catch size, area, current strength, amount of debris in the water and the preference of the fisher (Bowman and Tork, 1998; NEFSC Fisheries Sampling Branch, Woods Hole, MA, unpubl. data).

Both the haul/beach seine and beach-anchored gillnet are set using dories launched from the beach. The haul/beach seine and beach-anchored gillnet gear can range in length from 600 - 1500 ft. and is often set perpendicular to shore in an inverted "J" position (Bowman and Tork, 1998). A staff is anchored at the beach end to keep the net straight and open. In the case of the haul/beach seine, the staff is followed by a wash net, bunt and wing (Figure 3.2). With beach-anchored gillnets, the staff is followed by a gillnet only (Figure 3.2). For both configurations, the gillnet section is anchored offshore with an attached line (warp) that leads back and is anchored to the beach (Bowman and Tork, 1998). The haul/beach seine usually consists of 15 yd. (10 - 20 yd. range) of wash net with 2 7/8 – 3 1/4 in. stretched mesh-gillnet, 60 yd. (25 – 100 yd. range) of a multifilament-nylon bunt with 2 7/8 - 3 1/4 in. stretched mesh, and 400 yd. (300 – 800 yd. range) of a gillnet wing with 2 7/8 - 8 1/2 in. stretched mesh (NEFSC Fisheries Sampling Branch, Woods Hole, MA, unpubl. data). The beach-anchored gillnet usually consists of three to four 100 yd. gillnets with a 2 7/8 - 8 1/2 in. stretched mesh (Bowman and Tork, 1998).

The gear is set and hauled by crews ranging between two and six fishers (Bowman and Tork, 1998). Usually the gear is hauled on a low tide after a 12 hour soak time (Bowman and Tork, 1998). The wash net and bunt end of the net are first brought close to the shore to prevent escapement of fish around the beach end. A four-wheel drive vehicle then pulls in the offshore end of the net by grabbing the warp line at the water's edge, backing up as far as the width of the beach will allow, then returning to the water's edge to repeat the process. This process continues until the wing end reaches the beach. At this point both ends of the net are at the beach, forming an inverted "U". The retrieval of the net will continue so that the "U" is constantly shrinking. This retrieval method corals the fish. If the catch is small, the bulk of the fish will be caught in the gillnet section but if the catch is large, the fish will be concentrated

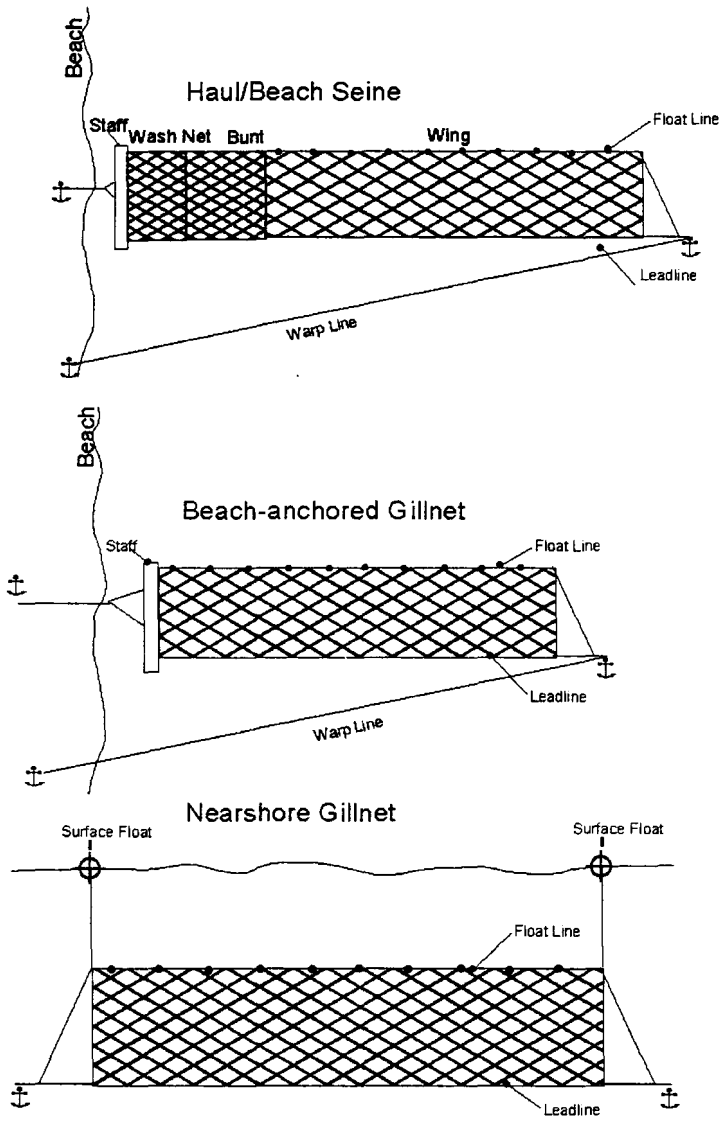

Figure 3.2 Three gear types that are used in the haul/beach seine fishery.

in the bunt section. This is advantageous because the fish in the bunt section do not have to be picked out of gillnet but can simply be dumped into a tote on the beach (Bowman and Tork, 1998).

The dominant species taken include weakfish, spotted seatrout, bluefish, spot, striped mullet, kingfish, Atlantic croaker and harvestfish (Appendix 4, Table 6). Usually the type of species caught is opportunistic and depends on the seasonal presence of the migratory fish (Bowman and Tork, 1998). There is also a directed striped bass haul/beach seine fishery, which is limited to a seasonal quota (Daniel, 1998; Bowman and Tork, 1998).

The haul/beach seine and beach-anchored gillnet fisheries operate between NC/VA border and Ocracoke Island, but the majority of the activity occurs between Duck/Corolla and Hatteras (Figure 1.2) (Bowman and Tork, 1998). Based on the available NCDMF data, Dare County has 97% of the total haul/beach seine and beach-anchored gillnet trips and 93% of the landings (NCDMF, 2000b). These fisheries

operate predominantly in the spring and fall (Appendix 5, Figure 8) (Bowman and Tork, 1998; Daniels, 1998). The peaks in effort occur in April and May (spring), September and October (fall) and December (winter - due to directed striped bass fishery) (Appendix 5, Figure 8) (NCDMF, 2000b).

The beach-based fishermen may also use dories to fish nearshore gillnets that are anchored but not attached to the beach (Figure 3.2) (Bowman and Tork, 1998). These nearshore gillnets should theoretically fall under the nearshore gillnet fishery but are included and reported with the haul/beach seine fishery because fishers work in close proximity to the beach and associate themselves with the haul/beach seine fishery. Since this gear type fishes like a gillnet throughout and is not attached to the beach, it is incorrectly reported and should be reported as a gillnet (NCDMF Proclamation FF-14-2001).

Generally, the nearshore gillnets are set right off the beach in water deep enough to float the entire height of the net (Figure 3.2). These nets are anchored at both ends and set perpendicular or parallel to the shore depending on the target species, weather and oceanic conditions. The first retrieval method involves picking up one end of the net and leading it across the beam (rail to rail) of the dory. This allows the fishers to pick the fish out of the net then directly set it back into the water, without bringing the entire net into the boat (*i.e.*, fish over). The second retrieval technique involves hauling the entire gillnet into the dory. The type of retrieval method used is determined by catch size and weather or oceanic conditions (Bowman and Tork, 1998).

B. Long Haul Seine Fishery

The long haul seine fishery is an important estuarine finfish fishery in North Carolina that dates back to the early 1900's (DeVries, 1982). The fishery peaked in the mid-1970's with approximately 90 crews working throughout the State. Since that time participation has declined significantly to 10 – 15 crews working statewide (Gearhart and Lewis, 2001). The long haul seine fishery is unique to North Carolina due to the State's large, shallow, smooth-bottomed estuaries (DeVries, 1982; DeVries and Ross, 1983). The long haul seine fishery is listed as a Category II fishery under the MMPA's LOF (66 FR 6545, January 22, 2001).

The long haul seine consists of a 1000 – 1200 yd. net that hangs 6 ft. in the water column (Figure 3.1) (Guthrie *et al.*, 1973). The seine is pulled by two 30 – 45 ft. boats for distances up to 1 – 2 nautical miles. While the seine is being towed, the float line of the net remains a few feet under the water surface (depending on the depth of the water) and the leadline stays on the bottom (Guthrie *et al.*, 1973; DeVries, 1982). The seine consists of four 100 to 150 yd. sections of wing net (# 9 twine - nylon) with a 4 in. stretched mesh and two back nets (# 18 twine - nylon) with a 2 1/2 in. stretched mesh (Gearhart and Lewis, 2001). Another part of the fishery includes a sweep seine or deeper net that has a bunt with 1 3/4 in. stretched mesh (# 12 twine – nylon) (Guthrie *et al.*, 1973). The long haul seine is fished in 7 – 20 ft. of water and bunted in water 3 ft. deep at slack tide (Guthrie *et al.*, 1973; DeVries, 1982). To set, pull and haul in the long haul seine typically takes a full day with a six-man crew (Guthrie *et al.*, 1973; DeVries and Ross, 1983).

This fishery targets Atlantic croaker, spot and weakfish, which comprise approximately 65% of long haul landings (DeVries, 1982; West and Wilson, 1997). There are greater than 20 secondary species with commercial value that are caught by long haul seines. These species include menhaden, hogfish, bluefish and spotted seatrout (Appendix 4, Table 7) (DeVries and Ross, 1983; West and Wilson, 1997). The long haul seine fishery operates in Pamlico and Core Sounds and their major tributaries (Figure 1.2) (DeVries and Ross, 1983).

There are two regional hauling styles that are determined by the depth of water and location in Pamlico Sound (DeVries and Ross, 1983). The long haul seines used in southern Pamlico Sound are pulled onto

shoal areas with a firm bottom (DeVries and Ross, 1983). After the seine is pulled onto a shoal, it is brought together around a stake and then one side of the net at a time is pulled past the stake which concentrates the catch into a small area (DeVries and Ross, 1983). Once the catch is contained, the bunt section of the sweep seine is used to capture the catch and load it onto a run-boat. Fishermen do much of this work standing in the shallow water (Guthrie *et al.*, 1973). The long haul seines used in northern Pamlico Sound are hauled in slightly deeper water. This fishery occurs along the Outer Banks. A ring haul method is employed in which the seine is set and hauled to a shoal where the terminal end is brought aboard the boat. Fishers remain in the vessel and the net is retrieved in a circular pattern until the fish are concentrated. The catch is then bunted and bailed into a run boat (Gearhart and Lewis, 2001).

The long haul seine fishery can last from February through November but effort is highest June through October (Cunningham *et al.*, 1992). Based on the available NCDMF data, Dare and Carteret Counties comprise 97% of the total trips (NCDMF, 2000b). Carteret County is most active with 52% of the total trips and 75% of the total landings, whereas Dare County has 47% of the long haul seine trips and 25% of the landings (NCDMF, 2000b). The fishery usually operates from June – August (summer) in Dare County and July – October (summer and fall) in Carteret County (Appendix 5, Figure 9) (NCDMF, 2000b). There are few participants in this fishery, with six to ten fishing crews operating in the northern areas and four crews in the southern areas (West and Wilson, 1997).

C. Swipe Net Fishery

Swipe net fishing is a modification of the long haul seine but only one boat is used (Figure 3.1) (DeVries and Ross, 1983). Although the swipe net fishery is most closely related to the long haul seine fishery, it is listed under the mid-Atlantic haul/beach seine fishery as a Category II fishery under the MMPA's LOF (65 FR 24,448, April 26, 2000). This categorization is to maintain consistency with other states that do not have the long haul fishery but actively practice haul/beach seining and use this terminology.

The net is called a "swiper" and is usually about one half the length of the typical long haul seine (*i.e.*, two wing and two back nets [500 - 600 ft.] with a sweep seine attached to it) (Guthrie *et al.*, 1973). Total catch is usually less than with the long haul seine but usually a crew of only three is required (Guthrie *et al.*, 1973). Several hauls can be made in a day and swipe nets are especially effective in small areas where fish are concentrated (Guthrie *et al.*, 1973). This fishery occurs mainly in the winter for spotted seatrout (DeVries and Ross, 1983). Because of confidentiality constraints due to a limited number of participants in this fishery, effort data could not obtained from the NCDMF TTP for this report.

4. Stop Net Fishery

The stop net fishery began in the early-mid 1900's and is unique to Bogue Banks, NC. Fishers from this area modified the traditional beach seine gear used to target striped mullet. They added a stationary, anchored, multi-filament net designed to abate the migration of striped mullet out of the inlet to nearshore spawning grounds. Stationary stop nets are deployed perpendicular to the beach in an L-shaped configuration at four designated locations along Bogue Banks. Once the mullet are corralled, a beach seine is used to capture fish from within the stop net and haul them on to shore (Figure 4.1) (Francesconi, 1994). This fishery is temporally restricted to October and November, and is listed as a Category II fishery under the MMPA's LOF.

The stop net is constructed of inshore (suds and backstaff) and offshore (lead) sections (Figure 4.2). A continuous float and leadline connect these three sections of net. The stop net is 400 yd. long. The first 100 yd. of net is set perpendicular to the beach and is called the suds section. This net is constructed of 8 in. stretched mesh and sits approximately 10 ft. deep. The second 100 yd. is called the backstaff and is

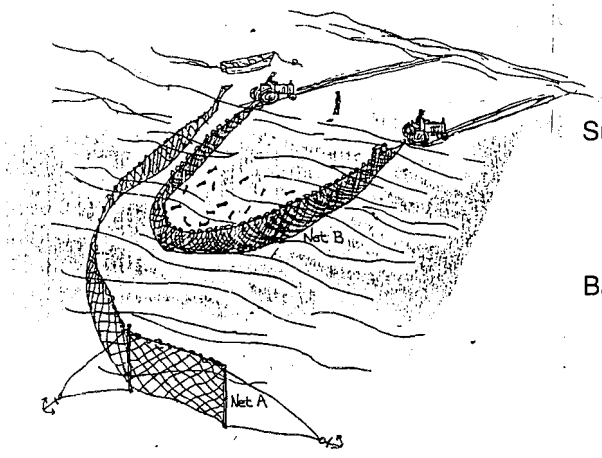

Illustration taken from Pagett (1995)

Figure 4.1 Stop Net Fishery. Net A is the stationary stop net. Net B is the beach seine used to capture catch from within the stop net and haul it on to shore using tractors.

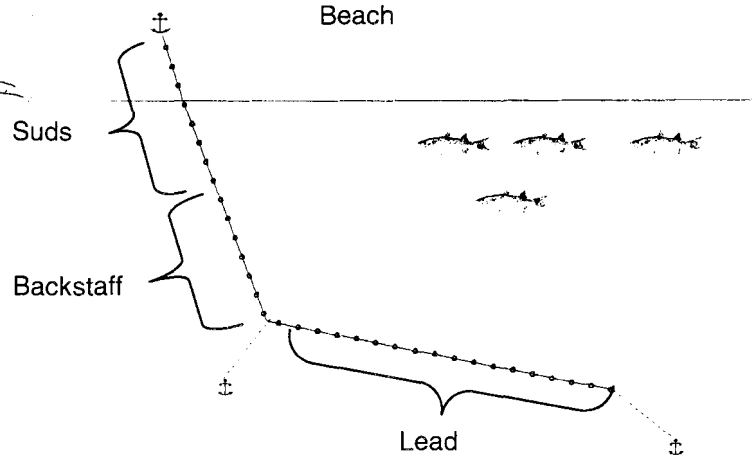

Figure 4.2 The stop net is constructed of the suds, backstaff, and lead sections and is 400ft. in length.

constructed of 8 in. stretched mesh and is 16 ft. deep. The terminal end of the net is set parallel (75° – 90° to the east compared to the south facing beach) to shore and is called the lead. The lead is 200 yd. in length, has a stretched mesh size of 6 in. and is approximately 18 - 20 ft. deep (Figure 4.2) (Asher, 2001).

There are two crews, consisting of approximately 20 fishers each, permitted to fish with stop nets. Each crew may set a maximum of two 400 yd. nets at one time, at designated sites. Stop nets may not be set within 800 yd. of an existing set or within 300 ft. of an ocean fishing pier that is open to the public (Rule15A NCAC 3J .0402 (3) (b) (6) in NCMFC, 2001). The four designated stop net locations lie between Beaufort and Bogue Inlets and are referred to as the Fort Macon, Atlantic, Salter Path and Emerald Isle sites (Figure 1.2) (NCDMF Proclamation FF-21-1999).

Although there are no regulations that mandate when the nets must be retrieved during the season, the net is typically retrieved after five days (120 hrs). However, soak times may vary from one to fifteen days (Asher, 2001). Retrieval and resetting of the net is dependent on shifts in weather, catch rates and the presence of migrating schools (Asher, 2001). When winds shift to the southeast, the net is hauled in. Nets may be left out of the water one to five days (James Francesconi, North Carolina Division of Marine Fisheries, Morehead City, NC, pers. comm.). After the stop net is set, a seine is used to capture fish that have entered the stop net corral. The seine is constructed of 1 3/4 - 1 7/8 in. stretched mesh and is anchored to a tractor at one end of the beach and run out with a skiff along the open side of the L shaped stop net. The seine traces the net, returns to shore and is attached to an additional tractor. The tractors jointly haul in the catch. This method is called a beach strike. Sets range from zero to five per day, depending on the available catch. On average there are two to three sets per day (Francesconi, 1994).

The striped mullet is targeted because of the commercial value of its roe. Striped mullet account for 99% of the total fish hauled during beach strikes, and the landings are dependent on the size of the school which can range from 1,000 to 50,000 lb. Catch size is estimated by truckload. Each truck holds approximately 3,000 lb. and several trucks can be employed to move catch to the dealers (Asher, 2001). Value is based on the average gonadal somatic index (GSI) of the fish (6 - 8%). The roe is shipped to Japan and the unused portion of the fish is processed for bait (James Francesconi, North Carolina

Division of Marine Fisheries, Morehead City, NC, pers. comm.). Other bycatch species associated with the haul are Florida pompano, spotted seatrout, red drum, spot, kingfish, sea bass, bluefish, flounder, cownose rays and clearnose skates (Asher, 2001).

Commercial landing statistics are not available from the NCDMF TTP due to confidentiality constraints which prevent information from being released when the number of seafood dealers or participants is less than three. Stop net trips and landings are recorded under beach seine gear for Carteret County but cannot be reported in this document because of the aforementioned constraints.

5. Blue Crab Pot Fishery

The blue crab *(Callinectes sapidus)* fishery of North Carolina is one of the most profitable commercial fishing industries in the State, in terms of landings, value, amount of harvest gear and participants (Henry and McKenna, 1998). The annual dockside value of the harvested blue crab is estimated to be $40 million with an additional $25 - $50 million derived from processed crab products (NC State, 2000). This industry supports both commercial and recreational participants. The number of full time commercial participants has increased by at least 44% since the early eighties. Fishers have shifted their effort to the blue crab fishery due to declines in several of the States' important fisheries (oysters, shad and striped bass) (Henry and McKenna, 1998). Any fisher holding a Standard or Retired Commercial Fishing license can participate in the fishery. Currently, there are approximately 3,000 active commercial participants in North Carolina (McKenna *et al.*, 1998). The blue crab pot fishery is listed under the Atlantic blue crab pot/trap as a Category II fishery under MMPA's LOF (66 FR 6545, January 22, 2001). It has also been suggested that the recreational fishery has expanded but harvest estimates are not available for this fishery sector. A Maryland case study estimated that recreational harvest in that State was at least equal to 30% of the total commercial harvest, which may indicate that the recreational sector has a similar contribution to the total NC statewide harvest (NC State, 2000). The North Carolina regulations set a limit of five crab pots per person in public areas but the number of crab pots set on a waterfront property can vary according to the number of people living at the property, including acquaintances (NC State, 2000).

Figure 5.1 Blue crab pot used in North Carolina.

There are several gear types used to harvest the blue crab, including trotlines, trawls and crab pots (Figure 5.1). The use of crab pots has steadily risen since the 1950's and presently accounts for 95% of the total blue crab harvest (NC State, 2000). It is reported that 1,000,000 - 1,200,000 commercial crab pots are used annually in North Carolina estuarine waters (Sean McKenna, North Carolina Division of Marine Fisheries, Washington, NC, pers. comm.). The number of crab pots that are set per fisher can vary according to the geographic location in the State. In the southern counties, crab potters can set 150 - 200 pots but in the high effort zones such as the Pamlico Sound, up to 2,000 pots may be set by one participant (Sean McKenna, North Carolina Division of Marine Fisheries, Washington, NC, pers. comm.).

The crab pots are baited with fish, poultry or beef and usually are set in a row in shallow inshore waters. The crab pots are constructed of double-galvanized 18-gauge, hexagonal–mesh wire and pots are typically 24x24x20 inches (Figure 5.1) (NC State, 2000). The pots have a funnel shaped entry allowing the crabs to enter but not escape. They are attached to a black, 3-strand, twisted polypropylene 5/16 in. sinking line. The sinking line is designed to decrease the amount of excess line in the water column (Rule 15A NCAC 3J .0301 (2) (a) in NCMFC, 2001). The line is attached to a floating buoy to indicate the location of the pot.

This fishery targets several stages of the blue crab life cycle including hard shell crabs and peeler or soft-shell crabs (the molting stage of the crab). The peeler crabs represent approximately 3 - 4% of the total blue crab harvest in North Carolina. The peeler crabs are either a bycatch of the hard shell crab fishery or are caught by directed peeler trawling (NC State, 2000). The blue crab is common to all waters but the largest populations are found in the Albemarle and Pamlico Sounds. The peak months of blue crab trips in North Carolina are May – August with over 20,000 trips during the months of June and July for most years (Appendix 5, Figure 10) (NC State, 2000).

The majority of the crab pot activity is concentrated in the Pamlico and Albemarle Sounds. According to the NCDMF trip ticket statistics, approximately 95% of the total crab pot trips occur in counties which border these sounds (NCDMF, 2000b). The Pamlico Sound crab pot trips account for 76% and Albemarle Sound accounts for 18% of total statewide trips. The top four counties with the highest trips and landings are Beaufort, Dare, Pamlico and Hyde Counties (Appendix 5, Figure 11).

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Appendix 1: Index to Scientific Names of Commonly Caught Fish/Invertebrates in North Carolina as Listed by the American Fisheries Society

AFS and NC Common Names	Scientific Name
Atlantic Croaker	*Micropogonias undulatus*
Bait	Can refer to any combination of fish/invertebrate which do not have a marketable category.
Blue Crab	*Callinectes sapidus*
Bluefish	*Pomatomus saltatrix*
Bonito	*Sarda sarda*
Butterfish	*Peprilus triacanthus*
Carp	*Cyprinus carpio*
Catfish (Channel)	*Ictalurus punctatus*
Catfish (Red/Bullheads)	*Ictaluridae*
Catfish (White)	*Ictalurus catus*
Cobia	*Rachycentron canadum*
Crabs (Hard or Soft)	*Callinectes sapidus*
Crabs (Peelers)	*Callinectes sapidus*
Cutlassfish (Ribbonfish)	*Trichiurus lepturus*
Dogfish (Smooth)	*Mustelus canis*
Dogfish (Spiny)	*Squalus acanthias*
Drum (Black)	*Pogonias cromis*
Drum (Red)	*Sciaenops ocellatus*
Flounder (Fluke)	Flounder are recorded combined but location caught determines species. Inshore flounder are recorded as *P. lethostigma* and *P. albigutta* while coastal species are *P. dentatus*.
Flounder (Gulf)	*Paralichthys albigutta*
Flounder (Southern)	*Paralichthys lethostigma*
Flounder (Summer)	*Paralichthys dentatus*
Gar (Freshwater/Longnose)	*Leiostomus osseus*
Harvestfish (Starbutter)	*Peprilus alepidotus*
Herring	Herring include *Alosa aestivalis* and *Clupea harengus harengus*. The combination of these two species are referred to as River Herring.
Hogfish (Pigfish)	*Orthopristis chrysoptera*
Houndfish (Skipper/Gar)	*Tylosurus crocodilus*
Jack (Crevalle)	*Caranx hippos*
Kingfish/Sea Mullet	*Menticirrhus spp.* All kingfish/sea mullets are reported under the same heading.
Kingfish/Sea Mullet (Gulf)	*Menticirrhus littoralis*
Kingfish/Sea Mullet (Northern)	*Menticirrhus saxatilis*
Kingfish/Sea Mullet (Southern)	*Menticirrhus americanus*
Little Tunny (False Albacore)	*Euthynnus alletteratus*

Appendix 1, cont'd:

AFS and NC Common Names	Scientific Name
Mackerel (Boston/Atlantic)	*Scomber scrombus*
Mackerel (King)	*Scomberomorus cavalla*
Mackerel (Spanish)	*Scomberomorus maculatus*
Menhaden (Bait)	*Brevoortia spp.*
Monkfish	*Lophius americanus*
Mullets (Striped/Jumping)	*Mugil cephalus*
Perch (White)	*Morone americana*
Perch (Yellow)	*Perca flavescens*
Pinfish	*Lagodon rhomboides*
Pompano	*Trachinotus carolinus*
Puffer (Sea Chicken)	*Sphoeroides maculatus*
Shad (American Shad)	*Alosa sapidissima*
Shad (Gizzard)	*Dorosoma cepedianum*
Shad (Hickory)	*Alosa mediocris*
Shark (Black Tip)	*Carcharhinus limbatus*
Shark (Hammerhead)	*Sphyrna spp.*
Shark (Sandbar)	*Carcharhinus milberti*
Shark (Sharpnose)	*Rhizoprionodon terraenovae*
Shark (Thresher)	*Alopias vulpinus*
Sharks (regular)	may include all species not explicitly listed
Sheepshead	*Archosargus probatocephalus*
Skates	*Rajidae*
Spadefish	*Chaetodipterus faber*
Spot	*Leiostomus xanthurus*
Spotted Seatrout (Speckled Trout)	*Cynoscion nebulosus*
Striped Bass (Rockfish)	*Morone saxatilis*
Weakfish (Gray Trout)	*Cynoscion regalis*

Appendix 2: Glossary

Backstaff	The second 100 yd. of a stop net; constructed of 8 in. stretched mesh webbing.
Beach Seine	A seine operation which starts from a beach. The seine is usually set from the stern of the boat. The boat travels straight out from the shore and angles in an arc until it completes an elongated semicircle. When the boat reaches the shore the unfastened net end is then attached to a winch, tractor or truck and the net is pulled in and up onto the beach.
Bunt	The section of a net that is hung to allow it to bag and used to prevent escapement of fish.
Coastal	Includes near and offshore waters.
Crab Pot	A wire mesh box measuring 2 X 2 ft. used to harvest blue crabs.
Drift Gillnet	A net consisting of monofilament or multifilament webbing that entraps fish in its net but is unanchored and allowed to drift with the current.
Float Line	The top line of a gillnet that floats at the surface.
Haul Seine	See Beach Seine
Heart	The section of a pound net gear that funnels fish into the pound.
Inshore	Inside state waters; estuarine waters; landward of the 72 COLREGS line.
Lead	The section of a pound net gear that funnels fish towards the heart. This large-braided-nylon net extends straight from shore or along a shoal in shallow water and ends at the mouth of the heart. Also used to refer to the final section of a stop net gear that is set parallel to the shore; constructed of 6 in. stretched mesh webbing.
Leadline	The weighted bottom line of a gillnet.
Long Haul Seine	A seine similar to a swipe net, but pulled by two boats for distances up to several miles. Fish are encircled and concentrated by pulling the net around a fixed stake.

Appendix 2, cont'd:

Marine Mammal Authorization Program	Provides an exemption for commercial fishers from the general taking prohibitions of the MMPA. Participants in Category I, II, and III fisheries are required to report any incidental mortality or serious injury to marine mammals. Participants in Category I and II fisheries are required to register with the MMAP and are required to carry an observer upon request.
Maximum Net Productivity	The greatest net annual increment in population numbers or biomass resulting from additions to the population due to reproduction and/or growth less losses due to natural mortality.
Mid-Atlantic	The geographic area south of Long Island, landward to the 72 30' W. line, and north of the line extending due east from the North Carolina/South Carolina border.
Nearshore	Statewaters; within three miles of the state land boundary.
Offshore	Federal waters; greater than three miles of the state land boundary.
Optimum Sustainable Population	The number of animals which will result in maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element.
Potential Biological Removal	The maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its OSP.
Pound Net	A stationary gear that directs fish into enclosures or "pounds" by means of a lead. Used primarily to harvest finfish.
Runaround Gillnet	A net consisting of monofilament or multifilament webbing that entraps fish by encircling schools of fish. Also referred to as a drop or strike net.
Serious Injury	Any injury that will likely result in mortality.
Set Net	A stationary net consisting of monofilament or multifilament webbing that entraps fish in its mesh.
Set Net (Sink)	The top line is below the surface of the water.

Appendix 2, cont'd:

Set Net (Float)	The top line floats at the surface of the water.
Stop Net	A stationary anchored multifilament net which is set perpendicular to the shore and designed to abate the movement of striped mullet along the beach.
Strategic Stock	Designation for a stock that is declining and likely to be listed as a threatened species under the Endangered Species Act (ESA) or is listed as endangered or threatened under the ESA. Also, a stock is strategic if it is designated as depleted under the MMPA or if the level of direct human-caused mortality exceeds the potential biological removal (PBR) level for that stock.
Suds Net	The first 100 yd. of a stop net that is set perpendicular to the beach; constructed of 8 in. stretched mesh webbing.
Swipe Net	A seine pulled by one boat with one end secured in shallow water. The fish are encircled and concentrated by pulling the net around a stake.
Take	To harass, hunt, capture, or kill any marine mammal or attempt any of these activities.
Tie-downs	A length of rope used to tie the float and leadline together at regular intervals to reduce the height of the net and create a pocket of webbing in the net.
Warp	A line used to attach gear to an object.
Wash Net	The portion of the haul/beach seine closest to the beach. Used to help prevent escapement of fish.
Wing	The section of a haul/beach seine used to coral or gill fish.

Appendix 3: List of Acronyms and Abbreviations

ESA	Endangered Species Act
FR	Federal Register
Ft.	Feet
In.	Inches
LOF	List of Fisheries
MAFMC	Mid-Atlantic Fishery Management Council
MMAP	Marine Mammal Authorization Program
MMPA	Marine Mammal Protection Act
Mt.	Metric Tons = 2204.6 lb.
NCDMF	North Carolina Division of Marine Fisheries
NCMFC	North Carolina Marine Fisheries Commission
NEFMC	New England Fishery Management Council
NMFS	National Marine Fisheries Service
Nm.	Nautical Miles
OSP	Optimum Sustainable Population
PBR	Potential Biological Removal
SAR	Stock Assessment Report
TRT	Take Reduction Team
TTP	NCDMF Trip Ticket Program
Yd.	Yard/Yards

Appendix 4: Total Fish Landings by Month, Gear and Location for Category II Commercial Fisheries in North Carolina from 1995 - 1999

Table 1a. Nearshore total landings (metric tons), by month, for set net gillnet gear in Dare, Hyde and Carteret Counties from 1995-1999. Only those "species" or fish groupings having greater than 2.8 mt over a five-year period are shown. An asterik (*) indicates that the information is confidential. A "0" indicates that the value is less than 0.1 metric ton. Missing values indicate that no information was recorded. Scientific names and definition of fish groupings (*i.e.*, "sharks") are included in Appendix 1. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

Fish Landed	Dare County												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	5.9	1.7	5.9	5.7	1.7	0.3			0.0	0.8	2.9	1.9	26.8
Bluefish	493.8	291.0	173.1	81.2	62.2	11.7	5.8	2.2	27.0	26.5	156.4	480.5	1811.3
Bonita	2.5	*	0.8	0.0	1.7	0.2	*	*	0.0	0.2	0.3	0.2	5.9
Butterfish	2.1	1.1	4.0	5.7	2.6	1.4	0.7	0.3	3.2	13.0	5.4	10.8	50.4
Cobia	*			*	2.4	2.5	0.2	*	0.7	13.8	3.8		23.4
Croaker	866.6	805.9	626.5	52.8	1.2	1.5	0.3	0.2	1.6	12.9	70.6	397.5	2837.4
Dogfish, Smooth	51.6	65.0	408.9	140.6	12.9	3.6	*	*	1.0	10.9	35.6	83.4	813.4
Dogfish, Spiny	1659.6	1653.9	1547.1	129.4	*					*	96.1	1085.7	6171.8
Drum, Black	0.1	0.0	0.1	0.1	1.9	0.1	*	0.0	0.4	1.1	2.4	0.5	6.8
Drum, Red (Channel bass)	1.0	0.2	*	0.1	0.1	*	0.2	*	0.2	0.5	0.1	4.0	6.4
Flounders (Fluke)	0.6	0.4	0.4	0.5	0.1	0.2	0.4	0.0	0.8	0.3	0.2	0.9	4.9
Harvestfish (Starbutter)	0.0	0.0	0.0	0.0	2.4	1.2	0.4	0.1	3.8	4.3	0.1	0.1	12.5
Hickory Shad (Jack)	14.3	5.6	4.8	1.0	0.1			*			0.1	0.9	26.8
Kingfish	5.5	0.6	2.3	53.1	25.7	1.1	0.2	0.2	1.1	3.7	8.2	9.8	111.5
Ladyfish	*			*	*	0.0	0.1	0.6	2.4	0.1	*		3.2
Little Tunny (False Albacore)	43.5	23.4	27.7	7.5	0.3	0.1	*	0.6	1.1	14.1	39.8	31.4	189.5
Mackerel, Boston	*	0.2	3.0	0.7	0.0	0.0			*	*	0.0	0.0	3.9
Mackerel, King	1.9	0.2	0.9	2.2	0.6	0.4	0.8	1.2	5.3	49.5	51.5	1.3	115.7
Mackerel, Spanish	0.0	*	0.0	0.1	36.4	38.0	23.0	28.9	118.6	222.2	1.8	0.2	469.2
Menhaden Bait	14.7	10.2	10.1	22.3	5.4	0.3			*	1.7	11.8	20.3	96.9
Monkfish (Whole)	0.9	5.6	2.9	7.9								0.0	17.3
Mulltets, Striped	*	0.1	0.0	*	*	*	*	*	0.9	1.6	0.3	0.1	2.9
Shad	8.9	12.6	14.0	0.5	0.0	*					0.0	0.5	36.5
Shark, Blacktip	0.7	*	*	1.8	9.7	29.9	4.3	0.4	1.6	3.0	2.5		53.9
Shark, Sandbar	0.7		*	2.0	9.1	*	*	*	2.2	3.6	*		17.5
Shark, Sharpnose	*	*	*	*	1.5	1.4	1.2	*	3.0	12.7	3.7	0.9	24.5
Sharks	4.6	4.0	6.0	12.1	12.9	9.1	1.1	0.6	2.9	15.3	16.0	4.1	88.9
Sharks, Thresher	0.3	0.6	0.8	4.2	3.2	*	*		*	2.9	8.3	2.4	22.7
Spot	0.2	0.0	0.1	3.8	2.9	0.3	0.0	1.8	69.7	159.2	12.5	0.2	250.8
Spotted Seatrout	7.9	1.8	0.8	0.1	0.2	0.0	0.0	*	0.4	0.9	0.1	4.5	16.8
Striped Bass	172.6	17.0	0.2	*	0.0							49.6	239.3
Weakfish	269.0	302.0	267.2	265.6	51.0	0.9	0.2	0.2	1.0	2.9	20.8	162.7	1343.6

Appendix 4, cont'd:

Fish Landed **Hyde County**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	122.0	6.3	9.9	1.0						*	*	*	29.9
Bluefish		98.4	46.0	13.0	0.2	*	*	*	0.6	0.2	12.8	28.1	321.2
Butterfish		0.4	1.5	1.5	*	*	*	*	*	0.1	*	0.5	5.2
Croaker	75.1	379.6	404.9	25.2	*		*	*	*	0.1	*	68.0	1263.9
Dogfish, Smooth	410.1	17.2	128.6	22.2	*	*	*	*	*	*	*	7.8	250.9
Dogfish, Spiny	0.5	473.3	456.2	61.0							*	230.1	1630.6
Flounders (Fluke)		0.2	0.2	0.0		*				*	0.0	1.0	5.7
Hickory Shad (Jack)	*	3.0	3.2	*								*	11.1
Kingfish	1.2	0.6	0.3	1.2	*	*	*	*	0.0	*	0.1	0.2	2.8
Little Tunny (False Albacore)	*	7.2	6.0	0.6	*					0.0	0.5	6.3	34.5
Mackerel, Spanish	4.2		*	*	0.4	*	*	*	2.8	4.8	*	*	8.1
Menhaden Bait	0.3	3.1	3.0	0.6	*	*				*	*	1.5	12.5
Shad		2.7	1.8	0.1	*							0.1	5.9
Shark, Sandbar	*	*	*	3.6							*	*	3.6
Sharks	*	0.6	5.8	6.1	*		*	*	*		2.3	1.1	50.5
Striped Bass		1.9	*									*	43.3
Weakfish	0.7	92.7	139.3	32.1	0.2	*	*	*	*	0.0	0.7	8.2	353.8

Fish Landed **Carteret County**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	7.4	13.8	2.9	*	*	*				*	22.6	27.3	73.5
Bluefish		1.2	0.4	18.5	10.7	1.6	0.2	2.7	9.7	14.0	26.6	11.0	103.8
Bonita	5.7	*	2.8	0.1	*	*	*		*	0.1	4.6	2.2	11.6
Butterfish	*	6.2	1.8	0.8	0.1	0.0	0.0	*	0.1	1.1	23.3	11.4	50.5
Croaker		159.8	42.8	2.5	0.1	*		0.1	2.5	11.4	120.5	88.3	575.2
Dogfish, Smooth	68.4	*	24.9	3.2			*					*	42.6
Dogfish, Spiny	0.1	87.9	179.5	2.7					*	*		75.7	414.1
Harvestfish (Starbutter)	0.6	1.1	*	0.2	0.1	*	*	*	*	0.0	2.1	1.0	4.6
Kingfish	*	12.6	7.3	11.2	1.4	0.0	0.0	0.0	0.5	3.4	73.9	118.9	244.3
Mackerel, Spanish	10.4			0.1	3.8	1.9	1.9	11.2	19.3	27.1	0.4		65.8
Menhaden Bait		7.0	2.0	*	*					*	*	*	19.4
Mulltets, Striped			0.1				*	1.0	1.9	34.4	35.3	0.0	72.7
Spot		4.9	3.7	3.7	0.7	0.0	*	1.0	53.2	176.4	103.3	8.9	356.7
Spotted Seatrout		0.8	0.0	*	0.1	*	*	0.1	0.1	0.4	6.9	3.9	12.3
Weakfish	0.1	268.8	87.4	43.5	0.9	0.0	*	0.1	2.4	2.6	64.6	216.3	905.4

Appendix 4, cont'd:

Table 1b. Offshore total landings (metric tons), by month, for set net gillnet gear in Dare, Hyde and Carteret Counties from 1995-1999. Only those "species" or fish groupings having greater than 2.8 mt over a five-year period are shown. An asterik (*) indicates that the information is confidential. A "0" indicates that the value is less than 0.1 metric ton. Missing values indicate that no information was recorded. Scientific names and definition of fish groupings (*i.e.*, "sharks") are included in Appendix 1. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

Fish Landed	Dare County												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	4.3	2.5	2.1	0.4	*					*	*	*	9.3
Bluefish	528.5	686.1	884.5	374.9	39.2	1.4	*	0.3	1.1	1.9	130.0	346.8	2994.7
Butterfish	1.6	1.4	4.6	2.9	0.4	*	*	*	0.1	1.1	0.4	1.5	14.2
Croaker	570.2	1054.2	769.1	37.8	0.0	*	*		0.1	0.5	72.6	311.2	2815.7
Dogfish, Smooth	23.7	91.7	143.6	66.7	1.1	*	*	*	*	1.0	2.1	14.5	344.3
Dogfish, Spiny	1381.2	2266.1	1924.4	130.3						*	69.8	684.9	6456.8
Drum, Black	0.1	0.2	2.2	2.6	*				*	0.1	0.1	0.0	5.4
Flounders (Fluke)	0.9	1.4	4.9	0.9	*	*			*	0.1	0.1	0.5	8.9
Hickory Shad (Jack)	6.1	5.6	3.6	0.4							*	0.0	15.7
Kingfish	5.2	0.6	3.2	6.6	1.7	0.1	*	*	0.1	0.4	0.7	0.8	19.3
Little Tunny (False Albacore)	35.2	30.4	24.7	2.8	0.1	*		*	0.1	1.6	6.7	16.7	118.2
Mackerel, Boston	1.7	3.2	4.0	1.5	0.1	*					*	*	10.6
Mackerel, King	3.9	2.3	5.7	1.2	*	*	*	*	0.3	8.0	27.2	3.6	52.2
Mackerel, Spanish		*	0.0	*	4.6	2.7	*	0.1	6.5	45.6	0.2	*	59.7
Menhaden Bait	18.6	12.9	8.9	2.5	0.4	*				*	3.7	8.8	55.8
Monkfish (Whole)	4.5	68.1	501.4	376.7	9.9							0.5	961.2
Shad	4.7	14.3	10.2	0.2							*	0.4	29.9
Shark, Blacktip	0.3	*	9.2	0.8	1.5	*	0.9		*	*	*	0.3	13.1
Shark, Hammerhead	0.9		7.0	3.6			*						11.5
Shark, Sandbar	*	*	2.2	0.6	1.3	*	*			*			4.2
Shark, Sharpnose	0.4	*	*			*	*		*	1.6	0.1	1.5	3.6
Sharks	4.9	5.5	13.7	8.2	0.2	1.6	*		*	4.3	6.3	2.5	47.2
Sharks, Thresher	0.5	0.9	1.5	2.9	*	*				0.2	1.5	1.8	9.2
Skates	0.3	5.1	10.4	11.5								*	27.3
Spot	0.0	0.1	0.1	0.5	0.1				3.1	3.0	0.2	0.0	7.1
Striped Bass	15.8	1.9	0.0									4.6	22.3
Weakfish	308.4	398.5	344.2	106.7	5.8	0.1	*	*	0.0	0.2	5.2	45.2	1214.2

Appendix 4, cont'd:

Table 1b. cont.

Fish Landed	Hyde County												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	4.0	2.3	*								*		6.3
Bluefish	39.6	52.7	53.0	*						*	*	8.6	153.9
Croaker	45.2	171.0	111.0	*						*	*	46.1	373.2
Dogfish, Smooth	39.1	41.1	140.4	*	*		*			*	*	*	220.6
Dogfish, Spiny	193.3	284.3	160.6	*								89.9	728.0
Little Tunny (False Albacore)	2.8	1.6	2.7	*	*					*	*	0.2	7.2
Menhaden Bait	*	*	4.7	*								*	4.7
Monkfish (Whole)	0.6	0.1	5.5	*	*								6.2
Sharks	0.5	*	4.8	*	*	*	*			*	*	*	5.3
Weakfish	16.9	26.8	21.7	3.8						*	*	4.0	73.3

Fish Landed	Carteret County												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bluefish	5.9	2.4	1.7	2.1	*	*			*	1.5	0.7	2.4	16.7
Bonita	1.1	4.2	4.8	*		*					*	*	10.1
Butterfish	2.2	4.5	0.7	0.7						*	5.2	2.2	15.5
Croaker	186.2	144.4	3.0	*						*	1.5	40.2	375.3
Dogfish, Spiny	63.6	152.7	139.5	*								33.7	389.6
Kingfish	3.1	4.7	3.7	3.4	*	*					*	4.4	41.1	60.4
Spot	0.3	0.4	0.5	0.3		*			2.4	5.4	2.8	2.5	14.6
Weakfish	139.5	196.7	67.5	9.5	*	*			*	*	2.4	21.6	437.1

Appendix 4, cont'd:

Table 2. Inshore total landings (metric tons), by month, for sink gillnet gear in counties surrounding Pamlico, Core and Albemarle Sounds and Onslow County from 1995-1999. Only those "species" or fish groupings having greater than 2.8 mt over a five-year period are shown. An asterik (*) indicates that the information is confidential. A "0" indicates that the value is less than 0.1 metric ton. Missing values indicate that no information was recorded. Scientific names and definitions of fish groupings (*i.e.,* "sharks") are included in Appendix 1. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

Fish Landed	Counties surrounding Pamlico and Core Sounds (Dare, Carteret, Hyde, Beaufort)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	2.8	20.9	56.3	79.5	13.9	3.7	2.1	1.1	1.5	3.9	3.7	15.0	204.4
Bluefish	16.9	3.9	10.2	162.9	108.5	19.6	11.6	38.6	41.1	27.5	9.7	7.5	458.0
Butterfish	0.4	0.1	0.2	1.2	1.4	0.7	0.5	0.3	1.0	1.2	1.5	0.8	9.3
Carp	*	0.3	2.3	0.3	0.1	*	*	0.0	0.1	0.1	*	0.3	3.5
Catfish	0.8	3.5	5.5	3.0	0.6	0.3	0.3	0.5	1.5	3.4	3.5	1.7	24.5
Catfish,(White & Channel)	0.2	1.8	1.8	0.5	*			0.0	*	0.3	0.1	0.2	4.7
Crab, Horseshoe		*	*	*	0.9	0.7	*	*	0.3	8.1	21.1	3.0	34.1
Crabs, Hard	0.7	1.1	2.7	7.5	13.4	11.4	8.1	4.9	8.5	9.6	3.9	2.5	74.2
Croaker	47.9	7.4	18.6	20.5	22.7	7.6	12.7	8.7	20.5	6.4	4.2	24.4	201.6
Dogfish, Smooth	0.7	0.7	5.7	4.6	0.4	*	*	*	*	*	1.3	0.0	13.5
Dogfish, Spiny	10.0	25.9	18.9	3.4			*	*	*	*	*	17.5	75.6
Drum, Black	0.6	0.2	0.5	1.2	2.3	1.0	1.5	1.9	4.7	9.3	7.0	2.0	32.2
Drum, Red (Channel bass)	9.4	4.2	2.5	3.9	6.2	11.8	19.5	19.9	42.0	25.0	2.7	0.8	147.8
Flounders (Fluke)	2.7	3.0	8.7	22.1	37.3	47.1	72.4	114.1	311.7	638.7	492.3	60.4	1810.7
Harvestfish (Starbutter)	0.2			0.0	1.8	2.2	0.7	0.5	2.1	0.7	0.1	0.1	8.3
Herring	0.2	4.8	2.3	2.1								*	9.4
Hickory Shad (Jack)	8.6	41.0	21.2	4.2	0.0	*			0.0	*	0.1	0.8	75.9
Hogfish (Large Pigfish)	*		*	0.2	0.8	0.4	0.7	1.0	3.2	4.0	3.6	0.0	13.9
Houndfish				0.2	11.6	5.9	0.7	0.2	0.0	*	0.0	0.1	18.7
Kingfish	0.4	0.1	3.6	17.3	14.6	1.4	1.7	0.9	7.4	5.0	9.0	6.3	67.6
Little Tunny (False Albacore)	0.8	0.3	0.3	0.3	0.0				0.0	0.2	1.3	1.4	4.6
Mackerel, Spanish	0.1	0.0	*	0.1	15.6	27.4	14.9	39.3	19.8	13.2	0.1	0.0	130.5
Menhaden Bait	6.2	34.5	95.2	144.3	45.9	13.2	6.1	4.1	2.7	4.7	14.2	46.4	417.4
Mulltets, Striped	9.9	10.0	5.8	3.7	3.9	7.1	16.7	24.7	30.3	151.9	110.8	20.8	395.5
Perch, White	0.8	3.8	4.1	1.2	0.1	0.0	0.1	0.1	0.1	0.4	1.2	0.8	12.8
Pinfish		*	*	0.1	0.1	*	0.2	0.4	1.3	0.9	0.3	*	3.3
Pompano	*		*	0.0	0.1	0.2	0.3	0.6	1.2	0.8	0.0		3.1
Shad	0.5	9.5	23.4	4.2	0.0		*	*	0.0	0.0	0.1	0.2	37.8
Sharks	*	*	3.0	0.6	1.4	0.4	0.1	0.0	0.1	0.4	0.0	*	6.1
Sheepshead	0.0	0.0	0.0	0.2	0.9	1.9	1.9	3.5	11.1	10.1	1.0	0.0	30.8
Spadefish		*		0.0	0.1	0.6	0.8	2.2	3.1	1.0	*	*	7.8
Spot	0.0	0.0	0.3	13.1	17.0	9.6	6.7	11.7	110.9	133.0	9.4	0.3	312.1
Spotted Seatrout	25.7	13.6	10.2	11.6	7.8	5.1	2.4	3.1	7.7	18.7	31.8	34.6	172.4
Striped Bass	1.4	9.2	22.9	8.0				*	*	*	8.9	27.2	77.6
Weakfish	16.7	9.9	53.6	180.8	58.4	4.5	3.4	4.1	12.4	34.6	92.3	38.2	508.9
Yellow Perch	0.1	2.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	2.9

Appendix 4, cont'd:

Table 2. cont.

Fish Landed	Counties surrounding Albemarle Sound (Pasquotank, Perquimans, Tyrell)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	1.2	14.5	20.3	16.9	2.1	0.9	0.5	0.5	0.1	0.8	2.7	1.6	62.0
Bluefish	*	*	0.0	1.2	1.4	0.5	0.1	0.1	2.9	0.2	0.1		6.5
Carp	1.5	1.7	3.7	3.6	1.1	*	0.0	*	0.0	0.5	1.3	0.6	14.0
Catfish	5.8	12.3	12.7	6.8	5.3	2.1	1.8	2.4	4.8	5.2	6.6	3.7	69.5
Catfish, Red (Bullheads)	3.4	8.7	13.7	8.4	4.6	1.9	1.4	0.0	2.0	4.3	6.7	4.4	59.6
Catfish,(White & Channel)	3.6	12.2	22.3	14.2	6.6	3.7	2.7	3.2	5.0	5.5	5.2	3.9	88.1
Crabs, Hard	0.3	*	1.2	1.7	3.7	3.0	5.8	6.2	10.1	9.6	5.1	0.7	47.4
Crabs, Peelers				*	0.6	0.4	0.5	1.4	1.5	0.0			4.4
Croaker	0.1	0.0	0.3	0.7	2.2	2.8	2.6	3.0	2.4	0.7	0.5	0.1	15.6
Drum, Black	0.1	0.1	0.0	0.1	0.1	0.1	0.8	3.7	4.3	1.3	0.3	0.0	10.8
Drum, Red (Channel bass)	1.0	0.1	0.0	0.2	0.2	0.5	1.1	1.7	2.9	1.5	0.5	0.0	9.7
Flounders (Fluke)	4.2	7.2	17.3	37.9	41.1	66.6	119.6	177.1	258.1	208.0	178.8	31.1	1147.2
Gizzard Shad	3.2	4.0	14.5	7.5	1.6	0.4	*	0.1	*	2.6	4.1	4.1	42.2
Herring	0.9	3.0	7.3	7.6	*	*			*			0.0	18.7
Hickory Shad (Jack)	0.5	4.5	5.1	0.6				*				0.0	10.7
Mackerel, Spanish				*	*	*	0.2	*	17.6	*			17.8
Menhaden Bait	*	*	*	10.6	2.9	*			0.0				13.4
Mulltets, Striped	31.1	38.2	18.9	14.4	10.2	3.5	7.6	10.3	10.1	23.9	13.7	16.2	198.2
Perch, White	12.4	20.9	35.6	14.8	1.5	0.9	0.6	0.8	2.0	2.4	4.8	3.6	100.3
Shad	0.3	5.8	25.4	4.0	*			*	*		*	0.0	35.5
Spot	0.0	0.0	0.0	0.4	1.4	3.7	2.1	3.8	2.2	0.4	0.1	0.0	14.1
Spotted Seatrout	1.6	1.7	0.2	0.4	0.8	0.8	0.3	0.2	0.8	0.6	0.6	1.0	9.0
Striped Bass	*	6.9	24.8	10.0	*		*	*	*	*	1.5	3.5	46.7
Weakfish	0.1	0.0	0.2	1.8	1.8	0.1	0.1	0.3	2.0	1.7	2.2	0.1	10.5
Yellow Perch	3.8	8.8	3.1	1.4	0.9	0.8	0.3	0.3	0.2	0.3	0.4	1.0	21.2

Fish Landed	Onslow and New Hanover Counties												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bluefish	*	*	0.2	1.3	0.8	0.5	0.5	0.5	1.4	1.1	0.4	0.1	6.9
Croaker	*	*	*	0.3	0.5	2.0	6.3	5.3	1.4	0.4	0.1	0.1	16.4
Drum, Black	0.1	0.9	0.5	0.3	0.5	0.4	1.2	1.7	1.9	1.3	0.5	0.0	9.3
Drum, Red (Channel bass)	0.6	0.2	0.1	0.5	1.2	0.6	1.2	1.3	2.0	0.7	0.4	0.0	8.9
Flounders (Fluke)	7.7	4.0	2.6	9.5	28.9	33.6	46.1	41.3	41.6	44.3	26.0	11.1	296.6
Kingfish	*	*	5.5	2.9	0.1	0.0	0.0	0.1	0.0	0.1	2.7	1.3	12.7
Mulltets, Striped	3.0	2.0	2.4	2.3	1.3	2.5	3.3	5.8	8.2	10.0	16.7	3.5	61.1
Shad	0.3	3.9	5.2	2.2	*					*			11.7
Spot	*	*	0.1	1.5	2.9	7.4	8.0	9.6	41.1	126.6	28.7	0.7	226.5
Spotted Seatrout	1.2	0.9	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.8	1.3	0.7	6.1
Weakfish	*		0.9	0.5	0.0	0.0	0.0	0.0	0.1	0.4	1.2	1.7	4.9

Appendix 4, cont'd:

Table 3. Inshore total landings (metric tons), by month, for float gillnet gear in counties surrounding Pamlico and Core Sounds and Onslow County from 1995-1999. Only those "species" or fish groupings having greater than 2.8 mt over a five-year period are shown. An asterik (*) indicates that the information is confidential. A "0" indicates that the value is less than 0.1 metric ton. Missing values indicate that no information was recorded. Scientific names and definitions of fish groupings (*i.e.*, "sharks") are included in Appendix 1. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

Fish Landed	Counties surrounding Pamlico and Core Sounds (Dare, Hyde, Carteret, Beaufort, Craven, Pamlico)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	1.2	21.3	76.9	39.4	12.6	1.2	3.1	0.2	2.8	2.4	0.5	1.8	163.5
Bluefish	0.6	0.5	7.2	90.2	41.0	7.5	4.1	10.8	22.2	14.1	3.0	0.3	201.5
Butterfish	0.0	0.0	0.0	0.4	0.9	1.2	0.5	0.1	0.8	0.2	0.4	0.1	4.7
Catfish	0.9	3.3	5.2	3.2	0.7	0.1	0.2	0.2	0.5	0.8	0.9	2.5	18.5
Catfish,(White & Channel)	0.2	2.1	1.1	0.5	0.3	*	*	*	*	0.1	*	0.0	4.4
Crabs, Hard	*	0.2	0.8	1.2	0.9	1.1	3.3	1.6	1.3	1.0	0.2	0.0	11.8
Croaker	0.2	0.0	1.7	7.0	5.3	3.8	1.8	4.1	9.5	4.0	1.0	0.5	39.0
Dogfish, Smooth	0.2	0.3	1.2	0.6	2.1		*	*	*	*		*	4.4
Dogfish, Spiny	*	*	5.3	0.3	*						*	*	5.6
Drum, Black	0.4	0.6	0.4	1.7	3.2	1.8	1.3	3.3	5.6	6.6	4.0	0.5	29.5
Drum, Red (Channel bass)	1.6	1.5	1.6	2.4	5.2	5.5	6.3	10.2	20.2	13.5	3.1	0.2	71.3
Flounders (Fluke)	1.9	3.0	11.7	41.3	59.0	78.9	83.9	107.0	147.4	168.6	79.2	6.1	788.0
Herring	3.6	9.0	5.7	7.2									25.4
Hickory Shad (Jack)	7.7	46.3	18.5	1.5	*				*	*	0.1	0.2	74.2
Hogfish (Large Pigfish)			0.0	0.1	0.2	0.2	0.3	0.8	0.9	3.5	0.6	*	6.6
Houndfish			*	0.3	7.1	2.5	0.2	0.1	*	0.2	*		10.4
Kingfish	1.2	0.0	1.3	4.0	3.2	0.8	0.3	0.1	0.8	2.9	1.8	0.6	17.1
Mackerel, Spanish	0.1	0.0	0.1	0.2	16.1	23.5	9.5	22.3	24.8	7.4	0.2	0.1	104.4
Menhaden Bait	20.1	25.0	61.6	35.9	12.3	4.9	1.5	0.5	3.0	2.3	2.7	1.7	171.5
Mulltets, Striped	45.6	26.2	15.7	22.5	19.7	20.9	23.2	43.6	35.8	305.9	151.6	57.4	768.2
Perch, White	3.9	9.5	6.0	2.7	0.5	0.1	0.2	0.2	0.3	0.7	2.8	2.4	29.4
Shad	1.1	21.2	51.2	11.7	0.0	0.0			*	*	0.0	0.0	85.4
Sheepshead	0.0	*	0.0	0.1	0.8	1.5	0.9	1.5	4.2	4.4	0.5	0.0	14.0
Spadefish				*	0.1	0.5	0.5	1.3	1.2	0.3	*		3.9
Spot	*	0.0	0.2	6.2	12.7	5.0	2.2	4.0	55.2	116.7	6.4	0.2	208.8
Spotted Seatrout	27.9	24.8	13.1	16.2	22.0	11.2	1.8	1.4	4.6	17.3	33.5	23.0	196.8
Striped Bass	0.1	10.5	35.4	11.8	0.0	*				0.0	1.4	4.1	63.3
Weakfish	2.0	1.2	28.9	78.3	20.9	1.9	0.6	0.6	4.2	11.4	16.7	2.8	169.5

Appendix 4, cont'd:

Table 3. cont.

Fish Landed	Onslow County												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bluefish	*	*	0.2	1.0	0.4	0.7	0.4	1.3	1.4	0.3		*	5.7
Croaker	*	*		0.1	0.7	1.6	3.4	6.4	1.2	0.1	*	*	13.4
Drum, Black	1.3	0.5	0.2	0.2	0.2	0.2	0.5	0.3	0.5	0.4	0.2	0.6	5.0
Drum, Red (Channel bass)	0.1	*	0.1	0.1	0.6	2.7	0.1	1.0	0.7	0.3	0.1	0.0	5.6
Flounders (Fluke)	2.8	3.2	2.1	5.6	24.0	21.0	20.9	20.8	27.7	17.4	8.2	2.7	156.2
Mulltets, Striped	2.9	1.7	2.2	2.7	2.0	3.9	3.5	5.7	2.5	12.4	9.9	2.0	51.5
Spot	*	*	*	2.6	6.7	7.1	11.0	12.8	13.8	25.1	1.6	0.1	80.9
Spotted Seatrout	2.8	1.2	0.3	0.2	0.4	0.2	0.2	0.3	0.2	1.3	2.8	2.9	12.7

Appendix 4, cont'd:

Table 4. Inshore total landings (metric tons), by month, for runaround gillnet gear in counties surrounding Pamlico Sound and Onslow and New Hanover Counties from 1995-1999. Only those "species" or fish groupings having greater than 2.8 mt over a five-year period are shown. An asterik (*) indicates that the information is confidential. A "0" indicates that the value is less than 0.1 metric ton. Missing values indicate that no information was recorded. Scientific names and definitions of fish groupings (*i.e.*, "sharks") are included in Appendix 1. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

Fish Landed	Counties surrounding Pamlico Sound (Dare, Carteret, Pamlico and Hyde)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
Bluefish	*	*	0.1	0.2	0.2	0.7	3.0	6.1	3.1	5.2	0.8		19.4
Croaker	0.0		0.1	0.0	0.1	0.2	0.7	1.4	0.5	0.1	0.1		3.1
Drum, Black	0.1	*	0.2	0.1	0.1	0.9	0.7	0.4	0.1	0.6	0.7	0.2	4.0
Drum, Red (Channel bass)	1.1	0.7	0.2	1.7	3.4	11.5	35.7	25.9	20.7	14.8	3.8	0.1	119.7
Flounders (Fluke)	0.1	0.1	0.2	0.1	0.4	0.5	0.7	1.0	1.0	4.0	2.7	0.0	10.8
Mackerel, Spanish	*				0.0	0.1	0.0	0.6	0.3	4.2	0.2	*	5.4
Mulltets, Striped	32.9	23.0	19.9	18.2	40.7	42.1	87.1	151.8	108.9	786.5	295.1	32.0	1638.2
Spot	*	*	0.0	0.1	2.1	2.0	2.6	2.3	7.3	20.5	4.9	*	41.9
Spotted Seatrout	10.6	5.7	1.3	0.4	1.0	0.6	1.2	0.4	1.0	9.0	32.2	12.1	75.6
Weakfish	0.3	0.1	0.6	0.1	0.0	0.0	0.2	0.1	0.1	0.6	2.3	0.0	4.3

Fish Landed	Onslow and New Hanover Counties												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Total**
Drum, Black	1.4	2.5	0.4	0.5	0.1	0.1	*	*	*	0.1	0.2	0.1	5.4
Mulltets, Striped	31.3	24.7	26.8	16.8	11.2	9.8	11.4	12.1	17.0	64.3	116.2	33.9	375.5
Spot	*	0.0	*	0.5	0.8	1.5	1.8	1.4	3.7	2.5	0.3	*	12.4
Spotted Seatrout	1.3	0.6	0.2	0.1	0.0	0.0	0.0	0.0	0.1	0.3	1.0	1.1	4.9

Appendix 4, cont'd:

Table 5. Inshore total landings (metric tons), by month, for drift gillnet gear in Carteret and New Hanover Counties from 1995-1999. Only those "species" or fish groupings having greater than 2.8 mt over a five-year period are shown. An asterik (*) indicates that the information is confidential. A "0" indicates that the value is less than 0.1 metric ton. Missing values indicate that no information was recorded. Scientific names and definitions of fish groupings (*i.e.*, "sharks") are included in Appendix 1. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

Fish Landed	Carteret County												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bluefish		*	*	3.6	0.7	0.2	0.1	0.1	0.2	0.2	*	*	5.2
Drum, Red (Channel bass)	*			0.2	1.8	2.2	0.2	0.1	0.3	0.4	0.2	*	5.4
Flounders (Fluke)			*	0.7	2.6	4.4	4.6	2.9	3.2	3.8	0.5	*	22.7
Mulltets, Striped				*	*	0.5	1.2	0.5	0.7	26.5	11.3	0.1	40.8
Spot		*	*	0.1	0.1	*	*	0.2	6.8	7.0	0.3		14.6

Fish Landed	New Hanover County												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Shad	0.1	0.7	2.3	0.8									3.9
Spot									*	15.1	4.4		19.4

Appendix 4, cont'd:

Table 6. Total landings (metric tons), by month, for beach seine gear in Dare County from 1995-1999. Only those "species" or fish groupings having greater than 2.8 mt over a five-year period are shown. An asterik (*) indicates that the information is confidential. A "0" indicates that the value is less than 0.1 metric ton. Missing values indicate that no information was recorded. Scientific names and definitions of fish groupings (*i.e.,* "sharks") are included in Appendix 1. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

Fish Landed	Dare County												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait	*		0.6	6.7	5.5	5.9	*	*	*	*	1.3	*	19.9
Bluefish	0.7	3.0	0.2	10.9	82.2	29.9	2.2	1.8	9.3	8.3	9.6	48.9	207.2
Butterfish	*	*	0.1	2.7	4.2	1.7	0.0	*	0.0	0.1	0.1	0.2	9.0
Croaker	0.1	*	9.8	27.9	8.6	19.4	1.0	*	2.4	0.5	1.0	1.1	71.8
Dogfish, Spiny	*	4.2	*	*								6.9	11.1
Drum, Black	0.1	0.0	0.1	0.1	0.2	0.1	*	*	0.3	2.1	2.2	0.9	6.2
Drum, Red (Channel bass)	2.5	0.2	0.7	0.1	0.6	1.5	0.3		0.2	0.6	0.3	1.4	8.5
Harvestfish (Starbutter)			*	0.0	82.8	28.8	0.9	*	0.9	1.3	*		114.7
Hickory Shad (Jack)	0.7	0.5	1.3	3.2	*					*	*	1.2	6.8
Kingfish	0.2	0.0	0.2	17.5	30.0	2.1	0.3	0.1	0.7	1.7	3.2	0.3	56.3
Little Tunny (False Albacore)	0.7	*	0.8	0.3	0.3	*			0.5	2.0	1.3	2.7	8.5
Mackerel, Spanish	*			0.0	4.9	3.3	0.6	0.8	2.7	3.9	0.1	*	16.4
Menhaden Bait	*	*	1.1	5.2	10.2	17.5	*	*	*	1.0	2.2	0.9	38.0
Mulltets, Striped	0.9	0.0	*	0.0	0.3	0.0	*	*	3.2	7.6	9.0	0.4	21.5
Puffer (Sea Chicken)			*	2.9	0.0					0.0	0.1	*	3.1
Spot		*	0.0	2.3	20.7	8.8	1.6	2.5	199.9	168.5	10.6	0.0	415.0
Spotted Seatrout	9.2	7.4	0.8	32.3	5.6	1.4	0.1	0.0	1.1	1.4	2.9	26.1	88.4
Striped Bass	13.4	7.8	*		*	*						214.3	235.5
Weakfish	2.0	0.2	4.0	98.9	152.8	7.4	0.1	0.0	0.4	0.7	3.7	3.5	273.8

Appendix 4, cont'd:

Table 7. Total landings (metric tons), by month, for long haul seine gear in Dare and Carteret Counties from 1995-1999. Only those "species" or fish groupings having greater than 2.8 mt over a five-year period are shown. An asterik (*) indicates that the information is confidential. A "0" indicates that the value is less than 0.1 metric tons. Missing values indicate that no information was recorded. Scientific names and definitions of fish groupings (*i.e.*, "sharks") are included in Appendix 1. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

Fish Landed	Dare and Carteret Counties												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Bait		*	*	1.9	12.3	26.9	27.4	27.7	13.3	7.7		*	117.2
Bluefish	*		0.0	7.8	19.2	18.2	26.1	24.3	17.0	10.5	0.8	*	123.9
Butterfish	*			*	7.3	4.6	1.6	2.3	2.4	1.9	0.6	*	20.7
Catfish	*	2.7	7.1	*	*	*		0.1	*		*	*	9.9
Croaker			*	0.3	24.1	63.3	100.3	60.8	12.6	6.9	3.1	*	271.4
Drum, Black	*			0.2	3.5	3.4	1.6	0.8	1.1	3.1	0.6	0.1	14.5
Drum, Red (Channel bass)	0.2	*	0.1	0.0	0.1	10.3	10.7	5.5	13.5	2.3	0.0	*	42.6
Flounders (Fluke)	*	0.0	0.1	0.1	0.2	0.5	1.7	3.5	3.6	6.3	0.2	*	16.1
Harvestfish (Starbutter)					2.9	0.2	0.3	0.1	0.5	0.3			4.3
Hogfish (Large Pigfish)				*	6.1	26.5	26.6	28.8	16.4	32.2	10.5		147.1
Houndfish					4.9	9.2	4.3	1.2	0.1				19.7
Kingfish				0.6	3.5	3.6	5.5	8.2	9.4	9.7	1.3	*	41.8
Mackerel, Spanish				0.0	1.1	1.4	0.6	1.2	0.8	0.6		*	5.7
Menhaden Bait		*	*	*	*	100.5	64.6	37.7	61.6	*		*	264.4
Mulltets, Striped	0.1	0.2	0.2	0.1	0.1	0.3	0.3	3.6	4.1	6.4	1.5	*	16.8
Pinfish					*	2.2	1.4	10.4	20.6	9.3	*		43.7
Sheepshead				0.1	1.5	2.5	3.5	5.6	4.3	3.4	0.1	*	21.0
Spot			*	9.4	72.7	187.4	263.2	228.6	389.5	1092.4	46.4	*	2289.6
Spotted Seatrout	3.1	1.7	3.7	7.2	7.3	11.5	15.9	14.7	11.2	32.9	31.7	11.4	152.3
Striped Bass		0.6	2.5	0.4							*	*	3.5
Weakfish	0.0		0.0	48.4	77.6	71.6	77.7	132.5	143.0	151.1	16.1	0.7	718.7
Yellow Perch	*	0.4	1.8	0.8				*	*		*	*	2.9

Appendix 5: Trips and Landings by Gear Type and Location of Category II Commercial Fisheries in North Carolina from 1995 - 1999

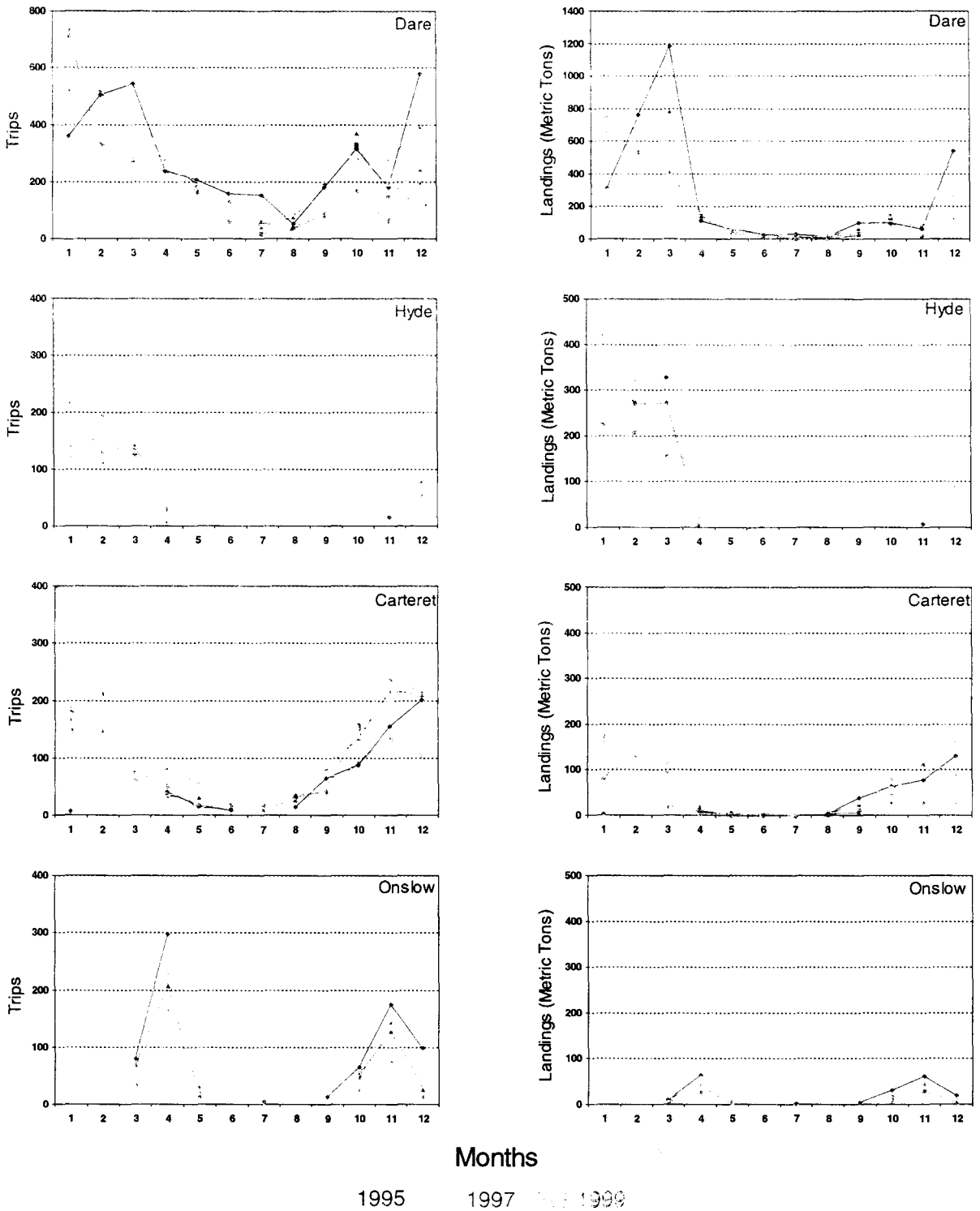


Figure 1 Nearshore (< 3 nautical miles) sink gillnet trips and landings of North Carolina for each month in 1995 - 1999. Note that the scale for Dare County is higher. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

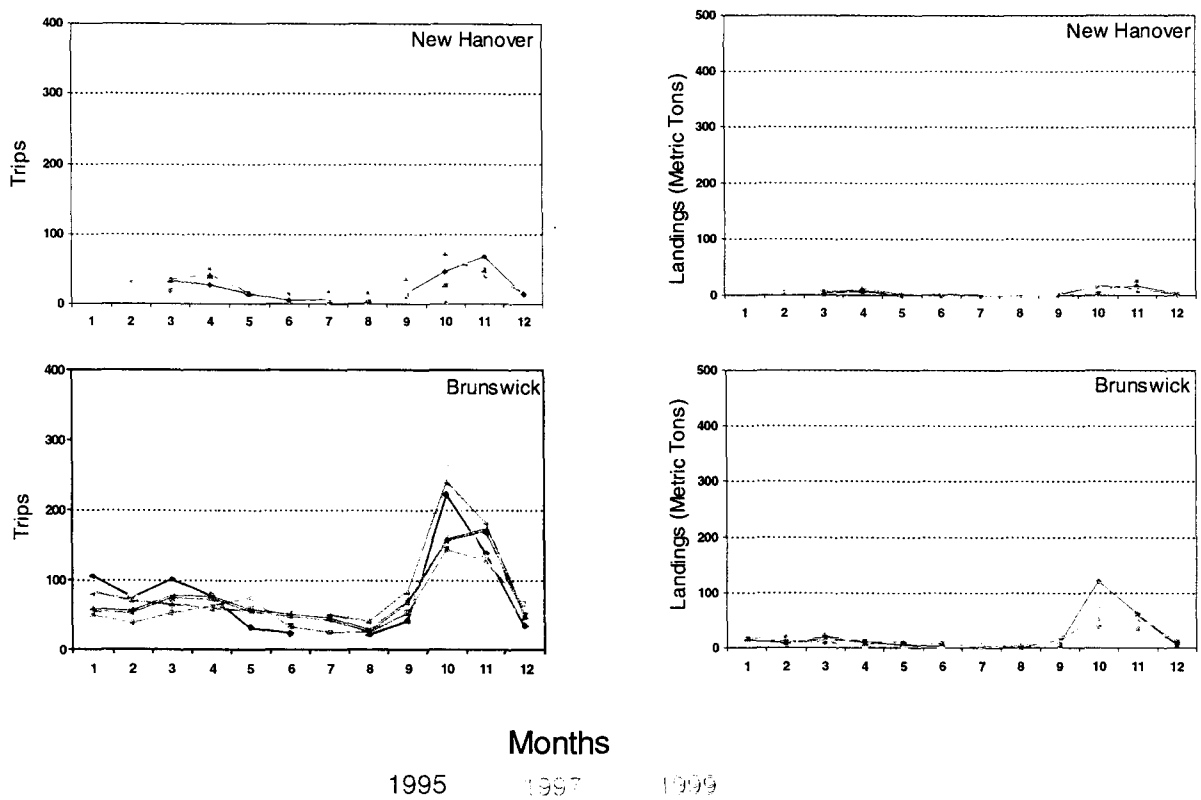


Figure 1 cont. Nearshore (< 3 nautical miles) sink gillnet trips and landings of North Carolina for each month in 1995 - 1999. Note that the scale for Dare County is higher. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

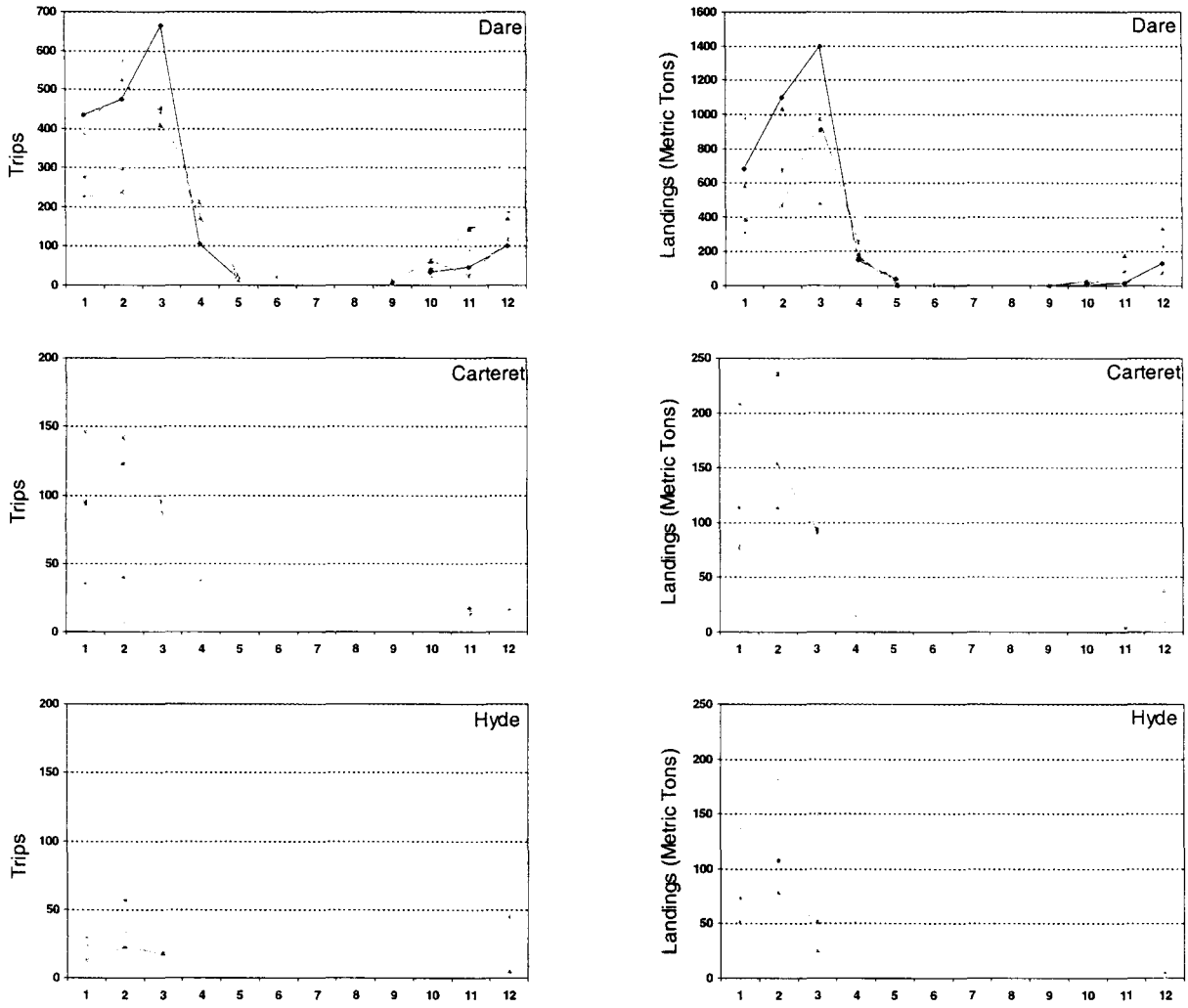


Figure 2 Offshore (> 3 nautical miles) sink gillnet trips and landings of North Carolina for each month in 1995 - 1999. Note that the scale for Dare County is higher. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

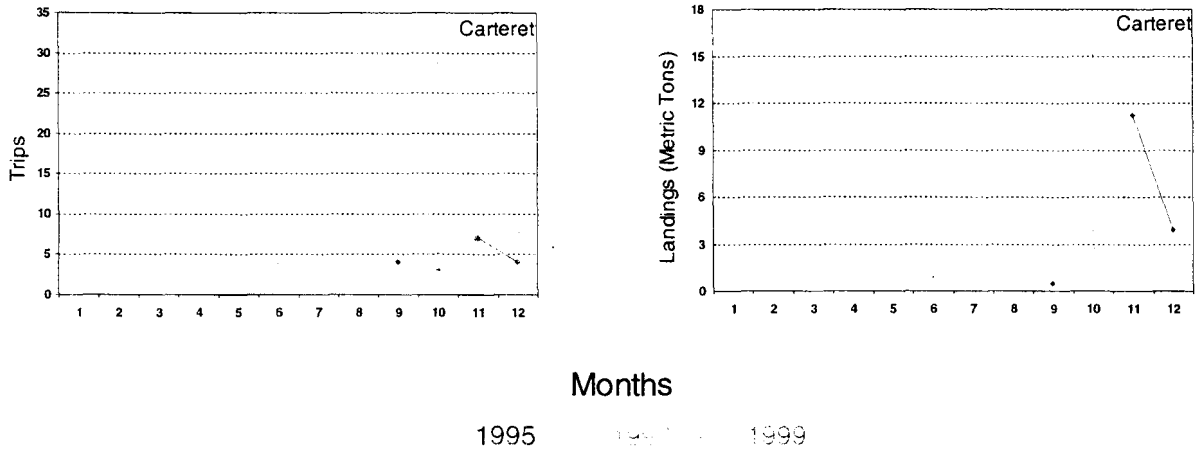


Figure 3 Nearshore (< 3 nautical miles) runaround gillnet trips and landings of Carteret County, North Carolina for each month in 1995 - 1999. This figure includes the only county with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

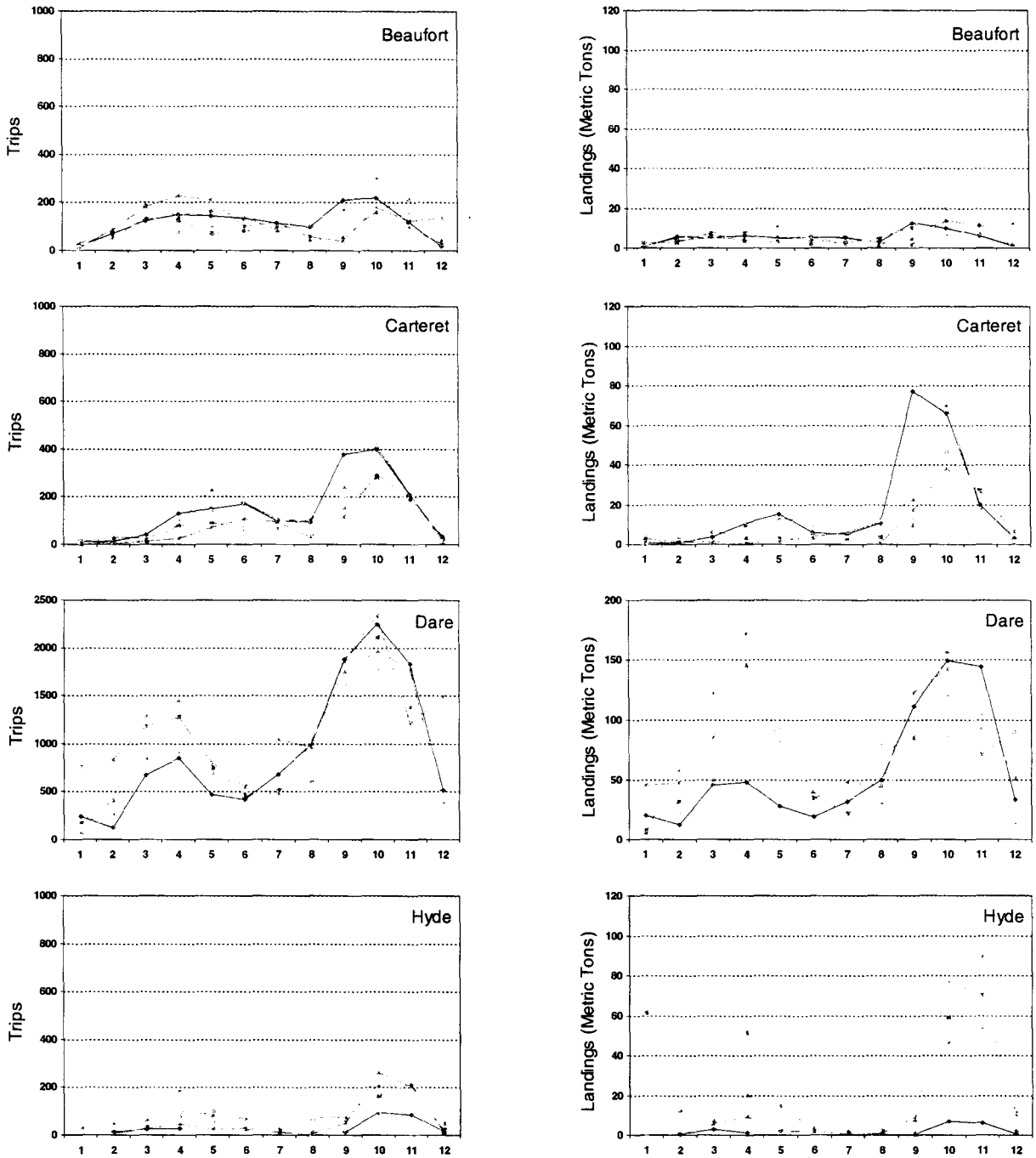


Figure 4 Inshore sink gillnet trips and landings of North Carolina for each month in 1995 - 1999. Note that the scale for Dare County is higher. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

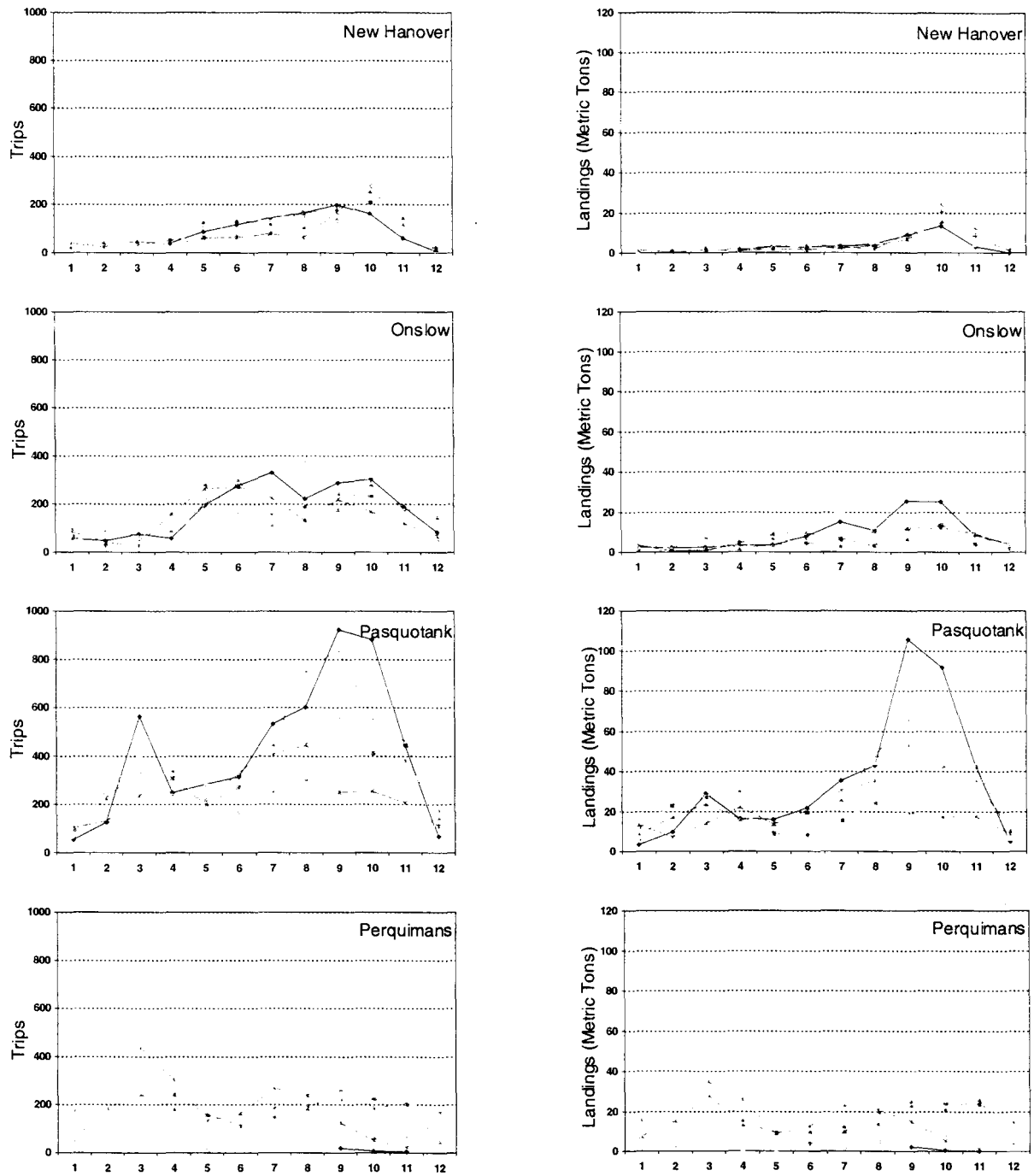


Figure 4 cont. Inshore sink gillnet trips and landings of North Carolina for each month in 1995 - 1999. Note that the scale for Dare County is higher. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

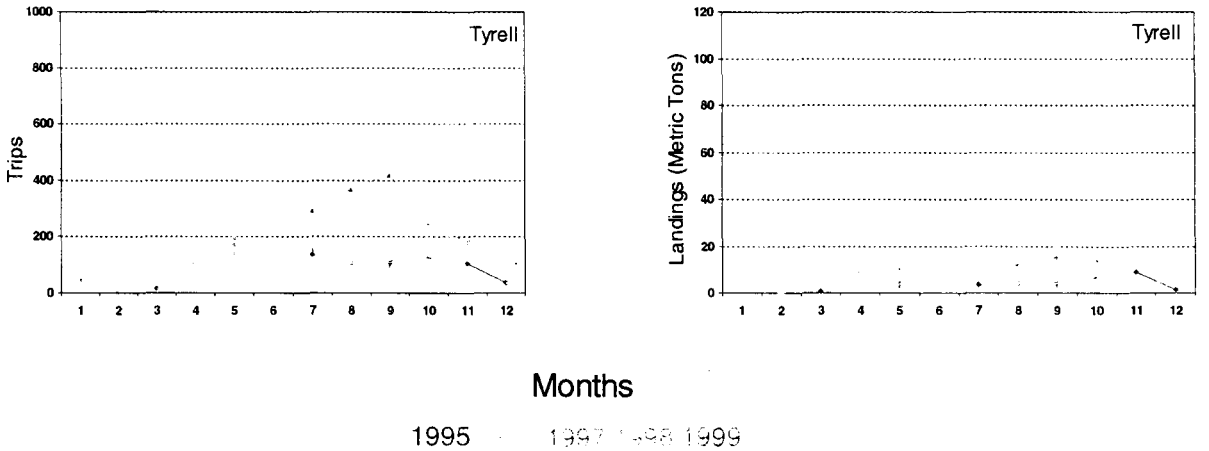


Figure 4 cont. Inshore sink gillnet trips and landings of North Carolina for each month in 1995 - 1999. Note that the scale for Dare County is higher. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

Appendix 5, cont'd:

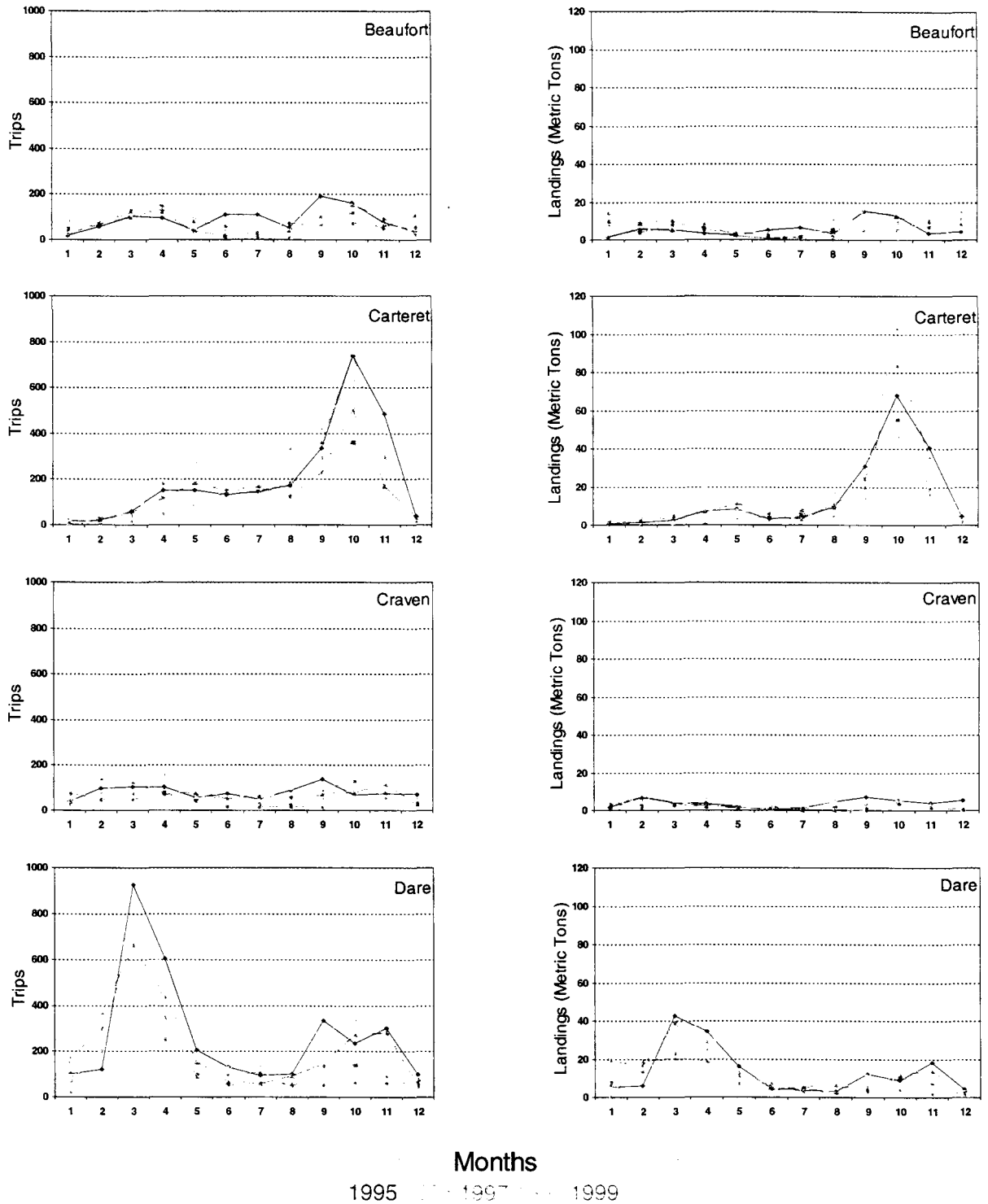


Figure 5 Inshore float gillnet trips and landings of North Carolina for each month in 1995 - 1999. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

Appendix 5, cont'd:

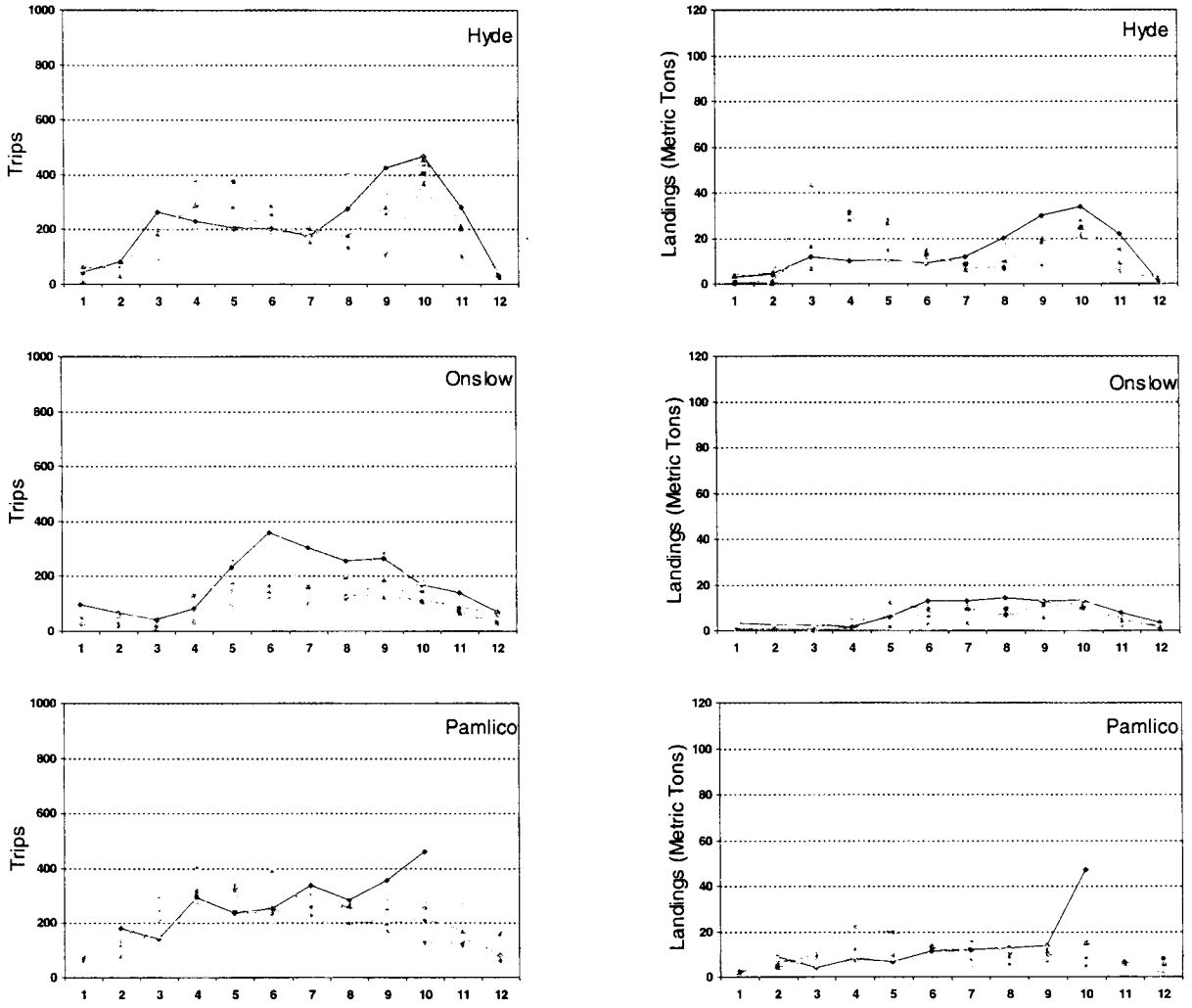


Figure 5 cont. Inshore float gillnet trips and landings of North Carolina for each month in 1995 - 1999. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

Appendix 5, cont'd:

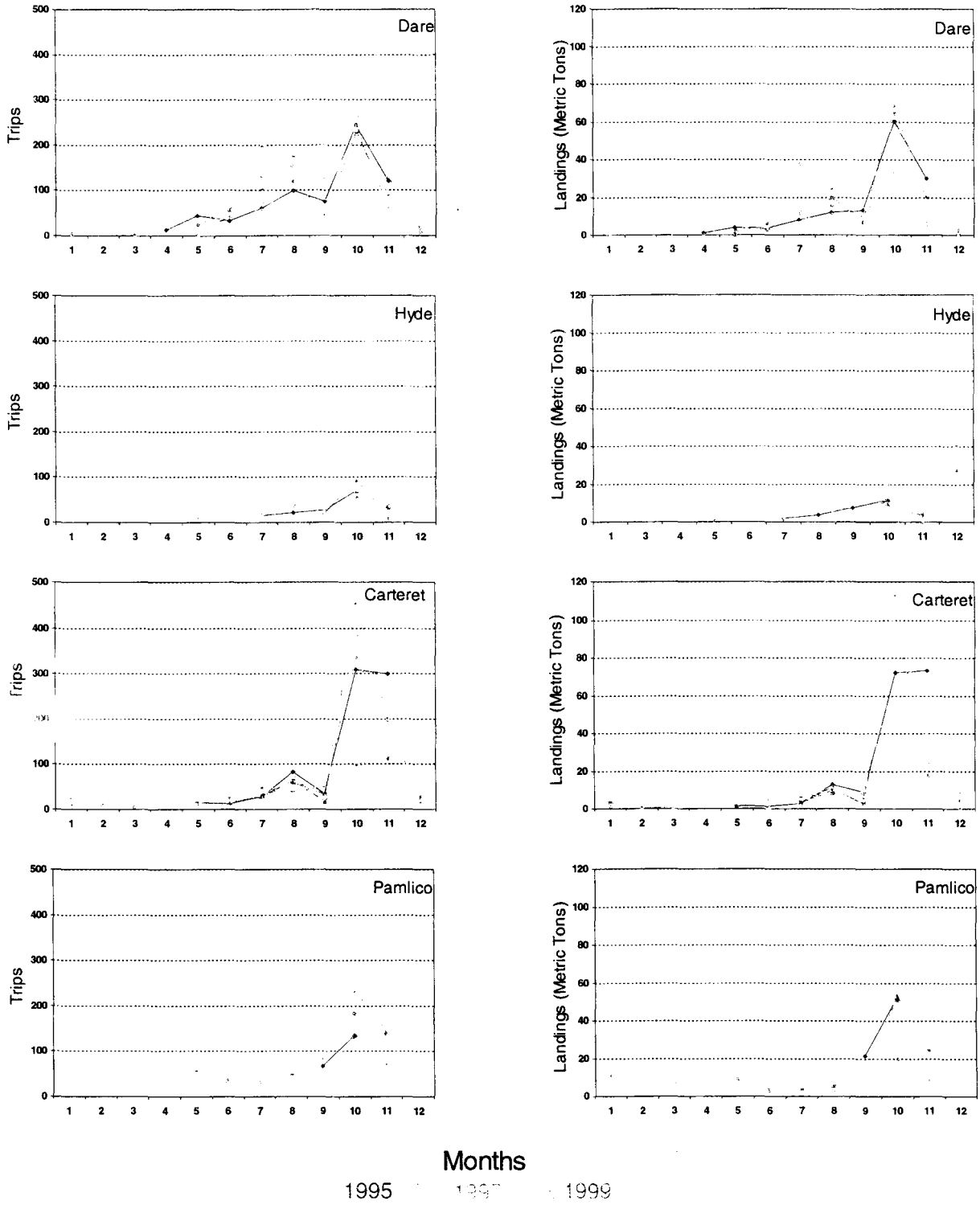


Figure 6 Inshore runaround gillnet trips and landings of North Carolina for each month in 1995 - 1999. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

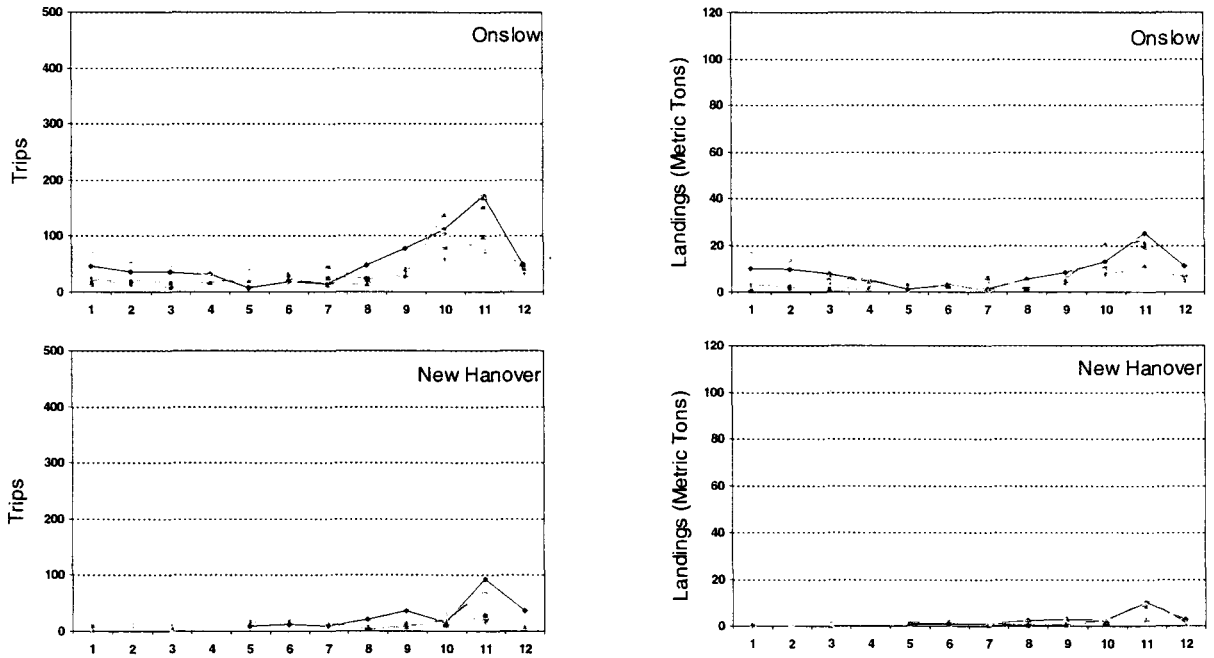
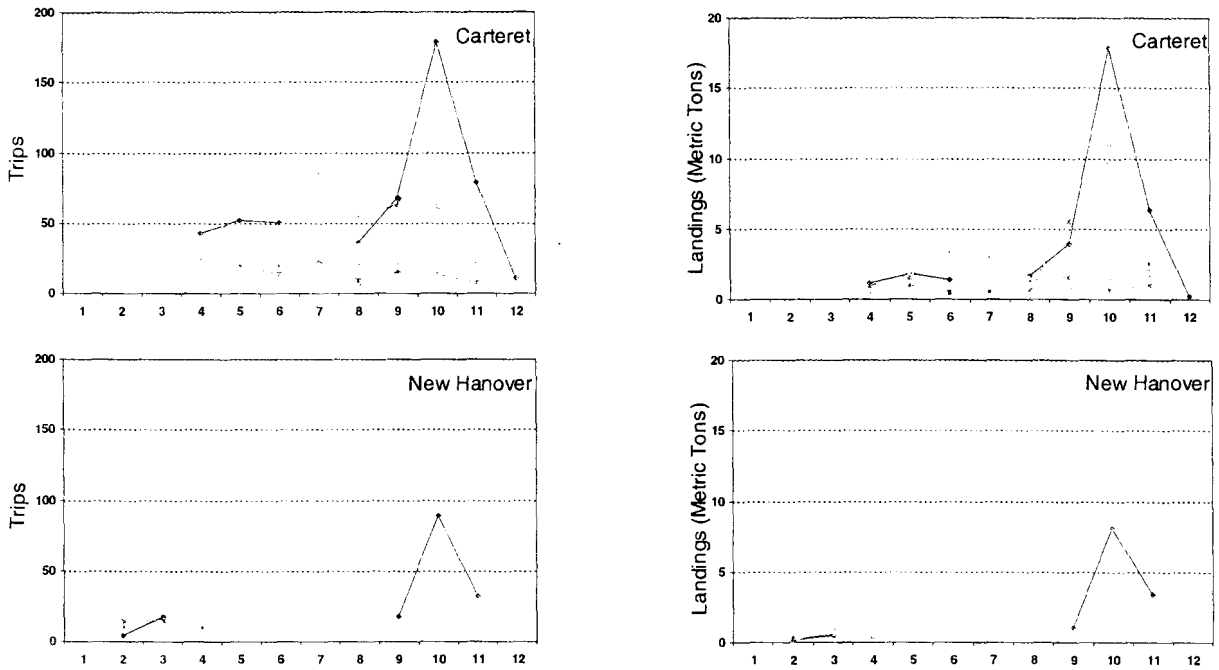


Figure 6 cont. Inshore runaround gillnet trips and landings of North Carolina for each month in 1995 - 1999. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

Appendix 5, cont'd:



Inshore drift gillnet trips and landings of North Carolina for each month in 1995 - 1999. This figure only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

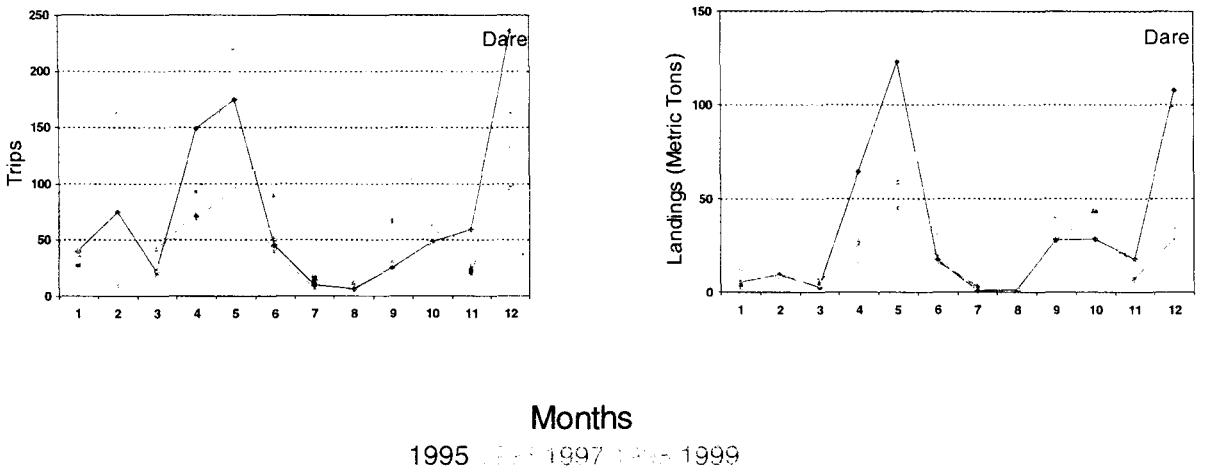


Figure 8 Beach seine trips and landings of Dare County, North Carolina for each month in 1995 - 1999. This figure includes the only county with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

Appendix 5, cont'd:

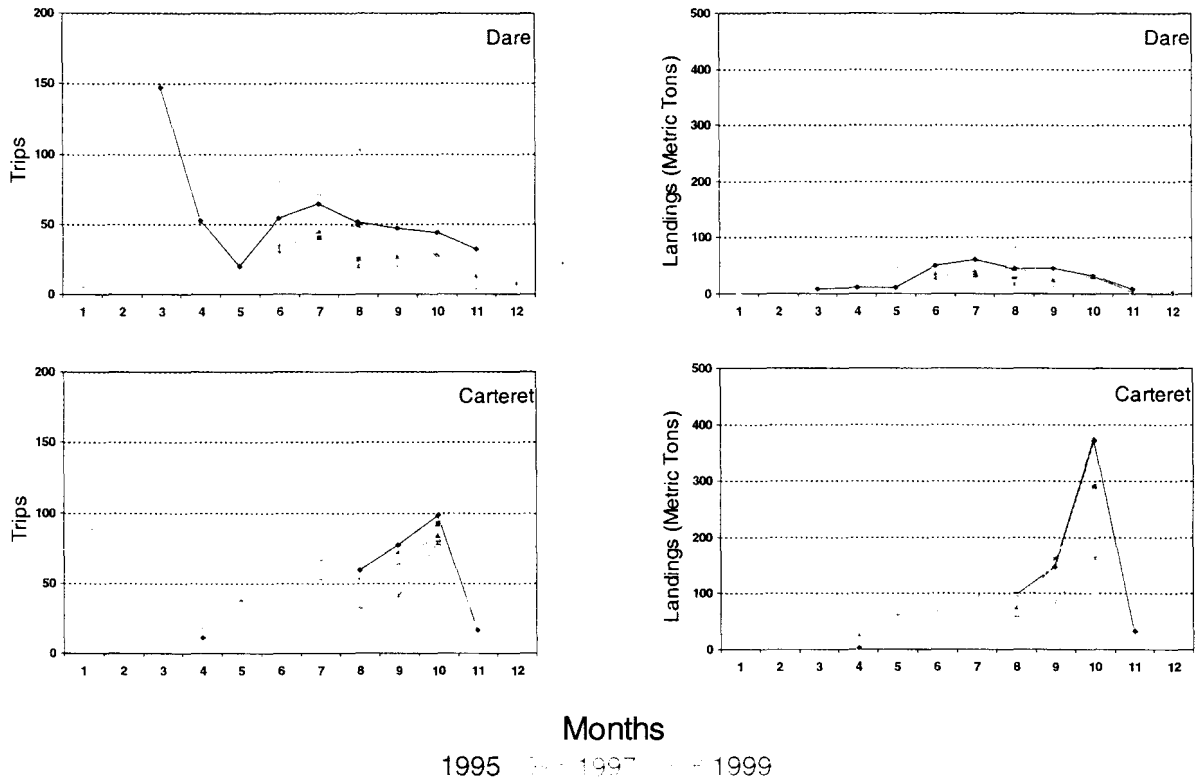


Figure 9 Long haul seine trips and landings of North Carolina for each month in 1995 - 1999. This figure includes only those counties with enough supporting data to graph. Data are provided by North Carolina Division of Marine Fisheries, Trip Ticket Program.

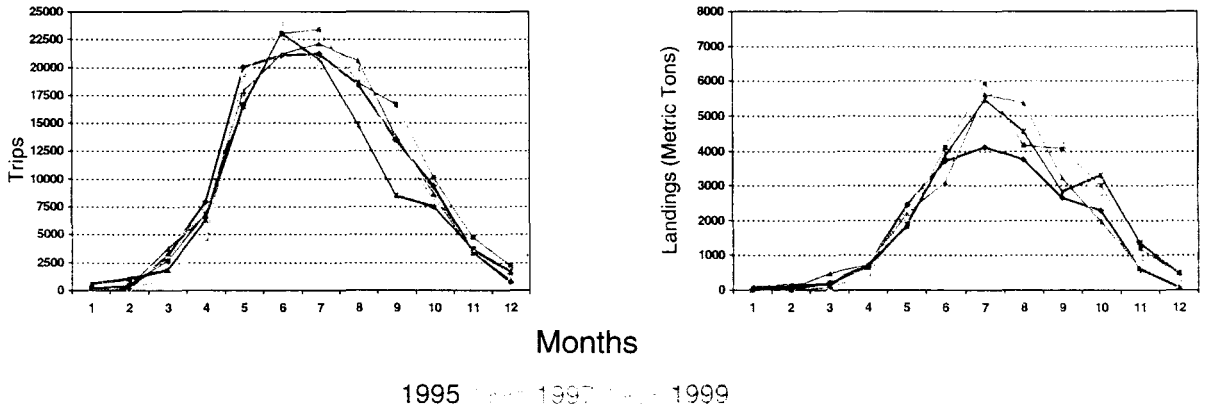


Figure 10. The monthly distribution of total crab pot trips and landings for all counties of North Carolina, from 1995 - 1999. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.

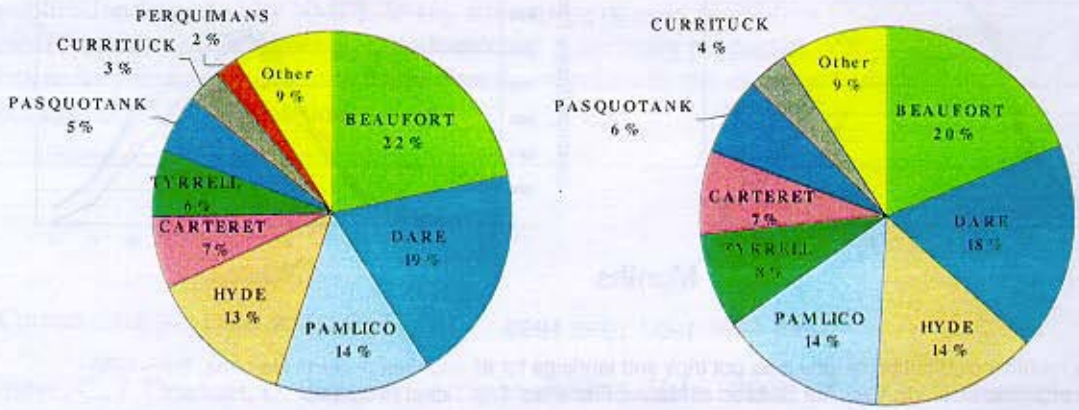


Figure 11. Percent crab pot trips and landings in North Carolina for 1995 - 1999 for each county where blue crabs are landed. Data are provided by North Carolina Division of Marine Fisheries' Trip Ticket Program.