DRAFT FOR PUBLIC COMMENT

Fishery Management Report

of the

Atlantic States Marine Fisheries Commission

Omnibus Amendment to the Interstate Fishery Management Plans For Spanish Mackerel, Spot, and Spotted Seatrout

Prepared for Public Comment
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DRAFT

Omnibus Amendment to the Interstate Fishery Management Plans for Spanish Mackerel, Spot, and Spotted Seatrout

(Spanish Mackerel Amendment 1, Spot Amendment 1, Spotted Seatrout Amendment 2)

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Draft Document for Public Comment.

AMENDMENT PROCESS AND PROPOSED TIMELINE

In October 2008, the South Atlantic State/Federal Fisheries Management Board initiated the development of an amendment to the Spanish Mackerel Fishery Management Plan. In August 2009, the Management Board decided to expand the amendment into an Omnibus Amendment to also revise the fishery management plans for spot and spotted seatrout. The diagram below depicts the amendment development process.

The public is encouraged to submit comments regarding the Omnibus Amendment. The final date that comments on the Draft Omnibus Amendment will be accepted is **July 20, 2011**. Comments may be submitted by mail, email, or fax. If you have any questions or would like to submit comment, please use the contact information below.

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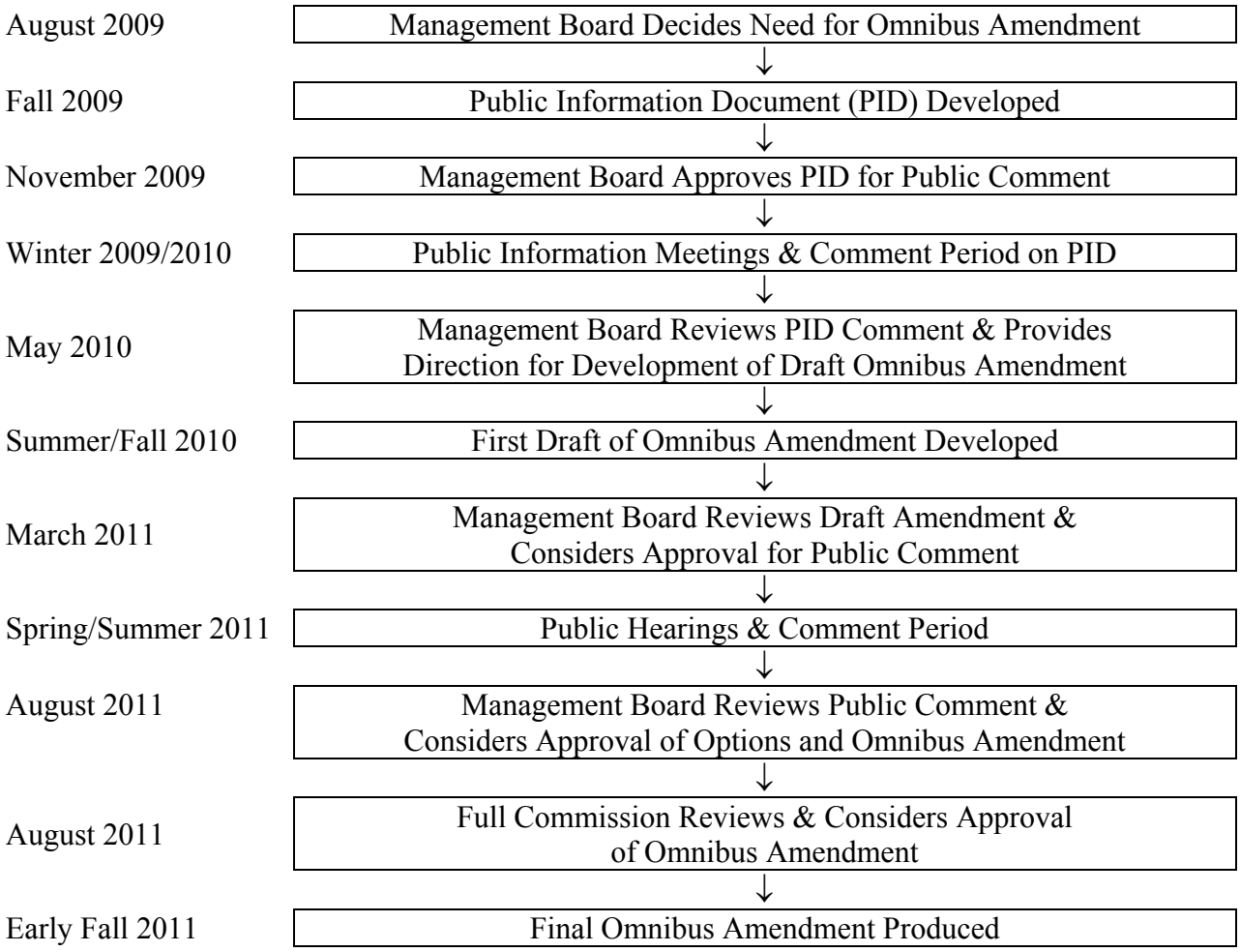

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1. INRODUCTION

1.1. Background Information

The primary purpose of managing Spanish mackerel, spot, and spotted seatrout stocks is to ensure that the resources can be utilized throughout their range by current and future generations of the fishing and non-fishing public. An additional purpose is to foster compatible management among the states that harvest these resources, and in the case of Spanish mackerel, between the states and the federal government.

The Spanish mackerel, spot, and spotted seatrout management programs function under the Atlantic States Marine Fisheries Commission's Interstate Fisheries Management Program (ISFMP), with immediate oversight by the South Atlantic State/Federal Fisheries Management Board.

The original Interstate Fishery Management Plans (FMPs) for Spanish mackerel, spot, and spotted seatrout were adopted in 1990, 1987, and 1984, respectively. Only voluntary measures are included. The FMPs identify few management measures for implementation, particularly for spot and spotted seatrout. Most of the recommendations for these two species relate to research and monitoring activities, because data to manage these species were inadequate.

In terms of regulatory measures, the Spot FMP recommends the use of bycatch reduction devices and increasing fishery selectivity to age-1 and older fish, and the Spotted Seatrout FMP recommends a 12" minimum size limit with comparable mesh size regulations in directed fisheries. This size limit corresponds to the length at which data indicated 50% of spotted seatrout females reach sexual maturity. In a later review of the Spot FMP, the Management Board found the recommendations to be vague and perhaps no longer valid, and recommended an amendment to define new management measures capable of achieving the goals of the FMP.

In comparison to spot and spotted seatrout, the Spanish Mackerel FMP included more regulatory recommendations. Because the FMP was designed to complement federal Spanish mackerel regulations in the South Atlantic Fishery Management Council's Coastal Migratory Pelagic Resources FMP, the FMP recommends regulations consistent with those in federal waters at the time of its adoption (1990). It also established a process to track federal regulations through an annual review and Board recommendation process; however, while the federal FMP has been amended numerous times since 1990, the Spanish Mackerel FMP has not been revised and the history of Management Board recommendations to the states is not well documented.

All measures in these three species' FMPS are recommended rather than required, because the FMPs were adopted prior to the enactment of the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA; 16 U.S.C. 5105-5108; Title VIII of Pub. L. 103-206, as amended). The ACFCMA was established in 1993 for the purpose of supporting and encouraging the development, implementation, and enforcement of effective interstate conservation and management of Atlantic coastal fishery resources. Enforcement of state compliance with mandatory plan provisions is carried out by the Secretary of Commerce, who has the authority to

declare a moratorium in a state's fishery if that state has not implemented and enforced the plan as required and if doing so is necessary for the conservation of the fishery in question.

Under the ACFCMA, the Atlantic States Marine Fisheries Commission (Commission or ASMFC) is responsible for:

- Preparing and adopting coastal FMPs to provide for the conservation of coastal fishery resources, in consultation with appropriate regional Fishery Management Councils,
- Specifying the requirements necessary for states to be compliant with the plan and identifying each state that is required to implement and enforce the plan,
- Reviewing, at least annually, each state's implementation and enforcement of the plan to determine whether each state is effectively implementing and enforcing the plan within established timeframes, and
- Notifying the Secretaries of Commerce and the Interior within 10 working days if it determines that a state is not compliant with the plan (and withdrawing any such determination immediately if the state implements the actions required).

In 1994, as a result of the ACFCMA, the Commission adopted an Interstate Fisheries Management Program (ISFMP) Charter to establish standards and procedures for the preparation and adoption of coastal fishery management plans (ASMFC 2009a). Once an FMP is amended to incorporate the standards and procedures in the ISFMP Charter, the ASMFC can also adopt management requirements that can be enforced through the ACFCMA.

1.2. Statement of the Problem

The ASMFC adopted the Spanish mackerel, spot, and spotted seatrout FMPs prior to the enactment of the ACFCMA and the adoption of its ISFMP Charter. The FMPs have not yet been amended to reflect the content of these two documents, and are thus inconsistent with Commission policies. State compliance with any management measures in these species' current or future management plans cannot be enforced through the ACFCMA until the plans are modified to incorporate the standards and procedures described in the ISFMP Charter.

Additionally, the Spanish Mackerel FMP was intended to achieve compatible management throughout the species range, including both state and federal waters. The management measures recommended in the Spanish Mackerel FMP for states are not consistent with current federal Spanish mackerel requirements. The FMP's mechanism to track and adopt regulations consistent with federal regulations is ineffective and the results undocumented.

1.2.1. Benefits of Implementation

1.2.1.1. Ecological Benefits

Spanish mackerel, spot, and spotted seatrout will benefit from the development of a management program in which states are required to promulgate management measures necessary for the conservation of the resources. Consistent management measures and goals across state lines, that have been updated to comply with the ACFCMA and the changes in the ISFMP Charter, will

provide better protection against depletion and a better future for the species and the fishing communities.

Further, should it be determined that a species does not currently need additional conservation measures, updating the plans with the provisions of the ACFCMA will permit more timely adoption of conservation measures in the event that they become necessary. Thus these changes will continue to provide enhanced ecological benefits to the species and their larger natural community.

1.2.1.2. Social and Economic Benefits

Setting up a management regime to insure long-term sustainability of Spanish mackerel, spot, and spotted seatrout will provide long-term economic opportunity in both the harvesting and processing sectors. Sustaining viable fisheries benefits fishing communities by helping maintain diversity in the targeted species and providing opportunities to harvest, process, and further develop support industries.

Revised management programs that are consistent with the Commission's standards and procedures will provide clear direction to states for implementing the management program. Management tools made available in the ISFMP Charter, such as means to apply for alternative management measures or exemptions to requirements, will provide flexibility to the states to manage resources within their jurisdiction.

In the case of Spanish mackerel, the state representatives will be able to consider and respond to changes in federal regulations in a much more timely and efficient manner. Consistent measures between state and federal waters simplify the regulatory framework for fishers and improve the enforceability of measures.

1.3. Description of the Resources

These brief resource descriptions are summarized from several reports referenced in this document and are intended to provide the reader with the basic information necessary to understand the life history, fisheries, and stock status of Spanish mackerel, spot, and spotted seatrout.

1.3.1. Life History

Spanish Mackerel

Spanish mackerel (*Scomberomorus maculates*) are restricted to the western Atlantic coast of the US and the Gulf of Mexico (Collette and Russo 1979, 1984). The majority of evidence supports the existence of separate Atlantic and eastern Gulf of Mexico stocks (SAFMC 2008). Although primarily used for convenience, the Dade/Monroe County, Florida boundary is used as a management and assessment boundary and serves as an opportune dividing line for the two proposed stocks (SAFMC 2008).

Gathered in large schools, Atlantic coast Spanish mackerel generally range from the Florida Keys to New York or southern New England, although occasional strays are found in the Gulf of Maine. They most commonly occur in state jurisdictional waters. These fish make seasonal migrations, wintering off Florida before moving to the Carolinas by April or May, to the Chesapeake Bay by May or June, and as far north as New England by July (Berrien and Finan 1977). Later in the year, as waters cool, Spanish mackerel return to warm Florida waters. They are known to pass very near to the beach on their seasonal migrations. Spanish mackerel prefer open water but are sometimes found over deep grass beds and reefs, as well as in shallow estuaries.

The spawning season of Spanish mackerel is progressively longer from north to south, primarily due to water temperature: roughly June through August in Chesapeake Bay, May through August off the Carolinas and Georgia, and April through September off Florida (SAFMC 2008). Peak spawning is thought to occur in June. Spawning appears to take place on the inner continental shelf.

Larvae grow quickly in their shallow, nearshore water habitat, generally reaching lengths of 11" to 16" fork length (FL) in a year (SAFMC 2008). This range in length at age is indicative of the wide range in individual fish growth rates. Some Spanish mackerel of age 0-5 can be found in the same length interval (Powell 1975, Fable et al. 1987, Schmidt and Collins 1989, SAFMC 2008). Additionally, growth varies between sexes; female Spanish mackerel grow faster and reach a larger size than males (Schmidt et al. 1993, SAFMC 2008).

Spanish mackerel mature quickly and sexual dimorphism is also apparent in maturity data, with males maturing younger and at smaller sizes. Data compiled for the 2008 stock assessment indicate that both males and females can become sexual maturity at age-0, but all males were mature at age 1, while females required a second year to reach 100 percent maturity (SAFMC 2008). Males reached 50 percent maturity at 9.4" FL, and females at 13.9" FL. Spanish mackerel rarely live to be older than five to eight years of age. A maximum age estimate of 12 years from Nobel et al. (1992) was used in the last Spanish mackerel stock assessment (SAFMC 2008).

More information of the life history of Spanish mackerel is available in ASMFC (1990) and SAFMC (2008).

Spot

Spot (*Leiostomus xanthurus*) range from the Gulf of Maine to the Bay of Campeche, Mexico in estuarine and coastal waters to depths of at least 205 m (Bigelow and Schroeder 1953; Dawson 1958; Springer and Bullis 1956). On the Atlantic coast of the United States, the area of greatest abundance and center of the commercial fishery on the Atlantic Coast extends from Chesapeake Bay to South Carolina (ASMFC 2010b).

Adult spot migrate seasonally between estuarine and coastal waters. They enter bays and sounds during spring, but seldom occur as far up-estuary as do the young. Spot often segregate by size in estuarine habitats; larger fish are typically found in deeper water (Hales and Van Den Avyle 1989). They remain in these areas until late summer or fall before moving offshore to spawn or escape low water temperature (Hildebrand and Schroeder 1928; Roelofs 1951; Dawson 1958;

Hoese 1973). Adults are generally present in the Chesapeake Bay from April through October, exhibit movement out of the Bay from August to October, and are present off Cape Hatteras, North Carolina during the winter (Pacheco 1962a; Pearson 1932).

Spot are a late fall to early spring spawner; spawning occurs from October—March off the Chesapeake Bay, North Carolina and South Carolina, with peak spawning in December and January, and October—April off Georgia (Colton et al. 1979; Warlen and Chester 1985; Dawson 1958). Spawning is believed to occur in offshore waters based on migrations of maturing fish, collection of ripe fish, and distribution of larvae (ASMFC 2010b). Spot, like all of the Sciaendae, are batch spawners.

Spot larvae emigrate from the offshore spawning area to nursery habitat in winter and early spring. Larvae will enter the estuary segregated by age; younger and smaller larvae will immigrate at the beginning and end of the immigration period (Warlen and Chester 1985). The young-of-year spot are largely resident in the nursery habitat for the duration of warm weather, but as temperature drops in the fall, they emigrate to deeper estuarine waters or the ocean (Weinstein and O'Neil 1986).

Growth of spot is very rapid. An average of 84% of the cumulative growth of spot occurs within the first year, and 99% occurs by the end of the second year (Piner and Jones 2004). Spot average about 8" at age-1 and 9" at age-2, after which growth in length in limited. The spot is a short-lived species, rarely attaining a maximum age of six years (NCDMF 2005). Fish older than age 4 are rare to catch. The maximum size and lifespan of spot appears to be greater on the Atlantic coast north of South Carolina.

Recent histological data indicate that spot can begin to mature before reaching one year in age, with 50% maturity for both males and females occurring between age one and two. Males reach 100% maturity by age 2 and females by age 3 (ASMFC 2010b). Males generally mature at a smaller size.

More information of the life history of spot is available in ASMFC (2010b).

Spotted Seatrout

On the Atlantic coast, spotted seatrout (*Cynoscion nebulosus*) occur from Cape Cod to the Florida Keys, but are most abundant from the Chesapeake Bay southward. Distinct regional stocks may exist throughout the Atlantic Coast; however, these have only been confirmed along Florida's Atlantic Coast (Murphy et al. 2006), and for stocks from Virginia's Chesapeake Bay (Wiley et al 2003).

Spotted seatrout make seasonal movements within the estuarine and coastal zones based on climatic conditions and reproductive and feeding behaviors. In general, spotted seatrout appear to be non-migratory and spend their entire life within five to ten miles of their natal estuary, although spotted seatrout in the northern portion of their range (Virginia /North Carolina) may be exceptions as evidenced by tagging data (J. Lucy, Virginia Institute of Marine Science, personal communication; T. Ellis, North Carolina State University, personal communication).

Spotted seatrout have a protracted spawning season typically occurring April to September, depending on region. Peak spawning activity generally occurs around the full moon on or near seagrass beds, sandy banks, natural sand, shell reefs, near the mouths of inlets, and off the beach (Murphy et al. 1999; Tucker and Faulkner 1987; McMichael and Peters 1989; Daniel 1988; Brown-Peterson et al. 2002). During the peak of the season, older spotted seatrout (> 3 years old) spawn every two days while younger spotted seatrout (ages 0 and 1) spawn every 4 days (Murphy et al. 2006). Estimates of fecundity for spotted seatrout range from 3 to 20 million ova per year depending on age, length, water temperature (Murphy et al. 1999; Nieland et al., 2002; Roumillat and Brouwer, 2004).

Spotted seatrout mature at an early age and have fast growth rates that begin to decrease with age. They begin to mature in their second year of life (age 1) at approximately 10 inches long for males and approximately 11 inches for females. All fish are mature by the third year (age 2). They may live as long as 18 years, but individuals over five years of age are rare.

The larvae use tidal flows to migrate into estuaries (Perret et al. 1980), where they settle in seagrass beds, shallow bays, and backwater creeks (McMichael and Peters 1989). The fry gather in schools during their first summer and tend to travel together until they are four or five years old. Young-of-year spotted seatrout utilize small upper estuarine tidal creeks as nursery habitat. At approximately 6-8 inches, juveniles recruit to larger tributary and lower estuary habitats.

When the waters cool during the winter, juveniles migrate to deeper, warmer water. However, if winter temperatures are severe, particularly a large drop in temperature over a short period of time, then winter mortality may occur. Cold stun events have been documented in South Carolina (de Silva unpublished), Florida (Johnson and Seaman 1986), the Gulf of Mexico (Perret et al. 1980), and North Carolina (Jensen 2009). After winter, seatrout migrate to oyster bars and shallow bays.

1.3.2. Stock Assessment Summary

Spanish Mackerel

The most recent stock assessment was completed in 2008 through the SouthEast Data, Assessment, and Review (SEDAR) process (SAFMC 2008). The input data (through 2007) were applied to four models, with a statistical catch at age model being the primary model. The Review Panel concluded that the statistical catch at age model could be used to determine if overfishing is occurring, but that it could not provide annual estimates of fishing mortality or biomass or be used to determine if the stock is overfished. This conclusion was based on the degree of uncertainty in the input data (i.e., historical recreational catch and bycatch in shrimp fisheries), sensitivity to model assumptions (e.g., uncertainty about how much importance to place on different sources of information), and lack of fishery-independent indices of adult population size. None of the other three models was deemed adequate or appropriate as a standalone stock assessment model.

Spot

In the past, no coastwide assessment was performed for spot due largely to data inadequacies, the species' short lifecycle, and a perception of healthy stock status based on high landings over the

long-term. However, with a decline in coastwide landings, the Commission has recently been more involved in monitoring the stock. Beginning in 2007, the Spot Plan Review Team (PRT) compiled and analyzed available fishery-dependent and fishery-independent data from the species' core area (Maryland–South Carolina) to develop relative spot abundance indices (ASMFC 2007, 2008, 2009b, 2010a). In 2010, the Commission also developed a life history report that could provide necessary data for a stock assessment (ASMFC 2010b).

The availability of data for an assessment has also been assessed, with the analysis indicating that a stock assessment would likely be possible using some of the less complex assessment methodologies, if adequate discard estimates could be produced. However, there is little to no monitoring of the South Atlantic shrimp trawl fishery, as well as several other state fisheries, which incidentally catch spot, so the PRT has not recommended that a stock assessment be initiated.

Spotted Seatrout

A coastwide stock assessment of spotted seatrout has not been conducted given the largely non-migratory nature of the species and the lack of data on migration where it does occur. North Carolina, South Carolina, Georgia, and Florida have performed age-structured analyses on local stocks of spotted seatrout. Only the North Carolina and Florida assessments are used for making management decisions in those states, due to data limitations in the South Carolina and Georgia assessments that made their results unreliable. The North Carolina assessment included data through 2008, and was peer reviewed by an external review panel (Jenson 2009), and the Florida assessment used data through 2005 (Murphy 2006).

1.3.3. Stock Status

Spanish Mackerel

Spanish mackerel is not experiencing overfishing; the overfished status is unknown (SAFMC 2008). General trends in the assessment results show that fishing mortality increased from the late 1970s through 1991, resulting in biomass decline, but then fishing mortality declined and biomass has increased in recent years (**Figure 1, Figure 2).** Fishery-dependent data indicate an increasing biomass trend as well, except for the last four years that show a decline. The current fishing mortality does not seem to be inhibiting stock growth.

Spot

The overfishing and overfished status of spot is unknown. Relative abundance indices show mixed results; however, the Spot PRT noted its concern about the status of the resource because of multiple declining trends and the fact that spot is a relatively short lived species, meaning that their abundance can change rapidly given poor environmental conditions amidst high fishing pressure (ASMFC 2009b). The most recent stock monitoring report from the PRT stated the following (ASMFC 2010a):

> "Coastwide commercial landings have declined since 1950. Commercial harvest-per-unit-effort is generally stable or declining in the two states with the largest landings. Increases in 2009 are not expected to persist due to poor recruitment in 2009. The commercial catch-at-age data, which showed an expansion of the age structure in the

> early 2000s, has contracted the last several years. Length-at-age and weight-at-age have decreased for ages 1-3 spot. Distribution of citations for recreational catch of spot has decreased the last several years, which supports the trend of reduced availability of older spot. Recruitment indices show great inter-annual variability as expected, but those with longer time series exhibit a decline in the magnitude of peaks over time. All juvenile abundance indices reviewed showed poor production in 2009. Most indices of adult spot in the species core area are also either stable or declining."

Spotted Seatrout

Coastwide, the overfishing and overfished status of spotted seatrout is unknown. A 2006 assessment in Florida and a 2009 assessment in North Carolina provide contrasting reports on the status of spotted seatrout in their jurisdictions (Murphy et al. 2006; Jensen 2009).

The 2006 Florida assessment examined spotted seatrout in Florida by four regions (Northeast, Southeast, Southwest, and Northwest). Estimates for transitional spawning potential ratio in 2005 for spotted seatrout in each region exceeded the Commission's target of 35% (Murphy et al. 2006). Thus, management measures put in place in this fishery have been successful. However, the number of directed trips for spotted seatrout has increased in all regions, and the state of Florida plans to carefully monitor fishing effort for further increases that could put pressure on the regional stocks.

The 2009 North Carolina spotted seatrout stock assessment considered North Carolina and Virginia one unit stock. Consistent with a current ASMFC management objective, the spotted seatrout fishery in North Carolina is considered to be undergoing overfishing when the SPR is below 20 percent. The 2009 North Carolina spotted seatrout stock assessment indicated that the stock has been overfished and that overfishing has been occurring throughout the entire 18-year time series [1991-2008 (Jensen 2009)]. The current fishing mortality rate (F) in North Carolina is more than twice the rate allowable to assure a sustainable harvest. In North Carolina, much of the overfishing has been in recent years when recreational fishing effort and number of discards have increased. Managers should be concerned with the increasing effort in the recreational fishery because the recreational fishery selects for smaller, younger fish, reducing the opportunity for young spotted seatrout to spawn prior to being harvested (Jensen 2009).

A 1997 Georgia assessment found that fishing mortality needed to be reduced to meet the 20% SPR goal, resulting in a one inch increase to the 12-inch minimum size limit and a 10-fish reduction from the 25fish creel limit (Zhao *et al*. 1997). A more recent (2002) Georgia assessment found evidence that the stock was overfished; however, the report indicated that the estimates of SPR were unreliable due to data deficiencies and changing methodology (Foster, unpublished).

1.4. Description of the Fisheries

1.4.1. Commercial Fishery

Spanish Mackerel

Since 1950 an average 3.8 million pounds of Spanish mackerel have been landed commercially from the East Coast. During this time, the landings have remained relatively stable with one large peak from 1975 through 1983 and with a smaller peak in the late 1950s (Figure **3**). Coast wide landings have ranged from 1.9 million pounds in 1967 to 11 million pounds in 1977. From 1950 to present, the east coast of Florida accounts for the largest portion of the commercial Spanish mackerel landings, averaging 3.4 million pounds a year (88.8%), followed by North Carolina (294,000 pounds, 7.6%) and Virginia (105,000 pounds, 2.8%). Even though over 99% of the commercial landings were from Florida, North Carolina, and Virginia, Spanish mackerel have been commercially landed in Connecticut, Delaware, Georgia, Massachusetts, Maryland, Maine, New Jersey, New York, Rhode Island, and South Carolina (**Table 1**).

Most commercially harvested Spanish mackerel are caught using gill and cast nets and the use of these gears has been nearly equal over that last ten years. From 2000 to 2009, the average annual harvest of Spanish mackerel by gill and cast nets was 2.5 million pounds, comprising 85 percent of the harvest. In addition to gill and cast nets, Spanish mackerel are harvested with fixed nets, haul seines, hook and line, and trawls (Table **2**).

Nominally, the dockside value of the commercial Atlantic coast Spanish mackerel harvest has ranged from a low of $166,000 in 1967 to a high of $3.2 million in 2007 (1962-2009, Table **2**). Annual coast wide value has been above $2 million since 2004. However, after adjusting dockside landings for inflation and adjusting to 2010 U.S. dollars, we find that 1987 is the low point at $695,000, and 1977 was the peak value at $7.3 million (Figure **4**). The average price per pound of Spanish mackerel from 1962 through 2009 was $1.05, however, the average price per pound from 2000-2009 is $1.38, an increase of more than $0.30 (Figure **4**). The highest average annual price per pound was observed in New York in 2008 and was $2.80. The average price per pound is higher in the northern part of the fishery. In the same year the price per pound in Florida was $0.82 (Table **3**).

Spot

Spot has been landed commercially in all coastal states from Massachusetts to Florida at some point between 1950 and 2009, with the overall trend in landings decreasing over that time period (Figure **5**). Historically, the bulk of the landings have come from five states (VA, NC, SC, FL, and MD) accounting for 99.1% of total landings over the last 60 years, with the majority of that total coming from Virginia (37.9%) and North Carolina (36.3%). Massachusetts and Rhode Island only reported three years of landings between the two states (Table **4**). Georgia had regularly reported landings from 1950 through 1981, but only had four years of reported landings after 1981. New York also had sporadic landings over the entire time period, but did have landings covering 19 years with 10 of those years occurring since 1993. Maryland, Virginia, South Carolina, and Florida were the only states that had reported landings every year for the entire time period. Delaware reported landings during the majority of years but were missing landings from 1961-1974 (with the exception of 500 lbs in 1963). Virginia and North Carolina

annual landings were regularly over 1 million lbs per year for the entire time period. South Carolina had annual landings regularly in excess of 1 million lbs from 1951 through 1976 but has been significantly less since then. Florida also had regular annual landings in excess of a million lbs from 1959 through 1994. The decreases in landings in both of these states were likely due to increasingly restrictive management regulations on commercial gear (particularly nets) in state jurisdictional waters. Over the last ten years, the bulk of the landings (98.6%) have come from Virginia (61.0%), North Carolina (34.0%) and Maryland (3.6%). Three states (MA, RI, and GA) had no reported commercial landings during 2000 – 2009.

Commercial landings for spot on the Atlantic coast varied with peaks of 14.5 million lbs (1952) and 12.7 million lbs (1975) to lows of 2.86-3.13 million pounds in recent years (2008 and 2006 respectively) (Figure **5**). Spot landings showed an overall decline from the early 1950s to the mid 1960's followed by an increasing trend through the mid 1970s after which the fishery has shown a steady decline since 1982. Commercial spot landings have only risen above the long term mean for the entire time series (7.5 million lbs) twice since 1982 (1987 and 1994). To a large extent, landings have been driven by four states (VA, NC, FL, SC), with Virginia and North Carolina having annual mean landings of 2.86 ± 0.169 and 2.83± 0.199 million lbs respectively, while Florida and South Carolina had mean annual landings approximately one third those of Virginia and North Carolina (FL = 0.851 ± 0.104 and SC = 0.857 ± 0.140 million lbs). The remaining states all had lower mean landings owing to either significantly lower landings or years with no reported landings. Overall landings trends by state indicated a consistent decrease in landings since the mid 1980s for both the Carolinas and Florida. A portion of the decline in commercial landings in South Carolina and Florida can likely be attributed to gear restrictions in inshore waters instituted in the late 80s and early 90s, while the decrease in North Carolina may be attributed to a combination of poor recruitment in recent years with a contraction in the age structure and a decrease in length and weight at age for 1-3 year old spot (see Section 1.3.3 above).

By region, South Atlantic (SC – FL) landings have declined much more than Mid Atlantic (NY – NC) landings (Figure **6**). Haul seines, gill nets, pound nets, and trawls accounted for approximately 93% of all landings. The annual contributions by fixed nets and trawls have remained relatively consistent throughout the entire time period. From 1950 to the mid 1980s haul seines accounted for the greatest portion of landings followed by gill nets. This trend reverses in the mid-1980s with gill nets accounting for the greatest portion of the landings (Table **5).**

The dockside value of commercial spot harvest ranged from a low of $531,473 in 1969 to a high of $4,228,468 in 2007 (**Figure 7**). Annual coast wide landings value stayed below $1 million prior to 1970, and has consistently remained above $2 million since 1986. The time period with the highest landings values occurred in the 1970's with a decade cumulative value of $91.3 million, with decadal values afterwards ranging from $20-30 million. The price per pound for spot from the raw data ranged from a low of $.08 (1962) to a high of $0.91 (2006) and the overall trend appeared to be an increase in the wholesale ex-vessel price over time (**Figure 7**). However, when prices were adjusted for inflation, peaks in price per pound occurred in 1965 and 1969 with a general decline in price through 1992, at which point wholesale price began to increase again until reaching the peak value in the series of $0.97 in 2006. The 1960's and the

2000's had the highest mean decadal prices ($0.67 and $0.65 respectively), while the overall wholesale price remained relatively stable from 1970 through 1999 ranging from $0.51- $0.59 per pound.

Spotted Seatrout

Spotted seatrout is a relatively low-volume commercial fishery. Atlantic coast commercial landings of spotted seatrout (1950-2009) ranged from 164,350 pounds (2001) to 2.3 million pounds (1952) from 1950 to 2009 (Figure **8**). Total coastwide commercial landings of spotted seatrout averaged 1.8 million pounds during the 1950's, and were sustained at or above the 1 million pound level during most of the 1960's and 1970's. Since 1977, commercial landings have remained below 1 million pounds. Coastwide landings for 2001 to 2005 averaged 202,799 pounds, but increased in the last four years to 409,435 pounds. Prior to 1990, the majority of commercial landings were reported from the east coast of Florida. Since 1990, the majority of commercial landings have been reported from North Carolina. The sharp decline in Florida's commercial landings of spotted seatrout observed since 1995 coincided with the implementation of the entangling net restrictions enacted in July 1995 and the restrictive vessel limits, open season, and size limits enacted in January 1996 (Murphy et al., 2006). Since the harvest restrictions in the Florida spotted seatrout fishery, no other state has reported landings close to the landings observed in North Carolina. From 1996 to 2009, an average of 77% of the commercial landings was from North Carolina. In 2009, 83% of the landings were reported to be from North Carolina, while Virginia and the east coast of Florida were responsible for only 12% and 6% of commercial landings, respectively. Landings from states north of Maryland are minimal and inconsistently landed from year to year.

Variability in annual catch has been common for this species and seemed to parallel the climatic conditions of the preceding spring and winter, i.e., low catches following severe winters. The large decline from 1976 to 1978 may have resulted from high mortalities caused by extremely cold winter temperatures in 1976 and 1977 (Merriner 1980), and North Carolina reported that cold stun events influenced the decreased landings in 1996, 2000, 2001 and 2003 (Jensen 2009).

Trends in value parallel fluctuations in landings. For those years when the value of landings is available, the dockside value of the Atlantic coast spotted seatrout commercial harvest has ranged from a low of $211,072 in 1967 to a high of $962,403 in 1995 (**Table 6**, **Figure 9)**. In terms of value, the fishery clearly had a high point in the nineties, with landings sometimes nearing or exceeding $800,000, followed by declines to less than $300,000 from 2001 to 2005. Values have increased in more recent years (2006-2009) to near or exceeding $400,000.

In North Carolina, the real price for spotted seatrout has not moved appreciably over the past 35 years, although it has kept up with inflation and has risen to over $1.50 per pound since 2003 (NCDMF 2010). The consistent ex-vessel price of the fish, when compared to the drastic swings in the supply over the decades, indicates a relatively inelastic demand curve and the likely presence of acceptable substitutes to consumers (NCDMF 2010).

Spotted seatrout have been commercially harvested coastwide using a variety of gears, but gill nets and haul seines were the predominant gear (Table **9**). Historically, haul seines were an important gear, but landings by this gear have diminished in recent years (2000-2009). Other

gears that accounted for a minor portion of the landings included pound nets, gigs, rakes, pots, trawls, rod and reel, spears and long lines.

1.4.2. Recreational Fishery

Spanish Mackerel

Between 1981 and 2009 annual average recreational landings (in numbers) of Spanish mackerel amounted to 1.0 million fish. Landings in this time period ranged from a minimum of 129,000 fish in 1983 to a maximum of 1.7 million fish in 1988 (

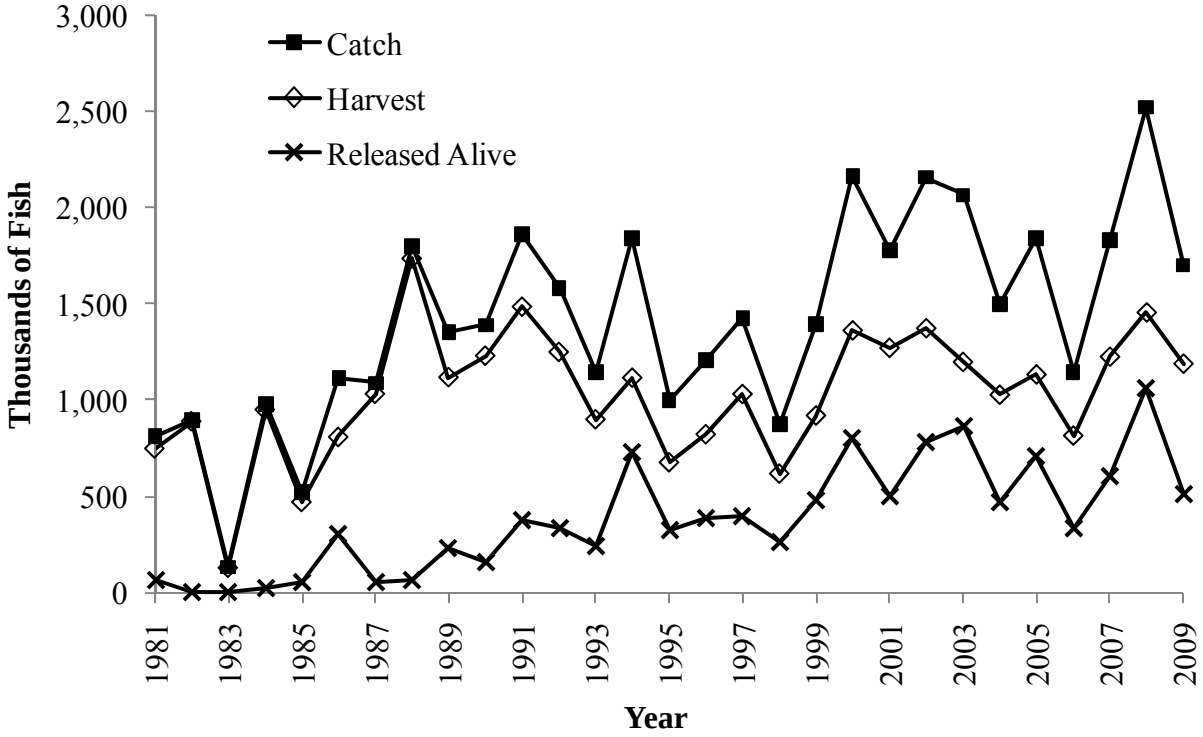

Figure **10**, **Table 7**). The annual catch of Spanish mackerel since 1989 has been stable with Florida and North Carolina caught fish dominating the catch. From 2000 through 2009, Florida and North Carolina comprised 91% of the recreational catch (in numbers) of Spanish mackerel along the Atlantic Coast with 51% being landed from waters off Florida. The recreational catch of Spanish mackerel is mostly centered in the south and large catches are observed in every southern state up to Maryland. North of Maryland Spanish mackerel harvests are mostly negligible and sporadic.

Spot

Annual harvest landings (A + B1) for the recreational spot fishery on the Atlantic coast have ranged between 5-20 million fish per year between 1981 and 2009 (Figure **11**), with four states (VA, MD, NC, SC) accounting for greater than 80% of total harvest for all years (**Table 8**). Landings from states north of Maryland were either sporadic (NY, NJ) or consistently low (DE) over the years. With the exception of three years (1981, 1983, and 1985), practically the entire spot harvest occurred in state territorial waters (inshore and < 3miles). There was an overall declining trend in harvest from 1986 through 1999, then an increasing trend from 2000 through 2007, and then a recent decline over the last two years. The overall trend for the entire time

period is a general decline in harvest landings. Regionally, the general decline from the mid-1980s was seen in both the mid Atlantic (NY - NC) and the south Atlantic (SC – FL); however, the general increase in harvest beginning in 1999-2000 was driven by increased landings in the mid Atlantic, particularly MD, VA, and NC (Figure **12**). The south Atlantic landings were variable during this time and increased slightly but remained at or below the long term mean for the region (4.5 million fish per year).

The relative abundance of spot in recreational landings (numbers of fish caught per trip) has shown a similar decreasing trend since 1981 as seen in the commercial landings (NMFS/MRFSS, 2009). Both the mid Atlantic and south Atlantic had this declining trend, although the mid Atlantic did show an increase in catch effort from 2001 to 2007 before declining again (**Figure 13**). Spot were the number one ranked species (in terms of catch number) of Sciaenidae for both the mid-Atlantic and south Atlantic coasts in 16 of the 28 years since 1981 and were ranked second in the remaining 12 years. The longest time period in which spot were not the number one ranked Sciaenidae species occurred in recent years, from 1996 to 2005, when they were surpassed by Atlantic Croaker (*Micropogonia undulates*). The reason for the decline in both commercial landings and recreational CPUE (particularly in the southeast Atlantic) is not immediately evident. A comprehensive examination of the population structure coupled with data on the size, age and sex structure of spot from the southeast Atlantic coast could answer this question as well as provide timely and valuable data necessary for stock assessments and future effective management of this resource.

Spotted Seatrout

Over the last 27 years, the recreational catch of spotted seatrout has shown a continual upward trend, increasing from 1.1 million fish in 1981 to a high of 8.1 million fish in 2007. Since 2007 there has been a slight decline in recreational catch with 6.7 million fish caught in 2008 and 5.5 million fish in 2009 (Figure **14**). The recreational harvest of spotted seatrout continues to fluctuate without trend around its average of 1.3 million fish (Figure **14**). In 2009, recreational harvest was approximately 1.4 million fish (2.0 million pounds), a decrease from 1.6 million fish (2.5 million pounds) in 2008 (**Table 9**). Due in part to recreational size and creel limits; the percentage of caught fish being released continues to be approximately 75-80 percent of the catch since 2000. Along the Atlantic Coast, three states are responsible for harvesting 79 % of the recreational spotted seatrout harvest since 1991. In 2009, the east coast of Florida, Georgia, and North Carolina are respectively responsible for harvesting 32%, 24%, and 26% of all Atlantic Coast recreationally-landed spotted seatrout. The remaining number of fish were landed by anglers in South Carolina (11%), Virginia (7%), Maryland (less than 0.5%), and Delaware (less than 0.5%). Recreational catches are generally made with rod and reel, but some are taken by recreational nets and by gigging, where these methods are permitted. Most recreational fishing is conducted from private boats and the majority of the catch is taken in inland waters.

1.4.3. Subsistence Fishery

Subsistence fishing is often described as catching fish in order to provide necessary food. Fishing can provide a less expensive alternative to purchasing food. The data describing the exact magnitude of subsistence fishing for Spanish mackerel, spot and spotted seatrout were not available at the time this Amendment was developed. However, anecdotal information indicates

that fishermen, usually fishing from shore, do rely to some degree on fish they catch for food. It is likely these fishers target all three species, although in different levels, and if caught, they would be kept for food.

1.4.4. Non-Consumptive Factors

Spanish Mackerel

The MRFSS estimates of Spanish mackerel released alive from the Atlantic coast have generally increased (

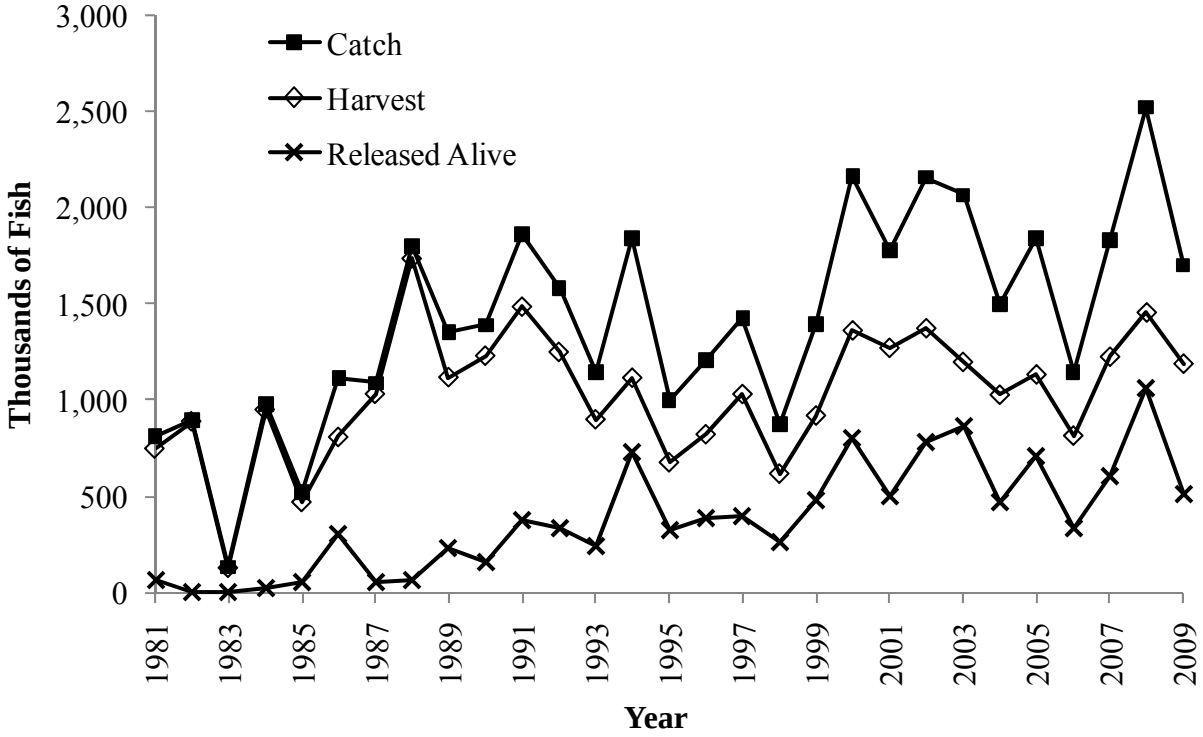

Figure **10**). A ratio of the number of Spanish mackerel harvested versus released reveals a shift to more fish being released in recent years (Figure **15**). From 1994 through 2009 all values were less than three, from 1981 to 1994, only one value was less than three and there was much more variability in this earlier time frame. The increase in recreational releases would have a corresponding increase in discard mortality. This shift could indicate recreational anglers are being more selective, are practicing catch and release fishing, or having higher incidental catch due to larger stock sizes, or a combination of these factors. The increase in abundance could lead to higher number of releases as fishermen continue fishing after having filled their need to keep fish for consumption.

Spot

The ACCSP estimates of spot caught and released alive (B2s) from the Atlantic coast has generally decreased over time, with clear declines from 1981 to 1989 and from 1992 through 2003, after which levels began to increase (Figure **11**). The ratio of the number of spot harvested versus the number released revealed differing trends regionally (Figure **16**). The ratio for the mid Atlantic region had a decreasing trend in the number of spot released relative to the harvest. In the south Atlantic region, the ratio was variable from year to year but stayed relatively consistent

between a value of 1 and 3. Positive values for the ratios overall indicated that the number of harvested spot was always consistently higher (by a factor of two or more) than the number of B2s. A portion of the spot released as B2s undoubtedly suffered discard mortality, but there is little or no data to indicate the level of mortality or possible effects on the stock in general.

Spotted Seatrout

Spotted seatrout are discarded (released alive) for a variety of reasons including catch under the legal size limit, over the creel limit, or conservative catch and release practices. MRFSS provides estimates of discards and identifies the disposition of fish released. Approximately 88% of discards are released because of the minimum size limit (NCDMF 2010).

The MRFSS estimates of spotted seatrout released alive from the Atlantic coast have increased over the time series, peaking at 6.5 million fish in 2007 (**Figure 14**). Since then, the number of fish released alive has declined, reaching 4.1 million fish in 2009. Given the generally flat trend in landings and the increasing trend in alive releases, the ratio of harvest to released spotted seatrout has declined over time, averaging 1 harvested to every three released fish over the past ten years (**Figure 17**).

For fishermen targeting spotted seatrout, increases in abundance and/or increases in size limits and/or decreases in bag limits could lead to higher numbers of releases as fishermen continue fishing after catching the legal limit.

1.4.5. Interactions with Other Fisheries, Species, or Users

Spanish Mackerel

Spanish mackerel are important prey for the bottlenose dolphin *Tursiops truncatus* and sharks such as the dusky shark *Carcharinus obscurus*, smooth hammerhead *Sphyrna zygaena*, bull shark *Carcharinus leucas*, porbeagle *Lamna nasus*, and tiger shark *Galeocerdo cuvieri* (Bigelow and Schroeder 1948; Kemp 1949; Lukens 1989). In addition to being important prey species for dolphins and sharks, the Spanish mackerel fishery has a history of interacting with both bottlenose dolphins and sharks. There are many documented observations as well as anecdotal observations of dolphins and sharks feeding on Spanish mackerel entangled in gill nets and causing damage to the nets or completely destroying them (Lukens 1989; Northridge, 1991).

Spanish mackerel are schooling fish that prey primarily on fishes in the Cluepeidae and Carangidae families, followed by panaeid shrimp and squid (Saloman and Naughton 1983). As water temperatures increase the schools migrate north along the Atlantic Coast from Florida to as far north as Rhode Island and then return south in the fall (Collette 1983, Lukens 1989). This behavior can make them susceptible to interactions with the shrimp fishery. Harris and Dean (1998) observed shrimps trawl trips off South Carolina captured Spanish mackerel on 41% of the tows (Harris and Dean 1998) and Andrews (NMFS 2008) estimated the average annual number of Spanish mackerel caught in shrimp trawls in the South Atlantic to range from 115,000 to 7,000,000 between 1998 and 2007.

Spot

Spot make up a major component of shrimp-trawl bycatch in the Atlantic shrimp fishery, and the magnitude of removals due to this fishery is highly uncertain. Previous studies of shrimp trawl fisheries by-catch have found that spot could account for as much as 80% of the catch by weight and 60% of the catch by number, depending on the area of coast (Peuser 1996). The fish taken in these trawls are generally small and represent only one or two age classes (Peuser 1996). The exact rates of by-catch mortality are difficult to determine but it is generally accepted to be high for spot. The effects of bycatch mortality from the shrimp trawl fishery have been shown to affect the adult population in other species such as Atlantic croaker (Diamond et al. 1999). These population level effects in the south Atlantic included declines in abundance, size at maturity, reduction in the length frequency distribution, modal lengths, and maximum lengths (Diamond et al. 1999; Diamond et al. 2000). It is not presently known what population effects the shrimp trawl fishery may be having on spot on the Atlantic coast.

In addition to the spot's importance as a fishery resource, they are a major component of estuarine fish assemblages throughout the southeast coast, and as such play a vital role in the ecosystem. Spot are one of the dominant prey items of higher level predators such as recreationally valuable fishes (spotted seatrout, red drum, and striped bass) (Walter & Austin 2003; Craig et al. 2006; Overton et al. 2008), marine mammals (Atlantic bottlenose dolphin) (Mead & Porter 1990; Barros & Wells 1998; Gannon & Waples 2004; Recks & Seaborn 2008), and many bird species (Stevens et al. 2006; Viverette et al. 2007; Zydelis & Kontautas 2008). Because spot are so common among estuarine fish assemblages of the mid and south Atlantic, their ecological importance as a food resource to tertiary and apex predators in the aquatic food web cannot be underestimated. Changes in the spot as a stock can affect not only the directed commercial and recreational fisheries for this species but can have indirect effects on other commercially and recreationally valuable fisheries that can have social, economic, as well as ecological implications.

Spotted Seatrout

Historically, the majority of commercial harvest of spotted seatrout occurs in North Carolina with gill nets being the predominate gear. Commercial harvest may occur in other states but it is largely in the form of incidental bycatch in various net fisheries. Commercial sale of spotted seatrout may still occur in states with no directed commercial fishery. This often occurs when hook and line recreational fishermen and for-hire fishers sell their catch for profit under a commercial wholesale license.

In North Carolina, spotted seatrout are typically not a target species, but rather an incidental bycatch of multi-species fisheries such as the gill net, long haul seine, beach seine/stop net, or fish trawl fisheries. It is likely that non-harvest losses occur to some extent from gill nets, haul seines/swipe nets, beach haul seines, stop nets, trawls, and crab pots, but the data available suggest the bycatch of spotted seatrout is minimal, and the North Carolina spotted seatrout stock assessment assumed estimates of bycatch in the commercial fishery to be negligible (Jensen 2009).

In addition to spotted seatrout's importance as a fishery resource, it is an important trophic link within the estuary between invertebrates and small fishes and the higher-level predators, notably bottlenose dolphins (Bortone 2003).

1.5. Habitat Considerations

1.5.1. Description of the Habitat

Spanish Mackerel

As indicated in Section 1.3.1, Spanish mackerel are common inhabitants of near-coastal and estuarine waters of the Atlantic and Gulf coasts of the US, with a center of abundance along the Florida coast. As a pelagic species, their habitat is largely the water column. However, they have been reported to utilize reef areas and grass beds and it seems likely that sargassum would provide valuable habitat where and when patches occur near shore. Despite the associations with structure, temperature and salinity are believed to be the most important factor governing their distribution (ASMFC 1990), supporting their primary association with the water column rather than bottom habitat.

Spot

Spot are found in estuaries and coastal areas from the Gulf of Maine to the Bay of Campeche, Mexico, and are most commonly found from Chesapeake Bay to South Carolina (Phillips et al. 1989; Chesapeake Bay Program 1991; Murdy et al. 1997; ASMFC 1987). Juvenile spot prefer shallow water areas, less than 8m, over fine sediment and in tidal marshes (Phillips et al. 1989; Stickney and Cuenco 1982; Chesapeake Bay Program 1991). Juvenile spot are found in salinities ranging from 0 to 30 ppt and water temperatures from 5º to 30º C (Stickney and Cuenco 1982; Phillips et al. 1989, ASMFC 1987), and therefore are found from polyhaline to fresh water in nursery areas. Adult spot are tolerant of salinities up to 60 ppt (ASMFC 1987; Phillips et al. 1989) and are more abundant in coastal waters and lower estuaries and less abundant in lower salinity areas, compared to juveniles. Spot can tolerate dissolved oxygen levels as low as 1.3 mg/l, but prefer concentration of 5.0 mg/l or higher (ASMFC 1987; Phillips et al. 1989).

Spotted Seatrout

Spotted seatrout make use of a variety of habitats during their life history with variations in habitat preference due to location, season, and ontogenetic stage. Although primarily estuarine, spotted seatrout use habitats throughout estuaries and occasionally the coastal ocean, and protection of each habitat type is critical to the sustainability of the spotted seatrout stock.

Spotted seatrout use the water column habitat, defined as "the water covering a submerged surface and its physical, chemical and biological characteristics" (Street et al. 2005), for spawning, transport of progeny, foraging and movement throughout the estuary and nearshore coastal areas. The water column also provides a transport mechanism for spotted seatrout eggs and larvae.

Of the available habitats, submerged aquatic vegetation (SAV) is of critical importance to all life history stages of spotted seatrout. SAV habitat is "bottom that is recurrently vegetated by living structures of submerged, rooted vascular plants (i.e. roots, rhizomes, leaves, stems, propagules,

and sometimes algae), as well as temporarily unvegetated areas between vegetated patches" (Street et al. 2005). The ASMFC lists SAV as a Habitat Area of Particular Concern (HAPC) for spotted seatrout (ASMFC 1984). Eggs, larvae, postlarvae, young-of-the-year, and adult spotted seatrout have been documented in mesohaline and polyhaline seagrass beds (Tabb 1966; ASMFC 1984; Mercer 1984; Thayer et al. 1984; McMichaels and Peters 1989; Rooker et al. 1998). Tabb (1958) indicated that the preferred habitat for spotted seatrout is low-flow areas with abundant seagrass. In Tampa Bay, McMichaels and Peters (1989) found that seagrass was the primary habitat for juvenile spotted seatrout. Habitat suitability models have indicated that spotted seatrout abundance is linearly related to percent seagrass cover until a plateau is reached at 60% coverage (Kupschus 2003). The composition of species in the seagrass beds may also influence the use of these habitats by juvenile spotted seatrout (Rooker et al. 1998). Additionally, meta-analyses indicated that juvenile spotted seatrout abundances were found to be greater in SAV than soft bottom and oyster reef, and were greater than or equivalent to abundances in wetland habitats (Minello 1999; Minello et al. 2003).

Spotted seatrout also use shallow soft bottom as nurseries, foraging, and refuge habitats. Soft bottom habitat is defined as "unconsolidated, unvegetated sediment that occurs in freshwater, estuarine, and marine systems" (Street et al. 2005). One of the most important functions of soft bottom habitat is as a foraging area for herbivores, detritivores, secondary consumers (including spotted seatrout), and larger predators. Marine soft bottom also has been noted to function as important habitat for spotted seatrout, especially during summer and winter estuarine temperature extremes (Tabb 1958; Mahood 1974; ASMFC 1984; Mercer 1984), and movements of spotted seatrout to soft bottom beaches in response to higher temperatures have been reported throughout much of their range.

Shallow unvegetated estuarine shorelines may be used by spotted seatrout as important corridors between habitats, while reducing predation risk. Spotted seatrout can use shallow flats as migratory refuges from larger predators which cannot access shallow waters (Peterson and Peterson 1979).

The complex three-dimensional structure of shell bottom habitats provides juvenile and adult spotted seatrout with areas for refuge, foraging, and growth. Juvenile and adult spotted seatrout have been documented using shell bottom habitats in Virginia (Harding and Mann 2001), North Carolina (Lenihan et al. 2001; Grabowski 2002), South Carolina (Daniel 1988), and Louisiana (MacRae 2006).

1.5.1.1. Spawning Habitat

Spanish Mackerel

Little appears to be definitively known regarding preferred Spanish mackerel spawning habitat. References to spawning occurring during seasonal migrations (Powell, 1975; Collette and Russo, 1984) would suggest that spawning occurs in the water column in near-shore waters.

Spot

Data indicate that spot spawn further offshore and in deeper waters than other sciaenids. Spot typically migrate offshore and spawn in the relatively deep water of the outer continental shelf,

though some evidently spawn in both nearshore waters and estuaries (Dawson 1958; Lewis and Judy 1983). Ripe adults aggregate off beaches in fall and begin migration offshore, possibly migrating to more southern waters in the process (Pearson 1932). Spot may spawn repeatedly over several weeks (Hildebrand and Cable 1930), with some individuals remaining offshore after spawning (Pearson 1932; Wenner et al. 1979, 1980). Fall migrations of maturing spot to offshore waters were reported from Chesapeake Bay (Hildebrand and Schroeder 1928), North Carolina (Roelofs 1951), and South Carolina estuaries (Dawson 1958). Ripe spot were collected in depths up to 82 m off South Carolina (Dawson 1958) and 8−10 mi off the Georgia coast (Hoese 1973). Smith (1907) stated that in North Carolina spot spawn in the sounds and inlets and Hildebrand and Cable (1930) suggested that spawning occurred in close proximity to passes off North Carolina; however, no evidence was offered to support these statements. Larval distributions of spot also indicate that spawning occurs more heavily offshore (26−128 m) than inshore (14.6−20.1 m; Berrien et al. 1978; Lewis and Judy 1983; Warlen and Chester 1985).

Spotted Seatrout

The spawning season for spotted seatrout varies depending on location (Murphy et al. 1999). Spawning takes place on or near seagrass beds, sandy banks, natural sand, shell reefs, near the mouths of inlets, and off the beach (Daniel 1988; Brown-Peterson et al. 2002) and peaks around the full moon (Tucker and Faulkner 1987; McMichael and Peters 1989). Temperature and salinity have an influence on the reproductive output of female spotted seatrout as peak spawning activity occurs at temperatures between 21 and 29°C and at salinities typically greater than 15 ppt (ASMFC 1984; Mercer 1984; Saucier and Baltz 1992; Saucier and Baltz 1993; Holt and Holt 2003; Kupschus 2004). Research from a three year study in SC indicates a significant difference in batch fecundity of different age classes, with marked increase as age increases from age 1 to age 3. However, combining batch fecundity and relative abundance of age classes, age 2 fish appear to make the largest contribution to reproductive effort. Overall spawning frequency was once every 4.4 days; with an average of 28 spawns per season (Roumillat and Brouwer 2004). Eggs of spotted seatrout are positively buoyant at spawning salinities, allowing for wind- and tidally-driven distribution throughout the estuary (Churchill et al. 1999; Holt and Holt 2003). However, sudden salinity reductions cause spotted seatrout eggs to sink, thus reducing dispersal and survival (Holt and Holt 2003). Larval spotted seatrout have been collected in surface and bottom waters of estuaries in North Carolina, Florida, and Texas (McMichael and Peters 1989; Hettler and Chester 1990; Holt and Holt 2000).

1.5.1.2. Egg and Larval Habitat

Spanish Mackerel

Powles and Stender (1976) found catches of "young scombrids" to be generally confined to the outer shelf and slope waters. However, ASMFC (1990) cites a personal communication from Stender regarding other research of his which recorded larvae entering Breech Inlet at Charleston, SC. Marancik (2005) encountered Spanish larvae on the inner shelf, defined as less than 20m depth. These reports indicate that larvae can be found from estuarine waters to the outer shelf.

Spot
Eggs are pelagic and buoyant. Larvae absorb the yolk sac and oil globule within 5 days of hatching (Powell and Gordy 1980). Larvae are initially found in surface waters but become more demersal as they grow (Hildebrand and Cable 1930; Lewis and Judy 1983). Larvae are transported through inlets and river mouths to nursery habitats in estuaries and bay by winds, tides and Ekman transport. Primary nursery habitat includes low salinity bays and tidal marsh creeks with mud and detrital bottoms.

Spotted Seatrout
Spotted seatrout larvae use tidal flows to migrate into and within estuaries (Perret et al. 1980) where they settle in seagrass beds, shallow bays, and backwater creeks (McMichael and Peters 1989).

1.5.1.3. Juvenile Habitat

Spanish Mackerel
Juveniles appear to utilize the water column in a wide range of habitats. Individuals ranging from 30-200mm are frequently collected by the Coastal Survey of SEAMAP-SA in near-shore waters ranging from 5 to 9 m deep (ASMFC 2000). As mentioned previously, larvae have been captured entering estuaries. Tagatz and Dudley (1961) recorded juveniles in salinities as low as 4.7ppt in the Neuse River, NC. While not in great numbers, they have also been collected in electo-shock studies conducted in SC rivers in salinities as low as 0.5ppt (John Archambault, SCDNR, pers. comm.).

Spot
Tidal salt marshes and their associated drainages are recognized primary nurseries for spot (Herke 1971; Parker 1971; Weinstein 1979; Currin et al. 1984). Due to its high productivity, this habitat provides ample prey for spot, which feed mostly on small bottom dwelling worms and crustaceans (Chao and Musick 1977). The habitat is shallow and structurally complex, providing a physical refuge from predators. In addition, spot are well adapted to live in the physiologically stressful low dissolved oxygen, high carbon dioxide environment of small tidal creeks (Cochran 1994). Research in Rose Bay, North Carolina suggests that during their first summer, spot grow and disperse from shallow edges of the bay to all depths (Currin 1984).

Spotted Seatrout
Juvenile spotted seatrout appear to use estuarine wetlands, principally salt/brackish marshes, as nurseries (Tabb 1966; ASMFC 1984; Mercer 1984). Of particular importance to juvenile spotted seatrout is the marsh edge habitat (Hettler 1989; Rakocinski et al. 1992; Baltz et al. 1993; Peterson and Turner 1994). Studies in Texas and Florida estuaries found that juvenile spotted seatrout densities were higher in *Spartina alterniflora* marsh edge habitats than in soft bottom, shell bottom, and inner marsh habitats, and were equivalent to or higher than densities in SAV (Minello 1999; Tuckey and Dehaven 2006). However, recent meta-analysis has indicated that spotted seatrout densities were consistently higher in SAV than in vegetated marsh edge habitats (Minello et al. 2003).

Soft bottom habitats function as important nurseries for juvenile spotted seatrout (Ross and Epperly 1985; Noble and Monroe 1991). These areas generally are located adjacent to wetlands and function to provide juveniles with abundant prey resources and appropriate physicochemical conditions for growth and survival.

The primary prey of juvenile spotted seatrout (less than 30 mm in length) consists mainly of benthic invertebrates, including copepods and mysid shrimps. Benthic microalgae and deposited detrital material provide a rich food base for invertebrates, which are important forage for juvenile spotted seatrout (Peterson and Peterson 1979).

Optimal temperature and salinity for juvenile spotted seatrout are 28° C and 28.1 ppt (Perret et al., 1980). Although fish survive at higher temperatures and salinities, there is evidence of reduced metabolism, which may be accompanied by reduced activity and growth (Wuenshel et al. 2004).

1.5.1.4. Adult Habitat

Spanish Mackerel

Adult Spanish mackerel inhabit coastal waters out to the edge of the continental shelf in the Atlantic Ocean (Collette and Nauen 1983), and also enter tidal estuaries (Hildebrand and Schroeder 1928). Temperature and salinity are believed to be the most important factors governing their distribution. According to Earll (1883), Spanish mackerel prefer water temperatures of 21 to 27º C, and are rarely observed in waters cooler than 18º C. Spanish mackerel usually inhabit waters with salinities of 32 to 36 ppt.

Spot

Adult spot are common in coastal waters during the spawning season and in estuaries and nearshore waters during the other parts of the year. They are typically found over sandy or muddy bottoms in waters up to approximately 60 m deep.

Spotted Seatrout

Adult diets are somewhat different from that of juveniles although the importance of food items in the water column remains. As juvenile spotted seatrout grow (greater than 30 mm in length), the dominant prey shifts to penaeid and palaemonid shrimps, which remain important in the diet of adults (Daniel 1988; McMichael and Peters 1989). As adult spotted seatrout increase in size, pelagic fishes and penaeid shrimps become increasingly important in their diet (Lorio and Schafer 1966; ASMFC 1984; Mercer 1984; Daniel 1988). Diet analysis of spotted seatrout in the lower Cape Fear River, North Carolina, revealed that Atlantic menhaden and brown shrimp are the dominant prey items of spotted seatrout during the summer and fall, and other important prey species included pinfish, spot, and striped mullet, indicating that spotted seatrout are mainly piscivorous after reaching age 1 (Tayloe and Scharf 2006).

1.5.2. Identification and Distribution of Habitat and Habitat Areas of Particular Concern

Spanish Mackerel

Critical habitats of Spanish mackerel are spawning grounds and areas where eggs and larvae develop. These areas require further delineation before specific habitat areas of particular concern can be designated. However, literature suggests that much of the eastern seaboard may fit this description. Estuaries provide critical nursery habitat to both Spanish mackerel and many of their prey items. The South Atlantic Fishery Management Council's Essential Fish Habitat Plan identifies essential fish habitat for coastal migratory pelagic species as including sandy shoals of capes and offshore bars, high profile rocky bottom and barrier island ocean-side waters, from the surf to the shelf break zone, but from the Gulf stream shoreward, including *Sargassum* (SAFMC 1998). It further recognizes all coastal inlets and all state-designated nursery habitats as being of particular importance.

Spot

Spot are strongly associated with the bottom as juveniles and adults and are seasonally dependent on estuaries. From Delaware south to Florida, primary nursery habitat includes low salinity bays and tidal marsh creeks with mud and detrital bottoms. Juvenile spot are also found in eelgrass beds in the Chesapeake Bay and North Carolina, however, by late spring juveniles are often much more abundant in tidal creeks than in seagrass habitats. Estuaries, which are especially susceptible to alterations from human activities, are designated as Habitat Areas of Particular Concern (HAPCs) for spot.

Spotted Seatrout

The ASMFC lists SAV as a Habitat Area of Particular Concern (HAPC) for spotted seatrout (ASMFC 1984).

Environmental conditions in spawning areas may affect growth and mortality of egg and larvae, as sudden salinity reductions cause spotted seatrout eggs to sink, thus reducing dispersal and survival (Holt and Holt 2003).

Winter water temperature dynamics are of particular importance to habitat quality for spotted seatrout. Generally, spotted seatrout overwinter in estuaries, only moving to deeper channels or to nearshore ocean habitats in response to water temperatures below 10°C (Tabb 1966; ASMFC 1984). Sudden cold snaps have been found to stun and kill large numbers of spotted seatrout in estuarine habitats during winter (Tabb 1966; Perret et al. 1980; ASMFC 1984; Mercer 1984). These large mortality events are often associated with rapid declines (less than 12 h) in temperature, which numb fish before they can escape to warmer waters (Tabb 1958, 1966). It should be noted that cold stun events appear to have a large influence on spotted seatrout population dynamics, but it is difficult to quantify increases in mortality associated with these events. Periodic increases in mortality associated with cold stuns should still be considered when implementing management measures as they are likely to continue to occur on a periodic basis and are largely unpredictable (NCDMF 2010).

1.5.3. Present Condition of Habitats and Habitat Areas of Particular Concern

Spanish Mackerel

Offshore areas used by Spanish mackerel eggs, larvae, juveniles, and adults appear to be the least affected by nearshore habitat alteration and water quality degradation. Oil pollution from offshore oil spills is a potential danger to the spawning grounds of Spanish mackerel. The water soluble aromatic hydrocarbon component of crude oil is damaging to fish eggs and larvae. Other pollutants such as pesticides, may act synergistically with oil to produce deleterious effects on young stages of fish (Strushaker et al. 1974). Oil dispersants with water soluble aromatic hydorcorbon fractions have also been found to be damaging to eggs and larvae, although second generation dispersants are less toxic, due to the reduction in aromatic hydrocarbons (Wilson 1977). This later issue may prove of particular interest as a result of the Deepwater Horizon oil spill in the Gulf of Mexico in 2010.

A 2007 Environmental Protection Agency (EPA) report of the National Estuary Program indicates that, along the Atlantic coast of the Southeast US, estuarine water quality was good and a sediment index and fish tissue contaminant index rated between good and fair (EPA 2007). Bergquist et al. (2009) seem to confirm this for SC estuaries based on a continuing assessment conducted in 2005-2006. All of these bode well for Spanish mackerel in the estuaries of the Atlantic Ocean. Initiation of broad scale open ocean pen aquaculture would have the potential to degrade coastal water quality and thus would merit monitoring, should it occur.

Spot

A number of activities may affect the condition of the habitats utilized by spot. Estuaries are extremely sensitive to dredging, point and nonpoint source pollution and destructive or unregulated practices in siliviculture, agriculture, or coastal development that contribute to increased turbidity. These activities may reduce the quantity and quality of spot habitat.

Spotted Seatrout

By nature, the extent of SAV coverage tends to fluctuate on the scale days to decades, depending on species and physical conditions (Fonseca et al. 1998). Globally, SAV habitat is declining. Rapid, large-scale SAV losses have been observed in the European Mediterranean, Japan, Chesapeake Bay, Florida Bay, and Australia (Orth et al. 2006). While threats to the stability of SAV health and distribution are many, water quality degradation, including nutrient enrichment and sediment loading, is the greatest threat to SAV (Orth et al. 2006). Nutrient and sediment loading into the water column can be traced to point source discharges, nonpoint source pollution, and the resuspension of bottom sediments. The impacts from the associated nutrient enrichment and sediment loading, such as increased turbidity, increased epiphytic loads, and sedimentation, and increased concentrations of toxic hydrogen sulfide directly reduce SAV growth, survival, and production (Dennison et al. 1993; Fonseca et al. 1998; SAFMC 1998). Effects of eutrophication are generally most severe in sheltered, low flow areas with concentrated nutrient loads and large temperature fluctuations (Burkholder et al. 1994).

Once SAV habitat is lost, the associated sediments are destabilized which can result in accelerated shoreline erosion and increased turbidity. These are conditions that are not favorable to SAV recolonization and expansion in the affected area. SAV in adjacent areas may also be

impacted by the resulting increase of turbidity in surrounding habitats, thus increasing the total area affected (Durako 1994; Fonseca 1996). Losses of SAV on much larger scales are particularly problematic because the rate of SAV recovery though propagation, recolonization, etc. is often much slower than the rate of SAV loss (Fonseca et al. 1998). Nevertheless, recovery of SAV habitat may be possible with improvements to water quality as evidenced by the net gain of SAV acreage in Tampa Bay, Florida and Hervey Bay, Australia following stricter water quality standards (Orth et al. 2006).

Actions associated with human water use also threaten SAV abundance and coverage. Dredging for navigational purposes, marinas, or infrastructure can directly impact SAV through large-scale removal or destruction of existing grass beds. Docks constructed over SAV and the associated shading can lead to the gradual loss of SAV both beneath and in a perimeter adjacent to the docking structure (Loflin 1995; Shafer 1999; Florida Department of Environmental Protection, unpub. data). In addition to the impacts of shoreline development and dredging on SAV, the associated increase in boating activity can lead to increased prop scarring through vegetated areas. The propeller cuts leaves, shoots, and roots structures and creates a narrow trench through the sediment. Recovery of SAV from prop scarring can take in upwards of 10 years, depending on SAV species and local conditions (Zieman 1976). Wakes associated with the increase in boating activity can lead to the destabilization of sediments, which, in turn, can increase turbidity, thus impacting SAV growth potential.

Use of bottom disturbing fishing gears also have the potential to damage or destroy SAV. Although the damage from each gear varies in severity, shearing of leaves and stems, and uprooting whole plants are the most common impacts of bottom disturbing gears (ASMFC 2000). Shearing of leaves and stems does not necessarily result in mortality of SAV, but in general, productivity is reduced (ASMFC 2000). Gears that result in belowground disturbance may cause total loss of SAV and require months to years for the affected area to recover.

A newly emerging threat to SAV is the potential impacts of global climate change on this sensitive habitat. While climate change has occurred throughout history, the rate at which sea surface temperature, sea-level, and CO_2 concentrations are increasing is much faster than experienced in the last 100 million years (Orth et al. 2006). These changes may be occurring at a rate too fast to allow SAV species to adapt. This leads to the potential for further large-scale losses of SAV habitat globally. If SAV is indeed able to adapt to the pace of climate change, shoreline stabilization projects in many coastal areas impede the shoreward migration of SAV necessitated by rising sea-level (Orth et al. 2006). Additionally, the increased frequency and intensity of coastal storms and hurricanes, and the associated delivery of freshwater, nutrients, and sediments, threaten to further degrade water quality in estuaries and coastal rivers, thus reducing SAV health and potential distributional extent (Scavia et al. 2002; Orth et al. 2006).

1.6. Impacts of the Fishery Management Program

The Omnibus Amendment proposes the first enforceable management plans for Spanish mackerel, spot, and spotted seatrout. However, as the management measures proposed in this amendment are not expected to incur changes to the prosecution of the Spanish mackerel, spot or spotted seatrout fisheries in state waters, there will not be associated economic or social impacts

from enactment of this amendment. Following are some considerations that could be used for assessments of social and economic impacts in the future.

1.6.1. Biological and Environmental Impacts

The current fishery regulations have supported viable fisheries for all three species. No major negative changes are expected as a result of implementing this Omnibus Amendment. With requirements for yearly compliance reports and reviews, as well as the ability to implement adaptive management and more quickly respond to changes in the populations, this amendment will improve the current management system, for both the stocks and the ecosystems they support.

1.6.2. Social Impacts[1]

There is very little information on fishermen, fishing-dependent businesses, or communities that depend on the Spanish mackerel, spot, and spotted seatrout fisheries. In order to understand the impact that any new rules and regulations may have on participants in the any fishery, in-depth community profiles need to be developed that will aid in the description of communities, both present and historical, involved in a fishery. Limited social science research has been conducted by NMFS in communities in the Gulf of Mexico and South Atlantic. Until more research is completed, and in-depth community profiles are developed for sample communities, it is not possible to fully describe the possible impacts of any change in fishing regulations on any fishery.

While not an in-depth ethnographic study, a project employing rapid assessment was completed to document the location, type and history of fishing communities in the South Atlantic region. South Atlantic Fishery Management Council staff worked collaboratively with the University of Florida to describe fishing communities in a broad manner (for example, whether the community is characterized mostly by commercial fishing, for-hire, recreational or some combination of all sectors), and link on-the-ground fieldwork with the collection of as much secondary data as possible. The secondary data included U.S. Census records, landings, permits, and state information. All of this information is used to form a baseline dataset to assist in the measurement of social and economic impacts (Jepson et al. 2006).

Most fishermen who participate in the Spanish mackerel fishery also participate in other fisheries. Even if mackerel fishing only accounts for a portion of the income earned by a fisherman, it may be an important part of their fishing activity and may mean the difference in someone being able to continue to fish or the necessity to seek other types of employment. If the mackerel fishery were to experience further reductions in catch, there could be economic and social ramifications for fishermen, fish processors, marinas, and other fishing-related businesses which draw part of their income from the mackerel fishery. If there are changes made to the current regulations for the mackerel fishery, it is assumed that the regulations would have the

[1] *Much of this section is taken or paraphrased from Amendment 15 coastal migratory pelagics:* Final amendment 15to the fishery management plan for coastal migratory pelagic resources in the Atlantic and Gulf of Mexico including environmental assessment, regulatory impact review, and regulatory flexibility act analysis. Gulf of Mexico, South Atlantic, and Mid-Atlantic Fishery Management Councils publication to the National Oceanic and Atmospheric Administration. November 2004.

most impact in communities where the most mackerel are landed, the most income from mackerel earned, the most boats are permitted for mackerel, and where the fishermen who fish for mackerel live. However, significant effects on fishermen and businesses in other communities should not be discounted because of potentially greater dependence on mackerel revenues.

The demographics of each community help the reader to understand the level of education obtained by community members, the price of housing, and the types of employment available in the community. If fishing regulations change to the point where people can no longer make a living at fishing, the other opportunities that exist in the community will be based on what jobs are available, level of education required, training, and language skills. Until further research is done in these communities, it is not possible to fully describe the dependency on fishing for these communities.

1.6.3. Economic Impacts

1.6.3.1. Commercial Fisheries

The Atlantic migratory group Spanish mackerel fishery was prosecuted by 364 vessels in the 2002/2003 fishing year, as recorded by the mandatory logbook reporting system. These vessels recorded 3,536 trips on which Spanish mackerel were harvested, for a total of 1.7 MP of Spanish mackerel valued at $1.06 million in gross revenues. Total gross revenues from all logbook reported finfish on these trips was $7.01 million. This is primarily a Florida fishery (SAFMC 2004).

Commercial landings of Atlantic migratory group Spanish mackerel fell sharply after July 1995 when the State of Florida implemented a Constitutional Amendment to regulate allowable fishing gear in the State's waters. Since then, landings recovered, without the spikes of earlier years, and the dollar value has been higher. Prices rose from $0.51 per pound to $0.97 per pound between the early 1980s and 2004-2008 (Vondruska 2010).

On average over the last five fishing years (2004/2005-2008/2009), there were 349 CFL vessels and 3,909 trips with landings of Atlantic migratory group Spanish mackerel. Since 1998/1999, productivity has seemed to vary with landings, declining sharply in 1999/2000, recovering, and declining in the last two years. In the last five fishing years, trips have averaged 520 lbs. Vessels harvesting Atlantic migratory group Spanish mackerel averaged 5,801 lbs of Spanish mackerel and $27,964 for all CFL-reported landings. Atlantic migratory group Spanish mackerel accounted for 19%-28% of the vessel gross, on average. Maximum gross revenues per vessel were approximately $226,000-$306,000 over this period. Vessels with Atlantic migratory group Spanish mackerel landings averaged 29-30 ft in length, had 286-304 hp engines, averaged 10-13 trips per year with Spanish mackerel landings, and averaged 37-43 trips per year for all CFL-reported species. Trips with Atlantic migratory group Spanish mackerel grossed an average of $663 for all fish landed, and Spanish mackerel accounted for 66%-73% of the total revenues from all species on these trips. Most trips had 1-2 person crews. Trips averaged 1.01-1.04 days at sea and fished in water 41-47 ft deep (Vondruska 2010).

Additional information on the economic description of the commercial fisheries for the coastal migratory pelagic (CMP) species (including king mackerel, Spanish mackerel, barracuda, bluefish, Atlantic bonito, cero, dolphin, little tunny, blackfin tuna, and wahoo) is contained in Vondruska (2010) and is incorporated herein by reference (S. Holiman, NMFS SERO, Personal Communication, 2011).

Five-year[1] average performance statistics.

Species	Vessels	Ex-vessel Value[2] Species (millions)	Ex-vessel Value All Species (millions)	Average Ex-vessel Value per Vessel
Atlantic Group Spanish Mackerel	349	$1.85	$9.76	$28,000

[1]Fishing-year (2004/2005, 2005/2006,…, 2008/2009) for Spanish mackerel
[2]2008 dollars.
Source: NMFS SEFSC Coastal Fisheries Logbook and NMFS NEFSC Commercial Fisheries Data Base System

Estimates of the average annual economic activity (impacts) associated with the commercial fishery for Spanish mackerel are provided. Business activity for the commercial sector is characterized in the form of full-time equivalent (FTE) jobs, income impacts (wages, salaries, and self-employed income), and output (sales) impacts (gross business sales). Income impacts should not be added to output (sales) impacts because this would result in double counting (S. Holiman, NMFS SERO, Personal Communication, 2011).

The estimates of economic activity include the direct effects (effects in the sector where an expenditure is actually made), indirect effects (effects in sectors providing goods and services to directly affected sectors), and induced effects (effects induced by the personal consumption expenditures of employees in the direct and indirectly affected sectors). Estimates are provided for the economic activity associated with the ex-vessel revenues from just Spanish mackerel as well as the revenues from all species harvested by the same vessels that harvested Spanish mackerel (S. Holiman, NMFS SERO, Personal Communication, 2011).

Average annual economic activity associated with the CMP fisheries.

Species	Average Ex-vessel Value[1] (millions)	Total Jobs	Harvester Jobs	Output (Sales) Impacts (millions)	Income Impacts (millions)
Atlantic Group Spanish Mackerel	$1.85	348	45	$24.31	$10.36
- All Species[2]	$9.76	1,840	240	$128.52	$54.77

[1]2008 dollars.
[2]Includes ex-vessel revenues and economic activity associated with the average annual harvests of all species harvested by vessels that harvested the subject CMP species.

1.6.3.2. Recreational Fisheries

Spot, spotted seatrout, and Spanish mackerel are key South Atlantic recreational species. In 2008, there were 2.9 million recreational anglers who took 22 million fishing trips in the South Atlantic. Over 80% of these anglers were residents of a regional coastal county. Of the total fishing trips taken, 50% of them were taken from a private or rental boat and another 48% were shore-based. Atlantic croaker and spot were the most often caught key species or species group with 10 million fish. Spotted seatrout (6.3 million fish) was another key species that was caught in large numbers in 2008, and 75% were released by anglers rather than harvested.

Spot, spotted seatrout, and Spanish mackerel showed increases in catch totals between 1999 and 2008. Between 2007 and 2008, spotted sea trout decreased in total catch (15%). During this period the largest increase observed for Spanish mackerel was 29%.

At the state level, Atlantic croaker and spot were the most often caught key species or species group in 2008 for North Carolina (5.4 million fish). About 50% of these fish were harvested rather than released. Spotted seatrout was the most commonly caught key species or species groups in East Florida (2.3 million fish). The majority of these fish were released rather than harvested. In South Carolina, Atlantic croaker and spot were the most caught key species or species group (2.8 million fish). Over 86% of these fish were harvested by anglers rather than released.

The following is an excerpt from *Fisheries Economics of the U.S., 2008*, which summarizes some economic information on the recreational fisheries in the South Atlantic (NMFS 2010). Included in the information is harvest and release data on spot, spotted seatrout, and Spanish mackerel.

Recreational Fisheries — South Atlantic

2008 Economic Impacts of Recreational Fishing Expenditures *(thousands of dollars)*

	Trips	Jobs	Total Sales	Value Added
East Florida	11,215,370	35,467	4,042,417	2,114,882
Georgia	1,281,738	2,549	311,224	161,664
North Carolina	7,180,732	22,001	2,291,227	1,139,245
South Carolina	2,576,201	5,509	487,545	265,600

2008 Angler Trip & Durable Equipment Expenditures *(thousands of dollars)*

Fishing Mode	Trip Expenditures		Durable Equipment Expenditures	Expenditures
	Non-Residents	*Residents*	Fishing Tackle	1,266,755
For-Hire	109,310	32,786	Other Equipment	346,901
Private Boat	90,137	329,897	Boat Expenses	2,573,984
Shore	496,051	233,791	Vehicle Expenses	1,643,805
Total Trip Expenditures	695,498	596,474	Second Home Expenses	356,397
			Total Durable Equipment Expenditures	6,187,843
Total State Trip and Durable Equipment Expenditures				7,479,816

Recreational Anglers by Residential Area *(thousands of anglers)*

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Coastal	1,451	2,089	2,279	1,948	2,271	2,105	2,615	2,603	3,157	2,330
Non-Coastal	257	384	419	334	473	511	472	477	493	560
Out-of-State	NA[1]	NA[1]	NA[1]	NA[1]	NA[1]	NA[1]	NA[1]	NA[1]	NA[1]	NA[1]
Total Anglers	1,708	2,473	2,698	2,282	2,744	2,616	3,087	3,080	3,650	2,890

Recreational Fishing Effort by Mode *(thousands of trips)*

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
For-Hire	665	520	497	440	412	434	601	552	623	580
Private Boat	6,935	9,119	9,565	8,266	9,963	9,369	10,073	10,749	13,137	11,009
Shore	6,835	10,436	11,534	9,057	10,872	11,060	11,138	12,511	11,893	10,665
Total Trips	14,435	20,075	21,596	17,763	21,246	20,862	21,813	23,813	25,652	22,254

Harvest (H) and Release (R) of Key Species / Species Groups *(number of fish in thousands)*

Species/Groups		1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Bluefish	H	799	1,425	1,974	1,617	1,664	1,657	2,210	1,969	2,453	1,881
	R	1,720	3,092	3,906	3,190	2,276	2,723	3,005	3,707	4,540	3,441
Dolphinfish	H	1,387	1,860	1,526	1,297	1,138	891	1,134	1,127	1,217	1,058
	R	153	239	234	81	146	107	219	232	255	201
Drum (Atlantic Croaker & Spot)	H	3,385	3,222	6,146	3,702	5,520	5,881	4,440	5,509	6,272	5,917
	R	3,772	2,933	3,231	2,270	4,653	3,719	3,881	7,291	4,273	4,086
Drum, Red	H	302	384	353	294	470	469	498	356	456	473
	R	919	1,120	1,560	1,617	1,527	1,899	2,412	2,111	2,071	2,333
Drum (Spotted Seatrout)	H	1,408	1,245	806	760	825	1,100	1,350	1,624	1,450	1,544
	R	2,084	3,317	2,594	3,217	2,892	3,212	5,337	4,989	6,115	4,716
Mackerel, King	H	472	580	394	363	600	398	428	511	807	490
	R	108	99	99	99	256	156	208	196	303	167
Mackerel, Spanish	H	840	1,267	1,229	1,355	1,170	994	1,091	790	1,211	1,326
	R	438	717	459	770	840	453	705	322	587	995
Porgies (Sheepshead)	H	533	814	787	409	728	492	614	489	749	850
	R	435	436	604	454	558	382	436	438	604	774
Sea Bass, Black	H	321	377	550	340	423	892	811	783	612	379
	R	1,417	1,824	2,000	1,457	1,406	2,677	2,484	2,967	3,764	2,941
Sharks[2]	H	15	19	27	8	24	29	58	6	27	8
	R	479	778	1,451	1,020	1,366	1,653	2,049	1,792	2,057	2,392

[1]Out-of-state resident information is collected for individual states but whether an angler is a resident of a region is not specified; NA = data are not available.
[2]Sharks include species within the requiem shark family, blacktip sharks, and unidentified sharks. Species included in this group may not be equivalent to species with similar names listed in the commercial tables.

1.7. Location of Technical Documentation for Omnibus Amendment

1.7.1. Stock Assessment Documents

Spanish Mackerel
The lastest stock assessment for Atlantic Spanish mackerel was SEDAR 17 in 2008. However, the Peer Review Panel did not accept the biomass-based biological reference points from this assessment due to high levels of uncertainty. Previous assessments were completed by the NMFS Sustainable Fisheries Division (2003), and by Powers (1996) and Legault (1998). Future assessments will likely include the federal, stock assessment process.

Spot
There has not been a coastwide stock assessment conducted for Spot. However, the ASMFC Plan Review Team for Spot has been monitoring the stock status through reports to the South Atlantic State/Federal Management Board. These reports have included life history reviews as well as the development of appropriate management triggers for Board action. These management triggers are based on coastwide recreational landings (numbers of fish), coastwide commercial landings (pounds of fish), and the CPUE indices from the combined NC-FL SEAMAP Survey Index, the combined NY-NC NMFS Survey Index, and the Maryland Chesapeake Bay Seine Survey Index.

Spotted Seatrout
There is no coastwide stock assessment for spotted seatrout due to the largely non-migratory nature of the populations, although North Carolina and Virginia have collaborated in the past. State stock assessments have provided the data and have occurred in all states from North Carolina to Florida.

1.7.2. Law Enforcement Assessment Documents

Law Enforcement Committee has reviewed implementation of the current state-level requirements, none of which were mandatory under the original FMP for any of the three species.

2. GOALS AND OBJECTIVES

2.1. History and Purpose of the Plan

2.1.1. History and Prior Management Actions

Spanish Mackerel
Spanish mackerel is jointly managed from New York to the Dade/Monroe county line in Florida by the South Atlantic Fishery Management Council (in federal waters) and the Commission (in state waters).

The Council began management of Spanish mackerel through the Coastal Migratory Pelagic Resources FMP in 1982 to address problems such as inadequate biological and economic data to support management decisions, and conflicts between different user groups. The federal FMP

has been revised over time to address other problems such as allocation, bycatch, monitoring, and stock status (**Table 10**). **Table 11** provides a summary of current federal regulations. A new amendment addressing annual catch limits and targets, accountability measures, allocation, and regulations to limit total mortality to the annual catch target is being developed for completion in 2011. A draft version of Amendment 18 is available for public comment during April 2011; the management options under consideration, with the preferred options noted in **Table 12**.

The Commission initiated interstate management of Spanish mackerel in 1990 to conserve the Spanish mackerel resource and to achieve compatible management among the states that harvest Spanish mackerel, and between the states and the federal government (ASMFC 1990). The interstate FMP was developed to track the federal FMP, thus it adopted the same management area and management criteria (e.g., overfished definition) identified in the federal FMP and recommended complementary fishery regulations (i.e., fishing year, minimum size limit, quota closure, recreational creel limit, commercial trip limit, commercial permits, and gear restrictions). A plan review team was to annually review the adequacy of the interstate FMP in coordinating state and federal management and make recommendations for revisions. This process has not resulted in any amendments to the interstate FMP. **Table 13** provides a summary of current state regulations for Spanish mackerel; **Table 16** provides a summary of existing general state regulations that affect the catch of Spanish mackerel.

Spot

The interstate FMP for spot was approved in 1987 and includes the states from Delaware through Florida (ASMFC 1987). There is no federal management of spot. Interstate plan objectives include: conducting biological, environmental, economic, and social research on spot and improving fishery-dependent data collection, maintaining a spawning stock sufficient to minimize the possibility of recruitment failure, attaining optimum yield per recruit, promoting harmonious use of the resource among various components of the fishery, and promoting adoption of highest possible standards of environmental quality. The plan recommended two management measures for implementation: 1) promote the development and use of bycatch reduction devices (BRDs) through demonstration and application in trawl fisheries, and 2) promote increases in yield per recruit through delaying entry to spot fisheries to age one and older. Other recommendations focus on research and monitoring activities. Considerable progress has been made in developing, testing, and implementing BRDs, although additional research and development of current and new devices is recommended (ASMFC 2009c). While many general gear restrictions, such as minimum mesh sizes and closed areas, help protect some age classes of spot, only Georgia has implemented a minimum size limit (and creel limit). **Table 14** provides a summary of current state regulations for spot; **Table 16** provides a summary of existing general state regulations that affect the catch of spot.

Spotted Seatrout

The Commission adopted the FMP for spotted seatrout in 1984 for the states from Maryland to Florida (ASMFC 1984). There is no federal management of spotted seatrout. Interstate plan objectives include: attaining optimum yield over time, maintaining a spawning stock sufficient to minimize the possibility of recruitment failure, promoting conservation in order to reduce inter-annual variability in availability and increase yield per recruit, promoting the collection of data and research on the species, promoting harmonious use of the resource among various

components of the fishery, and promoting the determination and adoption of environmental quality standards and providing habitat protection. In 1991, Amendment 1 modified the second objective, making it more specific, to maintain a spawning potential ratio of at least 20% to minimize the possibility of recruitment failure. Recommended management measures include a minimum size limit of 12 inches total length (TL) with comparable mesh size regulations in directed fisheries (then defined as fisheries containing at least 60% spotted seatrout by weight), and data collection for stock assessment and monitoring the status of the fisheries. All states with a declared interest in spotted seatrout have implemented at least the recommended minimum size limit. **Table 15** provides a summary of current state regulations for spotted seatrout; **Table 16** provides a summary of existing general state regulations that affect the catch of spotted seatrout.

2.1.2. Purpose and Need for Action

The South Atlantic State/Federal Fisheries Management Board initiated the development of this Omnibus Amendment to provide for the implementation of mandatory measures, to achieve consistency with Commission standards and procedures for interstate FMPs, and, in the case of Spanish mackerel, to increase consistency between state and federal management. Under the existing management programs for Spanish mackerel, spot, and spotted seatrout, all management measures are voluntary, the Commission's standards and procures for interstate FMPs are lacking, and the interstate and federal Spanish mackerel management measures are inconsistent.

The development of the Omnibus Amendment does not necessarily mean that additional management measures will be put in place to regulate the harvest of Spanish mackerel, spot, and spotted seatrout; however, the Management Board will consider a suite of measures that could be implemented through adaptive management should it become necessary.

2.2. Goal

The goal of the Omnibus Amendment is to bring the FMPs for Spanish mackerel, spot, and spotted seatrout under the authority of the ACFCMA, providing leverage to better assure effective interstate management to perpetuate healthy, self sustaining populations of Spanish mackerel, spot, and spotted seatrout throughout their ranges and generate the greatest economic and social benefits from their commercial and recreational harvest and utilization over time.

2.3. Objectives

In support of the goal, the following objectives are proposed for Spanish mackerel:

1. Manage the Spanish mackerel fishery by restricting fishing mortality to rates below the threshold fishing mortality rates to provide adequate spawning potential to sustain long-term abundance of the Spanish mackerel populations.
2. Manage the Spanish mackerel stock to maintain the spawning stock biomass above the target biomass levels.
3. Minimize endangered species bycatch in the Spanish mackerel fishery.
4. Provide a flexible management system that coordinates management activities between state and federal waters to promote complementary regulations throughout Spanish mackerel's range which minimizes regulatory delay while retaining substantial ASMFC,

Council, and public input into management decisions; and which can adapt to changes in resource abundance, new scientific information and changes in fishing patterns among user groups or by area.

5. Develop research priorities that will further refine the Spanish mackerel management program to maximize the biological, social, and economic benefits derived from the Spanish mackerel population.

In support of the goal, the following objectives are proposed for spot:

1. Manage the spot fishery by restricting fishing mortality to rates below the threshold fishing mortality rates to provide adequate spawning potential to sustain long-term abundance of the Spanish mackerel populations.
2. Manage the spot stock to maintain the spawning stock biomass above the target biomass levels.
3. Minimize endangered species bycatch in the spot fishery.
4. Provide a flexible management system that coordinates management activities between state and federal waters to promote complementary regulations throughout spot's range which minimizes regulatory delay while retaining substantial ASMFC, Council, and public input into management decisions; and which can adapt to changes in resource abundance, new scientific information and changes in fishing patterns among user groups or by area.
5. Develop research priorities that will further refine the spot management program to maximize the biological, social, and economic benefits derived from the Spanish mackerel population.

In support of the goal, the following objectives are proposed for spotted seatrout:

1. Manage the spotted seatrout fishery by restricting fishing mortality to rates below the threshold fishing mortality rates to provide adequate spawning potential to sustain long-term abundance of the Spanish mackerel populations.
2. Manage the spotted seatrout stock to maintain the spawning stock biomass above the target biomass levels.
3. Minimize endangered species bycatch in the spotted seatrout fishery.
4. Provide a flexible management system that coordinates management activities between state and federal waters to promote complementary regulations throughout spotted seatrout's range which minimizes regulatory delay while retaining substantial ASMFC, Council, and public input into management decisions; and which can adapt to changes in resource abundance, new scientific information and changes in fishing patterns among user groups or by area.
5. Develop research priorities that will further refine the spotted seatrout management program to maximize the biological, social, and economic benefits derived from the Spanish mackerel population.

2.4. Specification of Management Unit

The management unit of the Omnibus Amendment shall be the entire coastwide distribution of Spanish mackerel, spot, and spotted seatrout from the estuaries eastward to the inshore boundary of the EEZ.

2.4.1. Management Areas

The management areas shall include the entire Atlantic coast distribution of each resource within the following states:

Spanish Mackerel: New York through eastern Florida (Dade/Monroe county line)

Spot: Delaware through eastern Florida (Dade/Monroe county line)

Spotted Seatrout: Maryland through eastern Florida (Dade/Monroe county line)

2.5. Definition of Overfished and Overfishing

A common approach in fisheries management for evaluating the need for management action as determined by stock status is through the use of a control rule. A control rule is based on biological reference points (BRPs), or particular values of stock size and fishing mortality rate (or proxies for those values; e.g., catch or harvest, fishing effort, exploitation). Frequently, both threshold and target BRPs are part of the control rule; thresholds are used to determine if the stock is overfished or experiencing overfishing, while targets are used to indicate the desired stock conditions. Overfishing is defined relative to the fishing mortality rate (*F*); if *F* is greater than the threshold, the stock is considered to be experiencing overfishing. Stock size resulting from the *F* is used to determine if the stock has become overfished; if stock size is below the threshold, the stock is considered to be overfished. (The term depleted may be used in the event that stock size is below the threshold but fishing mortality was not the primary cause.)

2.5.1. Fishing Mortality Threshold and Target

<u>Spanish Mackerel</u>

The biological reference points for Spanish mackerel will be based on achieving consistency with the federal fishery management program. The Coastal Migratory Pelagics Fishery Management Plan currently includes a maximum fishing mortality threshold (MFMT) on which overfishing status is determined, and a fishing mortality target. The federal FMP sets MFMT = $F_{MSY} = F_{30\%SPR}$, and $F_{TARGET} = F_{OY} = F_{40\%SPR}$, with no values estimated (where MSY = maximum sustainable yield, SPR = spawning potential ratio, and OY = optimum yield).

Federal reference points were set based on the previous Amendment 8 in 1996. SEDAR 17 assessed the Atlantic migratory group Spanish Mackerel in 2008. However, the Review Panel did not accept the base assessment model as appropriate for determining the exploitation rate (SAFMC 2008). As a result, the current Draft Amendment 18 for the Coastal Migratory Pelagics FMP does not alter the MFMT value, although it will allow for this value to be revised after a future stock assessment.

Draft Amendment 18, as recently approved for public comment by the South Atlantic and Gulf Fishery Management Councils in early 2011, proposes to establish an interim Overfishing Limit (OFL), dependent upon future review by the SSC, set at the mean of 10 years landings plus 2 times the standard deviation, resulting in an OFL of 6.14 million pounds. This limit is based on the Gulf Fishery Management Council's Allowable Biological Catch (ABC) control rule.

In addition, Draft Amendment 18 includes various options for calculating OY based on a percentage of the ABC (75-100% in 5% increments) and is folded into the determination of the Annual Catch Limits (ACLs). The Council selected as its preferred alternative Option 2, which sets ACL = OY = ABC = 5.29 million pounds, which is the median of the past 10 years landings. The commercial allocation under this option would be 2.70 million pounds, and the recreational allocation would be 2.21 million pounds. The Council's preferred option for an Annual Catch Target would set the recreational ACT at 2.03 million pounds. The Council's preferred option does not set a lower target for the commercial sector.

The Omnibus Amendment adopts the federal FMP's fishing mortality threshold and fishing mortality target as the definitions for the interstate Spanish mackerel fishing mortality threshold ($F_{THRESHOLD}$) and target (F_{TARGET}), respectively. The Omnibus Amendment will adopt at a minimum $F_{THRESHOLD} = F_{MSY}$, and $F_{TARGET} = F_{OY}$. Though point estimates of F_{MSY} and F_{OY} are not currently included in the Draft Mackerel Amendment 18, should the Council later adopt point estimates based on a future stock assessment, the South Atlantic State/Federal Fisheries Management Board may review and adopt through Board action specific values for $F_{THRESHOLD}$ and F_{TARGET}.

Spot and Spotted Seatrout

The Omnibus Amendment does not implement biological reference points to define if the spot and spotted seatrout stocks are experiencing overfishing or are being fished at target levels. There are no coastwide stock assessments for either species on which to base the biological reference points or develop estimates of fishing mortality for comparison to the biological reference points. Should these species be assessed coastwide in the future, biological reference points can be adopted through adaptive management.

2.5.2. Stock Biomass Threshold and Target

Spanish Mackerel

The biological reference points for Spanish mackerel will be based on achieving consistency with the federal fishery management program. The Coastal Migratory Pelagics Fishery Management Plan currently includes a biomass target and a minimum stock size threshold (MSST) on which overfished status is determined. The Omnibus Amendment adopts the federal FMP's MSST and biomass target as the definitions for the interstate Spanish mackerel stock biomass threshold ($B_{THRESHOLD}$) and target (B_{TARGET}), respectively.

Currently, the federal FMP sets MSST = 1-M(B_{MSY}), and B_{TARGET} = Biomass to achieve OY = Biomass at $F_{40\%SPR}$, with no values estimated (where M = natural mortality). Draft Amendment 18 to the Coastal Migratory Pelagics Fishery Management Plan had proposed to update the MSST value based on the results of the SEDAR 17 assessment of Atlantic migratory group

Spanish mackerel. However, the SEDAR 17 Review Panel did not accept the base assessment model as appropriate for making biomass determinations and did not accept estimates of stock abundance or biomass (SAFMC 2008). The Council plans to reexamine the values of the target and threshold when the next SEDAR assessment is completed.

The Omnibus Amendment will adopt at a minimum $B_{THRESHOLD}$ = [(1-M) or 0.5 whichever is greater]*B_{MSY}, and B_{TARGET} = Biomass to achieve OY, neither of which currently have point estimates. Should the Council later adopt point estimates for the target and threshold, the South Atlantic State/Federal Fisheries Management Board may review and adopt through Board action specific values for $B_{THRESHOLD}$ and B_{TARGET}.

Spot and Spotted Seatrout

The Omnibus Amendment does not implement biological reference points to define if the spot and spotted seatrout stocks are overfished or at target levels. There are no coastwide stock assessments for either species on which to base the biological reference points or develop estimates of stock size for comparison to the biological reference points. Should these species be assessed coastwide in the future, biological reference points can be adopted through adaptive management.

2.6. Stock Rebuilding Program

Should any of the stocks be defined as overfished or depleted, the Management Board will take action to recover the stock to the desired target level. Should it be determined that overfishing is occurring on any of the stocks, the Management Board will take action to reduce the rate of removals to at least the desired target level.

2.6.1. Stock Rebuilding Targets and Schedules

Spanish Mackerel

Should the stock be defined as overfished or experiencing overfishing, the South Atlantic Fishery Management Council will determine a stock rebuilding target and schedule consistent with the National Standard Guidelines. If the South Atlantic Fishery Management Council should determine a stock rebuilding target and schedule, this action will trigger review by the Spanish mackerel PRT and the South Atlantic Advisory Panel, in order to provide input on the process to the South Atlantic State/Federal Fisheries Management Board.

Spot and Spotted Seatrout

Should either stock be defined as overfished or experiencing overfishing, the South Atlantic State/Federal Fisheries Management Board will determine a stock rebuilding target and schedule.

2.6.2. Maintenance of Stock Structure

This omnibus amendment does not define current or desired stock structure for Spanish mackerel, spot, or spotted seatrout. Ideal stock structure, and appropriate management measures, can be determined if it becomes necessary through adaptive management.

2.7. Implementation Schedule

[Following the selection of management measures, the South Atlantic State/Federal Fisheries Management Board will establish a schedule to fully implement the Omnibus Amendment. This section will be written to reflect the implementation schedule.]

3. MONITORING PROGRAM SPECIFICATIONS / ELEMENTS

The South Atlantic Species Advisory Panel will meet as necessary to review the stock assessments for Spanish mackerel, spot, and spotted seatrout and all other relevant data pertaining to stock status. The Advisory Panel will forward its report and any recommendations to the Management Board.

The Spanish Mackerel, Spot, and Spotted Seatrout Plan Review Teams (PRTs) will annually review implementation of the management plan and any subsequent adjustments (addenda), and report to the Management Board on any compliance issues that may arise. The PRTs will also prepare the annual Spanish Mackerel, Spot, and Spotted Seatrout FMP Reviews and coordinate the annual update and prioritization of research needs (see **Section 6.2**).

3.1. Measurement of Annual Recruitment

Annual juvenile recruitment (appearance of juveniles in the ecosystem) of Spanish mackerel, spot, and spotted seatrout is measured through various fishery-independent, state and federal surveys in order to provide an indication of future stock abundance. When low numbers of young-of-year (age-0) fish are produced in a given year, recreational and commercial catch from that year-class may be lower when surviving fish become available to the fisheries. Recruitment is measured by sampling current year juvenile fish abundance in nursery areas.

The Omnibus Amendment includes no requirements regarding the measurement of annual juvenile recruitment, but recommends the continuation of surveys from which Spanish mackerel, spot, or spotted seatrout juvenile abundance indices are, or could be, developed (**Table 17**). These recommendations include surveys that have been used in past assessments (such as SEDAR, development of spot management triggers, or state-level stock assessments) and/or have been utilized previously to produce indices. Other surveys are included, as many of these have the potential to develop abundance indices from their data and provide a broader picture of the stocks' status. These indices are required in order to tune future stock assessments for these species. Efforts should be made to validate the ability of juvenile abundance indices to predict future year-class strength, as these indices can play a pivotal role in setting future catch levels and predicting trends in stock status.

3.2. Measurement of Relative Biomass/Abundance

Spanish mackerel, spot, and spotted seatrout are caught in various fishery-independent, state and federal surveys. Survey results are used to develop estimates of relative biomass or abundance. Relative abundance/biomass indices provide an indication of current stock size, and may also be used to tune future stock assessment for these species. The Omnibus Amendment encourages the continuation of surveys from which Spanish mackerel, spot, or spotted seatrout sub-adult and

adult abundance indices are, or could be, developed (**Table 17**), again with surveys that have been identified as currently important to measuring biomass along with other surveys that can be used to supplement information for these stocks.

3.3. Assessment of Stock Status

Spanish Mackerel

The South Atlantic State/Federal Fisheries Management Board recognizes the South Atlantic Fishery Management Council as the lead management body of (Atlantic coast) Spanish mackerel. As such, the ASMFC defers to the SAFMC on the schedule and procedures for assessing Spanish mackerel. Commission standards call for benchmark stock assessments to be completed every-five years (for those species that can and should be assessed on a coastwide basis). The Omnibus Amendment recommends the continued use of SEDAR for benchmark stock assessments of Spanish mackerel.

Spot

Spot have yet to be assessed on a coastwide basis. The Spot Plan Review Team (PRT) indicated that a defensible spot stock assessment may be possible once better bycatch and discard data are available, especially for the southern shrimp trawl fishery. The Omnibus Amendment encourages the collection and analysis of all data necessary to enable a spot stock assessment (see Section 6.1 for recommended data collection and analysis). When possible, spot should undergo a benchmark stock assessment every five years, as specified in Commission standards.

►► Issue 1. Assessment of Spot Stock Status

Option 1. Recommend data collection and analysis to enable future stock assessments.
Under this option, the paragraph above would be left as is.

Option 2. Implement a management trigger until a stock assessment can be completed.
Under this option, the paragraph above would be supplemented with the following information.

Until spot stock assessments can be completed on a regular basis, the Spot PRT will conduct an annual monitoring analysis, the results of which may trigger a recommendation for management action from the PRT to the South Atlantic State/Federal Fisheries Management Board. The results of the monitoring analysis will be reported to the Management Board as part of the annual Fishery Management Plan Review. The Management Board shall be the final arbiter in all management decisions.

The PRT has recommended the following management trigger:

The Management Board will be prompted to consider management action for spot when the terminal values in two of the relative abundance indices below, at least one of which must be from a fishery-independent data source, are equal to or below their respective data set's 10th percentile.

- Coastwide recreational landings (numbers), 1981 – present
- Coastwide commercial landings (pounds), 1950 – present
- SEAMAP–South Atlantic Trawl Survey catch-per-unit-effort (NC – FL data), 1989 – present
- NMFS Bottom Trawl Survey catch-per-unit effort (NY – NC data), 1972 – present
- Maryland DNR Chesapeake Bay Seine Survey catch-per-unit-effort, 1967 – present

The trigger would have prompted management consideration in 1996 (recreational landings and MD seine survey below the 10th percentile) and 1999 (recreational landings below the 10th percentile and SEAMAP survey equal to the 10th percentile) based on data through 2009 (**Table 18**). One index has been below the threshold value in each of the last five years (2005-2009).

The Management Board may later revise this section through adaptive management.

Discussion: The Management Board's preferred Option is Number 2.

Spotted Seatrout

Spotted seatrout have yet to be assessed on a coastwide basis and the Spotted Seatrout Plan Review Team does not support the completion of a coastwide stock assessment due to the localized population structure of the species. Several states have conducted state-specific or regional stock assessments. The Omnibus Amendment encourages all states in the management unit with significant fisheries for spotted seatrout to implement regularly scheduled state-specific or regional stock assessments.

The Management Board may later revise this section through adaptive management.

3.4. Summary of Fishery-Dependent Monitoring Programs

The Omnibus Amendment includes no requirements regarding fishery-dependent monitoring programs, but encourages all state fishery management agencies to pursue full implementation of the standards of the Atlantic Coastal Cooperative Statistics Program (ACCSP). The Management Board recommends a transitional or phased-in approach be adopted to allow for full implementation of the ACCSP standards. Until such time as the ACCSP standards are implemented, the Management Board encourages state fishery management agencies to initiate implementation of specific ACCSP modules, and/or pursue pilot and evaluation studies to assist in development of reporting programs to meet the ACCSP standards. The ACCSP partners are the 15 Atlantic coast states from Maine through Florida, the District of Columbia, the Potomac River Fisheries Commission, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the three fishery management councils, and the Atlantic States Marine Fisheries Commission. Participation by program partners in the ACCSP does not relieve states from their responsibilities in collating and submitting harvest/monitoring reports to the Commission as required under the Omnibus Amendment.

3.4.1. Catch, Landings, and Effort Data

Commercial Catch and Effort Data

The ACCSP's standard for commercial catch and effort statistics is mandatory, trip-level reporting of all commercially harvested marine species, with fishermen and/or dealers required to report standardized data elements for each trip by the tenth of the following month. Refer to the ACCSP Program Design document for more details on standardized data elements.

Recreational Catch and Effort Data

The ACCSP has selected the Marine Recreational Fisheries Statistics Survey (MRFSS) as the base program for recreational fishing data collection for shore and private boat fishing. The MRFSS provides statistics for finfish, but does not cover shellfish fisheries, which will require development of new surveys. The MRFSS combines data from two independent surveys to produce estimates of fishing effort, catch, and participation.

Household Telephone Survey for Effort Data

For private/rental boats and shore, fishing effort data should be collected through a random digit-dialed telephone survey of coastal county households until a comprehensive license-based sampling frame is established. A "wave" is a two-month sampling period, such as January through February (Wave 1) or March through April (Wave 2). The random-digit dialing survey for effort data is conducted in two-week periods that begin the last week of each wave and continue through the first week of the next wave.

Intercept Survey for Catch Data

Catch data for private/rental boats and shore fishing should be collected through an access-site intercept survey. State Partners are encouraged to increase their involvement in conducting the intercept survey. The ACCSP is addressing transition of conduct of the intercept survey for catch from a contractor to a cooperative agreement involving states at varying levels.

For-hire Catch and Effort Data

The ACCSP has selected the NOAA Fisheries For-Hire Survey as the preferred methodology for collecting data from charterboats and headboats (partyboats), also called the "for-hire" sector. The For-Hire Survey is similar to the MRFSS with two major improvements; it uses: 1) a telephone survey to collect fishing effort data from vessel representatives and 2) a validation process for the self-reported data. Catch data are collected in conjunction with the MRFSS with the addition of on-board samplers for headboats.

The independent survey components of the For-Hire Survey include: 1) a vessel effort survey; 2) an effort validation survey; 3) an access-site intercept survey for catch data; and 4) at-sea samplers on headboats for catch data. Using the data collected through these surveys, NOAA Fisheries generates catch and effort estimates for for-hire fisheries.

Vessel Telephone Survey for Effort Data

The vessel effort survey uses a coastwide directory of for-hire vessels as the sampling frame for for-hire fishing effort. The directory is continually updated as intercept and telephone interviewers identify changes in the fleet. Optimal sampling levels will be determined following evaluation of the Atlantic coast For-Hire Survey results from the first three years. Until the optimal sampling level is determined, a minimum of 10% of for-hire vessels or three charterboats and three headboats (whichever is greater), will be randomly sampled each week in each state. A vessel representative, usually the captain, is called and asked to provide information on the fishing effort associated with that vessel during the previous week. Vessel representatives are notified in advance that they have been selected for sampling and an example form is provided. To be included in the sample frame for particular wave, a vessel record must include: 1) at least one vessel representative's telephone number; 2) the name of the vessel or a vessel registration number issued by a state or the U.S. Coast Guard; 3) the county the boat operates from during that wave, and 4) designation as either a charter or guide boat (both called "charter") or headboat.

Validation Survey for Effort Data

To validate the self-reported effort data collected through the vessel telephone survey, field samplers periodically check access sites used by for-hire vessels to directly observe vessel effort. Interviewers record the presence or absence of a for-hire vessel from its dock or slip, and if the vessel is absent, they try to ascertain the purpose of the trip. Those observations are compared to telephone data for accuracy and to make any necessary corrections.

Catch Data

Vessels that meet the ACCSP definition of a charterboat, "typically hired on a per trip basis," are sampled for catch data through an intercept site survey of anglers at access points, similar to the MRFSS. The intercept survey has been in progress since 1981.

Some Partners collect for-hire effort data using VTRs, which are mandatory for some vessels and contain all minimum data elements collected by the For-Hire Survey. In areas where the survey runs concurrently with VTR programs, captains selected for the weekly telephone survey are permitted to fax their VTRs in lieu to being interviewed by phone.

At-sea Sampling of Headboats

At-sea samplers collect catch data aboard headboats, defined by the ACCSP as "any vessel-for-hire engaged in recreational fishing that typically is hired on a per person basis." Samples collected at-sea are supplemented by dockside sampling.

3.4.2. Biological Data

The ACCSP has set standards for how biological data should be collected and managed for commercial, recreational, and for-hire fisheries. Trained field personnel, known as port agents or field samplers, should obtain biological samples. Information should be collected through direct observation or through interviews with fishermen. Detailed fishery statistics and/or biological samples should be collected at docks, unloading sites, and fish houses. Biological sampling includes species identification of fish and shellfish; extraction of hard parts including spines and otoliths; and tissue samples such as gonads, stomachs, and scales.

3.4.3. Bycatch, Releases, and Protected Species Interactions Data

The ACCSP's bycatch standards include both quantitative and qualitative components. The quantitative components include at-sea sampling programs and collection of bycatch data through fisherman reporting systems. The qualitative components include sea turtle and marine mammal entanglement and stranding networks, beach bird surveys, and add-ons to existing recreational and for-hire intercept and telephone surveys. Specific fisheries priorities will be determined annually by the Bycatch Prioritization Committee.

3.4.4. Social and Economic Data

Commercial Fisheries

The ACCSP is testing its sociological and economic data collection standards for commercial harvesters. Standards for these kinds of data for dealers and fishing communities are in development with the Committee on Economics and Social Sciences. The ACCSP should collect baseline social and economic data on commercial harvesters using the following voluntary surveys:

- An annual fixed cost survey directed at the owner/operator,
- A trip cost survey to evaluate variable costs associated with a particular vessel's most recent commercial fishing trip to be directed at the vessel captain, and
- An annual owner/captain/crew/survey to gather sociological information.

Surveys may also be conducted using permit and registration data and vessel trip reports or sampling frames.

Recreational and For-hire Fisheries

The ACCSP's sociological and economic data for recreational and for-hire fisheries should come from periodic add-ons to existing telephone and intercept surveys. The standard is voluntary surveys of finfish fisheries conducted at least every three years.

3.5. Habitat Program

A periodic review should be conducted of the data resulting from the studies listed in **Table 17**. Particular attention should be directed toward what these data may indicate regarding habitat utilization and habitat condition (environmental parameters). A list of existing state and federal programs generating environmental data such as sediment characterization, contaminant analysis, and habitat coverage (marsh grass, oyster beds, SAV) should also be produced and those programs polled on a similar basis. Habitats utilized by this suite of species range from the fresh water dividing line out to, and likely beyond, the shelf break. Thus, virtually any study generating environmental data from estuarine or coastal ocean systems could be of value.

3.6. Bycatch Program

Bycatch is defined as "the portion of a catch taken incidentally to the targeted catch because of non-selectivity of the fishing gear to either species or size differences (ASMFC 1994). Bycatch can be divided into two components: incidental catch and discarded catch. Incidental catch refers to retained or marketable catch of non-targeted species, while discarded catch is the portion of the catch returned to the sea as a result of regulatory, economic, or personal considerations.

3.6.1. Spanish mackerel

Recreational
Spanish mackerel is primarily caught in Florida and North Carolina, whose total was 88.7% by mass of the 2010 recreational catch. Bycatch in the recreational fishery may be due to size limits (12" FL or 14" TL), bag limits (10 or 15 fish), or practicing catch-and-release. Of the states with consistent landings over the past ten years (Maryland to Florida), average release as a function of total catch ranged from 19.1% (Georgia) to 37.4% (Virginia).

Commercial
Florida and North Carolina dominate the Spanish mackerel commercial catch, bringing in 95.9% of the 2009 catch. Bycatch in the directed commercial fishery may be due to size requirements (12" FL) or potentially trip limits. In other fisheries, such as the South Carolina channel net, haul-seine, or shad gillnet fisheries, Spanish mackerel bycatch is possible. Observer data from these fisheries appears to be non-existent to limited, at best. However, all three of these fisheries are very limited spatially, seasonally, and in the number of participants. Additionally, spatial overlap between the shad fishery and Spanish mackerel individuals likely only occurs when they are too small to be taken by the large shad mesh (P. Webster, personal communication, 2011).

However, the biggest concern for commercial Spanish mackerel bycatch lies in the South Atlantic shrimp trawl fishery. Along with spot and Atlantic croaker, Spanish mackerel was also sometimes noted as one of the top finfishes in the South Atlantic shrimp trawl bycatch (Stender and Barans 1994). While more studies have evaluated the importance of BRDs and TEDs to decreasing the levels of spot bycatch, most studies have noted the presence of Spanish mackerel but recommended more studies. Towards this end, the Gulf and South Atlantic Fisheries Development Foundation and several states (North Carolina, South Carolina, Georgia, and

Florida) have evaluated finfish bycatch in the southeastern shrimp trawl fishery, including bycatch of Spanish mackerel. These studies concluded that BRDs are successful in decreasing the levels of bycatch, but without a broader and more complete data set, the full impacts of the bycatch on the Spanish mackerel populations are unknown.

3.6.2. Spot

Recreational

The main problem lies in the non-quantifiable incidental bycatch and discards mortality of small spot in non-directed fisheries. The spot recreational fishery itself has a large number of discards, with 2008 numbers indicating that 6.6 million spot were released live, the fourth highest in the MRFSS recreational time series. Releases have decreased since then, to about 3.8 million in 2010. Virginia (39.7%), Maryland (20.7%), and North Carolina (14.9%) account for the highest levels of catch (by pounds) and also high levels of bycatch releases. On average over the time series, Georgia had the highest release rate as a function of total catch (44.6%). Virginia, Maryland, and North Carolina all averaged release percentages less than 40% but still indicated high levels of release rates (34.3%, 39.9%, and 26.5%, respectively).

There are no size or creel limits, except for Georgia with 8" and 25, respectively. Thus, one can only guess that the high levels of releases may be due to the decision to practice catch-and-release or size-grading. Spot can also be susceptible to other recreational fishing, including charter and party boat fishing, but there are few data to rely upon for an estimate. Further, the release data assume that these fish were released alive but do not estimate release mortality. Releases represent, on average, 28% of the total recreational and commercial landings of spot.

Commercial

As stated for the recreational fisheries, the main problem lies in the non-quantifiable incidental bycatch and discards mortality of small spot in non-directed fisheries. In commercial fisheries, spot can be caught as bycatch in various gear-type fisheries. They can be a component of the bycatch in haul seine and pound net fisheries in the Chesapeake Bay and in North Carolina. Additionally the channel net fishery, haul-seine fishery, and a shad gillnet fishery in South Carolina potentially impact spot bycatch. However, the shad fishery operates in generally fresh waters and utilizes a large mesh size, which would not be likely to impact juvenile lifestages that might venture inland. Similarly, the channel net fishery uses large mesh sizes that will likely exclude spot and is limited in scope. The haul-seine fishery is directed at spot. As such, there are landings data for this fishery when it occurs. Effort in this fishery is extremely limited in scope spatially, seasonally, and in number of participants. Discards potentially exist for spot within its own commercial fishery in other states, but there are no size restrictions except for Georgia, which has not recorded commercial landings for spot since 1995 (< 0.005% of coastwide landings that year).

The largest impact to spot via bycatch is through the South Atlantic shrimp trawl fishery. To combat these high bycatch levels, which can result in discards or landings depending upon market conditions, considerable progress has been made in developing and implementing the use of bycatch reduction devices (BRDs) in the shrimp trawl and other fisheries. North Carolina Division of Marine Fisheries (NCDMF) conducted research on the four main gear types (shrimp

trawl, flynet, long haul seine, and pound net) responsible for the bulk of the scrap fish landings in order to reduce the catch of small fish (1993). State testing of shrimp trawl BRDs achieved finfish reductions of 50-70% with little loss of shrimp. North Carolina now requires escapement panels in bunt nets of long haul seines in an area of the Pamlico Sound. The Virginia Marine Resources Commission investigated the use of culling panels in pound nets and long haul seines to release small croaker, spot, and weakfish. The Potomac River Fisheries Commission (PRFC) also investigated and now highly recommends the use of culling panels in pound nets, finding that the panels allowed the release of 28% of captured spot less than six inches in length.

From these research efforts, perhaps the most important outcome is the required use of BRDs in all penaeid shrimp trawl fisheries, both federal and state, in the South Atlantic. McDonough (2010) prepared a white paper review of studies performed on the bycatch of spot in the shrimp trawl fisheries, which gave broad ranges of catch ratios. On average by weight, spot were caught at a ratio to shrimp of 1.3 : 1 per hour of trawling, with a range from 0.16 - 15.0 : 1. Most studies cited occurred after Turtle Excluder Devices (TEDs, 1987) were required but before the requirement for BRDs (1997/8). The National Marine Fisheries Service required a bycatch reduction of at least 30% to certify a particular BRD design for use. The collection of studies reviewed by McDonough (2010) indicated that levels of BRD-reduced bycatch ranged from an increase of 12.2% to a decrease of 87.0%, but the majority of the studies indicated a bycatch reduction of at least 30%.

While the requirements for TEDs and BRDs in the shrimp trawl fisheries have made a significant decrease in bycatch, data are still lacking to effectively estimate the full impact of the finfish bycatch on the spot populations.

3.6.3. Spotted seatrout

Recreational

Anglers target spotted seatrout in nearly all inshore waters, from the beaches to far up coastal rivers and creeks, including the surf, piers and jetties. Since 2005, spotted seatrout has ranked first in species targeted in the South Atlantic. Spotted seatrout are discarded (released alive) for a variety of reasons including catch under the legal size limit, over the creel limit, or conservative catch and release practices. MRFSS provides estimates of discards and identifies the disposition of fish released. Approximately 88% of discards are released because of the minimum size limit (NCDMF 2010). Hooking mortality rates for spotted seatrout have been documented to range from 4.6% to 55.6%, indicating large variability in mortality (see below).

Hooking Mortality

Study	Mortality	Area	Notes
Matlock and Dailey (1981)	up to 55.6%	TX	
Matlock et al. (1993)	7.3%	TX	
Hegen et al. (1983)	37%	TX	
Stunz and McKee (2006)	11%	TX	Incorporated angler experience level in study design
Murphy et al. (1995)	4.6%	FL	
Thomas et al. (1997)	17.5%	LA	
Duffy (1999)	9.1%	AL	
Duffy (2002)	14.6%	AL	
Gearhart (2002)	14.8%	NC (River & Outer Banks sites in Pamlico, Core, & Roanoke sounds)	Covers a wide area in NC
Brown (2007)	25.2%	NC (Neuse River)	Problems with DO in holding pens

Commercial

Bycatch of spotted seatrout can occur within its own commercial fishery, as well as other fisheries for crustaceans and finfish. Monitoring efforts vary from state to state and can include dockside and at-sea sampling programs, in addition to fishery-independent sampling programs. In North Carolina, undersized spotted seatrout were rarely observed in the sampling of commercial fisheries (NCDMF, unpublished data, 2007), as spotted seatrout are likely to pass through mesh sizes that dominate the commercial fishery. Undersized spotted seatrout were also rare in North Carolina's fishery-independent gill net sampling programs, which use mesh sizes typical for the commercial fishery (NCDMF, unpublished data, 2007). Undersized spotted seatrout were rarely seen by at-sea observers aboard North Carolina commercial gill net boats (B. Price, NCDMF, personal communication, 2010?), or in other gears that were not usually intended to harvest seatrout, such as shrimp or crab trawls (S. McKenna, NCDMF, personal communication, 2010?).

The South Carolina shrimp trawl fishery, channel net fishery, the haul-seine fishery (directed at spot), and the shad gillnet fishery may capture spotted seatrout as bycatch. The shad fishery operates in generally fresh waters and utilizes a large mesh size which would not be likely to impact juvenile lifestages, which might venture inland. There do not appear to be any observer data available regarding possible bycatch of spotted seatrout in the haul-seine fishery. Effort in this fishery is extremely limited in scope, including spatially, seasonally, and in the number of participants. The channel net fishery is similarly limited in scope and also appears to lack current observer data, though very limited observer data exist for a two year window ca. 2006-2007 (P. Webster, Personal Communication, 2011). These limited data indicate that young spotted seatrout were present but rare. This fishery's spatial and temporal scope are restricted to small windows and thus greatly reduce bycatch interactions with spotted seatrout.

Other data available for estimating the mortality rate of the commercial harvest, in North Carolina only, is limited to mortality estimates of gill nets. Data includes gill net mortality estimates from a small mesh gill net mortality study (Program 464), the independent gill net data (Program 915), and observer data (Program 466). The observer data set is very limited, and

cannot be used for estimates. From these limited data, the 2009 spotted seatrout stock assessment used a commercial discard mortality rate of 60%.

The South Atlantic shrimp trawl fishery is potentially a threat to the spotted seatrout fishery throughout its range, although this particular species is rarely, if ever, mentioned in bycatch studies. With the requirement now that all shrimp trawls must used BRDs, the bycatch of finfish has decreased. However, without species-specific behavior studies, the effectiveness of BRDs on spotted seatrout is unknown. Direct applicability of data from fishery-independent surveys are questionable, due to differences of fishing methodology. However, the 75' high-rise trawls utilized by the SEAMAP-SA Coastal Survey working near-shore waters from Cape Hatteras, NC to Cape Canaveral, FL have yielded very few individuals of spotted seatrout (Pearse Webster, SCDNR pers. comm.)

3.6.4. Bycatch monitoring recommendations

The shrimp trawl fishery is the only fishery with a broad enough temporal and spatial distribution of effort, and level of effort to merit possible scrutiny. There is no coastwide observer program for the shrimp trawl fishery, although data do exist from short-term or localized observer efforts in the past. For example, the Georgia Department of Natural Resources requires the use of bycatch reduction devices (BRDs) and turtle excluder devices (TEDs) in commercial food shrimp and whelk trawlers. Observers are placed onboard commercial food shrimp trawlers, commercial whelk trawlers, commercial bait shrimp trawlers, and with commercial cast netters to collect information on the catch of non-targeted species. Given the broad number of species potentially impacted by the shrimp trawl fishery, some form of formal observer coverage is encouraged, recognizing limits such as space constraints on smaller vessels. States should continue to encourage monitoring and reporting of bycatch in other fisheries, such as the pound net and haul-seine and recreational fisheries.

4. MANAGEMENT PROGRAM IMPLEMENTATION

4.1. Recreational Fisheries Management Measures

Options for recreational fisheries management measures for Spanish mackerel, spot, and spotted seatrout are provided below.

►► Issue 2: Recreational Fisheries Management Measures

	Option 1:	**Option 2:**	**Option 3:**
Spanish mackerel	Status quo (no coastwide ASMFC requirements)	Implement coastwide ASMFC requirements consistent with Federal FMP 2a) 12" FL or 14" TL minimum size limit 2b) 10 fish creel limit (Council preferred option in Amendment 18) 2c) Must be landed with head and fins intact 2d) Calendar year season 2e) Charter/headboat operators must possess species permit and comply with bag limits 2f) Permitted gear: Hook-and-line, run around nets, stab nets, cast nets, surface longline Vessels with coastal migratory permit fishing for or possessing Spanish mackerel on Florida's east coast limited to 2 run-around gill nets of different mesh sizes, neither of which may exceed 800 yards and only one may be fished at a time; Max soak time is 1 hour and nets must be marked with a max of 9 dissimilar floats spaced no greater than 100 yards Drift gill nets prohibited south of Cape Lookout, NC 2g) Recreational quotas decreased, via reduced bag limits, the following year if ACL overage, regardless of stock status (Council preferred option in Amendment 18)	Implement alterative coastwide ASMFC requirements 3a) X" FL/TL minimum size limit 3b) X fish creel limit 3c) Can be landed without head and fins intact 3d) X year season 3e) No specific permit for charter/headboat operators; must comply with bag limits 3f) No/X gear restrictions 3g) Management measures/quota accountability 3h) Any other recreational requirement selected by the Management Board

Discussion: The Management Board's preferred option is Number 2.

	Option 1:	**Option 2:**
Spot	Status quo (no coastwide ASMFC requirement)	Implement coastwide ASMFC requirement(s) 2a) Management triggers 2b) Any requirement(s) selected by the Management Board, including but not limited to: minimum size limit, maximum size limit, creel limit, fishing season, space/time closure, gear requirements, quota or cap

Discussion: The Management Board's preferred option is Number 2.

	Option 1:	**Option 2:**
Spotted seatrout	Status quo (no coastwide ASMFC requirement)	Implement coastwide ASMFC requirement(s) 2a) 12" TL minimum size limit with comparable mesh size limitations 2b) Implement monitoring and management measures to reach a 20% Spawning Potential Ratio 2c) Any requirement(s) selected by the Management Board, including but not limited to: minimum size limit, maximum size limit, creel limit, fishing season, space/time closure, gear requirements, quota or cap

Discussion: The Management Board's preferred option is Number 2.

4.2. Commercial Fisheries Management Measures

Options for commercial fisheries management measures for Spanish mackerel, spot, and spotted seatrout are provided below.

►► Issue 3: Commercial Fisheries Management Measures

	Option 1:	**Option 2:**	**Option 3:**
Spanish mackerel	Status quo (no coastwide ASMFC requirement)	Implement coastwide ASMFC requirement consistent with federal FMP 2a) Permit requirement to land Spanish mackerel 2b) Allowed gears: automatic reel, bandit gear, rod & reel, cast net, run-around gill net, stab net Prohibited: purse seines; drift gill nets south of Cape Lookout, NC) 2c) 3.5" stretched minimum mesh size for run-around gill nets 2d) 12" FL or 14" TL minimum size limit 2e) March 1 – end of February season 2f) Trip limits (per vessel, per day) NY-GA: 3500 lbs FL: 3500 lbs, 3/1-11/30; 3500 lbs Mon-Fri & 1500 lbs Sat-Sun, 12/1 until 75% adjusted quota taken; 1000 lbs, when 75% adjusted quota taken until 100% adjusted quotas taken; 500 lbs after 100% of adjusted quotas taken (the adjusted quota compensates for estimated catches of 500 lbs per vessel per day to the end of the season) 2g) Commercial harvest, possession and retention prohibited when the quota is met (Council preferred option in Amendment 18) 2h) Commercial quotas decreased the following year if ACL overage, regardless of stock status (Council preferred option in Amendment 18)	Implement alterative coastwide ASMFC requirement 3a) No specific permit requirement 3b) X gears allowed 3c) No/X" stretched minimum mesh size for run-around gill nets 3d) No/X" FL/TL minimum size limit 3e) X fishing season 3f) No/X trip limits 3g) Management measures/quota accountability 3h) Any other commercial requirement selected by the Management Board

Discussion: The Management Board's preferred option is Number 2.

	Option 1:	**Option 2:**
Spot	Status quo (no coastwide ASMFC requirement)	Implement coastwide ASMFC requirement 2a) Management triggers Any requirement(s) selected by the Management Board, including but not limited to: minimum size limit, maximum size limit, trip limit, fishing season, space/time closure, gear requirements, quota or cap

Discussion: The Management Board's preferred option is Number 2.

	Option 1:	**Option 2:**
Spotted seatrout	Status quo (no coastwide ASMFC requirement)	Implement coastwide ASMFC requirement 2a) 12" TL minimum size limit with comparable mesh size limitations 2b) Any requirement(s) selected by the Management Board, including but not limited to: minimum size limit, maximum size limit, trip limit, fishing season, space/time closure, gear requirements, quota or cap

Discussion: The Management Board's preferred option is Number 2.

4.3. Habitat Conservation and Restoration

1. Where sufficient knowledge is available, states should designate Spot, Spotted seatrout, and/or Spanish mackerel habitat areas of particular concern for special protection. These locations should be accompanied by requirements that limit degradation of habitat, including minimization of non-point source and specifically storm water runoff, prevention of significant increases in contaminant loadings, and prevention of the introduction of any new categories of contaminants into the area.
2. Where habitat areas have already been identified and protected, states should ensure continued protection of these areas by notifying and working with other federal, state, and local agencies. States should advise these agencies of the types of threats to Spot, Spotted seatrout, and/or Spanish mackerel populations and recommend measures that should be employed to avoid, minimize, or eliminate any threat to current habitat quality or quantity.
3. States should minimize loss of wetlands to shoreline stabilization by using the best available information, incorporating erosion rates, and promoting incentives for use of alternatives to vertical shoreline stabilization measures, commonly referred to as living shorelines projects.
4. All State and Federal agencies responsible for reviewing impact statements and permit applications for projects or facilities proposed for Spot, Spotted seatrout, and/or Spanish mackerel spawning and nursery areas should ensure that those projects will have no or only minimal impact on local stocks. Any project that would result in the elimination of essential habitat should be avoided, if possible, or at a minimum, adequately mitigated.
5. Each State should establish windows of compatibility for activities known or suspected to adversely affect Spot, Spotted seatrout, and/or Spanish mackerel life stages and their habitats. Activities may include, but are not limited to, navigational dredging, bridge

construction, and dredged material disposal, and notify the appropriate construction or regulatory agencies in writing.

6. Each state should develop water use and flow regime guidelines, where applicable, to ensure that appropriate water levels and salinity levels are maintained for the long-term protection and sustainability of the stocks. Projects involving water withdrawal or interrupt water flow should be evaluated to ensure that any impacts are minimized, and that any modifications to water flow or salinity regimes maintain levels within Spot, Spotted seatrout, and/or Spanish mackerel tolerance limits.
7. The use of any fishing gear that is determined by management agencies to have a negative impact on Spot, Spotted seatrout, and/or Spanish mackerel habitat should be prohibited within habitat areas of particular concern. Further, states should protect vulnerable habitat from other types of non-fishing disturbance as well.
8. States should work with the U.S. Fish and Wildlife Service's Divisions of Fish and Wildlife Management Assistance and Ecological Services, and National Marine Fisheries Service's Offices of Fisheries Conservation and Management and Habitat Conservation, to identify hydropower and water control structures that pose significant threats to maintenance of appropriate freshwater flows (volume and timing) to Spot, Spotted seatrout, and/or Spanish mackerel nursery and spawning areas and target these dams for appropriate recommendations during FERC re-licensing.
9. States should conduct research to evaluate the role of submerged aquatic vegetation (SAV) and other submersed structures in the spawning success, survival, growth and abundance of Spot, Spotted seatrout, and Spanish mackerel. This research could include regular mapping of the bottom habitat in identified areas of concern, as well as systematic mapping of this habitat where it occurs in estuarine and marine waters of the states.
10. States should continue support for habitat restoration projects, including oyster shell recycling and oyster hatchery programs as well as seagrass restoration, to provide areas of enhanced or restored bottom habitat. Existing examples associated with the state administrative agencies include:
    - North Carolina Coastal Habitat Protection Plan community oyster and habitat restoration projects
    - South Carolina Oyster Restoration and Enhancement (SCORE)
    - Generating Enhanced Oyster Reefs in Georgia's Inshore Areas (GEORGIA) oyster shell recycling program
    - Florida Fish and Wildlife Conservation Commission estuarine and marine habitat conservation and restoration programs
11. Water quality criteria for Spot, Spotted seatrout, and Spanish mackerel spawning and nursery areas should be established, or existing crieteria should be upgraded, so as to ensure successful reproduction of these species. Any action taken should be consistent with Federal Clean Water Act guidelines and specifications.
12. State fishery regulatory agencies, in collaboration with state water quality agencies, should monitor water quality in known habitat for Spot, Spotted seatrout, and/or Spanish mackerel, including turbidity, nutrient levels, and dissolved oxygen.
13. States should work to reduce point-source pollution from wastewater through such methods as improved inspections of wastewater treatment facilities and improved maintenance of collection infrastructure.

14. States should develop protocols and schedules for providing input on water quality regulations and on Federal permits and licenses required by the Clean Water Act, Federal Power Act, and other appropriate vehicles, to ensure that Spot, Spotted seatrout, and Spanish mackerel habitats are protected and water quality needs are met.

4.4. Alternative State Management Regimes

Once approved by the South Atlantic State/Federal Fisheries Management Board, states are required to obtain prior approval from the Management Board of any changes to their management program for which a compliance requirement is in effect. Changes to non-compliance measures must be reported to the Management Board but may be implemented without prior Management Board approval. A state can request permission to implement an alternative to any mandatory compliance measure only if that state can show to the Management Board's satisfaction that its alternative proposal will have the same conservation value as the measure contained in this amendment or any addenda prepared under Adaptive Management (***Section 4.5***). States submitting alternative proposals must demonstrate that the proposed action will not contribute to overfishing of the resource. All changes in state plans must be submitted in writing to the Board and to the Commission either as part of the annual FMP Review process or the Annual Compliance Reports.

4.4.1. General Procedures

A state may submit a proposal for a change to its regulatory program or any mandatory compliance measure under the Omnibus Amendment to the Commission, including a proposal for *de minimis* status. Such changes shall be submitted to the Chair of the Plan Review Team, who shall distribute the proposal to the Management Board, the Plan Review Team, the Technical Committee, the Stock Assessment Committee, and the Advisory Panel.

The Plan Review Team is responsible for gathering the comments of the Technical Committee, the Stock Assessment Committee and the Advisory Panel, and presenting these comments as soon as possible to the Management Board for decision.

The South Atlantic State/Federal Fisheries Management Board will decide whether to approve the state proposal for an alternative management program if it determines that it is consistent with the "target fishing mortality rate applicable", and the goals and objectives of this amendment.

4.4.2. Management Program Equivalency

The appropriate Technical Committee (i.e., Spanish mackerel, spot, or spotted seatrout), under the direction of the appropriate Plan Review Team, will review any alternative state proposals under this section and provide to the South Atlantic State/Federal Fisheries Management Board its evaluation of the adequacy of such proposals.

Following the first full year of implementation of an alternate management program, the appropriate Plan Review Team will have the responsibility of evaluating the effects of the

program to determine if the measures were actually equivalent with the standards in the Omnibus Amendment (or addenda to the amendment). The PRT will report to the Management Board on the performance of the alternate program.

4.4.3. *De Minimis* Fishery Guidelines

The ASMFC Interstate Fisheries Management Program Charter defines *de minimis* as "a situation in which, under the existing condition of the stock and scope of the fishery, conservation, and enforcement actions taken by an individual state would be expected to contribute insignificantly to a coastwide conservation program required by a Fishery Management Plan or amendment" (ASMFC 2009a).

States may petition the South Atlantic State/Federal Fisheries Management Board at any time for *de minimis* status. Once *de minimis* status is granted, designated states must submit annual reports including commercial and recreational landings to the Management Board justifying the continuance of *de minimis* status. States must include *de minimis* requests as part of their annual compliance reports.

►► Issue 4: *De Minimis* Criteria
Options for the *de minimis* criteria for Spanish mackerel, spot, and spotted seatrout are provided below.

States may apply for *de minimis* status, if for the preceding three years for which data are available, their average commercial landings or recreational landings (by weight) constitute less than **X** percent of the average coastwide commercial or recreational landings for the same period. A state that qualifies for *de minimis* based on their commercial landings will qualify for exemptions in their commercial fishery only, and a state that qualifies for *de minimis* based on their recreational landings will qualify for exemptions in their recreational fishery only.

Option 1: X = 1% States may apply for *de minimis* status, if for the preceding three years for which data are available, their average commercial landings and recreational landings (by weight) constitute less than **1**% of the average coastwide commercial and recreational landings for the same three-year period.
Option 2: X = 2% States may apply for *de minimis* status, if for the preceding three years for which data are available, their average commercial landings and recreational landings (by weight) constitute less than **2**% of the average coastwide commercial and recreational landings for the same three-year period.
Option 3: X = 3% States may apply for *de minimis* status, if for the preceding three years for which data are available, their average commercial landings and recreational landings (by weight) constitute less than **3**% of the average coastwide commercial and recreational landings for the same three-year period.

Species	**Landings cut-off and states that qualify for *de minimis* status under each option, based on 2007 – 2009 data** (Data from pers. comm. with ACCSP, Washington, DC)		
	Option 1 = 1%	***Option 2 = 2%***	***Option 3 = 3%***
Spanish Mackerel	52,838 lbs ME, NH, MA, RI, CT, NY, NJ, DE, MD, GA	105,676 lbs ME, NH, MA, RI, CT, NY, NJ, DE, MD, **SC**, GA	158,513 lbs ME, NH, MA, RI, CT, NY, NJ, DE, MD, SC, GA
Spot	89,974 lbs ME, NH, MA, RI, CT, NY, NJ, GA, FL	179,948 lbs ME, NH, MA, RI, CT, NY, NJ, **DE**, SC, GA, FL	269,922 lbs ME, NH, MA, RI, CT, NY, NJ, DE, SC, GA, FL
Spotted Seatrout	27,814 lbs ME, NH, MA, RI, CT, NY, NJ, DE, MD	55,630 lbs ME, NH, MA, RI, CT, NY, NJ, DE, MD	83,446 lbs ME, NH, MA, RI, CT, NY, NJ, DE, MD

Discussion: The Management Board's preferred option is a 1% *de minimis* threshold for commercial and recreational landings combined.

4.4.4. *De Minimis* Exemptions

For Spanish mackerel, *de minimis* states are not required to implement **XXXXXXX** mandatory compliance elements of this omnibus amendment, except for **XXXXXX**.

For spot, *de minimis* states are not required to implement **XXXXXXX** mandatory compliance elements of this omnibus amendment, except for **XXXXXX**.

For spotted seatrout, *de minimis* states are not required to implement **XXXXXXX** provisions of this omnibus amendment, except for **XXXXXX**.

(Possible Alternative: For spot/seatrout, *de minimis* states are not exempt from any of the mandatory compliance elements in this omnibus amendment, because the only requirement is the annual compliance report. When in the future additional mandatory compliance elements are adopted, exemptions for *de minimis* states will be defined.)

4.5. Adaptive Management

The South Atlantic State/Federal Fisheries Management Board may vary the requirements specified in this amendment as a part of adaptive management in order to conserve the Spanish mackerel, spot, and spotted seatrout resources. Specifically, the Management Board may change target fishing mortality rates and harvest specifications, or other measures designed to prevent overfishing of the stock complex or any spawning component. Such changes will be instituted to be effective on the first fishing day of the following year, but may be put in place at an alternative time when deemed necessary by the Management Board. These changes should be

discussed with the appropriate federal representatives and Councils prior to implementation in order to be complementary to the regulations for the EEZ.

4.5.1. General Procedures

The Plan Review Teams (PRTs) will monitor the status of the fisheries and the resources and report on that status to the South Atlantic State/Federal Fisheries Management Board annually, or when directed to do so by the Management Board. The PRTs will consult with the appropriate Technical Committee, Stock Assessment Committee, and Advisory Panel, if any, in making such review and report. The report will contain recommendations concerning proposed adaptive management revisions to the management program.

The South Atlantic State/Federal Fisheries Management Board will review the report of the PRT, and may consult further with the Technical Committee, Stock Assessment Committee, or Advisory Panel. The Management Board may, based on the PRT Report or on its own discretion, direct the PRT to prepare an addendum to make any changes it deems necessary. The addendum shall contain a schedule for the states to implement its provisions.

The PRT will prepare a draft addendum as directed by the Management Board, and shall distribute it to all states for review and comment. A public hearing will be held in any state that requests one. The PRT will also request comment from federal agencies and the public at large. After a 30-day review period, the PRT will summarize the comments and prepare a final version of the addendum for the Management Board.

The Management Board shall review the final version of the addendum prepared by the PRT, and shall also consider the public comments received and the recommendations of the Technical Committee, Stock Assessment Committee, and Advisory Panel; and shall then decide whether to adopt or revise and, then, adopt the addendum.

Upon adoption of an addendum implementing adaptive management by the Management Board, states shall prepare plans to carry out the addendum, and submit them to the Management Board for approval according to the schedule contained in the addendum.

4.5.2. Measures Subject to Change

The following measures are subject to change under adaptive management upon approval by the South Atlantic State/Federal Fisheries Management Board:

(1) Fishing year and/or seasons;
(2) Area closures;
(3) Overfishing definition, MSY and OY;
(4) Rebuilding targets and schedules;
(5) Catch controls, including bag and size limits;
(6) Effort controls;
(7) Bycatch allowance
(8) Reporting requirements;

(9) Gear limitations;
(10) Measures to reduce or monitor bycatch;
(11) Observer requirements;
(12) Management areas;
(13) Recommendations to the Secretaries for complementary actions in federal jurisdictions;
(14) Research or monitoring requirements;
(15) Frequency of stock assessments;
(16) De minimis specifications;
(17) Management unit;
(18) Maintenance of Stock Structure
(19) Catch allocation; and
(20) Any other management measures currently included in the Omnibus Amendment.

4.6. Emergency Procedures

Emergency procedures may be used by the South Atlantic State/Federal Fisheries Management Board to require any emergency action that is not covered by or is an exception or change to any provision in the Omnibus Amendment. Procedures for implementation are addressed in the ASMFC Interstate Fisheries Management Program Charter, Section Six (c)(10) (ASMFC 2009a).

4.7. Management Institutions

The management institution for Spanish mackerel, spot, and spotted seatrout shall be subject to the provisions of the ISFMP Charter (ASMFC 2009a). The following is not intended to replace any or all of the provisions of the ISFMP Charter. All committee roles and responsibilities are included in detail in the ISFMP Charter and are only summarized here.

4.7.1. ASMFC and the ISFMP Policy Board

The ASMFC and the ISFMP Policy Board are generally responsible for the oversight and management of the Commission's fisheries management activities. The Commission must approve all fishery management plans and amendments, including this Omnibus Amendment, and must also make all final determinations concerning state compliance or non-compliance. The ISFMP Policy Board reviews any non-compliance recommendations of the various Management Boards and Sections and, if it concurs, forwards them on to the Commission for action.

4.7.2. South Atlantic State/Federal Fisheries Management Board

The South Atlantic State/Federal Fisheries Management Board was established under the provisions of the Commission's ISFMP Charter (Section Four; ASMFC 2009a) and is generally responsible for carrying out all activities under this Omnibus Amendment.

The South Atlantic State/Federal Fisheries Management Board (Management Board) establishes and oversees the activities of each species' Plan Development or Plan Review Team, Technical Committees and Stock Assessment Subcommittee, and Advisory Panel. Among other things, the Management Board makes changes to the management program under adaptive management and

approves state programs implementing the amendment and alternative state programs under ***Sections 4.4*** **and** ***4.5***. The Management Board reviews the status of state compliance with the management program at least annually, and if it determines that a state is out of compliance, reports that determination to the ISFMP Policy Board under the terms of the ISFMP Charter.

4.7.3. Plan Development and Plan Review Teams

Plan Development Teams (PDTs) and Plan Review Team (PRTs) for Spanish mackerel, spot, and spotted seatrout will be composed of a small group of scientists and/or managers whose responsibility is to provide all of the technical support necessary to carry out and document the decisions of the South Atlantic State/Federal Fisheries Management Board. An ASMFC FMP Coordinator chairs each PDT or PRT. The PDTs and PRTs are directly responsible to the Management Board for providing information and documentation concerning the implementation, review, monitoring and enforcement of the species management plans. Each PDT and PRT shall be comprised of personnel from state and federal agencies who have scientific and management ability and knowledge of the relevant species. A multi-species PDT is responsible for preparing all documentation necessary for the development of the Omnibus Amendment, using the best scientific information available and the most current stock assessment information. The PDT will either disband or assume inactive status upon completion of the Omnibus Amendment. Alternatively, the Board may elect to retain PDT members as members of the species-specific PRTs or appoint new members. Each PRT will provide annual advice concerning the implementation, review, monitoring, and enforcement of the Omnibus Amendment once it has been adopted by the Commission.

4.7.4. Technical Committees

No technical committees currently exist for Spanish mackerel, spot, and spotted seatrout; however, the Management Board may elect to form a technical committee for any or all of the species in the future. Each Technical Committee would consist of representatives from state or federal agencies, Regional Fishery Management Councils, Commission, university or other specialized personnel with scientific and technical expertise and knowledge of the relevant species. The Management Board will appoint the members of a Technical Committee and may authorize additional seats as it sees fit. Its role is to act as a liaison to the individual state and federal agencies, provide information to the management process, and review and develop options concerning the management program. The Technical Committee will provide scientific and technical advice to the Management Board, PDT, and PRT in the development and monitoring of a fishery management plan or amendment.

4.7.5. Stock Assessment Subcommittees

No stock assessment subcommittees currently exist for Spanish mackerel, spot, and spotted seatrout, but they may be formed in the future. A Stock Assessment Subcommittee may be appointed by the relevant species' Technical Committee at the request of the Management Board, and will consist of scientists with expertise in the assessment of the relevant population. Its role is to assess the species population and provide scientific advice concerning the implications of proposed or potential management alternatives, or to respond to other scientific

questions from the Management Board, Technical Committee, PDT or PRT. A Stock Assessment Subcommittee reports to its Technical Committee.

4.7.6. Advisory Panel

The South Atlantic Species Advisory Panel was established according to the Commission's Advisory Committee Charter. Members of the Advisory Panel are citizens who represent a cross-section of commercial and recreational fishing interests and others who are concerned about the conservation and management of Spanish mackerel, spot, and spotted seatrout, as well as red drum and Atlantic croaker. The Advisory Panel provides the Management Board with advice directly concerning the Commission's management program for these five species.

4.7.7. Federal Agencies

4.7.7.1. Management in the Exclusive Economic Zone (EEZ)

Management of Spanish mackerel, spot, and spotted seatrout in the EEZ is within the jurisdiction of the Mid Atlantic and South Atlantic Fishery Management Councils under the Magnuson-Stevens Fishery Conservation and Management Act, as amended (16 U.S.C. 1801 et seq.). In the absence of a Council Fishery Management Plan for spot or spotted seatrout, management of these two species is the responsibility of the National Marine Fisheries Service (NMFS) as mandated by the Atlantic Coastal Fisheries Cooperative Management Act (16 U.S.C. 5105 et seq.).

4.7.7.2. Federal Agency Participation in the Management Process

The Commission has accorded the United States Fish and Wildlife Service (USFWS) and the NMFS voting status on the ISFMP Policy Board and the South Atlantic State/Federal Fisheries Board in accordance with the Commission's ISFMP Charter. The NMFS and USFWS may also participate on the Management Board's supporting committees described in *Sections 4.7.3-4.7.6*.

4.7.7.3. Consultation with Fishery Management Councils

In carrying out the provisions of this Omnibus Amendment, the states, as members of the South Atlantic State/Federal Fisheries Management Board, shall closely coordinate with the Mid Atlantic and South Atlantic Fishery Management Councils in order to cooperatively manage the Atlantic coast populations of Spanish mackerel, spot, and spotted seatrout. In accordance with the Commission's ISFMP Charter, a representative of the South Atlantic Fishery Management Council shall be invited to participate as a full member of the South Atlantic State/Federal Fisheries Management Board.

4.7.8. Recommendations to the Secretaries for Complementary Actions in Federal Jurisdictions

[Recommendations to the Secretaries for complementary actions in federal jurisdictions will be developed by the South Atlantic State/Federal Fisheries Management Board upon selection of management options for implementation in state waters.]

4.7.9. Cooperation with Other Management Institutions

In carrying out the Spanish mackerel provisions of the Omnibus Amendment, the states, as members of the South Atlantic State/Federal Fisheries Management Board, shall closely coordinate with the Mid Atlantic and South Atlantic Fishery Management Councils in order to cooperatively manage the Spanish mackerel population. In accordance with the Commission's ISFMP Charter, a representative of the South Atlantic Fishery Management Council participates as a full member of the South Atlantic State/Federal Fisheries Management Board.

At this time, no other management institutions have been identified that would be involved with management of spot or spotted seatrout on the Atlantic coast. Nothing in the Omnibus Amendment precludes the coordination of future management collaborations with other management institutions should the need arise.

5. COMPLIANCE

Full implementation of the provisions of the Omnibus Amendment is necessary for the management program to be equitable, efficient, and effective. States are expected to implement these measures faithfully under state laws. Although the Atlantic States Marine Fisheries Commission does not have authority to directly compel state implementation of these measures, it will continually monitor the effectiveness of state implementation and determine whether states are in compliance with the provisions of this fishery management plan. This section sets forth the specific elements states must implement in order to be in compliance with this fishery management plan, and the procedures that will govern the evaluation of compliance. Additional details of the procedures are found in the ASMFC Interstate Fisheries Management Program Charter (ASMFC 2009a).

5.1. Mandatory Compliance Elements for States

A state will be determined to be out of compliance with the provisions of this fishery management plan, according to the terms of Section Seven of the ISFMP Charter if:

- its regulatory and management programs to implement *Section 4* have not been approved by the South Atlantic State/Federal Fisheries Management Board; or
- it fails to meet any schedule required by *Section 5.1.2*, or any addendum prepared under adaptive management (*Section 4.5*); or
- it has failed to implement a change to its program when determined necessary by the South Atlantic State/Federal Fisheries Management Board; or
- it makes a change to its regulations required under *Section 4.4* or any addendum prepared under adaptive management (*Section 4.5*), without prior approval of the South Atlantic State/Federal Fisheries Management Board.

5.1.1. Mandatory Elements of State Programs

To be considered in compliance with this fishery management plan, all state programs must include harvest controls on Spanish mackerel, spot, and spotted seatrout consistent with the

requirements of *Sections 4.1, 4.2* and *4.3*; except that a state may propose an alternative management program under *Section 4.4*, which, if approved by the Management Board, may be implemented as an alternative regulatory requirement for compliance.

5.1.1.1. Regulatory Requirements

Each state must submit its required Spanish mackerel, spot, and spotted seatrout regulatory program to the Commission through the ASMFC staff for approval by the South Atlantic State/Federal Fisheries Management Board. During the period from submission until the Management Board makes a decision on a state's program, a state may not adopt a less protective management program than contained in this management plan or contained in current state law.

The following lists the specific compliance criteria that a state/jurisdiction must implement in order to be in compliance with the Omnibus Amendment:

[Criteria will be listed upon selection of management program options by the South Atlantic State/Federal Fisheries Management Board.]

Once a state's management program is approved by the South Atlantic State/Federal Fisheries Management Board, the state is required to obtain prior approval from the Management Board of any changes to the program for which a compliance requirement is in effect. Other measures must be reported to the Management Board but may be implemented without prior approval. Upon a state's request, the Management Board may grant permission to implement an alternative to any mandatory compliance measures only if that state can show to the Management Board's satisfaction that its alternative proposal will have the same conservation value as the measure contained in the Omnibus Amendment or any addenda prepared under Adaptive Management (*Section 4.5*). States submitting alternative proposals must demonstrate that the proposed action will not contribute to overfishing over the resource. All changes in state plans must be submitted in writing to the Management Board and to the Commission either as part of the annual FMP Review process of the Annual Compliance Reports.

5.1.1.2. Monitoring Requirements

The Omnibus Amendment contains no monitoring requirements. Monitoring requirements may be implemented under Section 4.5 (Adaptive Management).

5.1.1.3. Research Requirements

The Omnibus Amendment contains no research requirements. Research requirements may be implemented under *Section 4.5* (Adaptive Management). Research recommendations are provided in *Section 6*.

5.1.1.4. Law Enforcement Requirements

All state programs must include law enforcement capabilities adequate for successfully implementing that state's Spanish mackerel, spot, and spotted seatrout regulations. The adequacy of a state's enforcement activity will be monitored annually by reports of the ASMFC Law Enforcement Committee to the Spanish Mackerel, Spot, and Spotted Seatrout Plan Review Teams. The first reporting period under the Omnibus Amendment will cover ***[insert fishing years]***.

5.1.1.5. Habitat Requirements

The Omnibus Amendment contains no habitat requirements. See *Section 3.4* for habitat recommendations.

5.1.2. Compliance Schedule

States must implement the Omnibus Amendment according to the following schedule:

[Following the selection of management measures, the South Atlantic State/Federal Fisheries Management Board will establish a schedule to fully implement the Omnibus Amendment. This section will be written to reflect the implementation schedule.]

XXXXX: States must submit programs to implement the Omnibus Amendment for approval by the South Atlantic State/Federal Fisheries Management Board.

XXXXX: States must implement the Omnibus Amendment through their approved management programs. States may begin implementing management programs prior to this deadline if approved by the Management Board.

Reports on compliance must be submitted to the Commission by each jurisdiction annually beginning in ***[insert year]***, as follows:

Spanish Mackerel – October 1

Spot – November 1

Spotted Seatrout – September 1

5.1.3. Compliance Report Content

Each state must submit species-specific annual reports concerning its Spanish mackerel, spot, and spotted seatrout fisheries and management programs for the previous calendar year. A standard compliance report format has been prepared and adopted by the ISFMP Policy Board. States should follow this format in completing the annual compliance report.

5.2. Procedures to Determine Compliance

Detailed procedures regarding compliance determinations are contained in the ISFMP Charter, Section Seven (ASMFC 2009a). The following summary is not meant in any way to replace the language found in the ISFMP Charter.

In brief, all states are responsible for the full and effective implementation and enforcement of fishery management plans in areas subject to their jurisdiction. Written compliance reports as specified in the Plan or Amendment must be submitted annually by each state with a declared interest. Compliance with the Omnibus Amendment will be reviewed at least annually. The South Atlantic State/Federal Fisheries Management Board, ISFMP Policy Board or the Commission, may request the Spanish Mackerel, Spot, or Spotted Seatrout Plan Review Teams to conduct a review of plan implementation and compliance at any time.

The South Atlantic State/Federal Fisheries Management Board will review the written findings of the PRT within 60 days of receipt of a State's compliance report. Should the Management Board recommend to the Policy Board that a state be determined out of compliance, a rationale for the recommended non-compliance finding will be included addressing specifically the required measures of the Omnibus Amendment that the state has not implemented or enforced, a statement of how failure to implement or enforce the required measures jeopardizes the species' conservation, and the actions a state must take in order to comply with the Omnibus Amendment requirements.

The ISFMP Policy Board shall, within thirty days of receiving a recommendation of non-compliance from the South Atlantic State/Federal Fisheries Management Board, review that recommendation of non-compliance. If it concurs in the recommendation, it shall recommend at that time to the Commission that a state be found out of compliance.

The Commission shall consider any Omnibus Amendment non-compliance recommendation from the Policy Board within 30 days. Any state which is the subject of a recommendation for a non-compliance finding is given an opportunity to present written and/or oral testimony concerning whether it should be found out of compliance. If the Commission agrees with the recommendation of the Policy Board, it may determine that a state is not in compliance with the Omnibus Amendment, and specify the actions the state must take to come into compliance.

Any state that has been determined to be out of compliance may request that the Commission rescind its non-compliance findings, provided the state has revised its relevant species' conservation measures or shown to the Board and/or Commission's satisfaction that actions taken by the state provide for conservation equivalency.

5.3. Recommended (Non-Mandatory) Management Measures

The following management measures are recommended for states to fully or partially implement. These measures are not part of the compliance criteria for the Omnibus Amendment.

The South Atlantic State-Federal Fisheries Management Board, through this Omnibus Amendment, requests that those states outside the management units (listed below) implement complementary regulations to protect the spawning stocks of these species.

Spanish Mackerel: New York through eastern Florida (Dade/Monroe county line)

Spot: Delaware through eastern Florida (Dade/Monroe county line)

Spotted Seatrout: Maryland through eastern Florida (Dade/Monroe county line)

Should mandatory regulatory measures not be required under this amendment, it is recommended that states implement the following recommendations, or more conservative measures, for Spanish mackerel, Spot, and Spotted seatrout.

Spot

- Encourage the continued use of BRDs in fisheries to reduce spot bycatch
- Continue work on Spot Management Triggers and implement conservation measures when triggered

Spotted seatrout

- 12" TL minimum size limit for recreational and commercial fisheries with comparable mesh size limitations for relevant gear

Spanish mackerel

Commercial

- 12" FL or 14" TL minimum size limit
- March 1 to end of February season or when quota filled
- Landed with head and fins intact
- Catch limit (per vessel, per day) from CT/NY border to GA/FL border: 3500 lbs
- Catch limit (per vessel, per days) from GA/FL border to the Miami-Dade/Monroe County line in FL: 3500 lbs from March 1 to November 30; 3500 lbs Monday–Friday and 1500 lbs Saturday–Sunday from December 1 until 75% of the adjusted quota is taken; 1500 lbs from when 75% of the adjusted quota is taken until 100% of the adjusted quota is taken; and 500 lbs after 100% of the adjusted quota is taken (the adjusted quota compensates for estimated catches of 500 pounds per vessel per day to the end of the season)
- Authorized gears include automatic reel, bandit gear, rod and reel, cast net, run-around gill nets, and stab nets. Purse seines and drift gillnets are prohibited.
- Minimum size of 3.5" stretch mesh required for all run-around gill nets

Recreational

- 12" FL or 14" TL minimum size limit
- 10 fish creel limit
- Landed with head and fins intact
- Calendar year season
- Charter/headboat operators must possess species permit and comply with bag limits
- Gear restrictions to conserve the spawning stock and enforce the minimum size limits established (See **Table 13**).

5.4. Analysis of Enforceability of Proposed Measures

[This section will be drafted based on input from the ASMFC Law Enforcement Committee.]

6. MANAGEMENT AND RESEARCH NEEDS

The following list of research needs have been identified in order to enhance the state of knowledge of the Spanish mackerel, spot, and spotted seatrout resources, population dynamics, ecologies, and various fisheries for the species. The Technical Committees (if applicable), Advisory Panel, Plan Review Teams, and Management Board will review this list annually and an updated prioritized list will be included in the Annual FMP Reviews.

6.1. Stock Assessment and Population Dynamics

Spanish Mackerel

- Increase collection of fishery-dependent length, sex, age, and CPUE data to improve stock assessment accuracy. Simulations on CPUE trends should be explored and impacts on assessment results determined. Data collection is needed for all states, particularly those north of North Carolina.
- Develop fishery-independent methods to monitor stock size.
- Develop methodology for predicting year class strength and determination of the relationship between juvenile abundance and subsequent year class strength.
- To ensure more accurate estimates of t0, increase efforts to collect age 0 specimens for use in estimating von Bertalanffy growth parameters.
- Provide better estimates of recruitment, natural mortality rates, fishing mortality rates, and standing stock. Specific information should include an estimate of total amount caught and distribution of catch by area, season, and type of gear.
- Commission and member states should support and provide the identified data and input needed to improve the SEDAR process.
- Conduct yield per recruit analyses relative to alternative selective fishing patterns.
- Investigate the discard mortality of Spanish mackerel in the commercial and recreational trolling fisheries and commercial gill net fishery.
- Need observer coverage for Spanish mackerel fisheries: gill nets, cast nets, handlines, pound nets, and shrimp trawl bycatch.
- Evaluate potential bias of the lack of appropriate stratification of the data used to generate age-length keys.
- Evaluate CPUE indices related to standardization methods and management history, with emphasis on greater temporal and spatial resolution in estimates of CPUE.
- Expand TIP sampling to better cover all statistical areas.
- Complete research on the application of assessment and management models relative to dynamic species such as Spanish mackerel.
- Establish a monitoring program to characterize the bycatch and discards of Spanish mackerel in the directed shrimp fishery in Atlantic Coastal waters.
- Obtain adequate data to determine gutted to whole weight relationships.
- Conduct inter-lab comparisons of age readings from test sets of otoliths in preparation for any future stock assessment.

- Address issue of fish retained for bait (undersized) or used for food by crew (how to capture these as landings).
- Investigate whether catchability varies as a function of fish density and/or environmental conditions.
- Investigate how temporal changes in migratory patterns may influence indices of abundance.

Investigate the possibility of using models that allow catchability to follow a random walk, which can be useful in tracking longer-term trends in time-varying catchability and thus detect changes over time in CPUE (from SEDAR 2009)

Spot

- Initiate/increase state monitoring and reporting on the extent and mortality rates of young-of-year discards in fisheries that take significant numbers of spot. In particular, discards from the southern shrimp trawl fishery are inadequately monitored and documented.
- Expand sampling of scrap/bait fisheries beyond North Carolina to other states with significant amounts of unclassified landings.
- Evaluate the effects of mandated bycatch reduction devices on spot catch in those states with significant commercial harvests.
- Continue development of fishery-dependent and fishery-independent size and sex specific relative abundance estimates.
- Evaluate ability of available juvenile abundance indices to predict future year class strength and assess agreement/conflict between indices.
- Improve spot catch and effort statistics from the commercial and recreational fisheries, along with size and age structure of the catch, in order to develop production models.
- Cooperatively develop criteria for aging spot otoliths and conduct age validation studies.
- Increase and expand otolith sampling to support development of catch-at-age matrices for recreational and commercial fisheries.
- Develop a yield-per-recruit analysis.
- Conduct discard mortality studies for gears used in the recreational and commercial fisheries.
- Determine the onshore vs. offshore components of the spot fishery.

Spotted Seatrout

- Conduct state-specific stock assessments to determine the status of stocks relative to the plan objective of maintaining a spawning potential of at least 20%.
- Conduct tagging studies to verify estimates of natural and fishing mortality.
- Increase sources of fishery-independent data, including the development of surveys to estimate relative abundance of age-0 spotted seatrout.
- Collect data on the size or age of spotted seatrout released alive by anglers and the size and age of commercial discards.
- Expand the NMFS recreational fishery survey to assure adequate data collection for catch and effort data, and increased intercepts.
- Provide state-specific batch fecundity estimates for use in stock assessments.
- Develop state-specific juvenile abundance indices.
- Increase observer coverage in states that have a commercial fishery for spotted seatrout.

- Research the feasibility of including measures of temperature or salinity into the stock-recruitment relationship.
- Incorporate cold stun event information into the modeling of the population.
- Estimate or develop a model to predict the impact of cold stun events on local and statewide spotted seatrout abundances.
- Obtain samples (length, age, weight, quantification) of the cold the cold stun events as they occur.
- Increase observer coverage in a variety of commercial fisheries over a wider area.

6.2. Research and Data Needs

6.2.1. Biological

Spanish Mackerel

- Evaluate weight-at-age and length-at-age.
- Establish stock identification through available research techniques.
- Determine the relationship, if any, between migration of prey species (i.e., engraulids, clupeids, carangids) and migration patterns of the Spanish mackerel stock.

Spot

- Identify stocks and determine coastal movements and the extent of stock mixing via genetic and/or tagging studies.
- Continue evaluation of size and age at maturity.
- Define reproductive output based on fecundity and spawning periodicity.
- Evaluate natural mortality by age.
- Determine the effect that anthropogenic perturbations may be having on growth, survival, and recruitment.

Spotted Seatrout

- Continue work to examine the stock structure of spotted seatrout on a regional basis, with particular emphasis on advanced tagging techniques. Microchemistry, genetic, or tagging studies are needed to verify migration patterns, mixing rates, and origins of spotted seatrout between North Carolina and Virginia.
- Evaluate effects of environmental factors on spawning frequency and stock density.
- Conduct telemetry tagging surveys to provide precise estimates of mortality attributed to winter kills.
- Develop size specific fecundity estimates.
- Design and develop area specific spawning surveys to help in the delineation of area specific closures that would protect females in spawning condition.
- Continue research on catch and release mortality rate, including the possible influences of salinity on release mortality.

6.2.2. Social and Economic

Spanish Mackerel

- Establish more timely reporting of mid-Atlantic catches for quota monitoring.
- Consider MRFSS add-ons or other mechanisms for collection of socioeconomic data for recreational and commercial fisheries.

Spot

- Perform analysis of the economic impact of implementation of potential management measures (i.e., size limit, closed seasons, bag limits) on the recreational and commercial fisheries.

Spotted Seatrout

- Expand collection of socio-economic data for the commercial, recreational, and for-hire fishing sectors.

6.2.3. Habitat

Spanish Mackerel

- Delineate spawning areas and areas of larval abundance through temporal and spatial sampling.
- Determine normal Spanish mackerel migration routes and changes therein, as well as the climatic or other factors responsible for changes in the environmental and habitat conditions which may affect the habitat and availability of stocks.

Spot

- Identify critical habitat.

Spotted Seatrout

- Identify essential habitat requirements.
- Identify unique spawning location.
- Evaluate the role of SAV on the spawning success of spotted seatrout.
- Evaluate the role of shell hash and shell bottom in spotted seatrout recruitment, particularly where SAV is absent.
- Expand nursery sampling to include critical habitat (SAV) sampling in high and low salinity areas during the months of July through September.
- Investigate the relationship between temperature and mortality of adults and juveniles.
- Define overwintering habitat requirements.

7. PROTECTED SPECIES

In the fall of 1995, Commission member states, the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) began discussing ways to improve implementation and enforcement of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA) in state waters. In November 1995, the Commission, through its Interstate Fisheries Management Program (ISFMP) Policy Board, approved an amendment of its

ISFMP Charter (section 6(b)(2)) so that interactions between ASMFC managed fisheries and species protected under the MMPA, ESA, and other legislation, including the Migratory Bird Treaty Act (MBTA), be considered in the Commission's fisheries management planning process. Specifically, the Commission's fishery management plans (FMP) describe impacts of state fisheries on certain marine mammals and endangered species (collectively termed "protected species"), and recommend ways to minimize these impacts. The following section outlines: (1) the federal legislation that guides protection of marine mammals, sea turtles, and marine birds; (2) the protected species with potential fishery interactions; (3) the specific type(s) of fishery interaction; (4) population status of the affected protected species; and (5) potential impacts to Atlantic coastal state and interstate fisheries.

7.1. Marine Mammal Protection Act (MMPA) Requirements

The 1994 amendments to the MMPA established both short- and long-term goals for reducing mortality and serious injury of marine mammals due to incidental interactions with commercial fisheries (e.g., bycatch). The amendments also established provisions for convening stakeholder-based take reduction teams (TRTs) to develop take reduction plans (TRPs) as the mechanism for achieving these goals. The MMPA requires NMFS to convene TRTs to develop TRPs for each strategic stock that interacts with a Category I or II fishery, which are fisheries that have "frequent" or "occasional" incidental mortality or serious injury of marine mammals, respectively. Fisheries that have a remote likelihood of or no known incidental mortality or serious injury of marine mammals are classified in Category III. A strategic stock is defined as a stock: (1) for which the level of direct human-caused mortality exceeds the potential biological removal (PBR)[2] level; (2) which is declining and is likely to be listed under the ESA in the foreseeable future; or (3) which is listed as a threatened or endangered species under the ESA or as a depleted species under the MMPA. In the short-term (within six months of implementation), TRPs must reduce marine mammal bycatch to levels below a stock's PBR level. In the long-term (within five years of implementation), TRPs must reduce marine mammal bycatch to insignificant levels approaching a zero mortality and serious injury rate (defined as 10% of the PBR level) taking into account the economics of the fishery, the availability of existing technology, and existing state or regional fishery management plans.

The 1994 amendments to the MMPA also require fishermen in Category I and II fisheries to register under the Marine Mammal Authorization Program (MMAP), the purpose of which is 1) to provide an exemption for commercial fishermen from the general taking prohibitions for non-endangered or threatened marine mammals incidental to their fishing operations; 2) to take on board an observer if requested to do so by the Secretary of Commerce; and 3) to comply with any applicable TRP or emergency regulations. All commercial fishermen, regardless of the category of the fishery in which they participate, must report all marine mammal bycatch.

Section 101(a)(5)(E) of the MMPA requires the authorization of the incidental taking of individuals from marine mammal stocks listed as threatened or endangered under the ESA in the course of commercial fishing operations if it is determined that: (1) incidental mortality and

[2] PBR is the number of human-caused deaths per year each stock can withstand and still reach or maintain an optimum sustainable population level. This is calculated by multiplying "the minimum population estimate" by "½ stock's net productivity rate" by "a recovery factor ranging from 0.1 for endangered species to 1.0 for healthy stocks."

serious injury will have a "negligible impact" on the affected species or stock; (2) a recovery plan has been developed or is being developed for such species or stock under the ESA; and (3) where required under Section 118 of the MMPA, a monitoring program has been established, vessels engaged in such fisheries are registered in accordance with Section 118 of the MMPA, and a take reduction plan has been developed or is being developed for such species or stock. However, for most ESA-listed marine mammal species, takes have not been authorized through Sec. 101(a)(5)(E) of the MMPA because the "negligible impact" determination cannot be justified. Marine Mammal Authorization Certificates are not required for Category III fisheries; however, any serious injury or mortality of a marine mammal must be reported.

7.2. Endangered Species Act (ESA) Requirements

The taking of endangered birds, sea turtles, and marine mammals, plants, invertebrates and fish is prohibited under Section 9 of the ESA. In addition, NMFS or the USFWS may issue Section 4(d) protective regulations necessary and advisable to provide for the conservation of threatened species. There are several mechanisms established in the ESA to avoid the takings prohibition in Section 9. First, a 4(d) regulation may include less stringent requirements intended to reduce incidental take and thus allow for the exemption from the taking prohibition. Section 10(a)(1)(B) of the ESA authorizes NMFS to permit, under prescribed terms and conditions, any taking otherwise prohibited by Section 9 of the ESA, if the taking is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Finally, Section 7(a) requires NMFS to consult with each federal agency to ensure that any action that is authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species. Section 7(b) allows for the authorization of incidental take of listed species, usually as a least preferred option, and always contingent upon full consultation and identification of reasonable and prudent alternatives or plans to monitor and minimize such take.

7.3. Protected Species with Potential Fishery Interactions

Under the Migratory Bird Treaty Act it is unlawful "by any means or in any manner, to pursue, hunt, take, capture, [or] kill" any migratory birds except as permitted by regulation (16 USC. 703). Section 50 CFR 21.11 prohibits the take of migratory birds except under a valid permit or as permitted in the regulations. USFWS Policy on Waterbird Bycatch (October 2000) states, "It is the policy of the US Fish and Wildlife Service that the Migratory Bird Treaty Act of 1918, as amended, legally mandates the protection and conservation of migratory birds.

7.4. Protected Species with Existing Fishery Interactions

There are numerous protected species that inhabit the range of the Spanish mackerel, spot, and spotted seatrout management units covered under this FMP amendment. Nineteen species are classified as endangered or threatened under the ESA, while the remainder are protected by the provisions of the MMPA.

Listed below are ESA and MMPA protected species found in coastal and offshore waters of the Atlantic Ocean within the range of the Spanish mackerel, spot, and spotted seatrout fisheries. USFWS species of management concern that have the potential to interact with the Spanish

mackerel, spot, and spotted seatrout fisheries are also listed. Species of management concern are protected under the MBTA, but lack the protections mandated by the ESA.

ESA – Endangered
Blue whale (*Balaenoptera musculus)*
Fin whale (*Balaenoptera physalus)*
Humpback whale (*Megaptera novaeangliae)*
North Atlantic right whale (*Eubalaena glacialis)*
Sei whale (*Balaenoptera borealis)*
Sperm whale (*Physeter macrocephalus)*
Green turtle[3] (*Chelonia mydas*)
Hawksbill turtle (*Eretmochelys imbricata)*
Kemp's ridley turtle *(Lepidochelys kempii)*
Leatherback turtle (*Dermochelys coriacea)*
Shortnose sturgeon (*Acipenser brevirostrum)*
Bermuda petrel (*Pterodroma cahow*)
Roseate tern *(Sterna dougallii dougallii*), *NY, NJ, VA, NC*

ESA – Threatened
Elkhorn coral (*Acropora palmata*)
Green turtle (*Chelonia mydas)*
Johnson's seagrass *(Halophila johnsonii)*
Loggerhead turtle[4] *(Caretta caretta)*
Roseate tern *(Sterna dougallii dougallii*), *SC, GA, FL*
Piping plover *(Charadrius melodus)*
Staghorn coral *(Acropora cervicornis)*

MMPA – Protected
Includes all marine mammals above in addition to:
Atlantic spotted dolphin *(Stenella frontalis)*
Atlantic white-sided dolphin *(Lagenorhynchus acutus)*
Bottlenose dolphin *(Tursiops truncatus)*
Bryde's whale *(Balaenoptera edeni)*
Clymene dolphin *(Stenella clymene)*
Cuvier's beaked whale *(Ziphius cavirostris)*
Dwarf sperm whale *(Kogia sima)*
False killer whale *(Pseudorca crassidens)*
Fraser's dolphin *(Lagenodelphis hosei)*
Gray seal *(Halichoerus grypus)*

[3] The breeding populations of green turtles in Florida and on the Pacific coast of Mexico are listed as endangered; the remainder of the population is listed as threatened.
[4] A proposed rule would establish nine distinct population segments of loggerhead turtles. (A distinct population unit, or DPS, is a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The ESA provides for listing species, subspecies, or DPS of vertebrate species.) Under the proposed rule, the Northwest Atlantic Ocean DPS of loggerhead turtle would be listed as endangered under the ESA.

Harbor porpoise *(Phocoena phocoena)*
Harbor seal *(Phoca vitulina)*
Long-finned pilot whale *(Globicephala melas)*
Melon-headed whale (*Peponocephala electra)*
Mesoplodon beaked whale (*Mesoplodon spp.)*
Minke whale *(Balaenoptera acutorostrata)*
Pantropical spotted dolphin *(Stenella attenuata)*
Pygmy killer whale *(Feresa attenuata)*
Pygmy sperm whale *(Kogia breviceps)*
Risso's dolphin *(Grampus griseus)*
Rough-toothed dolphin *(Steno bredanensis)*
Short-beaked common dolphin (*Delphinus delphis*)
Short-finned pilot whale *(Globicephala macrorhynchus)*
Spinner dolphin *(Stenella longirostris)*
Striped dolphin *(Stenella coeruleoalba)*
White-beaked dolphin *(Lagenorhynchus albirostris)*

ESA – Species of Concern
Alewife (*Alosa pseudoharengus)*
Atlantic sturgeon[5] *(Acipenser oxyrinchus oxyrinchus)*
Barndoor skate *(Dipturus laevis)*
Blueback herring *(Alosa aestivalis)*
Dusky shark *(Carcharhinus obscures)*
Mangrove rivulus (*Rivulus marmoratus)*
Nassau grouper (*Epinephelus striatus)*
Night shark *(Carcharinus signatus)*
Opossum pipefish *(Microphis brachyurus lineatus)*
Porbeagle shark *(Lamna nasus)*
Rainbow smelt *(Osmerus mordax)*
Sand tiger shark *(Carcharias taurus)*
Speckled hind (*Epinephelus drummondhayi)*
Striped croaker *(Bairdiella sanctaeluciae)*
Warsaw grouper *(Epinephelus nigritus)*

MBTA—USFWS Species of Management Concern
Canvasback (*Aythya valisineria*)[6]
Redhead (*Aythya americana*) [5]
Greater scaup (*Aythya marila*) [5]
Lesser scaup (*Aythya affinis*) [5]
Surf scoter (*Melanitta perspicillata*) [5]
White-winged scoter (*Melanitta fusca*) [5]
Black scoter (*Melanitta americana*) [5]

[5] A proposed rule has been published listing Atlantic sturgeon as threatened or endangered (depending on population segment). The species is thus being considered by the Secretary of the Interior for listing as an endangered or threatened species.
[6] *These waterfowl species are USFWS Birds of Management Concern*

Long-tailed duck (*Clangula hyemalis*) [5]
Common goldeneye (*Bucephala clangula*) [5]
Red-throated loon (*Gavia stellata)*
Black-capped petrel (*Pterodroma hasitata)*Greater shearwater (*Puffinus gravis*)
Audubon's shearwater (*Puffinus lherminieri*)
Band-rumped storm-petrel (*Oceanodroma castro*)
Masked booby (*Sula dactylaria*)
Brown booby (*Sula leucogaster*)
Pied-billed grebe (*Podilymbus podiceps*)
Horned grebe (*Podiceps auritus*)
Magnificent frigatebird (*Fregata magnificens*)
Least tern (*Sternula antillarum*), non-listed Atlantic coast subspecies
Gull-billed tern (*Gelochelidon nilotica*)

The roseate tern, Bermuda petrel, and piping plover are the only ESA listed bird species within the mid-and south-Atlantic maritime regions. The roseate tern and Bermuda petrel are uncommon in inshore and coastal waters of the mid- and south-Atlantic and thus, have relatively low likelihoods of interacting with the Spanish mackerel, spot, and spotted seatrout fisheries. Nevertheless, exceptional efforts to avoid deleterious interactions with these species are warranted as they are rare and highly vulnerable to even minimal levels of mortality. The piping plover could be impacted by shore-based fishing activity if individuals were disturbed or killed by vehicles related to fishing efforts. However, during the nesting season, when plovers are highly vulnerable to beach disturbance, sensitive areas are posted and beach access is often restricted.

7.5. Protected Species with Documented Fishery Interactions

Although all of the protected species listed above may be found in the general geographical area covered under the Spanish mackerel, spot, and/or spotted seatrout management plans, not all are affected by the fisheries for several reasons. Some protected species may inhabit more inshore or offshore areas, prefer a different depth or temperature zone, or migrate through the area at different times than the species covered under this management plan. In addition certain protected species may not be vulnerable to capture or entanglement in certain gears used in the relevant fisheries.

Both recreational anglers and commercial fishermen seek Spanish mackerel, spot, and spotted seatrout. Recreational landings of Spanish mackerel have been reported in all states Maine through Florida, although consistent landings are limited to Virginia through Florida. Recently, the largest recreational fisheries are in North Carolina and Florida. Recreational landings of spot have been reported in all states New York through Florida, although consistent landings are limited to Delaware through Florida. The largest recreational fisheries range between Maryland and South Carolina. Recreational landings of spotted seatrout have been reported in all states New Jersey through Florida, although consistent landings are limited to Virginia through Florida. Recently, the largest recreational fisheries are in North Carolina and Georgia.

Spanish mackerel support important commercial fisheries in the South Atlantic, particularly in Virginia, North Carolina, and Florida, although commercial landings are reported at least once in all states Maine through Florida. Most commercially harvested Spanish mackerel are caught using gill and cast nets; hook and line gear has been growing in importance during the last decade. Spot have been landed commercially from Massachusetts through Florida, although more regularly from New Jersey south excluding Georgia; the bulk of landings come from Virginia and North Carolina recently. Haul seines, gill nets, pound nets, and trawls are all important gears for commercial spot harvest, particularly gill nets and haul seines. Spotted seatrout have been landed commercially from Massachusetts through Florida, although landings north of Maryland are sporadic. Consistent landings are limited to Virginia, North Carolina, and Florida in recent years. Spotted seatrout have been commercially harvested using a variety of gears, with gill nets and haul seines as the predominant gears.

7.5.1. Marine Mammals

Marine mammal interactions have been recorded in the following fisheries targeting Spanish mackerel, spot, and/or spotted seatrout: Mid-Atlantic gill net, North Carolina inshore gill net, South Atlantic gill net, Atlantic mixed species trap/pot, Mid-Atlantic haul/beach seine, North Carolina long haul seine, and Virginia pound net (see chart below derived from the 2011 MMPA List of Fisheries). Fisheries with past but no recently documented interactions include: Chesapeake Bay inshore gill net; Delaware River inshore gill net; and Mid-Atlantic bottom longline/hook-and-line. These fisheries are primarily Category II, except the Mid-Atlantic gill net fishery is Category I.

The chart below provides the marine mammal species and stocks documented as incidentally killed or injured in each fishery. Subsequent sections discuss the number of documented interactions with the primary species of concern described in the 2011 List of Fisheries: bottlenose dolphin, harbor porpoise, humpback whale, and fin whale. These bycatch reports do not represent a complete list, but represents those available, mainly from the Marine Mammal Stock Assessment Reports. It should be noted that without an observer program for many of these fisheries and/or very low observer coverage, actual numbers of interactions are difficult to obtain.

Fisheries for Spanish mackerel, spot, and spotted seatrout and the marine mammal species and stocks incidentally killed or injured (Source: 2011 MMPA List of Fisheries). *Replaced bottlenose dolphin (WNA coastal) with the following stocks: bottlenose dolphin (Northern Migratory coastal); bottlenose dolphin (Southern Migratory coastal); bottlenose dolphin (Northern NC estuarine system); bottlenose dolphin (Southern NC estuarine system).

Fishery Description	Marine Mammal Species and Stocks Incidentally Killed/Injured
CATEGORY I	
Mid-Atlantic gill net	Bottlenose dolphin –Northern Migratory coastal, Southern Migratory coastal, Northern NC estuarine system, Southern NC estuarine system, WNA offshore; common dolphin – WNA; gray seal – WNA; harbor seal – WNA; harp seal –WNA; long-finned pilot whale – WNA; short-finned pilot whale – WNA; White-sided dolphin – WNA; humpback whale – GME; harbor porpoise – GME/BF

Fishery Description	Marine Mammal Species and Stocks Incidentally Killed/Injured
CATEGORY II	
North Carolina inshore gill net	Bottlenose dolphin – Northern NC estuarine, Southern NC estuarine
Southeast Atlantic gill net	Bottlenose dolphin – Southern Migratory, SC/GA coastal, Central FL coastal, Northern FL coastal
Atlantic mixed species trap/pot	Fin whale – WNA, humpback whale – GME
Mid-Atlantic haul/beach seine	Bottlenose dolphin – Northern Migratory coastal, Southern Migratory coastal, Northern NC estuarine
North Carolina long haul seine	Bottlenose dolphin – Northern NC estuarine, Southern NC estuarine
Virginia pound net	Bottlenose dolphin – Northern Migratory coastal, Southern Migratory coastal, Northern NC estuarine

Mid-Atlantic Gill Net

The Mid-Atlantic Gillnet Fishery utilizes both drift and sink gillnets, including nets set in a sink, stab, set, strike, or drift fashion. Spanish mackerel, spot, and spotted seatrout may all be targeted. The fishery is classified as Category I because the total annual mortality and serious injury of bottlenose dolphin stocks (Northern Migratory coastal, Southern Migratory coastal, Northern NC estuarine system, Southern NC estuarine system, SC/GA coastal, Central FL coastal, Northern FL coastal, WNA offshore) in this fishery is greater than 50% of the stocks' Potential Biological Removal (PBR) level. Documented interaction with harbor porpoise, white-sided dolphin, harbor seal, gray seal, harp seal, coastal bottlenose dolphin, offshore bottlenose dolphin, common dolphin, minke whale (Canadian East Coast stock), humpback whale (Gulf of Maine stock), and long-finned and short-finned pilot whale were reported in this fishery. Estimated observer coverage from 1995-2007 ranges between one and five percent annually (Waring et al. 2009).

***** NMFS cannot yet differentiate to which stock a killed/injured animal belongs. Until NMFS is able to do so, each stock of bottlenose dolphin is considered to be driving the classification of the fishery.

Bottlenose Dolphin

From 1995 to 2008, a total of 19 coastal bottlenose dolphin takes were observed in the Mid-Atlantic gillnet fishery (Waring et al, 2010). The Mid-Atlantic gillnet fishery is a combination of small vessel fisheries that target a variety of fish species, including bluefish, croaker, spiny and smooth dogfish, kingfish, Spanish mackerel, spot, striped bass and weakfish (Steve et al. 2001). It operates in different seasons targeting different species in different states throughout the range of coastal bottlenose dolphins.

The Mid-Atlantic gillnet fishery has the highest documented level of mortality of bottlenose dolphins, and the North Carolina sink gillnet fishery is its largest component in terms of fishing effort and observed takes. Of 12 observed mortalities between 1995 and 2000, 5 occurred in sets targeting spiny or smooth dogfish, 1 was in a set targeting "shark" species, 2 occurred in striped bass sets, 2 occurred in Spanish mackerel sets, and the remainder were in sets targeting kingfish, weakfish or finfish generically (Rossman and Palka 2001). From 2001-2008, 7 additional bottlenose dolphin mortalities were observed in the mid-Atlantic gillnet fishery. Three mortalities were observed in 2001 with 1 occurring off of northern North Carolina during April and 2 occurring off of Virginia during November. Four additional mortalities were observed along the North Carolina coast near Cape Hatteras: 1 in May 2003, 1 in September 2005, 1 in September 2006 and 1 in October 2006. Because the Northern Migratory, Southern Migratory, Northern North Carolina Estuarine System and Southern North Carolina Estuarine System bottlenose dolphin stocks all occur in waters off of North Carolina, it is not possible to definitively assign all observed mortalities, or extrapolated bycatch estimates, to a specific stock. (Waring et al. 2010)

Harbor Porpoise

In the mid-1980s, using rough estimates of fishing effort, NMFS estimated that a maximum of 600 harbor porpoises were killed annually in this fishery. Before 1998, most of the harbor porpoise takes from US fisheries were from the Northeast sink gill net fishery (Waring et al. 2002). During 1994-1998, before the Take Reduction Plan, average estimated harbor porpoise mortality and serious injury in the Northeast sink gillnet fishery was 1,163. Between 1990 and 2004, NMFS Sea Sampling Program observed 501 harbor porpoise mortalities related to this fishery, with estimates of annual bycatch ranging from 2,900 animals in 1990 to 270 animals in 1999, and 395 animals in 2007 (Waring et al. 2009). The average annual harbor porpoise mortality and serious injury in the Northeast sink gillnet fishery from 2000 to 2004 was 450.

In July 1993, NMFS initiated an observer program in the Mid-Atlantic coastal gill net fishery. This fishery, which extends from North Carolina to New York, is a combination of small vessel fisheries that target a variety of fish species; some of the vessels operate right off the beach, some use drift nets and others use sink nets. From 1995 to 2000, 114 harbor porpoise were observed taken (Waring et al. 2002). During that time, fishing effort was scattered between New York and North Carolina from the beach to 50 miles from shore. After 1995, documented bycatch was observed from December to May. Annual average estimated harbor porpoise mortality and serious injury from the Mid-Atlantic coastal gill net fishery before implementation of the Harbor Porpoise Take Reduction Plan (1995-1998) was 358 animals. Following implementation of the Harbor Porpoise Take Reduction Plan and other fishery management plans for groundfish, fishing practices changed during 1999 (Waring et al. 2002), and the

average annual harbor porpoise mortality and serious injury in this fishery fell to 65 animals (2000-2004). The average annual harbor porpoise mortality and serious injury in the mid-Atlantic gillnet fishery from 2003 to 2007 was 250 (0.26) (Waring et al. 2009).There was 1 harbor porpoise observed incidentally taken in this fishery in 2007 and 9 taken in 2008 (Orphanides 2010).

Humpback Whale

Assessing the level of interactions between humpback whales and fisheries has been difficult and is derived from two primary sources -- observed takes and non-observed fishery entanglement records, including strandings records. Between 1996 and 2007 (U.S. and Canada), there were 36 documented humpback whale interactions with fishing gear (13 mortalities and 23 serious injuries) (Waring et al. 2009). Two of the 12 seriously injured humpbacks were observed entangled in gillnet gear in the Bay of Fundy, Canada. Unfortunately, most of the records do not contain the detail necessary to assign entanglements to a particular fishery or location because often times a whale is carrying a piece of line that cannot easily be attributed to a specific fishery. Additionally, observing a humpback whale or other large whale becoming entangled in fishing gear is extremely rare. More information is needed on fisheries interactions with humpback whales, specifically the location of the interaction and types of gear involved.

North Carolina Inshore Gill Net

This fishery includes any fishing effort using any type of gillnet gear, including set (float and sink), drift, and runaround gillnet in North Carolina's inshore waters. Spanish mackerel, spot, and spotted seatrout may all be targeted. This fishery is classified as Category II because the total annual mortality and serious injury of bottlenose dolphin (Bottlenose dolphin, Northern North Carolina (NC) estuarine; Bottlenose dolphin, Southern NC estuarine) in this fishery is greater than 1% and less than 50% of the stock's Potential Biological Removal (PBR) level. NMFS cannot yet differentiate to which stock a killed/injured animal belongs. Until NMFS is able to do so, each stock of bottlenose dolphin is considered to be driving the classification of the fishery. Observer coverage has been limited to the fall flounder fishery in Pamlico Sound, however, 2010 was the first year NMFS allocated federal observer coverage to inshore NC waters because of the new designation of estuarine stocks.

Bottlenose Dolphin

The Northern North Carolina Estuarine System (NNCES) stock interacts with the North Carolina inshore gillnet fishery. There is no systematic federal observer coverage of these fisheries by the National Marine Fisheries Service (NMFS), although the North Carolina Division of Marine Fisheries operates systematic coverage of the fall flounder gillnet fishery in Pamlico Sound (Price 2008). As a result, information about interactions with North Carolina inshore fisheries is based solely on stranding data and it is not possible to estimate the annual number of interactions or mortalities in these fisheries (Waring et al. 2010). The total estimated average annual fishery mortality on the NNCES stock ranges between a minimum of 4.1 and a maximum of 22.6 animals per year. This range reflects the uncertainty in assigning observed or reported mortalities to a particular stock (Waring et al. 2010).

Atlantic Mixed Species Trap/Pot

This fishery uses traps and pots along the Atlantic coast, excluding those for lobster, crab, or eel. Spot and spotted seatrout may be targeted. There has not been observer coverage in this fishery. The fishery is classified as Category II based on analogy to other gear types or fisheries that are known to cause mortality or serious injury of marine mammals (the Category I "Northeast/Mid-Atlantic American lobster trap/pot fishery" and the Category II "Atlantic blue crab trap/pot fishery").

Fin whale

Of 55 fin whale events in a study by Glass et al. (2010) of Mortality and Serious Injury Determinations for Baleen Whale Stocks along the United States and Canadian Eastern Seaboards, 2004-2008, 14 were confirmed entanglements; 3 of these were fatal, the highest percentage for any of the whale species (21%), and 3 resulted in serious injury. For the period 2003 through 2007, the minimum annual rate of human-caused mortality and serious injury to fin whales was 2.8 per year (Waring et al. 2009). It is difficult to ascertain which specific fishery is responsible for an entanglement event.

Humpback whale

Waring et al. (2009) note that 11 entanglements involving lobster pot/trap gear from the 1990-1994 period were the basis used to reclassify the lobster fishery. For the period 2003 through 2007, Waring et al. (2009) reviewed records of dead, injured, and/or entangled humpbacks, and found that entanglements accounted for four mortalities and ten serious injuries. As stated above for fin whales, it is difficult to determine the gear types involved in the entanglements of humpbacks and other large whales.

Southeast Atlantic Gill Net

This fishery uses gillnets set in sink, stab, set, or strike fashion, in the Atlantic Ocean off South Carolina, Georgia, and Florida, primarily in Federal waters due to gear prohibitions in state waters. Spanish mackerel, and to a lesser degree, spot may be targeted. This fishery is classified as Category I based on analogy to other Atlantic gillnet fisheries that use similar gear and operate in a similar manner to this fishery, and based on a 2001 recommendation to elevate all gillnet fisheries to Category II (unless there is evidence to the contrary). Documented interactions with coastal bottlenose dolphin (Southern Migratory coastal, SC/GA coastal, Central FL coastal, Northern FL coastal) were reported in this fishery (Waring et al. 2009).

Mid-Atlantic Haul/Beach Seine

This fishery uses seines with one end secured (e.g., swipe nets and long seines), both ends secured, or those anchored to and hauled up on the beach, in waters off North Carolina, Virginia, Maryland, and New Jersey. (The only NC fishery included is the "Atlantic Ocean striped bass beach seine fishery"; other NC small and large mesh beach-anchored gill nets are in the Category I Mid-Atlantic gill net fishery). Spot and spotted seatrout may be targeted. This fishery was observed from 1998-2001; there has been very limited coverage since 2001. This fishery has observed interactions with coastal bottlenose dolphin (Bottlenose dolphin, Northern North Carolina (NC) estuarine system; Bottlenose dolphin, Northern Migratory coastal; Bottlenose dolphin, Southern Migratory coastal) (Waring et al. 2009).

North Carolina long haul seine

This fishery uses multi-filament seines consisting of a 1,000-2,000 yard net pulled by two boats for 1-2 nm in waters off North Carolina, including estuarine waters in Pamlico and Core Sounds and their tributaries. Fish are encircled and concentrated by pulling the net around a fixed stake. Spot and spotted seatrout may be targeted. The fishery is classified as Category II because the total annual mortality and serious injury of bottlenose dolphin (Bottlenose dolphin, Northern North Carolina (NC) estuarine system) in this fishery is greater than 1% and less than 50% of the stock's Potential Biological Removal (PBR) level. There has not been observer coverage in this fishery, but occasional interactions with coastal bottlenose dolphins have been reported. The fishery has been defined as a Category II fishery in the 2010 List of Fisheries based on observer data of three live-released dolphins and stranding records of interactions.

Virginia Pound Net

This fishery uses a stationary gear, designed with a large mesh lead posted perpendicular to the shoreline and extending outward to the corral where the catch accumulates, in nearshore coastal and estuarine waters off Virginia, including waters inside the Chesapeake Bay. Spot and Spanish mackerel may be targeted. This fishery is classified as Category II because the total annual mortality and serious injury of bottlenose dolphins (Bottlenose dolphin: Northern Migratory coastal, Southern Migratory coastal, Northern NC Estuarine System) in this fishery is greater than 1% and less than 50% of the stock's Potential Biological Removal (PBR) level. The NEFOP began observing effort in this fishery in 2001. Occasional interactions with coastal bottlenose dolphins have been observed while monitoring for sea turtle interactions in both the commercial and experimental fisheries. Stranding data for 2004-2008 indicate 17 cases where bottlenose dolphins were removed from pound net gear, and it was determined that animals were entangled pre-mortem. In each case, the bottlenose dolphin was recovered directly from the fishing gear. Of these 17 cases, 14 were documented mortalities while 3 were released alive (Sue Barco, Virginia Aquarium) (Waring et al. 2010). This fishery was categorized as a Category II based on evidence of coastal bottlenose dolphin mortality in pound nets, especially in the Virginia portion of the Chesapeake Bay.

7.5.2. Sea Turtles

Gill Nets

Stranded loggerhead and Kemp's ridley sea turtles have been partially or completely entangled in gillnet material, and are most likely to come in contact with the gear in shallow coastal waters. Loggerheads and leatherbacks have been captured in the Mid-Atlantic gill net fishery. Green sea turtles are present in these areas and could also be taken in this fishery. Leatherbacks are also present especially when warmer waters bring jellyfish, their preferred prey, into coastal areas. Hawksbill sea turtles are only rare visitors to the areas where fishing effort occurs, preferring coral reefs with sponges for forage, so interaction would be limited. However, entanglement in gillnets has been identified as a serious problem for hawksbills in the Caribbean (NMFS and USFWS 1993).

Spring and fall gillnet operations have been strongly implicated in coincident sea turtle stranding events from North Carolina through New Jersey. On average, the highest numbers of interactions occurred in spring, followed by summer and fall. The southern states appear to have

had more spring interactions, while the northern states had more summer interactions, probably due to the northern migration of sea turtles in the warmer months.

Netting gear found on stranded turtles varied widely, from 2 - 11.5" (5-29 cm) stretch mesh, and ranged from small, cut pieces of net, to lengths (up to 1200' (365m)) of abandoned net. Net gear was of various materials including nylon, cotton, and propylene, and in various colors including blue, black, and green. Gear type included flounder, sturgeon, and mullet nets, monofilament, twine, gillnets, pound nets, trammel nets, seines, sink nets, and nets attached to anchors, cork floats, and buoys.

Virginia Pound Net

Most of pound net fishery interactions result in live releases and are documented primarily from North Carolina, Virginia, New York (Long Island), and Rhode Island. In Chesapeake Bay, Virginia, turtles become entangled in pound nets starting in mid-May with increasing numbers of entanglements until late June. The construction of leaders in pound nets has been found to be a significant factor in these entanglements (Musick et. al. 1987). NMFS has documented that fishing with pound net leaders results in lethal and non-lethal take of sea turtles. In 2002 and 2003, NMFS monitored pound nets in Virginia. The 2002 and 2003 monitoring results documenting sea turtle entanglement in and impingement on pound net leaders with less than 12 inches (30.5 cm) stretched mesh appeared to be more of a significant problem than originally assessed. NMFS continued to monitor pound nets during the 2004 spring season. In 2004, NMFS characterized 88 nets, 51 of which were active. Out of 1,190 surveys conducted, 4 sea turtles were observed to have been impinged or entangled in pound net leaders. Out of the four turtles that interacted with the pound net gear, one was released alive.

7.5.3. Atlantic Sturgeon

Data from the NEFSC Sea Sampling (Observer) Program Database and the U.S. Fish and Wildlife Service (USFWS0 tag reports (Eyler et al. 2004) identify sink gillnets as the principal source of Atlantic sturgeon bycatch and bycatch mortality. Sink gillnet fisheries are numerous along the Atlantic coast, targeting both large and small species in inshore and offshore waters (ASMFC 2007). The Mid-Atlantic Gillnet Fishery utilizes both drift and sink gillnets, including nets set in a sink, stab, set, strike, or drift fashion. The Southeast Atlantic Gillnet fishery uses gillnets set in sink, stab, set, or strike fashion, in the Atlantic Ocean off South Carolina, Georgia, and Florida, primarily in Federal waters due to gear prohibitions in state waters. Both of these fisheries are described above in 7.4.1.

ASMFC sponsored a workshop in 2007 to conduct a focused assessment of the NEFSC Observer Database, which principally covers fisheries in New England and the Middle Atlantic state waters. During the period 2001-2006, 511 Atlantic sturgeon were observed in gillnet fisheries. On a proportionate basis of all observed trips, 2.9 to 6.1% of gillnet trips encountered sturgeon. (ASMFC 2007) Means to reduce bycatch mortality in the monkfish sink gillnet fishery and other sink gillnet fisheries through modification of gear deployments (e.g., soak time, presence of tiedowns) could result in substantial reductions in sturgeon deaths.

7.5.4. Seabirds

Over 50 species of coastal and marine birds occur within areas fished for Spanish mackerel, spot, and spotted seatrout. These include marine waterfowl (e.g., ducks and brant), loons, petrels, shearwaters, storm petrels, cormorants, gannets, jaegers, alcids, and various species of terns and gulls. Many of these bird species breed along the northern and central Atlantic coast during the boreal summer, using inshore, coastal, and offshore waters of the western Atlantic during this period. A smaller number of species breed elsewhere, but forage in inshore, coastal, and offshore waters of the western Atlantic during May through September. Several other species spend winter non-breeding periods in inshore, coastal, and offshore waters of the western Atlantic where Spanish mackerel and spot, and spotted seatrout fisheries occur. All of these birds are protected under the ESA or the most recently amended version of the MBTA (CFC 50, section 10; www.fws.gov/migratorybirds/RegulationsPolicies/mbta/mbtintro.html).

Accurate abundance and distribution estimates are unavailable for many coastal and marine birds. While data exist for more intensively managed species such as diving ducks (Aythyini) and seaducks (Mergini), current research programs only monitor select populations, and robust monitoring efforts are lacking for most non-hunted species, such as loons, grebes, gannets, etc.

An unknown, but possibly significant, number of migratory birds are drowned each year by gillnets in inshore, nearshore, and offshore marine waters of the mid- and south-Atlantic regions.. While gillnet fishery observer coverage is scarce, a recent study estimated that nearly 1,500 red-throated and common loons are caught annually in commercial mid-Atlantic gillnet fisheries (Warden 2010). Another study, conducted in nearshore coastal waters between New Jersey and Virginia, estimated that over 2,000 marine birds, primarily loons and cormorants, were killed in anchored gillnets within a three-month observation period (Feb-April; Forsell 1999). Such high incidental gillnet mortality is corroborated with data from National Wildlife Health Center in Madison, Wisconsin, which indicates that many thousands of loons and sea ducks are killed each year. Most bird-fisheries interactions occur during January through April from North Carolina to New Jersey. South Carolina banned anchored gillnets in their coastal fishery because of excessive bird mortalities, and other south Atlantic states have limited their usage.

A list of MTBA protected bird species with the potential to interact with Spanish mackerel, spot, and/or sea trout fisheries is provided below. Most of the species listed are pursuit or plunge divers which take fish below the surface of the water or feed on benthic invertebrates. Fish eating birds are especially vulnerable to drowning in gillnets because they forage for prey underwater. Additionally, fish eating birds may be attracted to the vicinity of nets, which are sometimes deployed for days at a time, to feed on forage fish feeding near the nets. Most of the birds listed are present along the Atlantic coast from October through April, depending on weather and timing of migration.

I.

MBTA protected birds found in coastal and nearshore marine waters that could interact with Spanish mackerel, spot, and/or sea trout fisheries:
Long-tailed duck (*Clangula hyemalis*)
Black scoter (*Melanitta nigra*)
Surf scoter (*Melanitta perspicillata*)
Red-breasted merganser (*Mergus serrator*)
Common loon (*Gavia immer*)
Red-throated loon (*Gavia stellata*)
Horned grebe (*Podiceps auritus*)
Red-necked grebe (*Podiceps grisegena*)
Northern gannet (*Sula bassanus*)
Double-crested cormorant (*Phalacrocorax auritus*)
Great cormorant (*Phalacrocorax carbo*)
American brown pelican (*Pelicanus erythrorhynchos*)
Gulls (*Larus spp.*)
Least tern (*Sternula antillarum*)
Gull-billed tern (*Gelochelidon nilotica*)
Common tern (*Sterna hirundo*)
Caspian tern (*Hydroprogne caspia*)
Royal tern (*Thalasseus maximus*)
Sandwich tern (*Thalasseus sandvicensis*)
Forster's tern (*Sterna forsteri*)
Parasitic jaeger (*Stercorarius parasiticus*)
Razorbill (*Alca torda*)

II. MBTA protected birds found in coastal bays that could interact with Spanish mackerel, spot, and/or sea trout fisheries:
Redhead (*Aythya americana*)
Canvasback (*Aythya valisineria*)
Greater scaup (*Aythya marila*)
Lesser scaup (*Aythya affinis*)
Red-breasted merganser (*Mergus serrator*)
Common goldeneye (*Bucephala clangula*)
Bufflehead (*Bucephala albcola*)
Long-tailed duck (*Clangula hyemalis*)
Black scoter (*Melanitta nigra*)
White-winged scoter (*Melanitta fusca*)
Surf scoter (*Melanitta perspicillata*)
Common loon (*Gavia immer*)
Red-throated loon (*Gavia stellata*)
Pied-billed grebe (*Podilymbus podiceps*)
Horned grebe (*Podiceps auritus*)
Double-crested cormorant (*Phalacrocorax auritus*)
Great cormorant (*Phalacrocorax carbo*)
Gulls (*Larus spp.*)
Tern species (see list I above)

7.6. Population Status Review of Relevant Protected Species

7.6.1. Marine Mammals

Marine mammal species are known to co-occur with or become entangled in gear used by Spanish mackerel, spot and spotted seatrout fisheries, such as coastal bottlenose dolphin, humpback whale, harbor porpoise, and fin whale. These species are classified as strategic stocks under the MMPA. Additionally, the fin and humpback whales are listed as endangered under the ESA.

The status of these and other marine mammal populations inhabiting the Northwest Atlantic has been discussed in great detail in the US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments. Initial assessments were presented in Baylock et al. (1995) and were updated in Waring et al. (2010). The report presents information on stock definition, geographic range, population size, productivity rates, PBR, fishery specific mortality estimates, and compares the PBR to estimated human-caused mortality for each stock.

7.6.1.1. Bottlenose Dolphin

The coastal morphotype of bottlenose dolphins is continuously distributed along the Atlantic coast of the United States in both coastal nearshore and inshore estuarine waters. Specifically, the morphotype extends from Florida-New Jersey during the summer months and in waters less than 20 meters deep, including both inshore estuarine and nearshore waters. South of Cape Lookout, North Carolina, there are lower densities of animals over the continental shelf in waters between 20-100 meters deep, and the coastal morphotype overlaps spatially with the offshore morphotype. The coastal and offshore morphotype are morphologically and genetically distinct (Waring et al. 2010).

Scott et al. (1988) hypothesized a single coastal migratory stock (Western North Atlantic coastal stock) that ranged seasonally along the Atlantic coast. Recent studies, however, indicate this single migratory stock hypothesis is incorrect, with instead, a more complex mosaic of stocks. Therefore, re-analysis of stranding data, genetic, and satellite telemetry indicate fourteen stocks comprise the coastal morphotype, five coastal stocks, and nine bay, sound, and estuary stocks. (Waring et al. 2010) The five coastal stocks include: (1) Northern Migratory; (2) Southern Migratory; (3) SC/GA coastal; (4) Northern FL coastal; and (5) Central FL coastal. The nine bay, sound, and estuary stocks include: (1) Northern North Carolina Estuarine System stock; (2) Southern North Carolina Estuarine System stock; (3) Charleston Estuarine System stock; (4) Hilton Head/Savannah System stock; (4) Southern Georgia System stock; (4) Jacksonville System stock; (4) Indian River Lagoon Estuarine System stock; (8) Biscayne Bay Estuarine System stock; and (9) Florida Bay Estuarine System stock.

Under the MMPA, 13 of the 14 stocks comprising the coastal morphotype of bottlenose dolphins are strategic and listed as depleted. The stock is designated as depleted under the MMPA due to mortality caused during the 1987-88 die-off and high incidental commercial fishery-related mortality relative to Potential Biological Removal (PBR). There are data suggesting that the

population was at an historically high level immediately prior to a 1987-88 mortality event (Keinath and Musick 1988); however, this mortality event was estimated to have decreased the population by as much as 53%.

Abundance estimates from the 2010 Marine Mammal Stock Assessment for six coastal bottlenose dolphin management units are outlined in the following chart (Waring et al. 2010).

Best estimates of abundance for six management units of the Western North Atlantic Coastal Bottlenose Dolphins (Waring et al. 2010).

Management Unit	**Abundance Estimate**
Northern Migratory	9,604
Southern Migratory	12,482
South Carolina/Georgia	7,738
Northern Florida	3,064
Central Florida	6,318
Southern North Carolina Estuarine System	2,454

7.6.1.2. Harbor Porpoise

The Gulf of Maine/Bay of Fundy stock of harbor porpoises were proposed to be listed as threatened under the ESA on January 7, 1993, but in 1999 NMFS determined this listing was not warranted (NMFS 1999). NMFS removed this stock from the ESA candidate species list in 2001. The harbor porpoise is considered a strategic stock under the MMPA because the average annual human-related mortality and serious injury exceeds the stock's PBR level. The PBR for the harbor porpoise is 703 animals (Waring et al. 2009). The total fishery-related mortality and serious injury for this stock not less than 10% of the calculated PBR, which means the human induced mortality is not approaching zero mortality and serious injury rate. For many years before 1999, the total fishery-related mortality and serious injury exceeded the PBR, and thus it was considered a strategic stock. After implementation of the Harbor Porpoise Take Reduction Plan in 1999, serious injuries and mortalities due to fishing interactions fell below the stock's PBR; however, bycatch levels consistently began rising soon after and the 2007 Stock Assessment Report indicated that these levels were again above PBR (Waring et al. 2007).

The harbor porpoise can range from Labrador to North Carolina. The Atlantic stock of harbor porpoise is referred to as the Gulf of Maine/Bay of Fundy stock and generally spends its winters in the Mid-Atlantic region, but also occurs in New England waters during this time. Harbor porpoise are generally found in coastal and inshore waters, but will also travel to deeper, offshore waters. The status of the harbor porpoise stock in US waters is unknown (Waring et al. 2009). There is insufficient data to determine the population trends for this species because they are widely dispersed in small groups, spend little time at the surface, and their distribution varies unpredictably from year to year depending on environmental conditions (NMFS 2002). The best estimate of abundance for the Gulf of Maine/Bay of Fundy harbor porpoise is 89,054 (CV= 0.47). The minimum population estimate is 60,970 individuals (Waring et al. 2009).

7.6.1.3. Humpback Whale

Humpback whales are listed as endangered under the ESA and are also protected by the MMPA. Recent abundance estimates indicate continued population growth of the Gulf of Maine stock. However, there are insufficient data to determine population trends of North Atlantic humpbacks and this particular stock may still be below its optimum sustainable population. Continued human-caused mortality, especially in the Mid-Atlantic region, may be limiting recovery. The Gulf of Maine stock is a strategic stock because the average annual human-related mortality and serious injury exceeds PBR, and because the North Atlantic humpback whale is an endangered species (Waring et al. 2009).

In the western North Atlantic, humpback whales feed during spring, summer and fall over a geographic range encompassing the eastern coast of the United States (including the Gulf of Maine), the Gulf of St. Lawrence, Newfoundland/Labrador, and western Greenland (Katona and Beard 1990). In the winter, most humpbacks migrate to the West Indies to mate and breed, while others have been observed at higher latitudes in the waters off the Mid-Atlantic and southeast U.S. The estimate of 11,570 individuals (CV=0.068) is regarded as the best available estimate for the North Atlantic (Waring et al. 2009). The best estimate of abundance for Gulf of Maine humpback whales is 847 animals (CV=0.55) and PBR for the Gulf of Maine humpback whale stock is 1.1 whales (Waring et al. 2009).

The major known sources of mortality and injury of humpback whales include entanglement in commercial fishing gear, such as sink gillnet gear, and ship strikes. Based on photographs of the caudal peduncle of Gulf of Maine humpback whales, Robbins and Mattila (1999) estimated that between 48% and 78% of animals exhibit scarring caused by entanglement. Several whales have apparently been entangled on more than one occasion. Glass et al. (2010) note the greater concern of animals never observed. Humpback whale scar evidence suggests that only 3-10% of entanglements are witnessed and reported (Robbins and Mattila 2004). These estimates are based on sightings of free-swimming animals that initially survive the encounter with the gear. Because some whales may drown immediately, or free themselves of the gear before they are observed entangled, the actual number of interactions may be higher. In addition, the actual number of species-gear interactions is contingent on the intensity of observations from aerial and ship surveys. Humpback whales may also be adversely affected by habitat degradation, habitat exclusion, acoustic trauma, harassment, or reduction in prey resources resulting from a variety of activities including the operation of commercial fisheries. Because entanglements and vessel collisions have been documented in both U.S. and Canadian waters, estimated human-caused mortality and serious injury are divided between the U.S. (4.0.) and Canada (0.4) for a total of 4.4 per year (Waring et al. 2009). The Atlantic Large Whale Take Reduction Plan (ALWTRP) established measures that attempt to reduce interactions between large whales (right, humpback, and fin whales) and commercial fishing gear in U.S. waters.

During the past several years there has been a fourfold increase in the number of strandings of humpback whales in the mid-Atlantic region, many with indications of fishing gear entanglement. Between 1989 and 1992, 31 humpback whales stranded from New Jersey through Virginia (Wiley et. al. 1994). Significantly more strandings occurred between Chesapeake Bay and Cape Hatteras, North Carolina. Strandings increased from February through April and 25

percent had scars consistent with net entanglement. Between 1990 and 1996, there were 10 humpbacks stranded in Virginia. Three of the animals showed evidence of rope abrasion consistent with entanglement. Between 1996 and 2000 (U.S. and Canada), there were 14 documented humpback whale interactions with fishing gear (two mortalities and 12 serious injuries). Two of the 12 seriously injured humpbacks were observed entangled in gillnet gear in the Bay of Fundy, Canada. For the period 2000 through 2007, there were 11 mortalities attributable to fishery interactions and 19 cases of serious injuries coast-wide (Waring et al. 2009). Unfortunately, most of the records do not contain the detail necessary to assign entanglements to a particular fishery or location because often times a whale is carrying a piece of line that cannot easily be attributed to a specific fishery. More information is needed on fisheries interactions with humpback whales, specifically the location of the interaction and types of gear involved.

7.6.1.4. Fin Whale

Fin whales are listed as endangered under the ESA and are also protected by the MMPA. The total level of human-caused mortality and serious injury is unknown. For the period 2003 through 2007, the minimum annual rate of human-caused mortality and serious injury to

fin whales was 2.8 per year and there were three confirmed mortalities resulting from entanglements. The best abundance estimate available for the western North Atlantic fin whale stock is 2,269 (CV= 0.37). This August 2006 estimate is recent and provides an estimate when the largest portion of the population was within the study area. However, this estimate must be considered extremely conservative in view of the incomplete coverage of the known habitat of the stock and the uncertainties regarding population structure and whale movements between surveyed and unsurveyed areas. PBR for the western North Atlantic fin whale is 3.4 (Waring et al. (2009).

Fin whales are common in waters of the U. S. Atlantic Exclusive Economic Zone (EEZ), principally from Cape Hatteras northward, with major feeding grounds in New England waters. Hain *et al.* (1992), based on an analysis of neonate stranding data, suggested that calving takes place during October to January in latitudes of the U.S. mid-Atlantic region; however, it is unknown where calving, mating, and wintering occurs for most of the population. A Final Recovery Plan for fin whales has been prepared and is available for review (NMFS 2010).

This Plan is available on the NMFS Office of Protected Resources Division website at: http://www.nmfs.noaa.gov/pr/recovery/plans.htm

7.6.2. Sea Turtles

All sea turtles that occur in US waters are listed as either endangered or threatened under the ESA. The Kemp's ridley (*Lepidochelys kempii*), leatherback (*Dermochelys coriacea*), and hawksbill (*Eretmochelys imbricata*) are listed as endangered. The loggerhead (*Caretta caretta*) and green turtle (*Chelonia mydas*) are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific coast of Mexico, which are listed as endangered. All

five of these species inhabit the waters of the US Atlantic and Gulf of Mexico. In 2007, the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (FWS) completed a 5-year review for the loggerhead indicated a possible separation of populations by ocean basins but that a more in-depth analysis was needed to determine the application of the distinct population segment (DPS) policy. (Conant et al. 2009).

Atlantic coastal waters provide important developmental, migration, and feeding habitat for sea turtles. The distribution and abundance of sea turtles along the Atlantic coast is related to geographic location, reproductive cycles, food availability, and seasonal variations in water temperatures. Water temperatures dictate how early northward migration begins each year and are a useful factor for assessing when turtles will be found in certain areas. Sea turtles can occur in offshore as well as inshore waters, including sounds and embayments.

7.6.3. Atlantic Sturgeon

There are only two Atlantic sturgeon populations for which size estimates are available - the Hudson River and the Altamaha River populations. In 1995, sampling crews on the Hudson River estimated that there were 9,500 juvenile Atlantic sturgeon in the estuary. Since 4,900 of these were stocked hatchery-raised fish, about 4,600 fish were thought to be of wild origin. The mean annual spawning stock size (spawning adults) was estimated at 870 (600 males and 270 females). The Altamaha River supports one of the healthiest Atlantic sturgeon populations in the Southeast, with over 2,000 subadults captured in research surveys in the past few years, 800 of which were 1 to 2 years of age. The population appears to be stable. (http://www.nmfs.noaa.gov/pr/species/fish/atlanticsturgeon.htm#status)

A status review was done in 2007 and NMFS has reviewed that status report and all other best available information to determine if listing Atlantic sturgeon under the Endangered Species Act (ESA) as either threatened or endangered is warranted. The SRT recommended that Atlantic sturgeon in the United States be divided into the following five distinct population segments (DPSs): Gulf of Maine; New York Bight; Chesapeake Bay; Carolina; and South Atlantic, and we agree with this DPS structure. After reviewing the available information on the Carolina and South Atlantic DPSs, the two DPSs located within the NMFS Southeast Region, NMFS has determined that listing these two DPSs as endangered is warranted. Therefore, NMFS has proposed to list these two DPSs as endangered under the ESA.

7.6.4. Seabirds

The ranges of three ESA-listed species of birds, roseate tern (estimated Atlantic population: <4,000 individuals), Bermuda petrel (estimated world population: <200 individuals), and piping plover (estimated world population: <6,000 individuals) overlap areas fished for Spanish mackerel, spot, and spotted seatrout. However, the potential for interactions between these fisheries and roseate terns and Bermuda petrels is small, as primary distributions of these endangered birds are beyond fishery boundaries. Nevertheless, exceptional efforts to avoid deleterious interactions with roseate terns and Bermuda petrels are warranted as they are rare and highly vulnerable to even minimal levels of mortality. The piping plover could be impacted by shore-based fishing activity if individuals were disturbed or killed by vehicles related to fishing

efforts. However, during the nesting season, when plovers are highly vulnerable to beach disturbance, sensitive areas are posted and beach access is often restricted.

The world population of black-capped petrels is thought to be less than 4,000 individuals. While black-capped petrels mostly occur farther offshore than most Spanish mackerel, spot, and spotted seatrout fisheries, exceptional efforts to avoid deleterious interactions with the species are warranted as it is rare and highly vulnerable to even minimal levels of mortality. Black-capped petrels are protected under the MBTA and are a USFWS species of management concern.

Several other MBTA-listed bird species have a greater potential to interact with Spanish mackerel, spot, and spotted seatrout fisheries. Many of these species are also USFWS species of management concern. Based on their distributions, behavior, and documented bycatch in mid- and south-Atlantic fisheries, loons and diving ducks are among avian taxa most likely to interact with Spanish mackerel, spot, and spotted seatrout fisheries. The red-throated loon is a USFWS species of management concern. While accurate population estimates are unavailable, it is likely that at least 50,000 individuals winter in U.S. Atlantic waters (Lee 2009). This species is threatened by many human activities, particularly gillnet fishing. Atlantic populations of common loons are more numerous, thus the species is not currently a USFWS species of management concern. However, common loons occur within fishery boundaries and are subject to multiple threats including bycatch, mercury and lead poisoning, poaching, disturbance, and loss of habitat. More accurate population estimates exist for intensively managed diving duck and seaduck species, such as scaup and scoters, that could interact with Spanish mackerel, spot, and spotted seatrout fisheries. While populations of most of these species are thought to be relatively high in U.S. Atlantic waters, current monitoring programs only survey a subsample of areas, and these duck species face numerous threats, including poaching.

Populations of several other MBTA-listed seabirds, including gannets, cormorants, and some gulls, which could interact with Spanish mackerel, spot, and spotted seatrout fisheries, are large and not declining. However, accurate population and status estimates are unavailable for most of these species and their bycatch rates have not been evaluated in most commercial fisheries.

7.7. Existing and Proposed Federal Regulations/Actions Pertaining to Relevant Protected Species

7.7.1. Bottlenose Dolphins

A Take Reduction Plan is required under the MMPA to reduce dolphin serious injury and mortality below PBR because strategic stocks of the coastal morphotype of bottlenose dolphins interact with Category I and II fisheries. PBR is defined as the maximum number of human-caused deaths per year each stock can withstand and still reach or maintain an optimum sustainable population level. NMFS convened the Bottlenose Dolphin Take Reduction Team (BDTRT) in 2001 to provide consensus recommendations in developing the Bottlenose Dolphin Take Reduction Plan (BDTRP).

NMFS issued a final rule implementing the BDTRP on April 26, 2006 (May 26, 2006 effective date) based on the BDTRT's consensus recommendations. The BDTRP includes regulatory and

non-regulatory management measures to reduce the incidental mortality and serious injury (bycatch) of the several stocks comprising the coastal morphotype of bottlenose dolphins in the mid-Atlantic gillnet fishery and eight other coastal fisheries operating within the dolphin′s distributional range. The BDTRP measures implement gillnet effort reduction, gear proximity requirements, gear or gear deployment modifications, and outreach and education measures to reduce dolphin bycatch below the marine mammal stock′s PBR. NMFS amended the BDTRP on December 19, 2008, (January 20, 2009 effective date) based on the BDTRT's 2007 consensus recommendations to extend nighttime medium mesh gillnet prohibitions in North Carolina during the winter that were due to expire.

The BDTRP affects the following fisheries via regulatory or non-regulatory components: the mid-Atlantic gillnet, North Carolina inshore gillnet, Southeast Atlantic gillnet, Southeastern U.S. Atlantic shark gillnet, Virginia pound net, mid-Atlantic haul/beach seine, Atlantic blue crab trap/pot, North Carolina roe mullet stop net, and North Carolina long haul seine

For additional information, please contact the National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division F/SER3, 263 13th Avenue South, St. Petersburg, FL 33701 or online at: http://www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.htm

7.7.2. Humpback Whale and Fin Whale

The Atlantic Large Whale Take Reduction Plan (ALWTRP; 64 FR 7529; February 16, 1999) addresses the incidental bycatch of large baleen whales, North Atlantic right whales, fin whales and humpback whales, in several trap/pot and gillnet fisheries, including the Mid-Atlantic gill net, Southeast Atlantic gillnet, and Atlantic mixed species trap/pot.

The ALWTRP is an evolving plan that relies on a suite of measures to meet its goals under the MMPA, including modifications to gear and fishing practices, research on both fishing gear and whale biology, outreach, and disentanglement. The ALWTRP specifies both universal gear modifications and area- and season-specific gear modifications and closures from Maine through Florida. The Atlantic Large Whale Take Reduction Team continues to identify ways to reduce possible interactions between large whales and commercial gear. In response to the continued serious injury and mortality of large whales from entanglement in commercial fishing gear, the ALWTRP was recently modified to incorporate additional trap/pot and gillnet fisheries, establish new gear modification requirements such as requiring the use of sinking groundline, establish marking requirements, and implement other regulatory changes. NMFS, in conjunction with the ALWTRT, are currently discussing a strategy for further reducing entanglement risk due to vertical lines. For more information on the ALWTRP and its components, visit the ALWTRP website at http://www.nero.noaa.gov/whaletrp. In October 2007, NMFS issued a final rule (72 FR 57104) which implements broad-based gear modifications. This broad-based gear modification strategy includes expanded weak link and sinking groundline requirements; additional gear marking requirements; changes in boundaries; seasonal restrictions for gear modifications; expanded exempted areas; and regulatory language changes for the purposes of clarification and consistency.

7.7.3. Harbor Porpoise

On December 2, 1998, NMFS published a final rule to implement the Harbor Porpoise Take Reduction Plan (HPTRP) for the Gulf of Maine and the Mid-Atlantic waters (63 FR 66464). The

Northeast sink gillnet and Mid-Atlantic gill-net fisheries are the two primary fisheries regulated by the HPTRP. Among other measures, the HPTRP uses seasonal time/area closures in combination with the deployment of acoustic deterrent devices (pingers) in Northeast waters (Maine through Rhode Island), as well as seasonal time/area closures along with gear modifications for both small mesh (greater than 5 inches (12.7 cm) to less than 7 inches (17.78 cm)) and large mesh (greater than or equal to 7 inches (17.78 cm) to 18 inches (45.72 cm)) gillnets in Mid-Atlantic waters (New York through North Carolina). Although the HPTRP predominately impacts multispecies (groundfish), spiny dogfish, and monkfish fisheries due to high rates of porpoise bycatch, other gillnet fisheries are also managed under the HPTRP depending on where these fisheries operate.

In response to increases in harbor porpoise bycatch and non-compliance in the years following the implementation of the HPTRP, NMFS recently published a final rule amending the HPTRP to include additional conservation measures to reduce harbor porpoise bycatch to levels below the stock's PBR. In New England, these measures include an expansion of seasonal and temporal requirements within existing management areas, the incorporation of two new management areas, and the establishment of a consequence closure strategy to encourage compliance with pinger requirements. In the Mid-Atlantic, new measures include the establishment of a new management area and slight change to a gear modification requirement.

Additional information regarding HPTRP regulations, outreach guides, and related information can be accessed at: http://www.nero.noaa.gov/prot_res/porptrp/

7.7.4. Sea Turtles

Under the ESA, and its implementing regulations, taking sea turtles – even incidentally – is prohibited, with exceptions identified in 50 CFR 223.206. The incidental take of endangered species may only legally be authorized by an incidental take statement or an incidental take permit issued pursuant to section 7 or 10 of the ESA, respectively. No incidental take of sea turtles is currently authorized for any of the gear (i.e., gill net, longlines) used to target fish and coastal sharks.

Existing NMFS regulations specify procedures that NMFS may use to determine that unauthorized takings of sea turtles occur during fishing activities, and to impose additional restrictions to conserve sea turtles and to prevent unauthorized takings (50 CFR 223.206(d)(4)). Restrictions may be effective for a period of up to 30 days and may be renewed for additional periods of up to 30 days each. In 2007, NMFS issued a regulation (50 CFR 222.402) to establish procedures through which each year NMFS will identify, pursuant to specified criteria and after notice and opportunity for comment, those fisheries in which the agency intends to place observers (72 FR 43176, August 3, 2007). These regulations specify that NMFS may place observers on U.S. fishing vessels, either recreational or commercial, operating in U.S. territorial waters, the U.S. exclusive economic zone (EEZ), or on the high seas, or on vessels that are otherwise subject to the jurisdiction of the U.S. Failure to comply with the requirements under this rule may result in civil or criminal penalties under the ESA.

Sea turtle-related regulations have been implemented since 2001, which impact the use of large mesh gill nets (>8 inches) throughout Virginia and North Carolina. These regulations include

one permanent area closure and three seasonal area closures. To protect migrating sea turtles, NMFS published a final rule on December 3, 2002 (67 FR 71895), establishing seasonally-adjusted gear restrictions by closing portions of the mid-Atlantic exclusive economic zone (EEZ) to fishing with gillnets with a mesh size larger than 8–inch (20.3–cm) stretched mesh. In this final rule, NMFS revised the large mesh size restriction from the current greater than 8–inch (20.3–cm) stretched mesh, as defined in the 2002 final rule, to 7–inch (17.8–cm) stretched mesh or greater. NMFS issued a final rule on May 5, 2004 (69 FR 24997), which prohibited the use of offshore pound net leaders in a portion of the Virginia Chesapeake Bay. The 2004 rule also prohibited the use of 12 inches (30.5 cm) and greater stretched mesh and stringers in nearshore pound net leaders in Pound Net Regulated Area I and all pound net leaders employed in the remainder of the Virginia Chesapeake Bay. On July 6, 2004, NMFS implemented additional regulations for the Atlantic pelagic longline fishery to further reduce the mortality of incidentally caught sea turtles (69 FR 40734). These measures include requirements on hook type, hook size, bait type, dipnets, lineclippers, and safe handling guidelines for the release of incidentally caught sea turtles.

Copies of the regulations are available from the Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910-3226.
http://www.nmfs.noaa.gov/pr/species/turtles/regulations.htm

7.7.5. Atlantic Sturgeon

The Commission and federal government implemented a coastwide moratorium on sturgeon harvest in late 1997 and early 1998 that will go through at least 2038. Bycatch remains an important issue in the recovery of Atlantic sturgeon populations throughout their range (ASMFC 2007). This issue is also given highest priority by the National Marine Fisheries Service (NMFS) Proactive Program for Atlantic sturgeon restoration. A status review completed on February 23, 2007 has now been reviewed by NMFS and has led to a proposed rule to list the distinct population segments in Carolina and the South Atlantic as endangered. A proposed rule listing Atlantic sturgeon under the ESA has been published: http://www.nefsc.noaa.gov/press_release/2010/News/NR1025/index.html

7.7.6. Seabirds

Under the ESA and its regulations, take of Bermuda petrels, roseate terns, and piping plovers, even incidentally, is prohibited. The incidental take of an ESA listed species may only be legally authorized by an incidental take statement or incidental take permit issued pursuant to section 7 or 10 of the ESA. No incidental takes of ESA listed bird species is currently authorized for Spanish mackerel, spot, or spotted seatrout fisheries.

Under the MBTA it is unlawful to "pursue, hunt, take, capture, [or] kill" migratory birds except as permitted by regulation (16 USC. 703). Many migratory waterbirds occur within the boundaries of the Spanish mackerel, spot, and spotted seatrout fisheries (see section 7.5.3.). USFWS Policy on Waterbird Bycatch (October 2000) states "It is the policy of the US Fish and Wildlife Service that the Migratory Bird Treaty Act of 1918, as amended, legally mandates the protection and conservation of migratory birds. The USFWS seeks to actively expand

partnerships with regional, national, and international organizations, States, tribes, industry, and environmental groups to address seabird bycatch in fisheries, by promoting public awareness of waterbird bycatch issues, and facilitating the collection of scientific information to develop and provide guidelines for management, regulation, and compliance."

Section 116(c) of the Magnuson-Stevens Fishery Conservation and Management Reauthorization Act (2006) authorizes the Interior and Commerce Departments to undertake projects, in cooperation with industry, to improve outreach about seabird bycatch in commercial fisheries and to reduce seabird-fisheries interactions, through information sharing and technology. USFWS seeks to partner with State, regional, and Federal agencies; industry; tribes; and NGOs to facilitate outreach and improve information and technology to reduce seabird bycatch in Spanish mackerel, spot, spotted seatrout, and other fisheries within state and Federal waters.

7.8. Potential Impacts to Atlantic Coastal State and Interstate Fisheries

Regulations under all three take reduction plans for Atlantic large whales (which includes humpback and fin whales), harbor porpoises, and bottlenose dolphins have the potential to impact gill-net, seine and trap/pot fisheries that harvest Spanish mackerel, spot and spotted seatrout. The plan with the greatest impact is the Bottlenose Dolphin Take Reduction Plan because of the high level of observed take and estimated bycatch that has occurred in gillnet fisheries in the past. Effort patterns in the Mid-Atlantic gillnet fishery are heavily influenced by marine mammal time/area closures and /or gear restrictions under the ALWTRP, HPTRP, and BDTRP; and gear restrictions due to fish conservation measures. (Waring et al. 2009).

7.9. Identification of Current Data Gaps and Research Needs

7.9.1. Bottlenose Dolphin Research Needs

- Provide observer coverage for the inshore Spanish Mackerel fishery (i.e. Pamlico Sound) and more information about the fishery characteristics.
- Determine the stock identity of bottlenose dolphin observed takes, or strandings, with evidence of fisheries interaction by matching dorsal fin images to Mid-Atlantic Bottlenose Dolphin Catalog or obtaining genetic samples (required to be provided by observers).
- Obtain reliable abundance estimates per stock to ensure PBR is accurately determined and in order to place animals in the correct stock.
- Refine the understanding of the distribution of the NNCES stock in: (1) Pamlico Sound during the summer using genetics; and (2) ocean waters, especially where there is an overlap with other stocks and observed takes can be applied to more than one stock.
- Expand observer coverage. Enhance observer documentation of dorsal fin photos and collection of biopsy samples from observed takes. If possible, collection of the whole carcass should be the priority for observed Tursiops takes to maximize data collection. The local stranding networks can help coordinate carcass collection. The USCG may be an asset to help tow in the carcass if the fisherman's vessel is too small.

7.9.2. Harbor Porpoise Research Needs

The following research needs have been identified by the Harbor Porpoise Take Reduction Team, NMFS, and through suggestions received during NMFS' recent HPTRP outreach meetings. Additional research needs can be found by visiting the NMFS Northeast Region's Protected Resources Division Research Priorities and Needs website (http://www.nero.noaa.gov/prot_res/research/).

- Research on testing the effectiveness of alternative methods of reducing incidental take of harbor porpoises such as pingers of higher frequencies than are currently required, as well as different gear modifications (e.g., thicker twine, reflective gillnets), and compare the effectiveness of these methods to currently required bycatch reduction methods.

7.9.3. Atlantic Sturgeon Research Needs

The following recommendations were formulated at a Sturgeon Bycatch Workshop held in 2007 (ASMFC 2007):

- Highest research priority should be given to evaluation of relative population contributions to regions of high bycatch. Molecular approaches are currently available to estimate these population contribution rates, but such studies should be undertaken through careful sampling designs to insure that genetic samples are representative of intercepted sturgeon.
- Abundance and vital rate estimates are required for populations contributing to coastal bycatch to evaluate whether bycatch rates are sustainable on a population-specific basis.
- The bycatch GENMOD modeling approach developed here should be used for analysis of historical bycatch (the 1989-2000 period). The model will need to be re-parameterized and refit. Also, changes in how data have been recorded by observers and within the vessel trip report (VTR) data prior to 2000 will need to be carefully considered.
- State effort statistics related to sink gillnet and other fisheries that retain sturgeons should be combined with the VTR database to permit improved expansion of observer-based bycatch rates.
- A detailed GIS analysis should be performed on the distribution of observed sturgeon bycatch to compare recent patterns of coastal habitat use by Atlantic sturgeon to historical ones (1989-2000). Although most sturgeon were caught as bycatch in waters <40 meters in gillnet and trawl fisheries, this depth association is expected to vary between New England and Mid-Atlantic regions and deserves additional analysis. The observer database (1989-present) could support habitat suitability mapping for Atlantic sturgeon in coastal waters of New England and the Mid-Atlantic.
- Controlled mesocosm-scale experiments on sink gillnet interactions and retention of sturgeon, such as those recently conducted at VIMS (C. Hager, pers. comm.), should continue to investigate gear factors associated with bycatch. Gear retention studies could be conducted in semi-field systems (large ponds) and permit estimates of catchability applicable to the field.

7.9.4. Seabird Research Needs

- Initiate and expand observer coverage/bycatch monitoring and collection and analysis of seabird bycatch data to better understand extent of seabird bycatch and identify bycaught seabird species within the target fisheries (state waters).
- Collaborate with fishermen to develop and test gear and identify deployment practices that reduce seabird bycatch within the target fisheries (state waters).
- Conduct outreach activities to facilitate sharing of seabird bycatch information in the target fisheries among agencies, industry and the public.

8. REFERENCES

ASMFC (Atlantic States Marine Fisheries Commission).1984 Fishery Management Plan for Spotted Seatrout. Washington (DC): ASMFC. Fisheries Management Report #4. 101 p.

ASMFC.1987. Fishery Management Plan for Spot. Washington (DC): ASMFC. Fisheries Management Report #11. 90 p.

ASMFC. 1990. Fishery Management Plan for Spanish Mackerel. Washington (DC): ASMFC. Fishery Management Report #18. 78 p.

ASMFC. 2000. Evaluating fishing gear impacts to submerged aquatic vegetation and determining mitigation strategies. Washington (DC): ASMFC. Habitat Management Series No 5. 38 p.

ASMFC. 2000. SEAMAP-SA 10-Year Trawl Report: Results of trawling efforts in the coastal habitat of the South Atlantic Bight, FY 1990-1999. Washington (DC): ASMFC. Special Report #71. 144 p.

ASMFC. 2007. Estimation of Atlantic Sturgeon bycatch in the Coastal Atlantic Commercial Fisheries of New England and the Mid-Atlantic. Special Report to the ASMFC Atlantic Sturgeon Management Board, August, Washington, D.C.

ASMFC. 2007. Spot Stock Monitoring Reports, 2007. Washington (DC): Atlantic States Marine Fisheries Commission. Report of the Spot Plan Review Team to the South Atlantic State-Federal Fisheries Management Board. 41 p.

ASMFC. 2008. Spot Stock Monitoring Reports, 2008. Washington (DC): Atlantic States Marine Fisheries Commission. Report of the Spot Plan Review Team to the South Atlantic State-Federal Fisheries Management Board. 49 p.

ASMFC. 2009a. Interstate Fisheries Management Program Charter. Washington (DC): ASMFC. 26 p.

ASMFC. 2009b. Spot Data Availability and Stock Monitoring Report, 2009. Washington (DC): Atlantic States Marine Fisheries Commission. Report of the Spot Plan Review Team to the South Atlantic State-Federal Fisheries Management Board. 85 p.

ASMFC. 2009c. 2009 Review of the Atlantic States Marine Fisheries Commission Fishery Management Plan for Spot. Washington (DC): ASMFC. A Report of the ASMFC Spot Plan Review Team. 12 p.

ASMFC 2010a. Spot Stock Monitoring Report, 2010a. Washington (DC): Atlantic States Marine Fisheries Commission. Report of the Spot Plan Review Team to the South Atlantic State-Federal Fisheries Management Board. 87 p.

ASMFC. 2010b. Spot Life History Report. Washington (DC): ASMFC. Report to the South Atlantic State/Federal Fisheries Management Board. 44 p.

Baltz DM, Rakocinski C, Fleeger JW. 1993. Microhabitat use by marsh-edge fishes in a Louisiana estuary. Environmental Biology of Fishes 36: 109-126.

Barros NB, Wells RS. 1998. Prey and feeding patterns of resident bottlenose dolphins (*Tersiops truncatus*) in Sarasota Bay, Florida. Journal of Mammology 79: 1045-1059.

Baylock RA. 1995. A pilot study to estimate abundance of the U.S. Atlantic coastal migratory bottlenose dolphin stock. NOAA Tech. Mem. NMFS-SEFSC-362, 9p.

Bergquist DC, Van Dolah RF, Riekerk GHM, Levisen MV, Crowe SE, Brock L, Greenfield DI, Chestnut DE, McDermott W, Fulton M, Wirth E Harvey J. 2009. The Condition of South Carolina's Estuarine and Coastal Habitats During 2005-2006. Charleston (SC): South Carolina Marine Resources Division. Technical Report No 103. 74 p.

Berrien P, Finan D. 1977. Biological and fisheries data on Spanish mackerel, *Scomberomorus maculatus* (Mitchill). Highlands (NJ): NMFS Sandy Hook Laboratory. Technical Series Report No 9. 52 p.

Berrien PL, Fahay MP, Kendall AW Jr, Smith WG. 1978. Ichthyoplankton from the R/V DOLPHIN survey of continental shelf waters between Martha's Vineyard, Massachusetts and Cape Lookout, North Carolina, 1965-66. US Nat Mar Fish Serv, NEFSC Sandy Hook Lab, Tech Ser Rep No 15. 152 p.

Bigelow HB, Schroeder WC. 1953. Fisheries of the Gulf of Maine. US Fish and Wildlife Serv, Fish Bull 53:423.

Brown K. 2007. Interstate fisheries management program implementation for North Carolina, Study II: documentation and reduction of bycatch in North Carolina Fisheries - Evaluation of the Estuarine Hook and Line Recreational Fishery in the Neuse River, North Carolina. Morehead City (NC): North Carolina Division of Marine Fisheries. Completion Report, NOAA Award No. NA 05 NMF 4741003, Segment 2.

Brown-Peterson NJ, Peterson MS, Nieland DL, Murphy MD, Taylor RG, Warren JR. 2002. Reproductive biology of female spotted seatrout, *Cynoscion nebulosus,* in the Gulf of Mexico: differences among estuaries? Environmental Biology of Fishes 63: 405-415.

Burkholder JM, Glasgow HB Jr, Cooke JE. 1994. Comparative effects of water-column nitrate enrichment on eelgrass *Zostera marina*, shoalgrass *Halodule wrightii*, and widgeongrass *Ruppia maritima*. Marine Ecology Progress Series 105: 121-138.

Chao LN, Musick JA. 1977. Life history, feeding habits and functional morphology of juvenile sciaenid fishes in the York River Estuary, Virginia. U.S. National Mar. Serv. Fish. Bull. 75:657-702.

Chesapeake Bay Program. 1991. Chesapeake Bay Atlantic Croaker and Spot Fishery Management Plan. U.S. Environmental Protection Agency. Contract No. 68-WO-0043. 33 p.

Churchill JH, Forward RB, Luettich RA, Hench JJ, Hettler WF, Crowder LB, Blanton JO. 1999. Circulation and larval fish transport within a tidally dominated estuary. Fisheries Oceanography 8 (Suppl. 2): 173-189.

Clapham PJ, Young SB, Brownell RL, Jr. 1999. Baleen whales: conservation issues and the status of the most endangered populations. Mammal Review 29: 35-60.

Cochran RE. 1994. Respiratory responses of the saltmarsh animals *Fundulus heteroclitis*, *Leiostomus xanthurus*, and *Palaemonetes pugio* to environmental hypoxia and hypercapnia and to the organophospahate pesticide, azinphosmethyl. M.S. Thesis University of Charleston, Charleston, South Carolina. 57 pp.

Collette BB, Nauen CE, 1983. An annotated and illustrated catalogue of tunas, mackerels, bonitos, and related species known to date. FAO Fisheries Synopsis 2(125).

Collette, BB, Nauen CE, 1983. Scombrids of the world. An annotated and illustrated catalogue of tunas, mackerels, bonitos and related species known to date. FAO Fisheries Synopsis 2(125).

Collette BB, Ruso JL. 1979. An introduction to the Spanish mackerels, genus *Scomberomorus*. In: Nakamura, Bullis, editors. Proceedings: Colloquium on the Spanish and King Mackerel Resources of the Gulf of Mexico. Ocean Springs (MS): Gulf States Marine Fisheries Commission. No 4. p 3-16.

Collette BB, Ruso JL. 1984. Morphology, systematic, and biology of the Spanish mackerels (*Scomberomorus*, Scombridae). Fish Bull US 82(4): 545-692.

Colton JB Jr, Smith WG, Kendall AW Jr, Berrien PL, Fahay MP. 1979. Principal spawning areas and times of marine fishes, Cape Sable to Cape Hatteras. US Nat Mar Fish Serv Fish Bull 76(4): 911-915.

Conant TA, Dutton PH, Eguchi T, Epperly SP, Fahy CC, Godfrey MH, MacPherson SL, Possardt EE, Schroeder BA, Seminoff JA, Snover ML, Upite CM, Witherington BE. 2009. Loggerhead sea turtle *(Caretta caretta)* 2009 status review under the U.S. Endangered Species Act. Report of the Loggerhead Biological Review Team to the National Marine Fisheries Service, August 2009. 222 pages.

Cortés E, Neer JA. 2002. Updated catches of sharks. NOAA Fisheries, SEFSC, Panama City Lab. Document SB/02/15 of the 2002 Shark Evaluation Workshop. Panama City, FL, June 24-28, 2002. 62p.

Craig KJ, Burke BJ, Crowder LB, Rice JA. 2006. Prey growth and size dependent predation in juvenile estuarine fishes: experimental and model analysis. Ecology 87(9): 2366-2377.

Currin BM. 1984. Food habits and food consumption of juvenile Spot, *Leiostomus xanthurus*, and croaker, *Micropodon undulatus*, in their nursery areas. M.S. Thesis. North Carolina State University, Raleigh. 103 pp.

Currin BM, Reed JP, Miller JM. 1984. Growth, production, food consumption, and mortality of juvenile spot and croaker: A comparison of tidal and nontidal nursery areas. Estuaries 714A/:451-459.

Daniel LB III. 1988. Aspects of the biology of juvenile red drum, *Sciaenops ocellatus* and spotted seatrout, *Cynoscion nebulosus* (Pisces: Sciaenidae) in South Carolina [thesis]. Charleston (SC): College of Charleston. 58 p.

Dawson CE. 1958. A study of the biology and life history of the spot, *Leiostomus xanthurus* Lacepede, with specific reference to South Carolina. Bears Bluff Lab Contr 28. 48 p.

Dennison WC, Orth RJ, Moore KA, Stevenson JC, Carter V, Kollar S, Bergstrom PW, Batiuk R. 1993. Assessing water quality with submerged aquatic vegetation. Bioscience 43: 86-94.

deSilva J. Unpublished. Stock assessment of spotted seatrout, Cynoscion nebulosus, in South Carolina with recommendations on the management of the recreational fishery. Charleston (SC): South Carolina Department of Natural Resources, Marine Research Institute.

Diamond SL, Crowder LB, Cowell LG. 1999. Catch and bycatch: The qualitative effects of fisheries on population vital rates of Atlantic croaker. Trans Amer Fish Soc 128: 1085-1105.

Diamond SL, Cowell LG, Crowder LB. 2000. Population effects of shrimp trawl bycatch on Atlantic croaker. Can J Fish Aquat Sci 57: 2010-2021.

Duffy J. 1999. Catch and release mortality studies of spotted seatrout and red drum in coastal Alabama. National Symposium on Catch and Release in Marine Recreational Fisheries.

Duffy J. 2002. Catch-and-release mortality studies of spotted seatrout and red drum in coastal Alabama. Pages 110-113 *in* J. A. Lucy, and A. L. Studholme, editors. Catch and release in marine recreational fisheries. American Fisheries Society, Bethesda, Maryland.

Durako MJ. 1994. Seagrass die-off in Florida Bay (USA): changes in shoot demographic characteristics and population dynamics in *Thalassia testudinum*. Marine Ecology Progress Series 110: 59-66.

Earll RE. 1883. The Spanish mackerel, *Cybrium maculates* (Mitchell), its natural history and artificial propagation, with an account of the origin and development of the fishery. Washington (DC): US Comm of Fish and Fisheries. Report for 1880. p 395-426.

Environmental Protection Agency (EPA). National Estuary Program Coastal Condition Report – NEP CCR Factsheet. EPA-842-F-06-001. 2007 [cited 2010 Aug 25]. Available from: http://water.epa.gov/type/oceb/nep/nepccr-factsheet.cfm

Eyler S, Mangold M, Minikken S. 2004. Atlantic Coast Sturgeon Tagging Data base. Summary report USFWS, Maryland Fishery Resources Office, Cot.

Fable WA Jr, Johnson AG, Berger LE. 1987. Age and growth of Spanish Mackerel, *Scomberomorus maculatus*, from Florida and the Gulf of Mexico. Fish Bull US 85(4): 777-784.

Fonseca MS. 1996. The role of seagrasses in nearshore sedimentary processes: a review. p. 261-286. *In* C. Roman and K. Nordstrom (eds.), Estuarine Shores: Hydrological, Geomorphological and Ecological Interactions. Blackwell, Boston, MA.

Fonseca MS, Kenworthy WJ, Thayer GW. 1998. Guidelines for the conservation and restoration of seagrasses in the United States and adjacent waters. Silver Spring (MD): National Oceanographic and Atmospheric Administration. NOAA Coastal Ocean Program Decision Analysis Series No 12. 222 p.

Forsell DJ. 1999. Mortality of migratory waterbirds in mid-Atlantic coastal anchored gillnest during March and April 1998. USFWS Chesapeake Bay Field Office Administrative Report, Annapolis, MD, 34 pp. Available online at http://www.seaturtle.org/PDF/ForsellDJ_1999_USFWSTechReport.pdf

Fullard KJ, Early G, Heide-Jorgensen MP, Bloch D, Rosing-Asvid A, Amos W. 2000. Population structure of long-finned pilot whales in the North Atlantic: A correlation with sea surface temperature? Molecular Ecology 9: 949–958.

Gannon DP, Waples DM. 2004. Diets of coastal bottlenose dolphins from the US Mid-Atlantic coast differ by habitat. Marine Mammal Science 20: 527-545.

Garrison LP, Rosel PE, Hohn AA, Baird R, Hoggard W. 2003. Abundance of the coastal morphotype of bottlenose dolphin Tursiops truncatus, in U.S. continental shelf waters between New Jersey and Florida during winter and summer 2002. NMFS/SEFSC report prepared and reviewed for the Bottlenose Dolphin Take Reduction Team. Available from: Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33149.

Gearhart J. 2002. Interstate fisheries management program implementation for North Carolina, Study II: documentation and reduction of bycatch in North Carolina Fisheries, Job 3: hooking mortality of spotted seatrout (*Cynoscion nebulosus*), weakfish (*Cynoscion regalis*), red drum (*Sciaenops ocellata*), and southern flounder (*Paralichthys lethostigma*) in North Carolina. Morehead City (NC): North Carolina Division of Marine Fisheries. Completion Report, Cooperative Agreement No. NA 87FG0367/2.

Glass AH, Cole TVN, Garron M. 2009. Mortality and serious injury determinations for baleen whale stocks along the United States eastern seaboard and adjacent Canadian maritimes, 2003-2007. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 09-04; 19 p.

Glass A, Cole TVN, Garron M. 2010. Mortality and Serious Injury Determinations for Baleen Whale Stocks along the United States and Canadian Eastern Seaboards, 2004-2008. NOAA Technical Memorandum NMFS NE 214 19 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at http://www.nefsc.noaa.gov/nefsc/publications/

Grabowski JH. 2002. The influence of trophic interactions, habitat complexity, and landscape setting on community dynamics and restoration of oyster reefs [dissertation]. Chapel Hill (NC): University of North Carolina-Chapel Hill. 155 p.

Hain JHW, Ratnaswamy MJ, Kenney RD, Winn HE. 1992. The fin whale, *Balaenoptera physalus*, in waters of the northeastern United States continental shelf. Rep. Int. Whal. Comm. 42: 653-669.

Hales LS, Van Den Avyle MJ. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (South Atlantic) – spot. U. S. Fish and Wildlife Service Biological Report 82(11.91).

Hamilton PK, Marx MK, Kraus SD. 1998. Scarification analysis of North Atlantic right whales (*Eubalaena glacialis*) as a method of assessing human impacts. Final Rept. To NEFSC, Contract No. 4EANF-6-0004.

Harris, P, Dean JM, 1998. The potential impact of juvenile king mackerel (*Scomberomorus cavalla*) and Spanish mackerel (*S. maculatus*) shrimp trawl bycatch mortality on southeast Atlantic adult populations. Appendix L. Stock assessment and fishery evaluation report for king mackerel, Spanish mackerel and cobia. Fishery Management Plan for Coastal Migratory Pelagics, Vol. 1.

Hegen HE, Matlock GC, Green AW. 1983. Handling and tagging survival of hook-caught spotted seatrout held in cages. Annual Proceedings of the Texas Chapter 5:39-53.

HerkeWH. 1971. Use of natural and semi-impounded Louisiana tidal marshes as nurseries for fishes and crustaceans. Ph.D. Thesis, Louisiana State Univ., Baton Rouge.

Hettler WF Jr. 1989. Nekton use of regularly-flooded saltmarsh cordgrass habitat in North Carolina, USA. Marine Ecology Progress Series 56: 111-118.

Hettler WF Jr, Chester AJ. 1990. Temporal distribution of ichthyoplankton near Beaufort Inlet, North Carolina. Marine Ecology Progress Series 68: 157-168.

Hildebrand SF, Cable LE. 1930. Development and life history of fourteen teleostean fishes at Beaufort, North Carolina. Bull US Bur Fish 46: 383-488.

Hildebrand SF, Schroeder WC. 1928. The fishes of Chesapeake Bay. Bull US Bur Fish 43(1). 388 p.

Hoese HD. 1973. A trawl study of nearshore fishes and invertebrates of the Georgia coast. Contrib Mar Sci 17: 63-98.

Hoey JJ, Moore N. 1999. Multi-species catch characteristics for the US Atlantic pelagic longline fishery. Captain's Report. National Marine Fisheries-NOAA-NMFS. Marfin Grant-NA77FF0543, (SK) Grant-NA86FD0113. 78p.

Holt GJ, Holt SA. 2000. Vertical distribution and the role of physical processes in the feeding dynamics of two larval sciaenids *Sciaenops ocellatus* and *Cynoscion nebulosus*. Marine Ecology Progress Series 193: 181-190.

Holt GJ, Holt SA. 2003. Effects of variable salinity on reproduction and early life stages of spotted seatrout. In: Bortone SA, editor. Biology of the Spotted Seatrout. Boca Raton (FL): CRC Press. p 135-145.

Jepson M, Kitner K, Pitchon A, Perry WW, Stoffle B. 2006. Potential fishing communities in the Carolinas, Georgia, and Florida: An effort in baseline profiling and mapping. SAFMC and NMFS-SERO, Fisheries Social Science Branch.

Jensen CC. 2009. Stock Status of Spotted Seatrout, Cynoscion nebulosus, in North Carolina, 1991-2008. Morehead City (NC): North Carolina Division of Marine Fisheries. 83 p.

Johnson DR, Seaman W Jr. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (south Florida)-spotted seatrout. US Fish and Wildlife Service Biological Report 82 (11.43). US Army Corps of Engineers. 18p.

Katona SK, Beard JA. 1990. Population size, migrations, and feeding aggregations of the humpback whale (Megaptera novaeangliae) in the western North Atlantic ocean. Rep. Int. Whal. Commn. Special Issue 12:295-306.

Keinath JA, Musick JA. 1988. Population trends of the bottlenose dolphin (*Tursiops truncatus*) in Virginia. Final Contract Report No. 40-GENF-800564, NMFS/SEFSC, Miami, FL. 36 pp.

Kemp RJ. 1949. Report on stomach analysis from June 1, 1949 through August 31, 1949. Ann. Rept. Tex Game Fish, Oyster Comm. p. 100–127.

Knowlton AR, Kraus SD, Kenney RD. 1994. Reproduction in North Atlantic right whales (*Eubalaena glacialis*). Can. Jour. Zool. 72: 1297-1305.

Kraus SD, Hamilton PK, Kenney RD, Knowlton A, Slay CK. 2000. Status and trends in reproduction of the North Atlantic right whale. Jour. Cetacean Res. Mgmt. Spec. Iss. 2.

Kupschus S. 2003. Development and evaluation of statistical habitat suitability models: an example based on juvenile spotted seatrout *Cynoscion nebulosus*. Marine Ecology Progress Series 265: 197-212.

Kupschus S. 2004. A temperature-dependent reproductive model for spotted seatrout (*Cynoscion nebulosus*) explaining spatio-temporal variations in reproduction and young-of-the-year recruitment in Florida estuaries. ICES Journal of Marine Science 61: 3-11.

Lee DS. 2009. Species profiles of western North Atlantic seabirds. Report for the Pelagic Longline Observer Program, NMFS Southeast Fisheries Science Center, Miami, FL. 84 pp. Available online at http://www.acjv.org/mb_resources.htm

Legault CM, Cummings N, Phares P. 1998. Stock assessment analyses on Atlantic migratory group king mackerel, Gulf of Mexico migratory group king mackerel, Atlantic migratory group Spanish mackerel, and Gulf of Mexico migratory group Spanish mackerel. NMFS SEFSC Miami Sustainable Fisheries Division Contribution MIA-97/98-15.

Lenihan HS, Peterson CH, Byers JE, Grabowski JH, Thayer GW, Colby DR. 2001. Cascading of habitat degradation: oyster reefs invaded by refugee fishes escaping stress. Ecological Applications 11(3): 764-782.

Lewis RM, Judy MH. 1983. The occurrence of spot, *Leiostomus xanthurus*, and Atlantic croaker, *Micropogonias undulatus*, larvae in Onslow Bay and Newport River estuary, North Carolina. US Nat Mar Fish Serv Fish Bull 81(2): 405-412.

Loflin RK. 1995. The effects of docks on seagrass beds in the Charlotte Harbor estuary. Florida Scientist 58(2): 198-205.

Lorio WJ, Schafer HE. 1966. A food habit study of the spotted seatrout, *Cynoscion nebulosus*, in the Biloxi Marsh area, Louisiana. In: Proceedings of the Annual Conference of Southeastern Association Game and Fish Commissioners 19: 289-296.

Lowery J, Paynter KT. 2002. The importance of molluscan shell substrate. Unpub. rep. National Marine Fisheries Service, Silver Spring, MD. 17 p.

Lukens, R.R. 1989. Spanish Mackerel Fishery Management Plan (Gulf of Mexico). Gulf States Marine Fisheries Commission, Ocean Springs, MS.

MacRae PSD. 2006. A community approach to identifying essential fish habitat for spotted seatrout, *Cynoscion nebulosus*, in Barataria Bay, LA [dissertation]. Baton Rogue (LA): Louisiana State University. 161 p.

Mahood RK. 1974. Seatrout of the genus *Cynoscion* in coastal waters of Georgia. Brunswick (GA): Georgia Department of Natural Resources, Game and Fish Division .Project No 2-116-R. 35 p.

Marancik KE, Clough LM, Hare JA. 2005. Cross-shelf and seasonal variation in larval fish assemblages on the southeast United States continental shelf off the coast of Georgia. Fish Bull 103: 108-129.

Matlock GC, Dailey JA. 1981. Survival of hook-caught spotted seatrout held in cages. Austin (TX): Texas Parks and Wildlife Department. Management Data Series No. 15.

Matlock GC, McEachron LW, Dailey JA, Unger PA, Chai P. 1993. Short-term hooking mortalities of red drums and spotted seatrout caught on single-barb and treble hooks. North American Journal of Fisheries Management 13:186-189.

McMichael RH Jr, Peters KM. 1989. Early life history of spotted seatrout, *Cynoscion nebulosus* (Pices: Sciaenidae), in Tampa Bay, Florida. Estuaries 12(2): 98-110.

Mead JG, Potter CW. 1990. Natural history of bottlenose dolphins along the central Atlantic coast of the United States. In: Leatherwood S, Reeves RR, editors. The Bottlenose Dolphin. San Diego (CA): Academic Press. p 165-198.

Mercer LP. 1984. A biological and fisheries profile of spotted seatrout, *Cynoscion nebulosus*. Morehead City (NC): North Carolina Department of Natural Resources and Community Development, Division of Marine Fisheries. Special Scientific Report No 40. 87 p.

Merriner. 1980. History and management of the spotted seatrout fishery. In: Gulf States Marine Fisheries Commission (editor). Proc. Colloq. on the biology and management of red drum and spotted seatrout. Spec Rep No 5: 55-61.

Minello TJ. 1999. Nekton densities in shallow estuarine habitats of Texas and Louisiana and the identification of Essential Fish Habitat. In: Benaka LR, editor. Fish Habitat: Essential Fish Habitat and Rehabilitation. Proceedings of the American Fisheries Society, Symposium 22. Bethesda (MD). p 43-75.

Minello TJ, Able KW, Weinstein MP, Hays CG. 2003. Salt marshes as nurseries for nekton: testing hypotheses on density, growth and survival through meta-analysis. Marine Ecology Progress Series 246: 39-59.

Murdy EO, Birdsong RS, Musick JA. 1997. Fishes of Chesapeake Bay. Washington (DC): Smithsonian Institution Press. 324 p.

Murphy MD, Heagey RF, Neugebauer VH, Gordon MD, Hintz JL. 1995. Mortality of spotted seatrout released from gill-net or hook-and-line gear in Florida. North American Journal of Fisheries Management 15: 748-753.

Murphy MD, Nelson GA, Muller RG. 1999. An update of the stock assessment of spotted seatrout, *Cynoscion nebulosus.* St. Petersburg (FL): Florida Fish and Wildlife Conservation Commission, Florida Marine Research Institute.

Murphy MD, Guenther CB, Mahmoudi B. 2006. An assessment of the status of spotted seatrout in Florida waters through 2005. Florida Fish and Wildlife Conservation Commission Fish and Wildlife Research Institute. In-House Report 2006-017, St. Petersburg.

NCDMF (North Carolina Division of Marine Fisheries). 2005. Survey of Population Parameters of Marine Recreational Fishes in North Carolina. Morehead City (NC): North Carolina Department of Environment and Natural Resources. Annual Progress Report Grant F-42.

NCDMF. 2010. DRAFT North Carolina Spotted Seatrout Fishery Management Plan. Morehead City (NC): North Carolina Division of Marine Fisheries. 311 p.

Nelson M, Garron M, Merrick RL, Pace RM III, Cole TVN. 2007. Mortality and Serious Injury Determinations for Baleen Whale Stocks along the United States Eastern Seaboard and Adjacent Canadian Maritimes, 2001-2005. Northeast Fisheries Science Center Reference Document 07-05.

Nieland DL, Thomas RG, Wilson CA. 2002. Age, growth, and reproduction of spotted seatrout in Barataria Bay, Louisiana. Transactions of the American Fisheries Society 131: 245-259.

NMFS (National Marine Fisheries Service). 1991. Recovery plan for the northern right whale (*Eubalaena glacialis*). Prepared by the Right Whale Recovery Team for the NMFS, Silver Spring, MD, 86 pp.

NMFS (National Marine Fisheries Service). 1999. Endangered Species Act Section 7 Consultation. Biological Opinion. Consultation Regarding the Federal Atlantic Herring Fishery.

NMFS (National Marine Fisheries Service). 2001. Endangered Species Act section 7 consultation on the Authorization of fisheries under the Spiny Dogfish Fishery Management Plan. Biological Opinion.

NMFS (National Marine Fisheries Service). 2002. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2002.

NMFS (National Marine Fisheries Service). 2006. Draft recovery plan for the fin whale (*Balaenoptera physalus*). National Marine Fisheries Service, Silver Spring, MD. http://www.nmfs.noaa.gov/pr/pdfs/recovery/draft_finwhale.pdf

NMFS (National Marine Fisheries Service). 2006. Final Consolidated Atlantic Highly Migratory Species Fishery Management Plan.

NMFS (National Marine Fisheries Service). 2007. List of Fisheries (LOF). Federal Register 72 (28 March 2007): 14486-14490.

NMFS (National Marine Fisheries Service). 2008. SEDAR17-DW12. Estimation of Spanish mackerel and vermilion snapper bycatch in the shrimp trawl fishery in the South Atlantic. Analysis performed by Kate Andrews, NMFS Southeast Fisheries Science Center.

NMFS (National Marine Fisheries Service). 2010. Fisheries Economics of the United States, 2008. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-109, 177 p. Available at: http://www.st.nmfs.noaa.gov/st5/publication/index.html.

NMFS, Sustainable Fisheries Division. 2003. Stock assessment analyses on Spanish and king mackerel stocks. NMFS SEFSC Miami Sustainable Fisheries Division Contribution SFD-2003-0008, 147 pp.

Nobel EB. 1992. Migration, age and growth of Spanish mackerel (*Scomberomorus maculatus*) in North Carolina. Morehead City (NC): North Carolina Division of Marine Fisheries. Study 2 in Completion Report for Project –F/29. 51p.

Noble EB, Monroe RJ. 1991. Classification of Pamlico Sound Nursery Areas: Recommendations for Critical Habitat Criteria. Morehead City (NC): North Carolina Department of Environment, Health, and Natural Resources, Division of Marine Fisheries. A/P Project No 89-09. 70 p.

Northridge, S.P. 1991. An updated world review of interactions between marine mammals and fisheries. FAO Fisheries Technical Paper. No. 251, Suppl. 1. FAO, Rome, Italy.

Orphanides CD. 2010. Estimates of Cetacean and Pinniped Bycatch in the 2007 and 2008 Northeast Sink Gillnet and Mid-Atlantic Gillnet Fisheries. US Dept Commer, Northeast Fish Sci Cent Ref Doc. 10-10; 45 p. Available from: National Marine Fisheries Service, 166 Water Street, Woods Hole, MA 02543-1026, or online at: http://www.nefsc.noaa.gov/nefsc/publications/

Orth RJ, Carruthers TJB, Dennison WC, Duarte CM, Fourqurean JW, Heck KL Jr, Hughes AR, Kendrick GA, Kenworthy WJ, Olyarnik S, Short FT, Waycott M, Williams SL. 2006. A global crisis for seagrass ecosystems. Bioscience 56(12): 987-996.

Overton AS, Manooch CS, Smith JW, Brennan K. 2008. Interactions between adult migratory striped bass (*Morone saxatilis*) and their prey during winter off the Virginia and North Carolina Atlantic coast from 1994 through 2007. Fishery Bulletin 106(2): 174-182.

Pacheco AL. 1962b. Age and growth of spot in lower Chesapeake Bay, with notes on distribution and abundance of juveniles in the York River system. Chesapeake Sci 3(1): 18-28.

Palka DA. 2001. Gear Characteristics of Mid-Atlantic Gillnet Hauls that Catch Bottlenose Dolphins. Draft report presented to attendees at the Bottlenose Dolphin Fishery Interaction Workshop. Raleigh, North Carolina.

Parker JC. 1971. The biology of the spot, *Leiastomus xanthurus* Lacepede, and Atlantic croaker, *Micropogon undulatus* (Linnaeus) in two Gulf of Mexico nursery areas. Ph.D. Thesis. Texas A & M Univ., College Station.

Pearson JC. 1932. Winter trawl fishery off the Virginia and North Carolina coasts. US Bur Fish, Invest Rep No 10. 31 p.

Perret WS, Weaver JE, Williams RO, Johansen PL, McIlwain TD, Raulerson RC, Tatum WM. 1980. Fishery profiles of red drum and spotted seatrout. Ocean Springs (MS): Gulf States Marine Fisheries Commission. Report No 6. 60 p.

Peterson GW, Turner RE. 1994. The value of salt marsh edge vs. interior as a habitat for fish and decapod crustaceans in a Louisiana tidal marsh. Estuaries 17(1B): 235-262.

Peterson CH, Peterson NM. 1979. The ecology of intertidal flats of North Carolina: a community profile. Washington (DC): U.S. Fish and Wildlife Service. OBS-79/39. 73 p.

Peuser R (editor). 1996. Estimates of finfish bycatch in the south Atlantic shrimp fishery. Final Report of the SEAMAP-South Atlantic Committee: Shrimp Bycatch Work Group. Washington (DC): Atlantic States Marine Fisheries Commission. 63 p.

Phillips, JM, Huish MT, Kerby JH, Morgan DP. 1989. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (mid-Atlantic)—Spot. U.S. Fish Wild. Serv. Biol. Rep. 82111.98. U.S. Army Corps of Engineeers, TR EL-82-4. 13 pp.

Piner KP, Jones CM. 2004. Age, growth and the potential for growth overfishing of spot (*Leiostomus xanthurus*) from the Chesapeake Bay, eastern USA. Marine and Freshwater Research 55: 553-560.

Powell D. 1975. Age, growth and reproduction in Florida stocks of Spanish mackerel, *Scomberomorus maculatus*. St. Petersbrug (FL): Florida Department of Natural Resources. FL Mar Res Publ No 5. 21 p.

Powell, AB, Gordy HR. 1980. Egg and larval development of the spot, *Leiostomus xanthurus*. U.S. Natl. Mar. Fish. Serv. Fish. Bull. 78:701-714.

Powels H, Stender BW. 1976. Observations on composition, seasonality and distribution of ichthyoplankton from MARMAP cruises in the South Atlantic bight in 1973. Charleston (SC): South Carolina Marine Resources Center. Technical Report No. 11. 47 p.

Powers, JE, Cummings N, and Phares P. 1996. Stock assessment analyses on Gulf of Mexico migratory group Spanish mackerel, and Atlantic migratory group Spanish mackerel. NMFS SEFSC Miami Sustainable Fisheries Division Contribution MIA-95/96-11.

Rakocinski CF, Baltz DM, Fleeger JW. 1992. Correspondence between environmental gradients and the community structure of marsh-edge fishes in a Louisiana estuary. Marine Ecology Progress Series 80: 135-148.

Read AJ. 1994. Interactions between cetaceans and gill net and trap fisheries in the Northwest Atlantic. Rept. Int. Whaling Comm. Special Issue 15: 133-147.

Recks MA, Seaborn GT. 2008. Variation in fatty acid composition among nine forage species from a southeastern US estuarine and nearshore coastal ecosystem. Fish Physiology and Biochemisty 34(3): 275-287.

Robbins J, Mattila DK. 1999. Monitoring entanglement scars on Gulf of Maine humpback whales. Center for Coastal Studies. Order number 40ENNF800288.

Robbins J, Mattila DK. 2004. Estimating humpback whale (Megaptera novaeangliae) entanglement rates on the basis of scar evidence. Provincetown (MA): Provincetown Center for Coastal Studies. Report to the National Marine Fisheries Service. Order number 43ENNF030121.

Roelofs EW. 1951. The edible finfishes of North Carolina. In: Taylor HF. Survey of Marine Fisheries of North Carolina. Chapel Hill (NC): Univ NC Press. p 127-128.

Rooker JR, Holt SA, Soto MA, Holt GJ. 1998. Post settlement patterns of habitat use by sciaenid fishes in subtropical seagrass meadows. Estuaries 21(2): 318-327.

Ross SW, Epperly SP. 1985. Utilization of shallow estuarine nursery areas by fishes in Pamlico Sound and adjacent tributaries, North Carolina. In: Yanez-Arancibia A, editor. Fish Community Ecology in Estuaries and Coastal Lagoons: Towards an Ecosystem Integration. Mexico: DR (R) UNAM Press. p 207-232.

Roumillat WA, Brouwer MC. 2004. Reproductive dynamics of female spotted seatrout (Cynoscion nebulosus) in South Carolina. Fishery Bulletin 102(3): 473-487.

SAFMC. 1998. Habitat Plan for the South Atlantic Region: Essential Fish Habitat Requirements for Fishery Management Plans of the South Atlantic Fishery Management Council. Charleston (SC): SAFMC. 457 p.

SAFMC (South Atlantic Fishery Management Council). 2004. Final Coastal Migratory Species Amendment 15 to the Fishery Management Plan.

SAFMC (South Atlantic Fishery Management Council). 2008. SEDAR 17 Stock Assessment Report, South Atlantic Spanish Mackerel. Charleston (SC): SAFMC. 508 p.

Saloman, CH, Naughton, SP, 1983. Food of Spanish mackerel, *Scomberomorus maculatus*, from the Gulf of Mexico and the southeastern seaboard of the United States. U.S. Dept. Comm., NOAA Tech. Mem. NMFS-SEFC-128.

Saucier MH, Baltz DM. 1992. Hydrophone identification of spawning sites of spotted seatrout *Cynoscion nebulosus* (Osteichthys: Sciaenidae) near Charleston, South Carolina. Northeast Gulf Science 12(2): 141-146.

Saucier MH, Baltz DM. 1993. Spawning site selection by spotted seatrout, *Cynoscion nebulosus*, and black drum, *Pogonias cromis*, in Louisiana. Environmental Biology of Fishes 36: 257-272.

Scavia D, Field JC, Boesch DF, Buddemeier RW, Burkett V, Cayan DR, Fogarty M, Harwell MA, Howarth RW, Mason C, Reed DJ, Royer TC, Sallenger AH, Titus JG. 2002. Climate change impacts on U.S. coastal and marine ecosystems. Estuaries 25(2): 149-164.

Schafer DJ. 1999. The effects of dock shading on the seagrass *Halodule wrightii* in Perdido Bay, Alabama. Estuaries 22(4): 936-943.

Schmidt DJ, and Collins MR. 1989. Age-length keys for Spanish mackerel, *Scomberomorus maculatus*, from the Gulf of Mexico and US Atlantic, 1988. SC Mar Resour Res Inst 10 p.

Schmidt DS, Collins MR, Wyanski DM. 1993. Age, growth and reproductive biology of Spanish Mackerel, *Scomberomorus maculatus*, for the Atlantic Coast of the southeastern US. Fish Bull 91: 526-533.

SEDAR. 2009. Procedural Guidance Document 2, Addressing time-varying catchability. Atlanta, Georgia, February 9-12. 28 p.

Smith HM. 1907. The fishes of North Carolina. NC Geol Econ Surv II. 423 p.

Springer S, Bullis HR Jr. 1956. Collections by the OREGON in the Gulf of Mexico. US Fish Wildl Serv. Spec Sci Rep Fish 196. 134 p.

Steve C, Gearhart J, Borggaard D, Sabo L, Hohn AA. 2001. Characterization of North Carolina Commercial Fisheries with Occasional Interactions with Marine Mammals. NOAA Technical Memorandum NMFS-SEFSC-458. 60 pp.

Stevens PW, Montague CL, Sulak KJ. 2006. Patterns of fish use and piscivores abundance within a reconnected salt marsh impoundment in the northern Indian River Lagoon, Florida. Wetlands and Ecological Management 14(2): 147-166.

Street MW, Deaton AS, Chappell WS, Mooreside PD. 2005. North Carolina Coastal Habitat Protection Plan. Morehead City (NC): North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries. 656 p.

Strickney RR, Cuenco ML. 1982. Habitat suitability index models: juvenile spot. US Fish Wildl Serv. FWS/OBS-82/10.20. 12 p.

Struhsaker JW, Eldridge MB, Echeverria T. 1974. Effects of benzene (a water-soluble compound of crude oil) on eggs and larvae of Pacific herring and northern anchovy. In: Vernberg FJ, Vernberg WB, editors. Pollution and physiology of marine organisms. New York (NY): Academic Press Inc. p 253-284.

Stunz GW, McKee DA. 2006. Catch-and-release mortality of spotted seatrout in Texas. North American Journal of Fisheries Management 26:843-848.

Tabb DC. 1958. Differences in the estuarine ecology of Florida waters and their effect on populations of spotted weakfish, *Cynoscion nebulosus* (Cuvier and Valenciennes). Proc. N. Am. Wildl. Conf. 23: 392-401.

Tabb DC. 1966. The estuary as a habitat for spotted seatrout, *Cynoscion nebulosus*. American Fisheries Society Special Publication No 3: 59-67.

Tagatz ME, Dudley DL. 1961. Seasonal occurrences of marine fishes in four shore habitats near Beaufort, NC, 1957-1960. Washington (DC): US Fish and Wildlife Service. Spec Sci Rep Fish 390: 1-19.

Tayloe WB, Scharf FS. 2006. Age, growth, and feeding habits of spotted seatrout (*Cynoscion nebulosus*) in the lower Cape Fear River [poster]. In: Tidewater Chapter (AFS) Annual Meeting; February 2006; Atlantic Beach (NC).

Thayer GW, Kenworthy WJ, Fonseca MS. 1984. The ecology of eelgrass meadows of the Atlantic coast: a community profile. Washington (DC): US Fish and Wildlife Service. FWS/OBS-84/02. 147 p.

Thomas, RG, Boudrequx C, Lightner J, Lear E, Hebert V. 1997. Hook-release mortality of red drum Sciaenops ocellatus and spotted seatrout Cynoscion nebulosus from common angling methods. Abstract from 1997 AFS Southern Division Meeting (http://www.sdafs.org/meetings/97sdafs/sciaenid/thomas1.htm)

Tucker JW Jr, Faulkner BE. 1987. Voluntary spawning pattern of captive spotted seatrout. Northeast Gulf Sciences 9: 59-63.

Tuckey TD, Dehaven M. 2006. Fish assemblages found in tidal-creek and seagrass habitats in the Suwannee River estuary. Fishery Bulletin 104: 102-117.

Viverette CB, Garman GC, McInich SP, Markham AC, Watts BD, Macko SA. 2007. Finfish-waterbird trophic interactions in tidal freshwater tributaries of the Chesapeake Bay. Waterbirds 30(1): 50-62.

Vondruska, J. 2010. Fishery analysis of the commercial fisheries for eleven coastal migratory pelagic species. SERO-FSSB-2010-01. 67 pp.

Walter JF, Austin HM. 2003. Diet composition of large striped bass (*Morone saxatilis*) in Chesapeake Bay. Fishery Bulletin 101(2): 414-423.

Warden ML. 2010. Bycatch of wintering common and red-throated loons in gillnets off the USA Atlantic coast, 1996-2007. Aquatic Biology 10: 167-180.

Waring GT et al. 2010. Draft U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments. 75 FR 46912. http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2010_draft.pdf

Waring GT, Josephson E, Maze-Foley K, and Rosel PE, editors. 2009. US Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2009. NOAA Tech Memo NMFS NE 213; 528 p.

Waring GT, Josephson E, Fairfield CP, Maze-Foley K. 2007. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments 2006. NOAA Technical Memorandum NMFS-NE-201. 388 p. http://www.nefsc.noaa.gov/nefsc/publications/tm/tm201/tm201.pdf

Waring, G.T., J.M. Quintal and S.L. Swartz. 2000. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments - 2000. NOAA Tech. Mem. NMFS-NE-162, 309 pp.

Waring GT, Quintal JM, Fairfield CP. 2002. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments 2002. NOAA Technical Memorandum NMFS-NE-169. 183 pp. http://www.nmfs.noaa.gov/pr/pdfs/sars/ao2002.pdf

Warlen SM, Chester AJ. 1985. Age, growth, and distribution of larval spot, *Leiostomus xanthurus*, off North Carolina. US Nat Mar Fish Serv. Fish Bull 83(4): 587-599.

Weinstein, MP. 1979. Shal1ow marsh habitats as primary nurseries for fishes and shel1fish, Cape Fear River, North Carolina. Fish. Bull., U.S. 77:339-357.

Weinstein MP, O'Neill SP. 1986. Exchange of marked juvenile spots between adjacent tidal creeks in the York River estuary, Virginia. Trans Am Fish Soc 115(1): 93-97.

Wenner, CA, Barans CA, Stender BW, Berry FH. 1979. Results of MARMAP otter trawl investigations in the South Atlantic Bight. I. Fall, 1973. S.C. Dep. Wildl. Mar. Res. Center Tech. Rep. 33. 79 pp.

Wenner, CA, Barans CA, Stender BW, Berry FH. 1980. Results of MARMAP otter trawl investigations in the South Atlantic Bight. V. Summer, 1975. S.C. Dep. Wildl. Mar. Res. Center Tech. Rep. 45. 57 pp.

Wiley BA, Chapman RW. 2003. Population structure of spotted seatrout, Cynoscion nebulosus, along the Atlantic coast of the U.S. In: Bortone SA, editor. Biology of the spotted seatrout. Boca Raton (FL): CRC Press. p 31-40.

Wilson KW. 1977. Acute toxicity of oil dispersants to marine fish larvae. Mar Biol 40: 65-74.

Wuenschel MJ, Werner RG, Hoss DE. 2004. Effect of body size, temperature, and salinity on the routine metabolism of larval and juvenile spotted seatrout. Journal of Fish Biology 64: 1088-1102.

Yeung C. 2001. Estimates of Marine Mammal and Sea Turtle Bycatch by the U.S. Atlantic Pelagic Longline Fleet in 1999-2000. NOAA Technical Memorandum NMFS- SEFSC-467. 46 p.

Zhao B, Wenner C, Nicholson N. 1997. Stock Assessment of the Spotted Seatrout Cynoscion nebulosus on the Georgia Coast, 1986-1995. In: South Carolina Department of Natural Resources. Cooperative Research on the Biology and Assessment of Nearshore and Estuarine Fishes along the Southeast Coast of the U.S: Part III. Spotted Seatrout, *Cynoscion nebulosus*. Charleston (SC): SC DNR. Final Report, Grant NA77FF0550.

Zieman JC. 1976. The ecological effects of physical damage from motor boats on turtle grass beds in southern Florida. Aquatic Botany 2: 127-139.

Zydelis R, Kontautas A. 2008. Piscivorous birds as top predators and fishery competitors in the lagoon ecosystem. Hydrobiologica 611: 45-54.

9. FIGURES

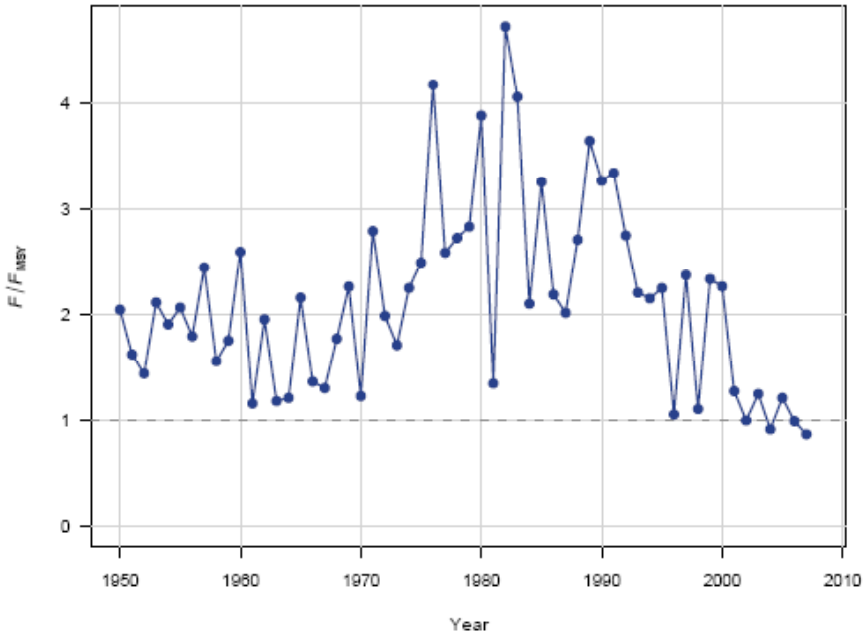

Figure 1. Estimated time series of Atlantic coast Spanish mackerel fishing mortality relative to maximum sustainable yield (MSY) benchmark: overfishing ratio (F/F_{MSY}).

Note that the SEDAR 17 Review Panel did not accept the annual estimates of F (Source: SAFMC 2008).

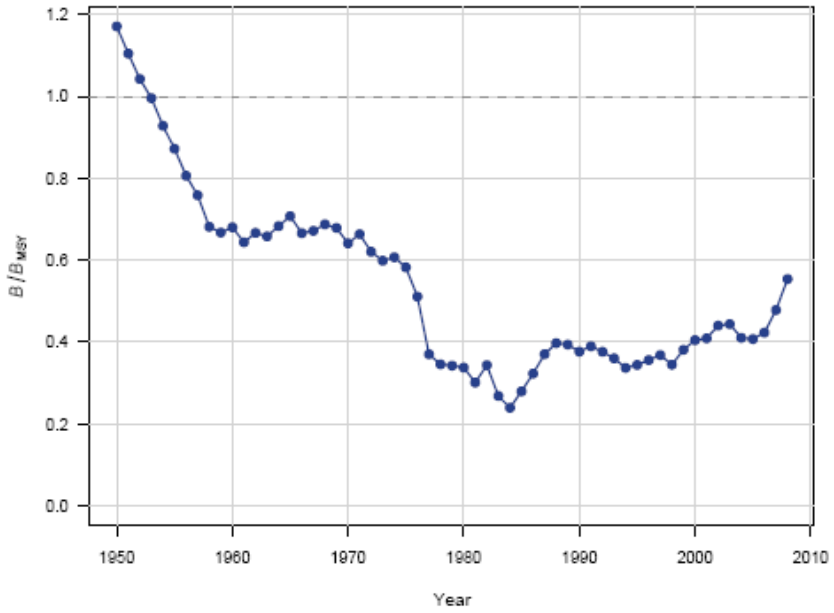

Figure 2. Estimated time series of Atlantic coast Spanish mackerel biomass relative to MSY benchmark: overfished ratio (B/B_{MSY}).
Note that the SEDAR 17 Review Panel did not accept the annual estimates of B or a biomass-based stock determination (Source: SAFMC 2008).

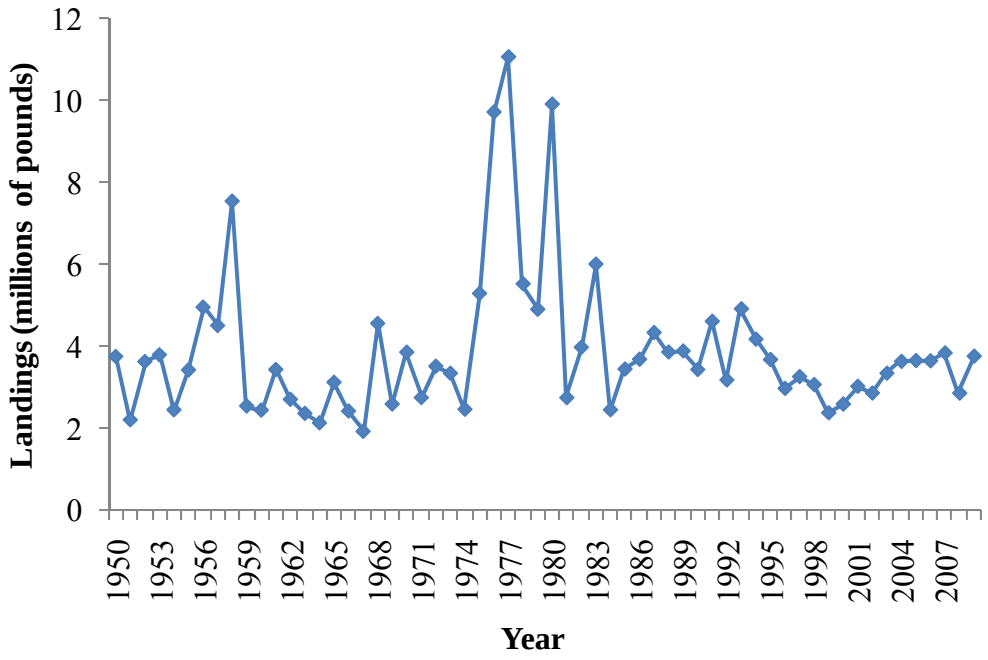

Figure 3. Commercial Spanish mackerel landings for the Atlantic coast

(Source: personal communication with ACCSP, Washington, DC)

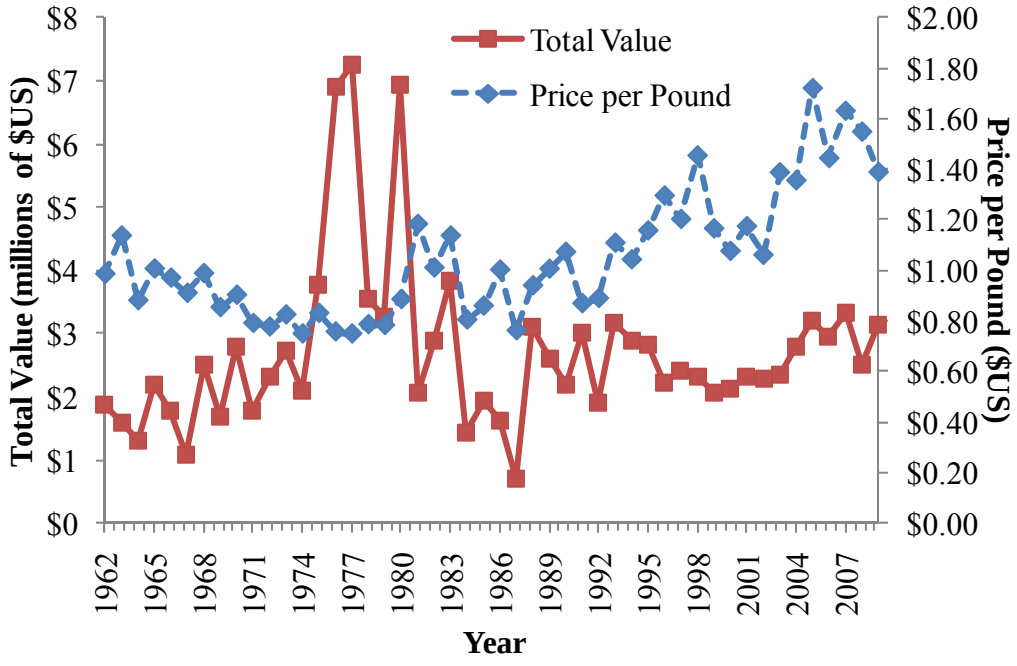

Figure 4. Wholesale total value and price per pound, adjusted for inflation, of Spanish mackerel landings

(Source: personal communication with ACCSP, Washington, DC)

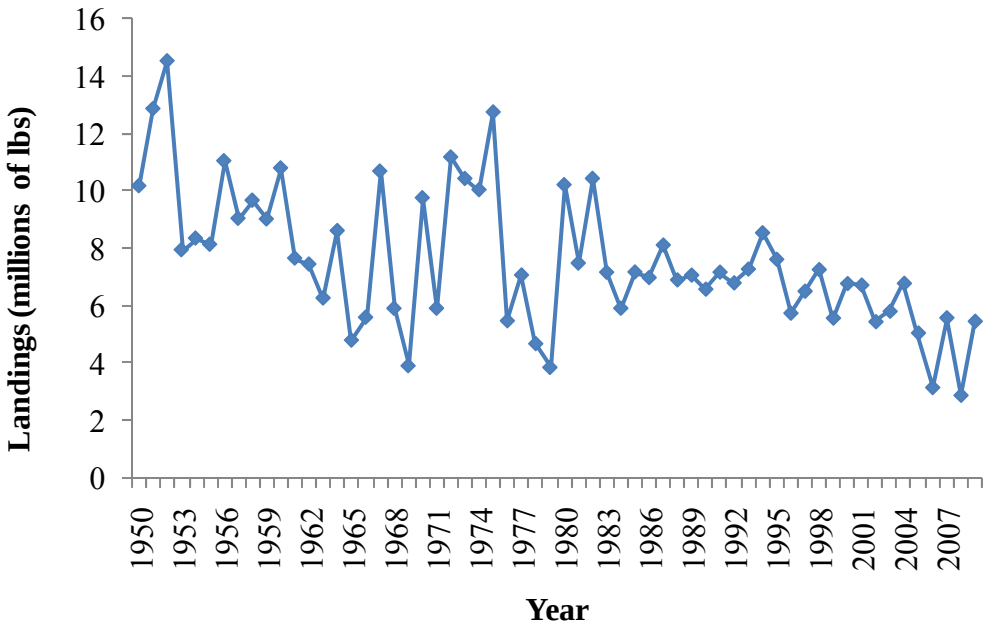

Figure 5. Commercial spot landings for Atlantic coast

(Source: personal communication, with ACCSP, Washington, DC)

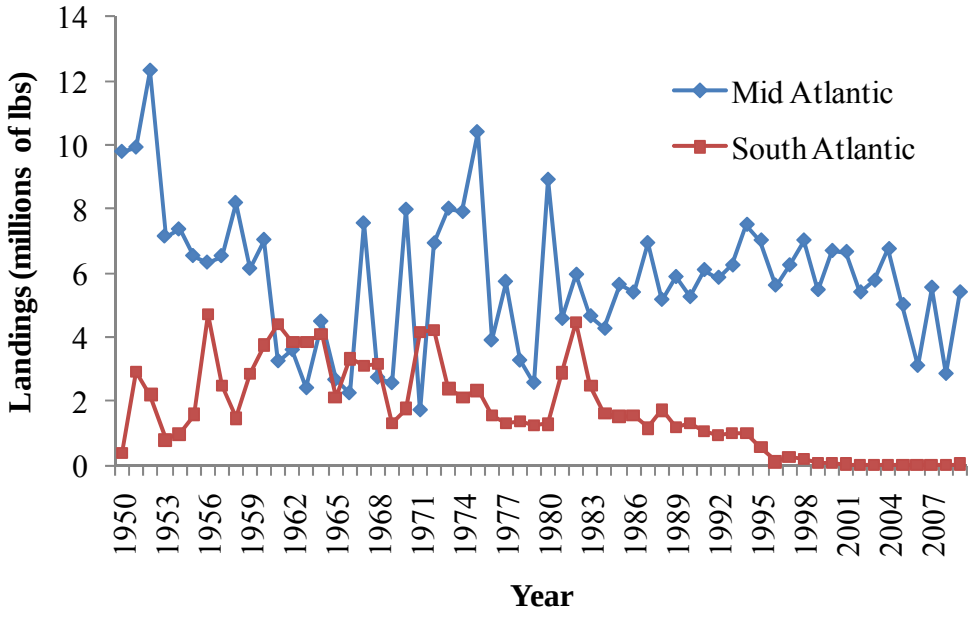

Figure 6. Commercial spot landings by Mid Atlantic and South Atlantic region

(Source: personal communication with ACCSP, Washington, DC)

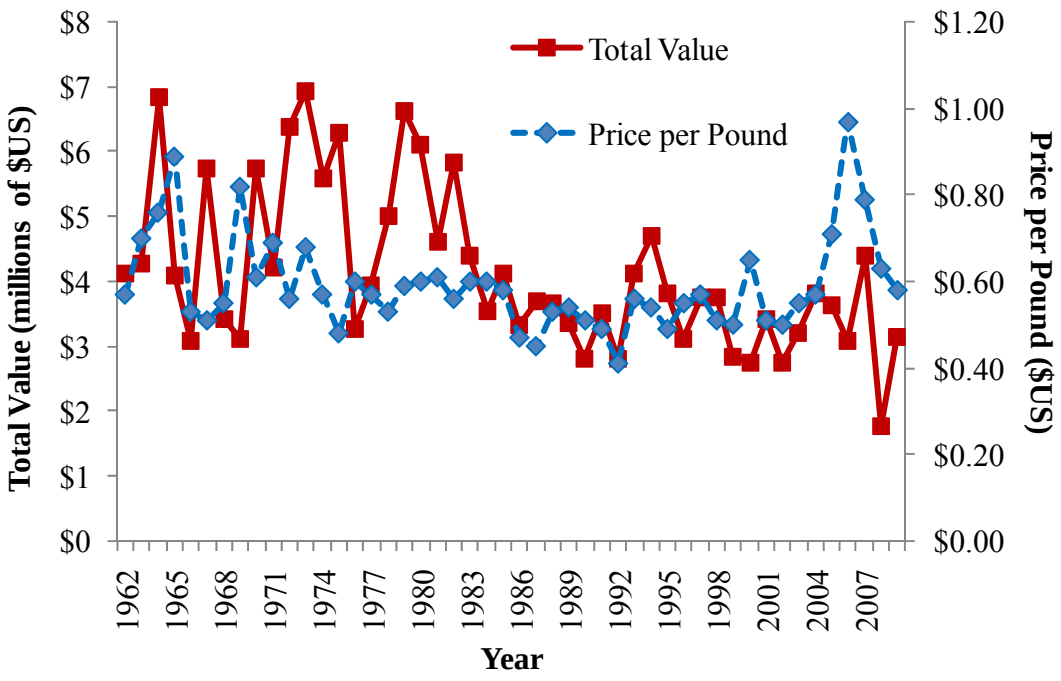

Figure 7. Wholesale total value and price per pound, adjusted for inflation, of spot landings

(Source: personal communication with ACCSP, Washington, DC)

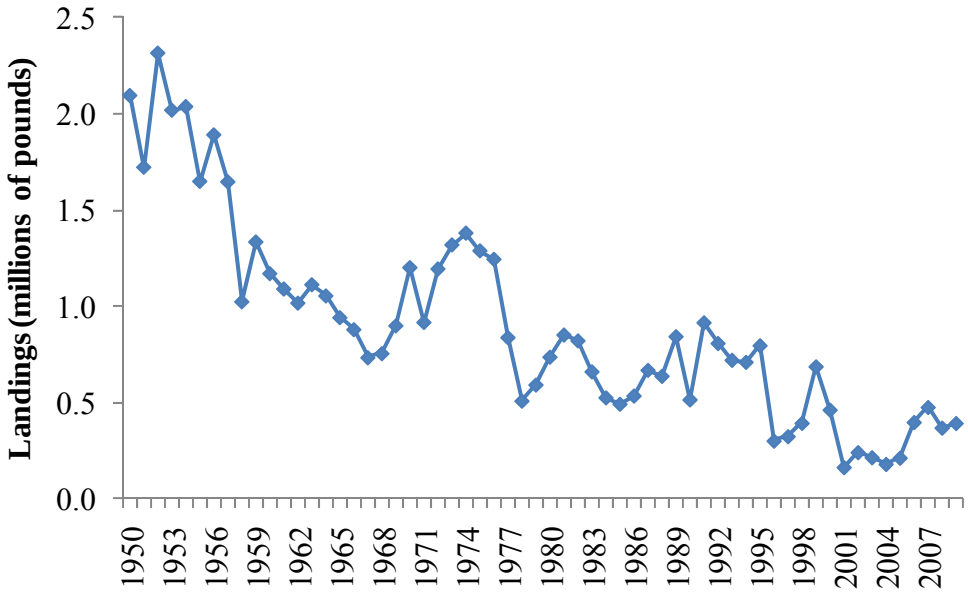

Figure 8. Commercial spotted seatrout landings (lbs) for Atlantic coast

(Source: personal communication with ACCSP, Washington, DC)

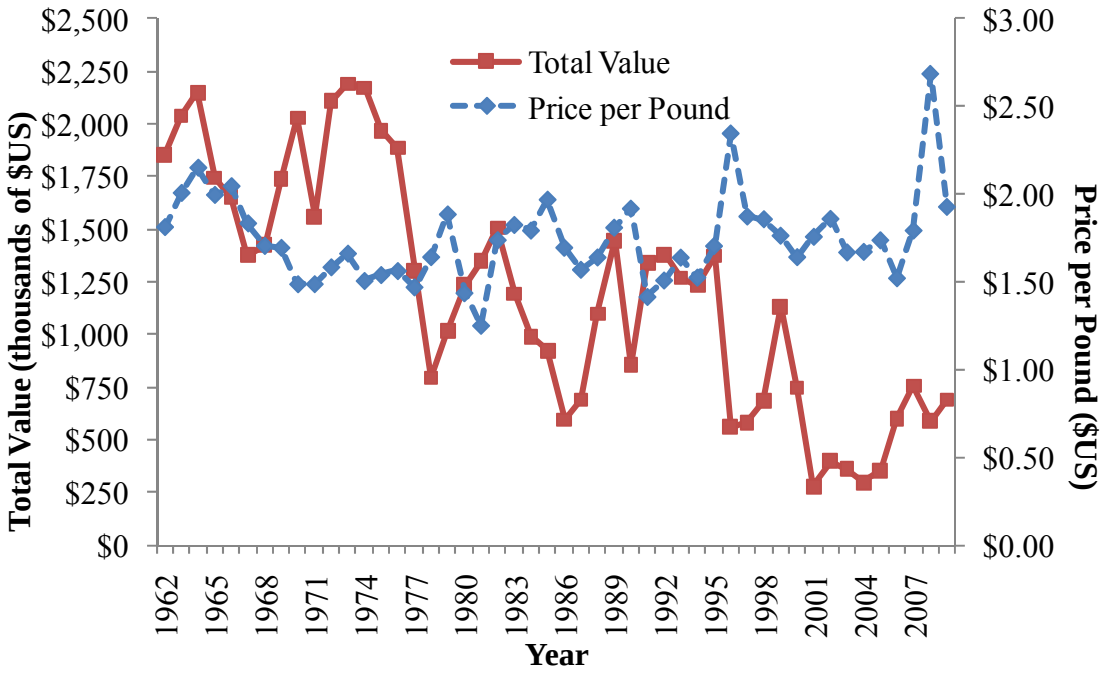

Figure 9. Wholesale total value and price per pound, adjusted for inflation, of spotted seatrout landings

(Source: personal communication with ACCSP, Washington, DC)

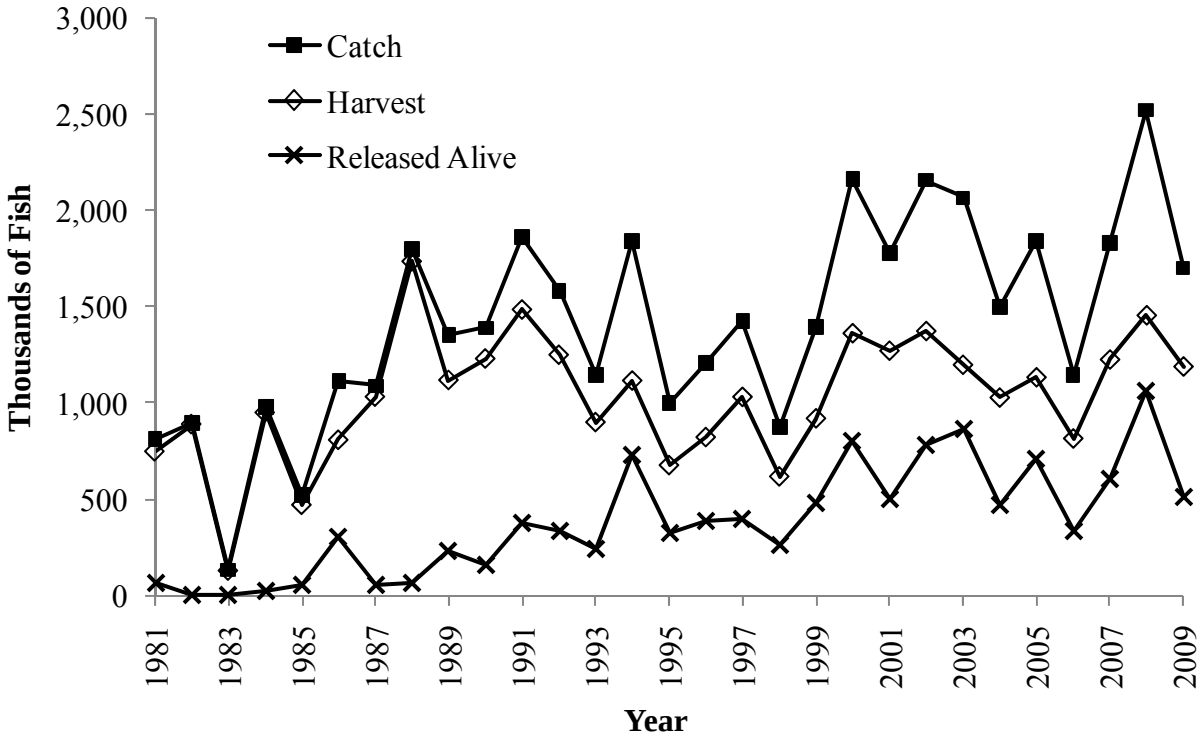

Figure 10. Recreational Spanish mackerel catch, harvest, and alive releases (numbers of fish) for the Atlantic coast

(Source: personal communication with ACCSP, Washington, DC)

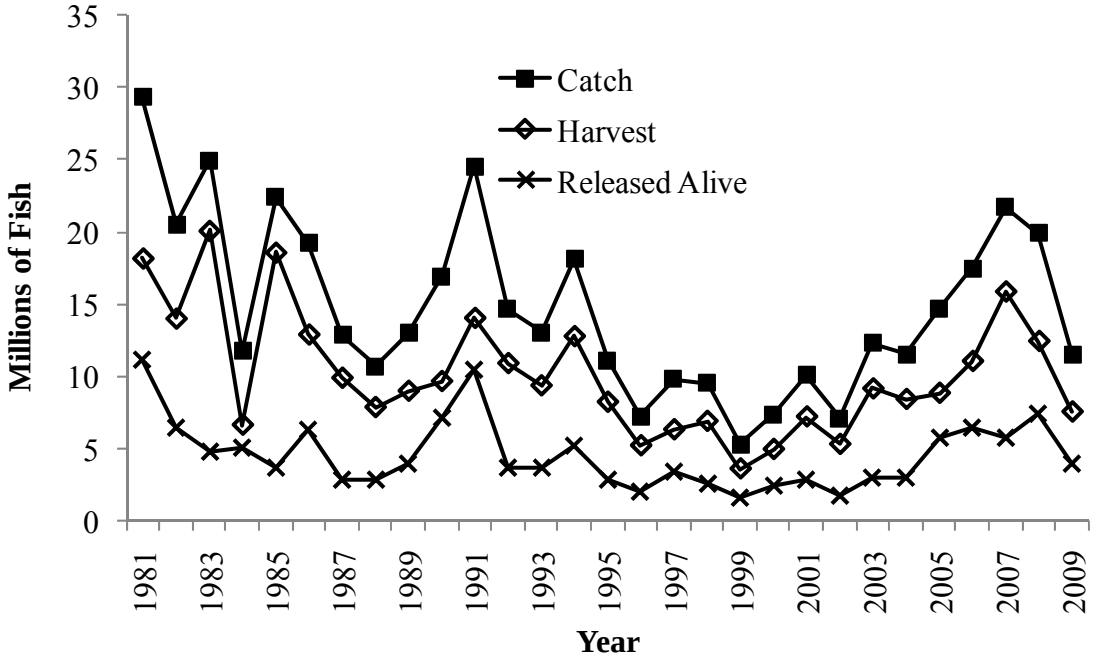

Figure 11. Recreational spot catch, landings, and alive releases (numbers of fish) for the Atlantic coast

(Source: personal communication with ACCSP, Washington, DC)

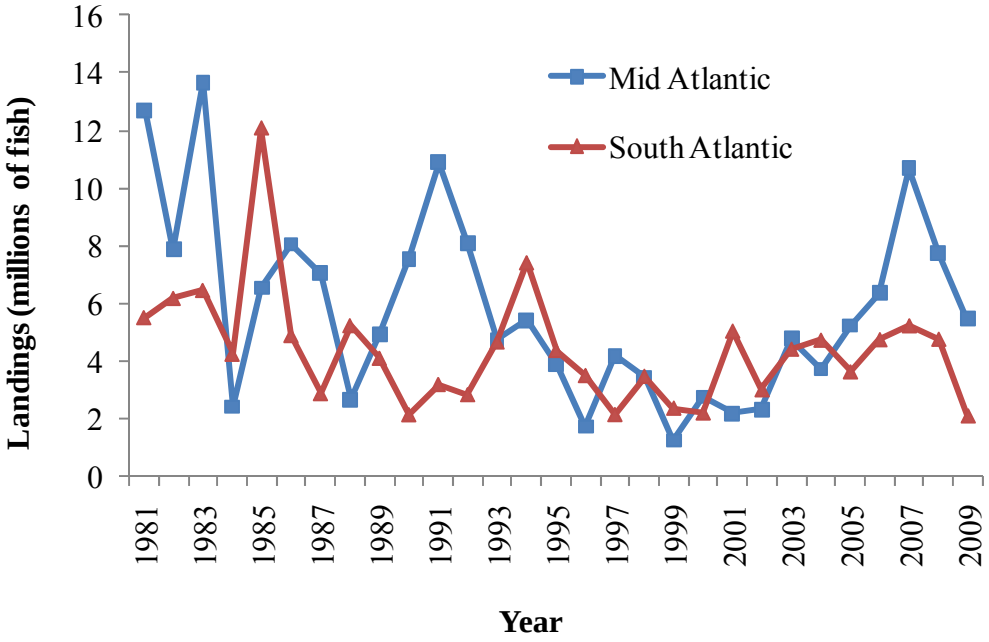

Figure 12. Recreational spot landings (A + B1, in numbers) by region

(Source: personal communication, ACCSP 2010)

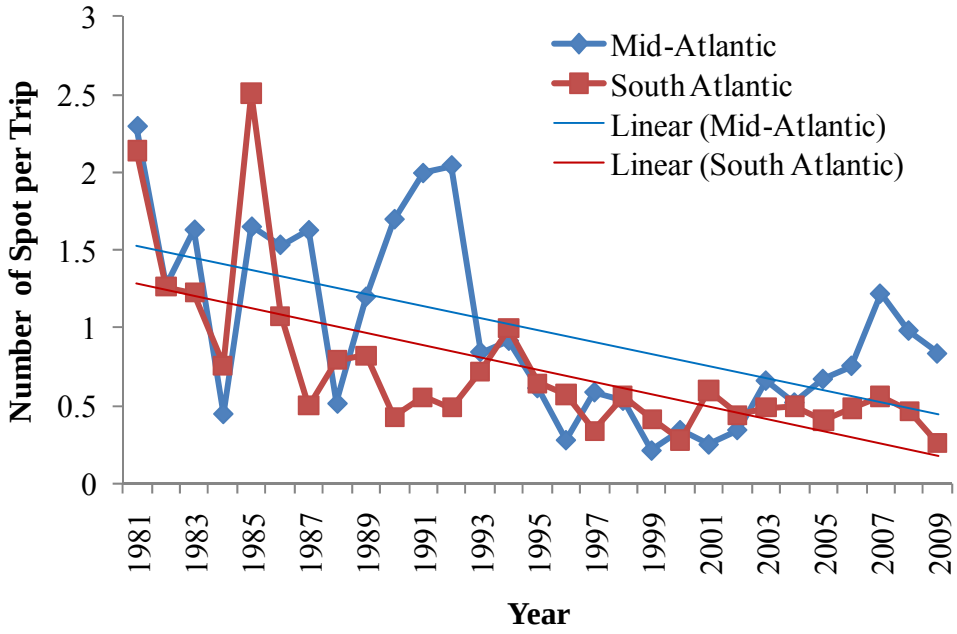

Figure 13. Recreational catch effort (number of fish per trip) for spot by region
(Source: personal communication, ACCSP 2010)

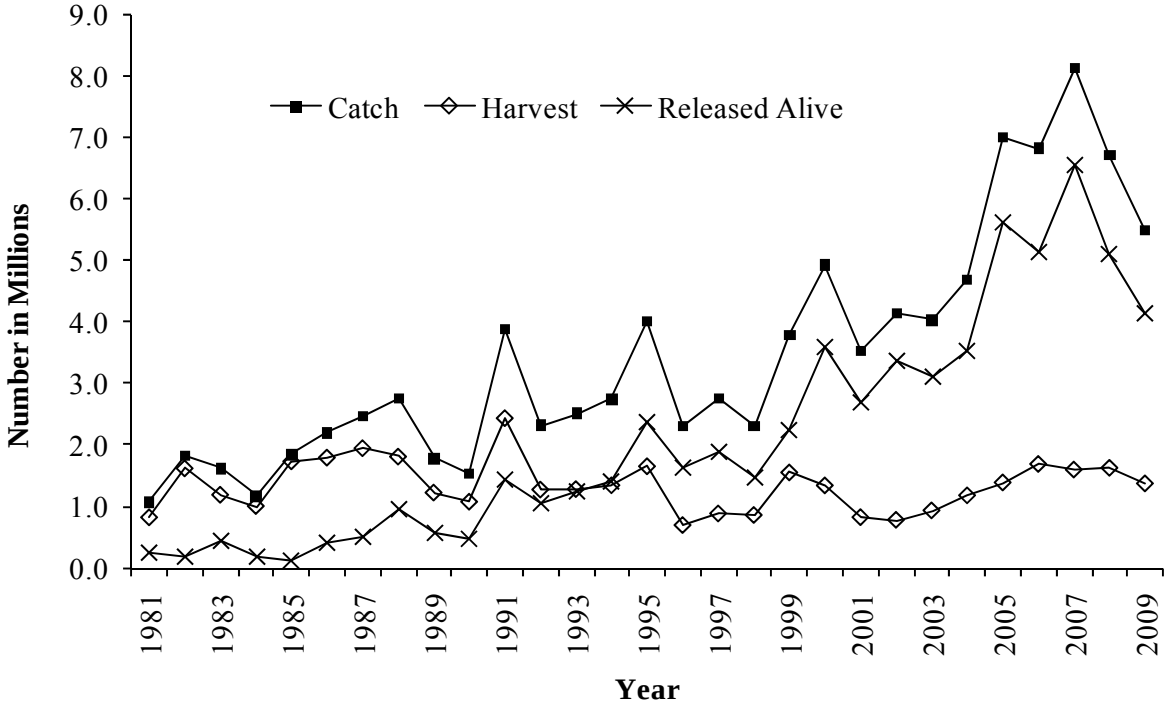

Figure 14. Recreational spotted seatrout catch, harvest, and alive releases (numbers of fish) for the Atlantic coast

(Source: personal communication with ACCSP, Washington, DC)

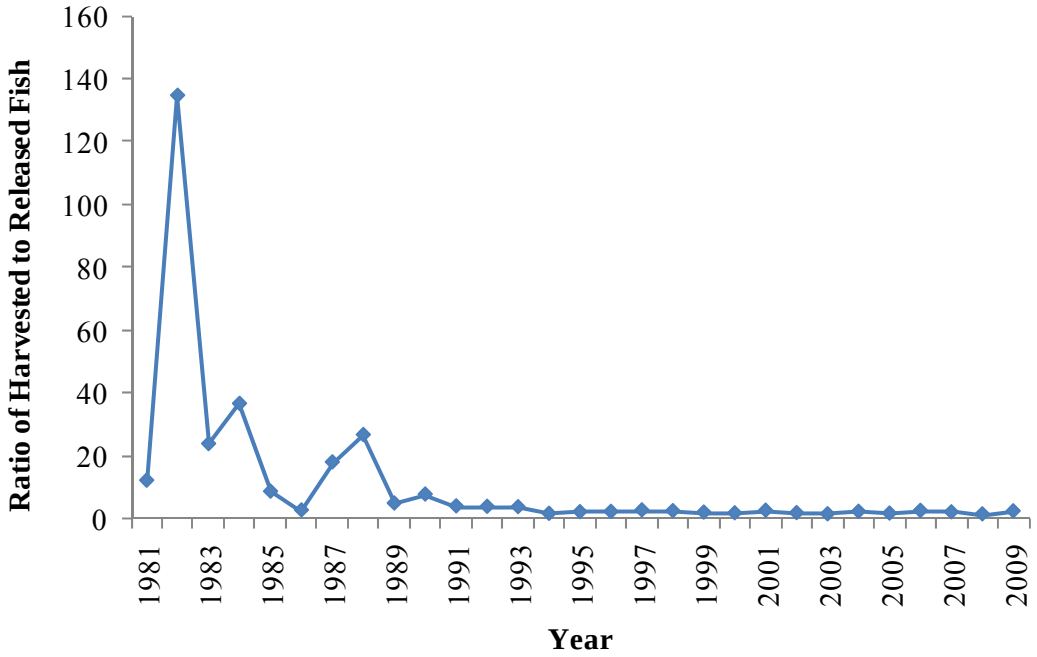

Figure 15. Ratio of Spanish mackerel recreationally harvested to released for the Atlantic coast

(Source: personal communication with ACCSP, Washington, DC)

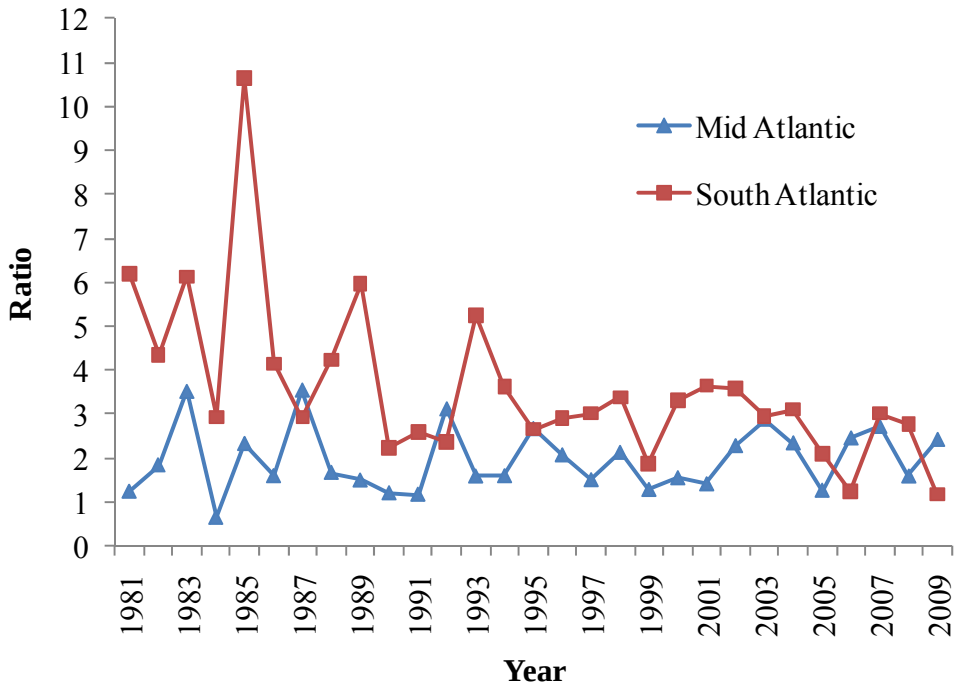

Figure 16. Ratio of harvested spot (A + B1) versus released (B2) by region

(Source: personal communication, ACCSP 2010)

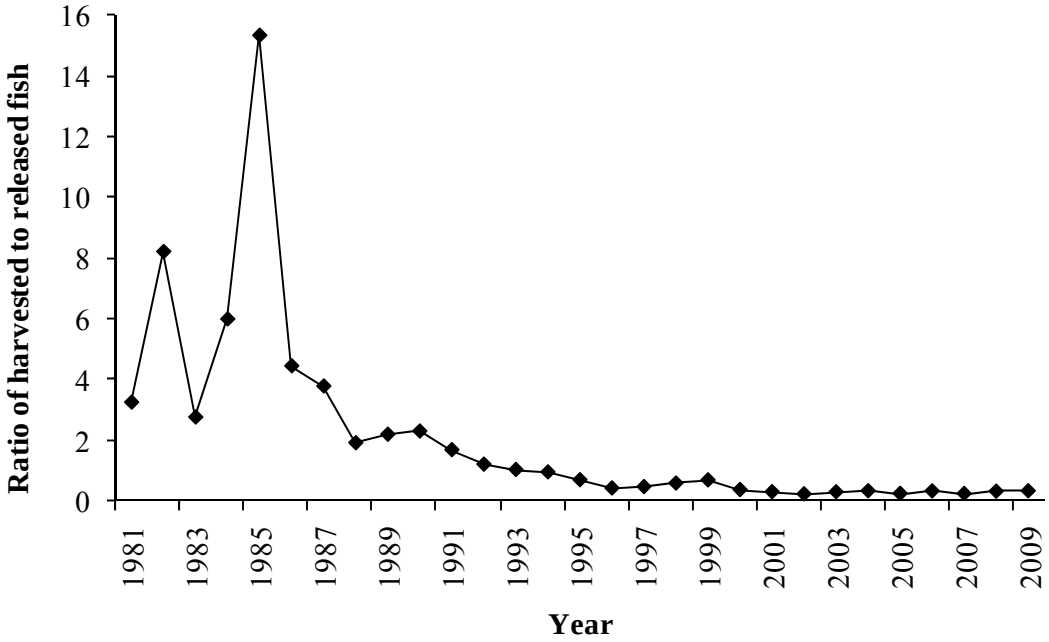

Figure 17. Ratio of spotted seatrout recreationally harvested to released for the Atlantic coast

(Source: personal communication with ACCSP, Washington, DC)

10. TABLES

Table 1. Commercial Spanish mackerel landings (lbs) by state and year

(Source: personal communication with ACCSP, Washington, DC)

Year	ME	MA	RI	CT	NY	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1950									13,500	147,500			3,576,600	3,737,600
1951									6,700	206,300			1,976,700	2,189,700
1952									2,800	174,300			3,434,700	3,611,800
1953						100			2,900	107,400	88,000		3,579,800	3,778,200
1954									3,500	329,500			2,101,100	2,434,100
1955									5,700	165,400			3,237,300	3,408,400
1956						200			16,400	345,600		500	4,578,100	4,940,800
1957									24,100	247,800			4,220,700	4,492,600
1958						200			7,700	211,300	4,800		7,307,700	7,531,700
1959			100			800			18,100	156,400			2,352,200	2,527,600
1960									19,900	118,500	6,100		2,282,300	2,426,800
1961			400					200	122,600	133,600	4,000		3,158,300	3,419,100
1962									14,600	83,200	13,300	300	2,578,300	2,689,700
1963									79,300	135,300	8,300	900	2,123,400	2,347,200
1964						100			33,100	78,300	2,500		2,002,200	2,116,200
1965			300					1,000	73,300	117,200	13,300	600	2,900,900	3,106,600
1966						100		400	141,900	78,500	1,300	1,300	2,181,300	2,404,800
1967						200		3,600	26,300	72,700	2,500	2,000	1,801,500	1,908,800
1968						100		1,700	58,500	68,900	8,200	600	4,406,500	4,544,500
1969		100						1,200	123,000	88,600	3,800		2,358,800	2,575,500
1970			200			200		1,100	200,100	63,300	1,800	400	3,574,400	3,841,500
1971			100			100		900	51,000	95,200	4,000	300	2,581,800	2,733,400
1972						100		400	22,700	96,300	5,200	4,700	3,369,000	3,498,400
1973						100		200	50,000	64,200	4,100	4,900	3,203,000	3,326,500
1974						1,700		100	24,000	73,300	2,000	500	2,346,100	2,447,700
1975			900		400	4,500		400	61,600	48,900	9,800	5,800	5,144,800	5,277,100
1976					600	1,400		400	79,600	30,500	3,600	3,000	9,588,600	9,707,700
1977						400			21,100	46,100	100	1,800	10,987,300	11,056,800
1978						100		100	1,600			211	5,510,538	5,512,549
1979									700			2,201	4,885,628	4,888,529

Year	ME	MA	RI	CT	NY	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1980					100	600			8,300	74,274	6,230	800	9,810,004	9,900,308
1981					500	500			3,500	51,220	53	406	2,673,757	2,729,936
1982					1,000	200			12,700	189,217	850	705	3,757,202	3,961,874
1983		2,600	2,600		600	100			3,500	41,301	376		5,942,229	5,993,306
1984					300	100			10,000	127,416	1,203		2,296,175	2,435,194
1985					100				15,300	173,158	1		3,241,897	3,430,456
1986		600			3,200	1,500			168,400	232,197	5,730	1,163	3,256,939	3,669,729
1987	3,300	16,000	4,900		16,600	24,000		4,800	251,200	504,055	370		3,497,135	4,322,360
1988			3,400		19,200	16,900		4,300	291,600	438,222	909	562	3,071,687	3,846,780
1989		12,400	8,900		17,700	24,100		10,400	354,400	589,260	737		2,853,177	3,871,074
1990		6,585	5,530		24,329	28,336		43,411	491,651	838,914	181		1,978,819	3,417,756
1991		19,698	9,530		149,321	77,151		62,688	447,127	858,780	407		2,972,167	4,596,869
1992		608	2,277		31,873	51,751		37,930	271,313	738,282	1,030		2,028,703	3,163,767
1993		5	2,843		42,063	23,036		9,445	335,688	583,493	266		3,903,498	4,900,337
1994		3,273	893		124,733	19,915		3,363	376,818	531,312	362		3,098,336	4,159,005
1995			12,101	2	8,364	2,130		3,068	168,729	402,169	135		3,064,926	3,661,624
1996			2,315	8	17,292	10,626			281,071	401,504	236		2,244,667	2,957,719
1997			23		31,067	11,719		2,263	164,408	766,850	66		2,269,289	3,245,685
1998			66		37,214	13,230		9,653	120,438	372,415	160		2,498,461	3,051,637
1999		5	234		47,831	16,389		20,213	251,555	459,100			1,566,706	2,362,033
2000			73		34,570	11,705		25,948	168,457	659,702	192		1,675,458	2,576,105
2001			20,037		13,843	9,365	4	17,936	178,194	653,473			2,115,774	3,008,626
2002				3	18,741	11,179		19,169	102,388	698,448	9		1,994,196	2,844,133
2003			325		18,339	4,847		5,153	103,379	456,782	214		2,739,177	3,328,216
2004		198	5,933		13,860	2,813		4,881	66,972	456,147			3,065,983	3,616,786
2005			81		5,197	1,892	15	6,824	43,384	445,995			3,133,772	3,637,160
2006			1,413		5,716	1,422		209	8,774	470,600			3,142,721	3,630,855
2007			2,087		7,238	2,061		3,638	58,055	486,700			3,264,453	3,824,232
2008			92		2,512	1,119		6,802	153,198	415,375			2,262,662	2,841,759
2009			157		3,158	3,299		11,423	137,715	961,810			2,627,448	3,745,011

Total	3,300	62,072	87,810	13	697,561	382,385	19	325,217	6,354,514	17,662,271	206,417	33,648	205,396,982	231,212,209

Table 2. Commercial Spanish mackerel landings (lbs) and ex-vessel value (dollars) by gear and year. The * indicates data that are confidential.

(Source: personal communication with ACCSP, Washington, DC)

	FIXED NETS		GILL NETS		HAUL SEINES		HOOK AND LINE		TRAWLS		OTHER GEAR		CAST NETS	
YEAR	lbs	Value	lbs	Value	lbs	Value	lbs	Value	lbs	Value	lbs	Value	lbs	Value
1950	25,300		3,219,700		134,500		336,500				21,600			
1951	37,300		1,560,100		80,900		189,500				321,900			
1952	54,600		3,451,000		43,600		31,500		200		30,900			
1953	47,300		3,267,500		269,400		84,000		23,400		86,600			
1954	188,500		2,038,600		87,600		72,000		500		46,900			
1955	53,300		2,937,500		91,800		243,500				82,300			
1956	84,900		4,014,900		214,700		504,500				121,800			
1957	53,400		3,997,600		166,700		212,600				62,300			
1958	15,000		6,940,700		149,900		196,900		400		228,800			
1959	24,700		2,227,500		113,300		95,700				66,400			
1960	23,700		2,174,900		75,900		78,400				73,900			
1961	133,900		3,082,200		82,800		55,200				65,000			
1962	20,300	$2,870	2,480,300	$233,570	62,500	$9,329	59,300	$5,573	800	$106	66,500	$7,054		
1963	79,400	$10,224	2,087,600	$190,987	103,000	$15,145	29,300	$2,667	1,500	$136	46,400	$5,632		
1964	32,200	$4,676	1,958,500	$166,254	59,600	$8,912	33,300	$2,797	1,000	$123	31,600	$3,315		
1965	89,600	$12,950	2,788,100	$277,948	73,700	$7,736	64,100	$6,628	10,300	$1,381	80,800	$8,215		
1966	111,800	$18,109	2,060,900	$219,123	50,500	$7,266	131,800	$14,755	4,900	$644	44,900	$4,819		
1967	23,300	$3,879	1,693,800	$143,149	53,000	$6,340	73,800	$7,013	7,900	$777	57,000	$5,586		
1968	72,900	$10,537	4,232,100	$366,131	70,400	$8,387	96,000	$8,829	16,900	$1,979	56,200	$5,361		
1969	83,900	$12,300	2,242,400	$240,356	142,200	$19,521	64,000	$7,142	6,700	$655	36,300	$4,087		
1970	105,100	$15,842	3,512,900	$443,499	103,300	$14,926	44,900	$14,544	10,000	$1,548	65,300	$7,947		
1971	25,800	$4,273	2,490,000	$300,118	73,600	$10,334	102,600	$12,070	7,900	$998	33,500	$3,955		
1972	22,800	$3,587	3,292,300	$415,437	49,000	$6,319	68,100	$9,588	28,000	$3,346	38,200	$5,027		
1973	50,700	$8,958	3,044,600	$510,986	46,200	$6,584	76,200	$13,022	30,200	$3,520	78,600	$13,759		
1974	25,200	$4,487	2,207,200	$430,865	33,100	$4,529	90,200	$17,352	12,800	$1,320	79,200	$14,908		
1975	62,500	$11,780	4,784,600	$838,984	39,200	$6,164	213,900	$37,377	15,600	$2,958	161,300	$28,011		
1976	77,100	$12,518	8,750,900	$1,624,059	48,000	$8,211	631,300	$116,424	5,000	$1,176	195,400	$36,017		
1977	28,900	$5,395	10,685,500	$1,950,522	19,700	$3,205	306,700	$55,671	1,900	$457	14,100	$2,535		
1978	2,401	$709	30,722	$6,150	8,143	$1,618	496	$141	708	$223	5,510,538	$1,058,252		
1979	726	$238	*	*			*	*	2,801	$645	4,885,628	$1,088,703		
1980	5,849	$1,975	62,429	$24,402	4,859	$1,293	10,605	$4,906	8,824	$2,750	9,811,053	$2,585,646		
1981	5,570	$2,206	24,832	$8,811	1,791	$629	20,731	$11,075	3,686	$1,332	4,174,532	$1,293,031		
1982	24,213	$8,706	115,401	$36,794	3,078	$1,001	58,459	$19,127	3,792	$1,537	3,758,603	$1,213,186		

	FIXED NETS		GILL NETS		HAUL SEINES		HOOK AND LINE		TRAWLS		OTHER GEAR		CAST NETS	
YEAR	lbs	Value	lbs	Value	lbs	Value	lbs	Value	lbs	Value	lbs	Value	lbs	Value
1983	18,897	$11,102	12,899	$4,839	4,819	$1,718	13,405	$4,140	1,149	$300	5,947,375	$1,727,952		
1984	23,270	$9,381	70,990	$22,735	8,918	$2,354	33,702	$11,525	1,769	$571	2,398,026	$670,153		
1985	47,217	$17,637	100,573	$40,563	14,261	$4,936	22,512	$8,869	3,596	$1,181	3,246,283	$878,075		
1986	201,695	$54,878	141,028	$55,351	31,141	$9,352	20,466	$8,063	18,775	$6,590	3,257,441	$9,044		
1987	475,233	$112,638	196,095	$74,664	43,576	$13,225	57,701	$19,644	36,774	$14,010	3,513,835	$47,978		
1988	405,061	$130,224	274,750	$101,821	47,531	$13,047	16,505	$5,767	23,276	$9,818	3,079,941	$1,422,036		
1989	517,940	$172,738	371,740	$167,372	75,451	$21,318	8,225	$4,206	43,082	$19,404	2,855,677	$1,087,776		
1990	514,918	$190,837	794,311	$321,509	32,349	$11,615	60,836	$23,311	35,373	$12,233	1,980,563	$757,014		
1991	480,487	$174,881	1,468,821	$610,360	59,236	$19,261	109,213	$45,557	83,306	$47,214	2,396,068	$992,569	*	*
1992	398,987	$160,452	2,508,545	$974,772	60,149	$17,986	44,378	$17,388	22,485	$9,238	130,326	$43,699	*	*
1993	331,171	$160,875	4,392,667	$1,862,874	41,893	$17,052	80,242	$37,169	13,398	$6,062	47,690	$21,723	*	*
1994	346,541	$184,996	3,693,846	$1,712,078	9,364	$3,783	50,172	$32,019	17,537	$9,961	43,371	$22,504	*	*
1995	219,753	$143,159	3,232,068	$1,694,806	5,543	$2,274	160,147	$120,178	10,774	$7,121	34,698	$16,669	*	*
1996	304,378	$208,619	2,464,123	$1,252,525	*	*	130,079	$94,732	46,292	$21,238	46,088	$30,507	*	*
1997	207,664	$113,063	2,670,891	$1,435,240	*	*	102,406	$78,293	26,240	$23,269	239,482	$136,235	*	*
1998	117,876	$107,073	2,696,323	$1,409,117	*	*	148,022	$126,626	10,958	$12,969	82,072	$68,356	*	*
1999	302,093	$241,089	1,795,696	$1,095,826	5,286	$4,398	183,312	$167,532	12,412	$13,663	67,952	$50,102	*	*
2000	206,358	$154,439	1,700,293	$1,048,632	11,180	$8,081	290,369	$234,345	17,365	$22,853	7,562	$228,755	357,060	$221,853
2001	221,733	$183,603	1,552,965	$1,063,479	5,590	$4,319	316,080	$225,188	25,052	$12,292	3,502	$396,762	888,791	$392,432
2002	135,745	$103,813	1,335,268	$990,558	1,396	$1,153	426,934	$298,979	5,378	$6,025	2,654	$492,677	957,847	$490,566
2003	111,811	$97,184	1,007,254	$718,199	1,531	$1,341	372,915	$247,298	2,715	$3,438	3,585	$944,825	1,890,452	$942,079
2004	70,714	$55,069	339,103	$283,768	1,972	$1,113	581,467	$450,272	8,853	$7,499	391,229	$1,649,557	2,226,900	$1,182,685
2005	49,830	$59,287	1,174,510	$1,166,587	12,131	$8,729	813,646	$612,122	5,469	$6,298	5,878	$1,009,309	1,577,497	$1,000,109
2006	7,162	$10,383	940,695	$560,802	4,737	$5,945	730,501	$621,991	1,793	$2,104	465,189	$1,540,117	1,481,162	$925,913
2007	59,343	$69,319	1,716,393	$1,488,794	3,322	$3,992	767,172	$712,028	5,374	$3,712	16,240	$886,205	1,257,793	$862,694
2008	198,167	$132,748	1,080,328	$1,035,278	5,685	$5,510	707,551	$743,826	1,713	$1,980	154,991	$561,476	693,855	$427,489
2009	369,341	$301,931	1,432,059	$1,243,252	7,650	$7,382	741,405	$754,757	1,477	$1,139	222,270	$782,059	971,353	$581,609

Table 3. Average state-specific and coastwide price per pound and coastwide wholesale value, adjusted for inflation, for Spanish mackerel

(Source: personal communication with ACCSP, Washington, DC)

Year	Price Per Pound														Total Value
	ME	MA	RI	CT	NY	NJ	DE	MD	VA	NC	GA	SC	FL	Coastwide	Coastwide
1962									$0.99	$1.83	$1.30	$0.87	$0.68	$0.98	$1,866,384
1963									$0.89	$1.07	$2.14	$0.94	$0.65	$1.14	$1,602,760
1964						$0.63			$1.01	$1.06		$1.10	$0.59	$0.88	$1,309,982
1965			$1.09					$1.05	$1.07	$0.70	$1.48	$0.97	$0.69	$1.01	$2,181,966
1966						$0.67		$1.21	$1.09	$0.81	$1.34	$0.96	$0.72	$0.97	$1,781,539
1967						$1.50		$1.18	$1.09	$0.73	$0.60	$0.71	$0.55	$0.91	$1,088,838
1968						$1.25		$1.03	$1.04	$0.68	$1.50	$0.85	$0.54	$0.99	$2,515,674
1969		$0.95				$0.00		$0.92	$0.88	$0.79		$0.94	$0.64	$0.85	$1,687,364
1970			$1.18			$0.62		$1.14	$0.86	$0.76	$1.18	$0.76	$0.72	$0.90	$2,800,480
1971			$1.24			$0.65		$0.95	$0.91	$0.79	$0.45	$0.68	$0.64	$0.79	$1,788,122
1972						$0.78		$1.08	$0.82	$0.70	$0.60	$0.77	$0.66	$0.77	$2,314,047
1973						$1.33		$0.76	$0.88	$0.69	$0.60	$0.68	$0.82	$0.82	$2,734,030
1974						$0.80		$0.71	$0.79	$0.57	$0.65	$0.85	$0.87	$0.75	$2,098,075
1975			$1.38		$0.61	$0.99		$0.69	$0.79	$0.57	$0.76	$0.96	$0.71	$0.83	$3,756,612
1976					$0.69	$1.00		$0.84	$0.64	$0.57	$0.97	$0.61	$0.71	$0.76	$6,887,891
1977						$1.05			$0.73	$0.55	$0.88	$0.61	$0.66	$0.75	$7,264,026
1978						$0.67		$0.40	$0.87		$1.33		$0.64	$0.78	$3,546,926
1979									$0.97		$0.70		$0.67	$0.78	$3,279,217
1980					$1.33	$0.76			$0.83	$1.05	$0.69	$0.83	$0.70	$0.88	$6,942,526
1981					$0.98	$1.86			$0.87	$1.02	$0.89	$1.90	$0.76	$1.18	$2,080,159
1982					$1.87	$1.30			$0.76	$0.73	$0.77	$0.91	$0.73	$1.01	$2,892,185
1983		$1.65	$2.07		$1.53	$0.59			$1.20	$0.81		$0.62	$0.64	$1.14	$3,829,019
1984					$1.21	$0.55			$0.85	$0.69		$0.93	$0.59	$0.80	$1,445,383

Year	ME	MA	RI	CT	NY	NJ	DE	MD	VA	NC	GA	SC	FL	Coastwide	Total Value Coastwide
1985					$1.38				$0.80	$0.79		$0.77	$0.55	$0.86	$1,929,049
1986		$1.75			$1.62	$1.29			$0.55	$0.70	$1.24	$0.44	$0.42	$1.00	$1,621,141
1987	$0.77	$0.59	$1.24		$1.55	$0.76		$0.87	$0.45	$0.55		$0.74	$0.07	$0.76	$695,425
1988			$1.20		$2.13	$1.08		$0.64	$0.59	$0.59	$0.53	$0.85	$0.85	$0.94	$3,095,953
1989		$0.94	$1.32		$1.85	$1.21		$0.66	$0.59	$0.64		$1.16	$0.67	$1.00	$2,604,466
1990		$1.34	$1.93		$1.28	$0.97		$0.63	$0.61	$0.63		$1.62	$0.64	$1.07	$2,205,872
1991		$0.80	$1.30		$1.39	$1.14		$0.62	$0.44	$0.58		$0.89	$0.66	$0.87	$3,023,519
1992		$0.79	$1.56		$1.19	$1.42		$0.33	$0.61	$0.64		$0.90	$0.56	$0.89	$1,907,352
1993		$1.21	$1.13		$1.46	$1.87		$0.78	$0.73	$0.65		$1.52	$0.62	$1.11	$3,176,033
1994		$1.15	$1.11		$1.83	$1.87		$0.47	$0.69	$0.68		$0.94	$0.64	$1.04	$2,887,701
1995			$1.94	$0.72	$2.25	$1.63		$0.66	$0.91	$0.77		$0.79	$0.76	$1.16	$2,836,710
1996			$2.57	$0.52	$2.25	$1.64			$0.98	$0.71		$0.98	$0.71	$1.30	$2,222,341
1997			$2.07		$1.99	$1.17		$1.24	$0.73	$0.84		$0.89	$0.70	$1.20	$2,428,223
1998			$0.81		$2.14	$1.70		$1.48	$1.23	$0.94		$2.66	$0.68	$1.46	$2,305,993
1999		$1.57	$0.32		$1.98	$1.53		$1.26	$1.08	$0.76			$0.82	$1.17	$2,052,977
2000			$0.97		$1.79	$1.52		$1.26	$0.83	$0.96		$0.52	$0.74	$1.08	$2,131,067
2001			$0.37		$2.01	$1.94	$1.23	$1.20	$0.98	$0.99			$0.67	$1.17	$2,311,764
2002				$0.40	$1.80	$1.67		$0.87	$0.90	$1.07		$1.08	$0.69	$1.06	$2,279,169
2003			$1.61		$1.89	$2.04		$1.32	$0.99	$1.09		$1.54	$0.62	$1.39	$2,363,692
2004		$2.26	$0.62		$1.79	$2.13		$1.19	$0.86	$1.33			$0.69	$1.36	$2,806,917
2005			$1.71		$2.40	$2.48	$2.31	$1.29	$1.33	$1.47			$0.79	$1.72	$3,202,949
2006			$0.65		$2.34	$1.82		$1.63	$1.53	$1.42			$0.72	$1.44	$2,960,101
2007			$0.66		$2.70	$2.46		$2.12	$1.15	$1.57			$0.75	$1.63	$3,320,366
2008			$1.48		$2.80	$2.48		$1.38	$0.58	$1.33			$0.82	$1.55	$2,504,756
2009			$1.78		$2.20	$1.99		$1.02	$0.98	$0.99			$0.78	$1.39	$3,151,657

Table 4. Commercial spot landings (lbs) by state and year

(Source: personal communication with ACCSP, Washington DC)

Year	MA	RI	NY	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1950			1,000	1,400	10,900	98,300	4,498,400	5,172,300	291,400		91,700	10,165,400
1951		10,000		126,900	17,700	128,600	5,030,500	4,614,500	2,646,000	1,200	280,500	12,855,900
1952				310,000	120,500	419,900	5,915,800	5,548,000	1,821,000	12,800	372,700	14,520,700
1953			2,100	86,000	44,700	283,400	3,912,300	2,814,700	440,000	8,800	344,600	7,936,600
1954			2,200	176,200	103,400	258,200	4,432,400	2,389,900	498,600	13,400	468,700	8,343,000
1955				49,200	228,100	407,600	3,948,800	1,898,000	1,130,300	103,000	361,400	8,126,400
1956		100		46,100	197,300	300,500	3,207,700	2,574,800	4,182,300	41,400	487,300	11,037,500
1957			6,400	172,400	132,300	589,100	3,471,200	2,157,500	2,097,900	64,400	340,500	9,031,700
1958				1,200	17,000	593,000	5,256,400	2,320,900	841,900	38,800	592,800	9,662,000
1959				11,300	19,700	85,000	3,754,500	2,264,900	1,840,700	300	1,032,300	9,008,700
1960				300	18,200	498,400	3,906,400	2,610,500	2,720,600	400	1,032,800	10,787,600
1961						9,600	1,183,900	2,055,700	3,468,500	100	928,600	7,646,400
1962				200		26,900	2,349,700	1,218,300	3,135,000	3,700	704,400	7,438,200
1963					500	15,200	1,474,800	915,500	2,719,200	4,100	1,127,000	6,256,300
1964				100		33,900	3,197,800	1,251,200	3,166,000	2,500	951,900	8,603,400
1965						600	1,750,500	912,600	1,174,000	11,000	938,100	4,786,800
1966						4,100	1,152,800	1,091,300	2,125,500	5,300	1,204,600	5,583,600
1967				100		248,300	4,253,300	3,047,900	2,219,100	10,500	898,500	10,677,700
1968						45,600	1,116,000	1,575,100	2,052,500	2,000	1,104,600	5,895,800
1969				6,400		20,700	1,048,500	1,487,800	453,500	2,400	874,600	3,893,900
1970				200		572,600	5,872,800	1,528,900	367,500	9,300	1,397,800	9,749,100
1971				3,100		20,300	503,600	1,190,100	1,285,500	5,800	2,891,100	5,899,500
1972				1,200		73,700	2,950,500	3,902,400	2,269,200	32,600	1,939,900	11,169,500
1973				9,500		27,100	2,576,000	5,397,400	1,455,300	33,900	920,700	10,419,900
1974				10,500		37,000	2,251,100	5,606,800	358,400	16,400	1,747,800	10,028,000
1975				58,500	17,000	102,900	1,918,400	8,299,800	1,490,800	8,900	841,100	12,737,400
1976			3,100	2,400	8,000	16,400	1,192,400	2,674,300	1,013,600	17,500	534,000	5,461,700
1977			5,600	20,400	11,400	16,400	1,866,600	3,805,200	294,600	7,100	1,029,000	7,056,300
1978			1,200	10,900	19,500	31,300	3,205,500		399,602	300	993,860	4,662,162
1979			300	1,800	18,100	10,600	2,541,000		391,766	250	871,375	3,835,191

Year	MA	RI	NY	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1980			1,100	2,400	5,300	6,300	1,795,100	7,100,053	410,763	1,429	882,480	10,204,925
1981				6,000	11,100	14,200	1,025,800	3,511,574	117,384	7,721	2,777,413	7,471,192
1982				1,800	2,500	6,200	1,017,100	4,918,763	62,232		4,411,943	10,420,538
1983				800		129,400	1,567,900	2,952,295	239,446		2,262,445	7,152,286
1984				100		43,200	735,200	3,481,920	129,705		1,506,860	5,896,985
1985				2,400	17,200	7,700	1,561,739	4,043,843	137,074		1,392,318	7,162,274
1986				6,600	86,400	104,400	1,839,500	3,354,191	654,672		918,875	6,964,638
1987				15,900	140,100	251,800	3,721,100	2,806,041	220,366		943,734	8,099,041
1988				1,600	38,700	58,000	1,985,500	3,080,258	376,101	626	1,344,276	6,885,061
1989				8,200	29,000	115,800	2,468,100	3,254,473	31,222	110	1,144,661	7,051,566
1990				9,039	24,900	127,882	1,630,735	3,455,460	37,602		1,275,729	6,561,347
1991				54,433	236,200	216,035	2,539,340	3,047,305	9,432		1,051,408	7,154,153
1992				102,213	95,000	331,837	2,497,622	2,826,138	171,899		755,495	6,780,204
1993	30		63	10,900	22,000	182,198	3,349,399	2,672,164	197,531	294	826,343	7,260,922
1994				31,408	100,400	166,246	4,269,402	2,937,311	18,241		1,002,760	8,525,768
1995				27,720	62,000	298,413	3,622,954	3,006,845	24,332	247	558,097	7,600,608
1996				866	80,930	256,179	2,982,041	2,290,000	60,158		56,423	5,726,597
1997			37	6,175	35,686	116,989	3,454,924	2,627,921	21,832		227,097	6,490,661
1998				27,578	140,363	208,032	4,245,615	2,396,980	62,859		161,205	7,242,632
1999				7,541	47,770	221,566	2,930,983	2,262,175	9,029		73,018	5,552,081
2000			720	10,232	32,288	158,506	3,657,922	2,829,813	8,519		57,948	6,755,948
2001				4,931	74,119	253,015	3,232,095	3,093,872	12,950		33,052	6,704,034
2002			5,536	468	12,749	133,265	3,060,412	2,184,004	8,978		21,258	5,426,669
2003			5	2,800	65,987	179,340	3,470,686	2,043,387	17,059		9,336	5,788,600
2004			72	1,652	58,502	43,729	4,326,966	2,316,982	2,593		12,680	6,763,175
2005			416	740	68,558	114,395	3,102,816	1,714,485	10,468		21,153	5,033,030
2006			1,815	278	7,522	34,018	1,695,985	1,364,743	4,765		22,501	3,131,627
2007						389,093	4,275,027	878,989	4,888		14,334	5,562,331
2008			369	1,256	117	123,596	1,988,999	737,244	1,409		9,177	2,862,166
2009			25	34,044	60,671	491,430	3,805,193	1,006,485	22,353		22,057	5,442,257
Total	30	10,100	32,058	1,486,374	2,540,362	9,757,963	171,595,754	164,522,012	51,436,130	468,577	51,100,310	452,949,668

Table 5. Commercial spot landings (lbs) and ex-vessel value (dollars) by gear and year. The * indicates data that are confidential.

(Source: personal communication with ACCSP, Washington DC)

	FIXED NETS		GILL NETS		HAUL SEINES		TRAWLS		OTHER GEAR	
YEAR	Landings	Value	Landings	Value	Landings	Value	Landings	Value	Landings	Value
1950	1,518,700		652,400		7,930,600		56,100		7,600	
1951	1,092,700		781,500		10,876,500		47,500		57,700	
1952	920,400		1,063,500		12,177,900		239,000		119,900	
1953	689,800		600,400		6,462,500		90,100		93,800	
1954	983,600		847,900		6,146,400		355,100		10,000	
1955	855,600		909,300		6,041,600		311,200		8,700	
1956	922,200		974,400		8,652,800		455,500		32,600	
1957	1,027,800		1,114,500		6,361,500		423,600		104,300	
1958	1,154,800		1,628,600		6,517,200		309,400		52,000	
1959	1,324,800		1,416,000		5,870,400		309,800		87,700	
1960	1,351,000		1,568,200		7,334,200		451,300		82,900	
1961	573,200		1,134,500		5,488,400		425,100		25,200	
1962	973,700	$93,790	1,260,700	$134,459	4,917,700	$334,466	269,700	$13,095	16,400	$2,687
1963	392,300	$65,536	1,406,000	$185,382	4,235,400	$340,455	208,900	$15,306	13,700	$2,023
1964	887,600	$140,429	1,700,300	$246,846	5,851,800	$586,180	148,300	$10,368	15,400	$2,431
1965	643,500	$92,642	1,301,800	$178,143	2,695,400	$318,598	128,600	$9,938	17,500	$2,549
1966	353,200	$29,816	1,525,000	$198,544	3,473,500	$216,846	196,200	$17,806	35,700	$4,806
1967	1,932,600	$203,752	2,037,500	$238,702	5,819,500	$396,604	861,600	$48,838	26,500	$3,662
1968	491,500	$48,570	1,387,200	$189,596	3,663,000	$286,431	331,100	$27,978	23,000	$3,310
1969	311,200	$39,903	1,190,700	$201,736	1,919,200	$244,198	394,300	$33,852	78,500	$11,784
1970	2,545,100	$243,988	3,464,000	$431,879	3,406,500	$323,556	175,500	$14,464	158,000	$22,580
1971	222,100	$26,827	2,855,600	$471,460	2,499,400	$259,779	278,700	$28,338	43,700	$6,888
1972	1,496,300	$169,780	3,137,100	$440,446	5,718,200	$563,878	770,300	$61,888	47,600	$8,029
1973	1,303,800	$164,831	2,005,500	$326,949	5,767,400	$810,526	1,306,700	$125,282	36,500	$6,216
1974	1,365,700	$208,281	2,676,300	$399,045	5,002,100	$571,569	903,500	$91,206	80,400	$11,796
1975	825,300	$101,949	1,952,600	$336,927	8,637,000	$1,040,173	1,286,400	$94,463	36,100	$7,091
1976	469,500	$78,381	1,188,400	$238,627	3,341,100	$492,154	431,700	$54,517	31,000	$6,169
1977	787,900	$153,075	2,004,700	$388,495	3,400,100	$448,728	816,200	$110,460	47,400	$8,852
1978	1,683,893	$296,138	1,634,603	$307,117	3,666,171	$519,445	1,553,623	$203,978	1,003,635	$192,074
1979	978,825	$203,786	2,156,205	$484,334	5,753,651	$1,126,925	1,396,954	$255,760	879,675	$175,254

1980	463,685	$117,894	2,150,962	$663,354	5,440,401	$1,091,990	1,267,804	$261,382	893,121	$208,687

(Continued – Commercial spot landings (lbs) and ex-vessel value (dollars) by gear and year)

	FIXED NETS		GILL NETS		HAUL SEINES		TRAWLS		OTHER GEAR	
YEAR	Landings	Value	Landings	Value	Landings	Value	Landings	Value	Landings	Value
1981	519,833	$150,638	878,966	$281,417	2,917,714	$749,620	385,866	$92,028	2,800,281	$675,535
1982	930,006	$277,188	634,793	$204,107	3,922,311	$889,331	518,180	$118,817	4,435,166	$1,140,549
1983	849,312	$255,563	1,063,604	$307,151	2,628,403	$682,918	349,172	$84,324	2,266,301	$704,257
1984	633,102	$186,961	1,053,510	$309,110	2,338,364	$592,353	363,254	$83,941	1,511,495	$536,902
1985	363,720	$126,502	1,878,251	$617,671	2,956,758	$671,508	570,244	$119,834	1,406,593	$524,270
1986	500,527	$162,870	2,346,421	$732,086	2,789,769	$706,095	399,036	$90,808	929,715	$5,487
1987	667,285	$205,094	4,049,989	$1,172,911	2,086,934	$508,272	294,236	$66,597	*	*
1988	370,588	$113,380	2,068,032	$749,065	2,760,674	$734,005	305,889	$71,260	1,380,016	$355,631
1989	469,603	$158,739	2,752,173	$1,124,986	2,292,821	$568,989	355,365	$86,577	*	*
1990	429,244	$146,116	1,592,755	$741,552	2,966,969	$750,651	266,502	$63,431	*	*
1991	364,846	$126,412	3,318,618	$1,218,317	2,541,121	$617,692	216,736	$47,182	735,521	$226,617
1992	375,678	$104,036	3,916,681	$1,158,434	2,093,998	$464,781	281,300	$62,348	113,802	$41,066
1993	295,462	$130,150	4,637,862	$1,919,168	2,200,647	$664,863	114,831	$32,742	66,947	$34,152
1994	654,797	$241,887	6,070,408	$2,260,139	578,844	$244,510	125,848	$34,469	1,366,402	$474,532
1995	599,624	$237,163	5,080,891	$1,761,744	373,418	$114,458	121,248	$36,891	1,646,423	$550,753
1996	316,822	$127,922	3,539,487	$1,379,253	399,929	$147,810	119,164	$45,074	1,352,801	$584,763
1997	363,823	$163,913	3,903,344	$1,635,096	354,752	$150,329	129,198	$50,156	1,821,129	$811,526
1998	412,853	$152,195	4,808,951	$1,779,915	516,430	$203,036	95,005	$28,063	1,460,636	$680,443
1999	275,528	$109,558	3,937,144	$1,516,484	1,067,325	$436,735	100,212	$36,996	209,092	$100,121
2000	294,772	$160,767	4,852,981	$2,612,648	1,581,987	$709,993	105,533	$41,154	49,713	$25,417
2001	482,155	$223,018	4,528,172	$1,864,252	1,483,229	$621,455	212,107	$89,290	64,400	$33,174
2002	404,903	$180,380	3,848,146	$1,588,216	1,008,120	$452,778	119,593	$50,427	68,823	$33,791
2003	584,092	$276,856	3,960,782	$1,869,601	1,128,245	$543,115	92,799	$39,789	42,983	$21,469
2004	352,220	$174,274	4,700,407	$2,370,691	1,064,257	$519,681	25,768	$11,634	631,869	$294,935
2005	311,955	$233,486	3,521,307	$2,303,589	987,902	$608,025	246,618	$121,308	55,158	$38,048
2006	117,913	$102,880	1,565,687	$1,594,628	717,942	$613,192	15,882	$10,500	776,120	$572,709
2007	316,302	$273,445	3,975,159	$2,998,315	1,072,163	$803,448	54,712	$30,857	218,818	$153,259
2008	193,383	$154,623	1,853,585	$1,066,951	713,433	$479,039	27,686	$16,374	75,626	$73,107
2009	202,681	$134,418	4,274,945	$2,387,565	608,240	$395,652	78,930	$34,278	298,251	$199,831
Total	43,195,329	$7,569,803	144,339,419	$47,587,101	223,220,222	$25,616,835	22,290,695	$3,176,068	29,950,311	$9,579,230

Table 6. Commercial spotted seatrout landings (lbs) and ex-vessel value (US dollars), by gear and year
(Source: personal communication with ACCSP, Washington, DC)

YEAR	FIXED NETS		GILL NETS		HAUL SEINES		HOOK AND LINE		TRAWLS		OTHER GEAR	
	Landings	Value	Landings	Value	Landings	Value	Landings	Value	Landings	Value	Landings	Value
1950	54,700		1,243,900		500,200		10,500		14,100		269,800	
1951	48,100		919,700		529,200		15,700		4,000		204,200	
1952	42,900		726,000		547,900		12,100		2,900		981,200	
1953	40,300		783,700		510,700		6,700		1,900		673,500	
1954	64,600		1,092,800		447,600		155,000		5,200		270,400	
1955	65,100		938,800		404,900		133,200				106,200	
1956	122,100		973,600		539,700		95,600		3,500		154,800	
1957	85,200		951,200		463,100		65,000				81,200	
1958	29,100		744,200		154,400		20,700		7,000		68,500	
1959	67,700		846,300		326,800		10,500				82,700	
1960	27,600		839,800		170,700		15,600				116,200	
1961	58,700		764,300		168,600		11,900				86,700	
1962	21,500	$5,090	766,000	$190,207	158,900	$44,205	13,600	$3,304	1,400	$280	55,600	$13,732
1963	19,200	$5,488	736,900	$181,930	220,300	$65,586	15,300	$3,672	3,000	$686	117,600	$28,420
1964	14,200	$3,691	707,300	$195,995	187,700	$66,984	17,400	$4,698	4,900	$1,207	122,700	$32,714
1965	38,800	$9,474	661,600	$171,699	161,400	$48,865	8,300	$1,962	8,400	$2,599	63,000	$17,118
1966	6,600	$1,951	693,200	$191,291	97,100	$28,644	7,500	$2,059	7,200	$2,149	67,800	$19,295
1967	17,800	$4,583	591,200	$169,670	39,500	$12,309	12,100	$3,398	9,900	$2,550	63,400	$18,562
1968	4,300	$659	591,300	$178,119	53,400	$16,223	13,500	$3,863	6,100	$1,825	86,200	$26,456
1969	18,800	$5,609	635,800	$211,704	148,800	$43,183	9,900	$3,155	3,600	$1,007	82,200	$28,005
1970	44,200	$12,314	798,000	$246,123	234,000	$64,217	20,200	$6,399	16,000	$3,530	88,400	$28,294
1971	54,600	$14,851	584,000	$191,854	192,100	$56,229	19,800	$6,463	26,100	$7,193	40,100	$13,119
1972	51,100	$14,859	688,800	$248,786	330,500	$99,180	16,000	$5,657	36,300	$9,579	71,300	$25,927
1973	45,600	$14,468	656,100	$239,908	435,000	$130,316	8,000	$3,024	108,600	$32,968	65,700	$25,619
1974	28,200	$8,334	720,000	$278,192	525,600	$162,525	9,000	$3,540	19,800	$7,261	77,300	$30,270
1975	32,400	$10,721	636,900	$261,170	521,100	$170,911	7,500	$3,137	38,900	$15,888	51,300	$22,859
1976	59,600	$18,981	708,600	$297,198	396,800	$138,971	5,600	$2,569	24,700	$12,092	48,800	$23,167
1977	13,000	$4,567	496,900	$236,556	258,700	$86,066	5,500	$2,632	17,800	$8,795	45,900	$23,208
1978	5,117	$1,706	42,437	$16,543	50,796	$19,209			5,359	$1,921	405,238	$234,683
1979	3,653	$1,151	70,943	$30,436	17,991	$7,376			18,429	$7,782	481,291	$336,572
1980	5,855	$2,621	91,845	$42,871	51,381	$20,746			29,662	$10,464	564,795	$395,499

(Continued – Commercial spotted seatrout landings (lbs) and ex-vessel value (US dollars), by gear and year)

	FIXED NETS		GILL NETS		HAUL SEINES		HOOK AND LINE		TRAWLS		OTHER GEAR	
YEAR	Landings	Value	Landings	Value	Landings	Value	Landings	Value	Landings	Value	Landings	Value
1981	10,282	$6,074	44,669	$22,564	58,787	$30,422			3,303	$1,796	737,186	$503,679
1982	12,890	$9,332	22,873	$16,614	50,951	$36,091			2,068	$1,187	737,681	$607,896
1983	13,715	$11,325	71,168	$53,648	86,354	$64,701			2,307	$1,473	488,025	$416,030
1984	11,144	$9,876	85,303	$68,675	56,177	$44,824			2,721	$2,017	374,852	$351,353
1985	826	$773	73,811	$63,981	36,993	$32,084			2,045	$1,847	382,350	$361,037
1986	1,698	$1,319	149,029	$118,329	41,075	$33,011			16,947	$12,577	326,780	$27,898
1987	26,355	$22,210	182,170	$153,116	106,617	$89,931	9,751	$11,978	5,180	$3,567	338,654	$24,214
1988	6,536	$6,208	182,926	$155,170	103,774	$88,564	9,953	$11,929	16,311	$10,834	318,123	$325,539
1989	2,027	$2,158	336,559	$322,753	105,025	$105,393	*	*	25,409	$24,338	363,761	$352,278
1990	1,066	$1,086	179,779	$160,148	86,571	$87,947	5,838	$8,049	2,611	$2,612	239,577	$251,223
1991	1,234	$988	354,584	$303,824	362,395	$306,409	37,462	$46,011	2,094	$2,022	157,568	$178,387
1992	9,367	$11,452	428,215	$461,423	233,526	$247,353	76,316	$93,660	1,482	$1,615	58,711	$68,211
1993	7,022	$7,583	476,203	$552,344	150,879	$169,503	68,001	$90,532	3,766	$4,031	15,021	$17,665
1994	14,900	$17,818	431,734	$514,882	34,191	$24,846	76,370	$100,665	3,719	$3,906	150,938	$180,944
1995	5,204	$5,693	429,637	$513,394	25,400	$32,130	67,691	$106,443	4,681	$5,251	263,630	$298,491
1996	4,122	$4,410	181,273	$202,254	2,439	$3,133	53,978	$100,094	1,235	$1,187	58,734	$91,760
1997	2,739	$3,537	161,358	$198,010	*	*	66,888	$114,945	175	$222	83,657	$97,107
1998	6,409	$8,706	215,610	$266,598	*	*	46,363	$81,095	717	$872	103,846	$121,004
1999	36,213	$35,631	382,076	$466,725	132,416	$162,708	67,395	$119,378	1,544	$1,630	66,956	$80,816
2000	19,434	$16,732	297,094	$366,246	85,492	$106,570	47,563	$86,434	8,559	$6,530	6,568	$8,230
2001	8,117	$9,652	97,841	$120,507	22,281	$28,733	29,474	$58,368	229	$263	6,677	$9,325
2002	3,365	$3,945	146,385	$176,279	36,771	$48,525	45,125	$89,593	267	$327	10,326	$11,723
2003	983	$1,160	137,333	$183,586	36,984	$49,635	27,601	$52,940	282	$310	12,809	$17,249
2004	4,858	$6,439	72,403	$96,299	27,437	$35,996	30,633	$61,169	235	$278	45,580	$60,658
2005	2,947	$2,368	107,463	$148,721	40,361	$55,869	36,850	$77,193	14,545	$19,854	12,087	$15,455
2006	618	$769	58,917	$78,411	47,532	$76,863	37,282	$76,273	19,428	$16,617	235,573	$313,951
2007	2,196	$2,963	303,820	$431,365	96,832	$144,684	49,607	$108,253	8,089	$11,969	16,603	$24,684
2008	1,551	$2,085	251,697	$387,587	76,138	$120,062	26,382	$56,365	1,889	$2,893	12,753	$19,543
2009	1,633	$2,531	279,956	$461,630	48,893	$83,709	48,089	$102,960	5,786	$9,753	10,589	$17,981

Table 7. Recreational Spanish mackerel landings (numbers) by state and year

(Source: personal communication, ACCSP 2010)

Year	MA	RI	CT	NY	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981	4,277								231,744	25,058	1,786	485,395	748,260
1982									694,420	21,092	408	173,649	889,569
1983									6,156	3,279	2,109	117,532	129,076
1984									618,313	79,855	3,718	248,048	949,934
1985									344,965	36,606	4,809	84,226	470,606
1986					1,479		457	6,942	431,021	147,358	25,257	195,385	807,899
1987				1,417			8,036	1,520	815,920	65,846	20,925	118,184	1,031,847
1988								101,691	1,312,070	82,136	4,403	233,582	1,733,882
1989		320		1,010	22,067			73,236	679,360	121,115	7,444	213,665	1,118,216
1990		403		1,726	2,495	319	1,355	63,821	821,334	81,375	31,567	225,263	1,229,658
1991	7,071	78	4,173	7,608	25,071	2,054	41,250	68,102	676,717	132,198	2,391	517,290	1,484,004
1992	0			1,325	10,549	210	4,847	71,265	701,974	62,546	25,736	370,809	1,249,262
1993	188			2,681	3,457		43,050	73,832	451,523	92,621	12,979	219,458	899,790
1994				0	7,910		43,710	145,872	535,949	113,991	15,235	252,668	1,115,335
1995				0	0		26,216	86,899	285,882	34,355	16,726	226,334	676,411
1996					1,172			69,399	355,036	134,282	16,948	245,085	821,923
1997						0		68,517	585,765	101,067	28,396	246,885	1,030,630
1998					4,046	186	3,633	33,140	239,052	65,584	28,002	244,235	617,877
1999		438		0	1,335	226	1,220	75,972	476,019	27,477	9,007	327,621	919,314
2000	1,528			4,453	923	0	15,219	71,249	671,353	28,283	20,545	547,315	1,360,867
2001	2,561			802	0	0	8,025	29,590	400,706	43,501	11,013	774,065	1,270,264
2002							0	17,433	401,982	24,235	1,927	926,600	1,372,177
2003	3,373						6,975	17,063	349,170	24,879	11,235	784,385	1,197,080
2004	1,338				1,531		8,800	21,012	308,996	144,394	7,906	532,956	1,026,932
2005							20,792	20,525	331,601	70,273	12,140	676,973	1,132,303
2006					465		3,118	21,303	305,343	42,867	2,441	439,324	814,861
2007							12,360	821	491,357	104,741	13,795	601,335	1,224,409
2008					470		5,777	121,773	686,501	58,465	14,519	566,397	1,453,902
2009					655		24,725	16,560	703,393	60,925	6,306	375,512	1,188,075
Total	20,337	1,238	4,173	21,021	83,625	2,996	279,565	1,277,539	14,913,621	2,030,402	359,671	10,970,176	29,964,363

Table 8. Recreational spot landings (numbers) by state and year

(Source: personal communication with ACCSP, Washington, DC)

Year	NY	NJ	DE	MD	VA	NC	SC	GA	FL	TOTAL
1981	44,278	28,006	17,508	948,931	11,662,684	4,023,934	562,750	124,057	799,226	18,211,373
1982	0	387,582	82,094	2,864,603	4,526,847	4,124,465	1,230,253	84,153	735,398	14,035,394
1983	0	0	14,464	1,600,362	12,059,247	4,880,268	970,747	112,123	488,029	20,125,239
1984	0	8,501	15,553	904,793	1,489,795	2,758,366	724,925	363,841	396,402	6,662,176
1985	15,494	12,692	0	1,028,391	5,491,918	8,789,391	2,355,044	62,338	861,700	18,616,969
1986	3,824	9,587	12,178	3,789,796	4,229,191	2,646,049	2,007,386	137,782	96,803	12,932,596
1987	0	0	0	3,180,704	3,864,151	2,129,146	599,807	79,487	73,833	9,927,128
1988	0	348,593	2,360	277,964	2,028,768	2,558,322	1,951,157	57,786	663,681	7,888,631
1989	602	1,128	45,853	1,154,314	3,714,855	2,924,299	1,078,570	34,977	67,506	9,022,104
1990	0	25,927	44,362	2,120,655	5,354,294	1,986,601	142,271	17,730	7,252	9,699,092
1991	0	88,393	138,113	1,841,555	8,820,075	2,317,095	598,290	10,281	269,628	14,083,432
1992	0	20,443	90,053	1,671,897	6,317,539	1,271,416	1,190,757	25,788	357,678	10,945,571
1993	1,168	7,788	3,263	1,880,043	2,836,534	2,057,440	1,437,809	228,606	946,757	9,399,408
1994	19,275	144,589	92,352	1,761,701	3,395,503	5,929,269	1,329,997	9,587	137,067	12,819,339
1995	0	2,949	51,695	1,099,658	2,731,242	3,329,981	875,189	27,842	140,231	8,258,786
1996	0	23,954	955	591,300	1,109,237	2,007,071	1,423,352	14,131	64,337	5,234,337
1997	0	20,148	126,089	713,657	3,328,144	1,440,661	680,842	5,471	31,987	6,346,999
1998	0	0	96,389	1,327,259	2,023,756	2,865,190	489,068	6,788	120,389	6,928,839
1999	0	0	19,911	655,289	569,250	1,308,167	801,785	5,578	264,233	3,624,213
2000	498,470	281,481	65,952	1,389,505	527,259	1,924,107	246,291	2,950	40,908	4,976,923
2001	0	0	51,096	1,088,997	1,056,365	3,650,711	735,551	3,681	652,975	7,239,378
2002	0	0	22,013	690,515	1,601,837	2,586,313	393,597	6,987	25,907	5,327,170
2003	0	0	30,165	3,300,594	1,441,002	3,796,557	524,513	11,524	84,685	9,189,041
2004	0	0	26,831	1,375,285	2,323,007	4,058,426	656,920	2,320	10,826	8,453,616
2005	0	41,324	202,657	2,006,925	2,993,635	3,125,897	464,510	2,999	41,671	8,879,618
2006	0	42,143	149,783	2,644,537	3,510,289	2,770,151	1,957,703	2,823	17,306	11,094,734
2007	2,756	0	239,701	3,842,569	6,608,680	4,268,838	911,960	8,516	36,775	15,919,794
2008	0	172,828	193,993	2,296,888	5,060,572	2,345,372	2,344,909	10,747	60,889	12,486,199
2009	0	16,651	135,485	2,170,685	3,145,633	1,168,436	878,428	7,169	58,226	7,580,712
Total	585,868	1,684,707	1,970,867	50,219,371	113,821,309	89,041,939	29,564,382	1,468,062	7,552,306	295,908,811

Table 9. Recreational spotted seatrout landings (numbers) by state and year

(Source: personal communication with ACCSP, Washington, DC)

Year	NJ	DE	MD	VA	NC	SC	GA	FL	Total
1981					30,037	20,934	189,080	576,847	816,898
1982					112,023	849,634	226,758	426,378	1,614,793
1983					91,956	121,940	325,655	645,120	1,184,671
1984					90,262	95,281	114,403	700,876	1,000,822
1985					263,878	347,851	251,764	866,162	1,729,655
1986			7,507	82,671	270,867	477,136	401,490	550,591	1,790,262
1987			29,295	17,415	320,977	392,329	439,782	744,330	1,944,128
1988			20,769	288,705	420,115	355,547	389,276	331,709	1,806,121
1989			151,986	66,033	181,149	174,011	448,767	198,617	1,220,563
1990			20,416	67,939	251,088	113,160	368,787	249,824	1,071,214
1991		1,094	17,995	69,032	316,895	438,502	1,204,116	385,817	2,433,451
1992		0	3,235	30,091	333,990	200,030	338,175	363,238	1,268,759
1993			7,038	103,131	206,523	222,144	463,702	274,118	1,276,656
1994		179	33,511	115,025	457,636	139,551	337,965	255,216	1,339,083
1995			19,198	90,838	325,927	223,751	607,095	381,884	1,648,693
1996			35,765	46,098	151,380	137,530	171,676	148,571	691,020
1997	3,196	245	19,951	92,725	256,719	111,576	167,287	228,096	879,795
1998		125	13,620	34,623	294,501	125,038	197,293	189,621	854,821
1999			2,112	138,492	410,321	101,260	655,407	241,096	1,548,688
2000			1,634	90,135	250,450	219,740	486,673	288,443	1,337,075
2001				13,447	182,124	63,452	309,487	250,987	819,497
2002				16,303	197,484	84,777	271,357	206,310	776,231
2003			2,091	102,484	106,415	123,027	425,993	169,587	929,597
2004		642		74,747	316,894	247,156	336,254	199,523	1,175,216
2005		349	3,828	31,416	512,262	268,467	231,429	337,744	1,385,495
2006		883	5,136	56,475	577,537	294,096	453,394	299,337	1,686,858
2007				145,736	525,156	122,419	499,709	302,625	1,595,645
2008				79,545	584,024	175,975	623,619	160,455	1,623,618
2009			11,680	40,109	509,416	147,266	478,895	182,752	1,370,118
Total	3,196	3,517	406,767	1,893,215	8,548,006	6,393,580	11,415,288	10,155,874	38,819,443

Table 10. History of Spanish mackerel management measures in the federal Coastal Migratory Pelagic Resources Fishery Management Plan

FMP (SAFMC 1982), effective 02/04/1983: treated fish from the Virginia/North Carolina border to the Texas/Mexico border as one US stock; set a January 1 to December 31 fishing year; defined the long-term goal of optimum yield (OY) as maximum sustainable yield (MSY), equal to 27 million pounds (mp); required fishery closure when OY met; set a minimum size limit of 12 inches fork length, permitting a 5% allowance by weight of undersized fish; established procedures for the Secretary of Commerce to take action by regulatory amendment to resolve possible future conflicts in the fishery; urged states adjacent to the management unit to adopt compatible regulations.
Amendment 1(SAFMC 1985), effective 10/22/1985: provided a framework procedure for pre–season adjustment of total allowable catch (TAC); set TAC at 27 mp, and required closure when TAC reached; 3000,000 lbs for purse seines; identified 14 inches total length as comparable to 12 inches total length for minimum size limit; charged an assessment group with annually assessing stock condition.
Emergency Rule (52 FR 290), effective 01/05/1987: beginning 01/01/1987 through 03/31/1987 allocated 1.869 mp to Atlantic between NC/VA border and Dade/Monroe County, Florida; established 4 fish bag limit, allowing sale of recreationally caught fish under the bag limit.
Notice Action (52 FR 2113), effective 01/20/1987: commercial fishery closed 01/14-03/31/1987 because quota met.
Emergency Rule (53 FR 2113), effective 04/03/1987: 90 day extension of 01/14-03/31/1987 emergency rule.
Amendment 2 (SAFMC 1987), effective 06/30/1987: revised MSY downward to 18 mp; recognized two migratory groups (Atlantic and Gulf), establishing the Dade/Monroe country line as boundary; set the Atlantic group TAC at 2.9 mp; revised the fishing year to April 1 to March 31; allocated TAC between commercial and recreational fisheries based on average ratio of catch for the period 1979 – 1985, resulting in 76% commercial or 2.2 mp, and 24% recreational or 0.7 mp; prohibited use of purse seines, with the exception of a 10% bycatch allowance; defined the gill net minimum mesh size at no less than a 3 ½ inches stretched mesh; bag limits established through follow-up notice action at 4 in FL, and 10 in NC, SC, and GA.
Regulatory Amendment (52FR 25012), effective 07/02/1987: increased TAC to 3 mp, allocating 2.26 mp to commercial and 0.74 mp to recreational.
Notice Action (52 FR 35720), effective 09/23/1987: reduced recreational bag limit to 0 because 0.74 mp quota reached.
Notice Action (52 FR 49415), effective 12/29/1987: closed commercial fishery because 2.36 mp quota reached.
Regulatory Amendment (53 FR 25611), effective 07/08/1988: increased TAC to 4 mp, allocating 3.04 mp to commercial and 0.96 mp to recreational.
Notice Action (53 FR 39097), effective 10/03/1988: reduced recreational bag limit to 0 because 0.96 mp quota reached.
Notice Action (54 FR 153), effective 12/29/1988: closed commercial fishery because 3.04 mp quota reached.
Regulatory Amendment (54 FR 24920), effective 04/1/1989: increased TAC to 6 mp, allocating 4.56 mp to commercial and 1.44 mp to recreational.
Amendment 3 (SAFMC 1989), effective 08/14/1989: prohibited use of drift gill nets; prohibited use of purse seines for overfished mackerel groups.
Amendment 4 (SAFMC 1989), effective 10/19/1989: reallocated TAC between commercial and recreational fisheries to 50/50 based on catches occurring during the early to mid 1970s; set TAC at 6 mp; allocated TAC increase unevenly between sectors (90% recreational, 10% commercial) such that 50/50 allocation achieved by 1994.

Regulatory Amendment (55 FR 25986), effective 06/26/1990: changed TAC to 5 mp, allocating 3.14 mp to commercial and 1.86 mp to recreational.
Amendment 5 (SAFMC 1990), effective 08/20/1990: extended management area through mid-Atlantic (i.e., to the Connecticut/New York border); revised the definition of "overfishing"; provided that the Council will be responsible for pre–season adjustments of TACs and bag limits; established 4 and 10 fish recreational bag limits in the southern (Florida) and northern (Georgia north) areas, respectively; deleted provision specifying that bag limit catch of mackerel may be sold.
Notice Action (56 FR 3422), effective 01/25/1991: closed commercial fishery because 3.14 mp quota reached.
Regulatory Amendment (56 FR 29920), effective 07/01/1991: increased TAC to 7.0 mp, allocating 3.5 mp to commercial and 3.5 to recreational; revised bag limits to 10 fish for northern area and 5 fish for southern area.
Notice Action (56 FR 66001), effective 12/17/1991: closed commercial fishery because 3.5 mp quota reached.
Amendment 6 (SAFMC 1992), effective 12/03/1992: specified rebuilding periods for overfished stocks; provided for biennial assessments and adjustments; provided for more framework actions, including size limits, vessel trip limits, closed seasons or areas, and gear restrictions; established commercial possession limits for northern and southern areas (i.e., 3500 lbs for northern area, and for southern area as follow: 1500 lbs from April 1 to November 30; between 500 and unlimited harvest depending on the day from December 1 until 80 percent of adjusted quota taken; 1000 lbs after 80 percent of adjusted quota reached; 500 lbs when 100 percent of adjusted quota reached; adjusted quota (3.25 mp) compensates for estimated catches of 500 lbs per vessel per day to the end of the season); revised qualifications for a commercial permit; discontinued the reversion of the bag limit to 0 when quota reached; modified the recreational fishing year to the calendar year; changed all size limit measures to fork length only.
Regulatory Amendment (58 FR 4093), effective 01/07/1993: reduced commercial trip limit in southern area to 1000 lbs because 80% of adjusted quota reached.
Regulatory Amendment (58 FR 11198), effective 02/20/1993: reduced commercial trip limit in southern area to 500 lbs because 100% of adjusted quota reached.
Regulatory Amendment (58 FR 40613), effective 07/29/1993: increased TAC to 9 mp, allocating 4.5 mp to commercial and 4.5 mp to recreational; revised initial change in trip limit to occur when 75% of adjusted quota is met instead of 80%.
Regulatory Amendment (58 FR 68327), effective 12/22/1993: reduced commercial trip limit in southern area to 1000 lbs because 75% of adjusted quota reached.
Regulatory Amendment (59 FR 8868), effective 02/18/1994: reduced commercial trip limit in southern area to 500 lbs because 100% of adjusted quota reached.
Regulatory Amendment (59 FR 40509), effective 04/01/1994: increased TAC to 9.2 mp, allocating 4.6 mp to commercial and 4.6 mp to recreational.
Amendment 7 (effective 09/23/1994): NA
Regulatory Amendment (60 FR 4866), effective 01/29/1995: reduced commercial trip limit in southern area to 1000 lbs because 75% of adjusted quota reached.

Regulatory Amendment (60 FR 39698), effective 04/01/1995: increased TAC to 9.4 mp, allocating 4.7 mp to commercial and 4.7 mp to recreational.
Regulatory Amendment (62 FR 23671), effective 05/01/1997: reduced TAC to 7 mp, allocating 3.5 mp to commercial and 3.5 mp to recreational; revised trip limit regime off FL (November 1 start for second period with greater weekend trip limit, 1500 lbs for third period).
Regulatory Amendment (62 FR 53278), effective 04/01/1997: increased TAC to 8 mp, allocating 4 mp to commercial and 4 mp to recreational.
Notice Action (62 FR 66304), effective 12/16/1997: reduced commercial trip limit to 1500 lbs.
Amendment 8 (SAFMC 1994), effective 04/03/1998: specified allowable gears (hook-and-line, run around nets, stab nets, and cast nets); limited run around gill net use off Florida (number of nets, mesh size, length, soak time); revised qualifications for a commercial permit; revised the seasonal framework procedures to allow adjustments in the overfishing definition, changes in allocation ratio, setting zero quotas and bag limits, and gear regulations including prohibition, and to provide for public comment; defined OY target at 40% static spawning potential ration (SPR) and requested the assessment group to provide additional information on SPR.
Notice Action (64 FR 7556), effective 02/10/1999: reduced trip limit to 1500 lbs.
Regulatory Amendment (64 FR 45457), effective 08/20/1999: decreased TAC to 6.6 mp, changed allocation to 55% commercial and 45% recreational, allocating 3.63 mp to commercial and 2.97 mp to recreational.
Amendment 9 (SAFMC 1998), effective 04/27/2000: allowed possession and sale of cut-off (damaged) fish that comply with minimum size limits and trip limits.
Regulatory Amendment (65 FR 41015), effective 08/02/2000: increased TAC to 7.04 mp, allocating 3.87 mp to commercial and 3.27 mp to recreational; revised April 1 to November 30 trip limits to 3500 lb; revised December 1 until 75% adjusted quota taken trip limit to unlimited Monday through Friday and 1500 lbs Saturday and Sunday; increased recreational bag limit to 15 fish; defined MSY = 5.7-7.5 mp, Bmsy = 12.2-15.8, MSST = 8.5-11.1, MFMT = 0.38-0.48
Amendment 10 (SAFMC 1998): designated Essential Fish Habitat (EFH) and EFH-Habitat Areas of Particular Concern.
Amendment 11 (SAFMC 1998), effective 12/1999: amended definitions of MSY, OY, overfishing and overfished consistent with National Standard guidelines; identified and defined fishing communities and addressed bycatch management measures.
Notice Action (69 FR 9969), effective 03/01/2004: reduced trip limit to 1500 lbs.
Notice Action (70 FR 5569), effective 02/01/2005: reduced trip limit to 1500 lbs.
Amendment 15 (SAFMC 2004), effective 08/08/2005: changed the fishing year to March 1 through February 28/29.
Notice Action (72 FR 5345), effective 02/05/2007: reduced trip limit to 1500 lbs.
Regulatory Amendment (73 FR 439), effective 03/12/2008: revised start date for commercial trip limit in southern area to March 1.

Table 11. Current federal regulations for Spanish mackerel

. *Commercial Fishery*

- Permit requirement
- 12" fork length (FL) minimum size limit
- Season opens March 1 and closes end of February or when quota is filled
- Quota = 3.87 million pounds (55% of total allowable catch or TAC)
- Must be landed with heads and fins intact
- Catch limit (per vessel, per day) from CT/NY border to GA/FL border: 3500
- Catch limit (per vessel, per days) from GA/FL border to the Miami-Dade/Monroe County line in FL: 3500 lbs from March 1 to November 30; unlimited catch Monday–Friday and 1500 lbs Saturday–Sunday from December 1 until 75% of the adjusted quota is taken; 1000 lbs from when 75% of the adjusted quota is taken until 100% of the adjusted quota is taken; and 500 lbs after 100% of the adjusted quota is taken (the adjusted quota compensates for estimated catches of 500 pounds per vessel per day to the end of the season)
- Authorized gears include automatic reel, bandit gear, rod and reel, cast net, run-around gill nets, and stab nets.
- Prohibited gears: purse seines; drift gillnets prohibited south of Cape Lookout, NC
- Minimum size of 3.5" stretch mesh required for all run-around gill nets

Recreational Fishery

- Gear restrictions apply
    - Permitted Gear: hook-and-line, run around nets, stab nets, cast nets, surface longline
    - Vessels with coastal migratory permit fishing for or possessing Spanish mackerel on Florida's east coast limited to 2 run-around gill nets of different mesh sizes, neither of which may exceed 800 yards and only one may be fished at a time; Max soak time is 1 hour and nets must be marked with a max of 9 dissimilar floats spaced no greater than 100 yards
    - Drift gill nets prohibited south of Cape Lookout, NC
- 12" FL minimum size limit
- Must be landed with head and fins intact
- Daily possession limit of 15 per person Florida-New York (applies to Charter/headboats too)
- Charter/headboat operators must possess vessel permit for coastal migratory fish
- Calendar year season
- Allocation = 3.17 million pounds (45% of TAC)

Table 12. Proposed measures in the Draft Amendment 18 to the Coastal Migratory Pelagic Resources FMP

SAFMC Preferred Option in **Bold**

	Definition	**Current**	**Proposed with No Alternatives**
MSY	maximum sustainable yield; largest long-term average catch that can be taken from the stock under equilibrium conditions	10.4 million pounds	11.461 million pounds (based on SEDAR 17 assessment)
MSST	minimum stock size threshold; level of biomass below which the stock is overfished	[(1-M) or 0.5 whichever is greater]* Bmsy = 0.85Bmsy, with no poundage estimate	[(1-M) or 0.5, whichever is greater) * Bmsy = 0.85*Bmsy = 8,085 MT (based on SEDAR 17 assessment)
MFMT	maximum fishing mortality threshold; level of F above which overfishing is occurring	Fmsy = F30%SPR, with no estimate	Fmsy = 0.371 (based on SEDAR 17 assessment)
OFL	overfishing limit; amount of annual catch corresponding to MFMT	none defined	unknown (based on Scientific and Statistical Committee recommendation) **Establish interim OFL as mean of past 10 years' landings plus 2 standard deviations, thus interim OFL = 6.14 million pounds**
ABC Control Rule and ABC	acceptable biological catch; level of annual catch that accounts for scientific uncertainty; the control rule determines the buffer between OFL and ABC	5.7 - 9.0 million pounds	Alternative 1. No action, do no not establish ABC Control Rule
			Alternative 2. Establish ABC based on SSC recommendation, to use the median landings of last ten years; ABC = 5.29 million lbs
			Alternative 3. Establish ABC Control Rule where ABC = OFL
			Alternative 4. Establish ABC Control Rule where ABC = X% of OFL; 4a) X=65; 4b) X=75, preferred measure; 4c) X=85
			Alternative 5. Establish ABC Control Rule where ABC = % of OFL, with the percentage based upon the level of risk of overfishing (P*); 5a) P* = 0.2; 5b) P*=0.3; 5c) P*=0.4; 5d) P*=0.5

OY [folded into ACL determ-ination]	optimum yield; long-term average amount of desired catch from a stock	Yield at F40%SPR, with no estimate	Alternative 1. No action, yield at F40% SPR = 11,458,000 lbs.
			Alternative 2. 65% yield at Fmsy = 10.608 million lbs.
			Alternative 3. 75% yeild at Fmsy = 11.051 million lbs.
			Alternative 4. 85% yield at Fmsy = 11.320 million lbs.
			Alternative 5. yield at F30%SPR = 10.565 million lbs.
			Alternative 6. yield at Fmax = 6.598 million lbs.
ACL	annual catch limit; annual total allowable catch, level of catch that invokes AMs	7.04 million lbs.	Alternative 1. No action, ACL = 7.04 million lbs, based on an ABC of 5.7 to 9.0 million lbs
			Alternative 2. ACL = OY = ABC = 5.29 million lb (based on SSC recommended ABC)
			Alternative 3. ACL = X% of ABC = _____ million lbs. 3a) X = 75; 3b) X = 85; 3c) X = 95 (Council needs to provide guidance on what ABC to use to calculate poundage)
ACT	annual catch target; annual catch that accounts for management uncertainty	Commercial: none defined	**Alternative 1. Don't specify**
			Alternative 2. ACT = ACL
			Alternative 3. ACT = 90% ACL
			Alternative 4. ACL = 80% ACL
		Recreational: none defined	Alternative 1. Don't specify
			Alternative 2. ACT = 85% ACL
			Alternative 3. ACT = 75% ACL
			Alternative 4. ACT = ACL*[(1-PSE) or 0.5, whichever is greater]
AM	accountability measures; management controls to prevent overages and correct or mitigate overages that occur	Commercial closure when quota met; no recreational AM	Alternative 1. No action; commercial harvest, possession, retention, purchase and sale prohibited when quota met; no recreational AM
			Alternative 2. Commercial closure when quota met; reduced season in subsequent year when recreational quota exceeded
			Alternative 3. Commercial payback of any overage; **3a) Payback regardless of stock status;** 3b) Payback only when stock overfished
			Alternative 4. Recreational payback of any overage; **4a) Payback regardless of stock status;** 4b) Payback only when stock overfished

Table 13. Current state regulations for Spanish mackerel

State	***Recreational***	***Commercial***
New York	14" TL, 15 fish	14" TL. 3,500 lb trip limit.
New Jersey	14" TL, 10 fish	14" TL.
Delaware	14" TL, 10 fish	14" TL.
Maryland	14" TL, 15 fish	14" TL.
Potomac River	14" TL, 15 fish	14" TL. Closure when federal waters close.
Virginia	14" TL, 15 fish	14" TL. 3,500 lb trip limit. Closure when federal waters close.
North Carolina	12" FL, 15 fish	12" FL. 3,500 lb trip limit (Spanish and king mackerel combined). Purse gill nets prohibited.
South Carolina	12" FL, 15 fish	12" FL. 15 fish. Closure when federal waters close.
Georgia	12" FL, 15 fish Closure from November 30-March 16	12" FL. 15 fish. Closure from November 30 - March 16.
Florida	12" FL, 15 fish. Transfer to other vessels at sea is prohibited. Cast nets less than 14' and beach or haul seines with no greater than 2" stretched mesh allowed	12" FL. Trip limits: April 1-Nov 30, 3500 lb; Dec 1 until 75% of adjusted quota taken, 3500 lb Mon-Fri & 1500 lb Sat-Sun; >75% adjusted quota until quota filled, 1500 lb; > 100% of adjusted quota until March 31, 500 lb. Restricted Species Endorsement Required Transfer of fish between vessels prohibited Allowed gear: beach or haul seine, cast net, hook and line, or spearing

Table 14. Current state regulations for spot

State	***Recreational***	***Commercial***
Georgia	8" TL; 25 fish limit.	8" TL. 25 fish limit except shrimp trawl (no limit). Directed finfish trawl prohibited. Shrimp trawl BRD requirement. Whelk trawl minimum mesh size 4" stretched. Gill nets prohibited (except shad).

Table 15. Current state regulations for spotted seatrout

State	***Recreational***	***Commercial***
New Jersey	13" TL; 8 fish	13" TL except 12" TL when taken by otter trawl 9/1-12/31. 150 lb bycatch limit. Gill net open 1/1-5/20 & 9/3-10/19 & 10/27-12/31; mesh > 3.25" stretched except 2.75 - 3.25" stretched allowed within 2nm for permitted fishermen doing monthly reporting. Otter trawl open 1/1-7/31 & 10/13-12/31; mesh > 3.75" stretched diamond or 3.375 stretched square. Pound net: open 1/1/-6/6 & 7/1-12/31. Hook & line: 8 fish, open year-round.
Delaware	12" TL	12" TL. Gill net minimum mesh 3.125" stretched April 1 – June 30.
Maryland	14" TL; 10 fish	12" TL. Trawl minimum mesh (3.375" square or 3.75" diagonal. Gill net minimum mesh 3".
PRFC	14" TL; 10 fish	14" TL
Virginia	14" TL; 10 fish	14" TL; hook & line: 10 fish limit. Quota: 51,104 lbs. Pound nets and haul seines allowed 5% by weight less than 14"
North Carolina	14" TL; 6 fish, maximum of 2 fish > 24" TL	14" TL; hook & line: 6 fish limit; No commercial possession allowed on weekends (midnight Friday through midnight Sunday)
South Carolina	14" TL; 10 fish. May only be taken by rod and reel or gigging. Gigging allowed March-November only. Gill nets may not be used on spotted seatrout due to their gamefish status.	Gamefish status (no commercial harvest or sale)
Georgia	13" TL; 15 fish	13" TL; 15 fish limit except for shrimp trawl (no limit, BRD required).
Florida	15-20" TL slot with 1 fish >20" allowed; North region: 5 fish limit and Feb closure; South region: 4 fish limit and Nov-Dec closure No spearing allowed	15-24" TL; June 1-Aug 31 season; 75 fish per day or vessel (the lesser); Allowed gear: hook & line, cast net Restricted Species Endorsement required Purchase and sale prohibited after Sept 5

Table 16. Summary of existing general state regulations that affect the catch of Spanish mackerel, spot, or spotted seatrout

State	***Regulation***
Delaware	No more than 200 ft of fixed, anchored, or staked gill net b/t May 10 and Sept 30 in all tidal waters Drift netting prohibited from 00:001 hrs on Saturdays through 16:00 hours on Sundays and legal holidays between May 10 and Sept 30 Additionally, fixed gill nets prohibited in the Delaware estuary north of Liston Point from Jan 1 to May 31 AND gill nets with twine size larger than 0.28 mm diameter or with stretch mesh > 5 ½" prohibited in Nanticoke River and its tribuatries or the C&D Canal and its tributaries Commercial gill nets shall be no less than 3 1/8" stretch from April 1 to June 30
Maryland	No trawling in Chesapeake Bay.
PRFC	Recommended pound net BRD.
Virginia	No trawling in state waters.
North Carolina	Shrimp trawl BRD requirement and 1 ½" min mish size. Closed from Fridays, 9pm to Sundays, 5pm, except in Atlantic Ocean. Hand retrieval required without a TED Crab trawl minimum mesh size 3" (4" in western Pamlico Sound). Shrimp/crab trawl incidental finfish trip limits: 500-1000 lb inshore; finfish weight must be < shrimp/crab weight Dec 1-Mar 31 in Atlantic. Flynet minimum mesh 3" square or 3.5" diamond. Attendance required for all gill nets south of the Emerald Isle bridge. North of the Emerald Isle bridge attendance required for gill nets less than 5 ½" and during the day for gill nets greater than or equal to 5 ½" mesh
South Carolina	Shrimp trawl BRD requirement. Whelk/crab trawl minimum mesh size 4" stretched. No finfish trawls operating. Gill nets no longer than 100 feet with a 3" minimum and 4.5" maximum stretched mesh size may be used only in unrestricted areas of the Atlantic Ocean. Gill nets no longer than 100 yards with 3" minimum stretched mesh size may be used only in special designated inshore areas. Gigging of spotted seatrout and red drum prohibited Dec, Jan, and Feb
Georgia	Directed finfish trawl prohibited. Shrimp trawl BRD requirement. Whelk trawl minimum mesh size 4" stretched. Gill nets prohibited (except shad).
Florida	Trawl TED required. Otter and skimmer trawls also have BRD requirement. Directed finfish trawls and all gill and entangling nets prohibited.

Table 17. Summary of existing state and federal fishery-independent surveys that collect Spanish mackerel, spot, and/or spotted seatrout.

Surveys designated as "high priority" for one of the three species are so highlighted: Spanish mackerel, red; spot, yellow; and spotted seatrout, turquoise.

Survey	Species notes
NMFS Northeast Bottom Trawl Survey, Nova Scotia to Cape Hatteras, ½" mesh codend liner, spring and fall cruises, 1972-present.	• Spanish mackerel: insufficient numbers collected for use in last coastwide assessment. • Spot: age 0+ collected, recommended index for spot management triggers. • Spotted Seatrout: insufficient numbers collected
NEAMAP Nearshore Trawl Survey, Cape Cod to Cape Hatteras, 150 site per spring and fall cruises, replacing nearshore strata previously sampled by NMFS Survey, 2007-present.	• Spanish mackerel: insufficient numbers collected for use in last coastwide assessment. • Spot: ~25,000 (~1,000kg) captured during each survey. Gross weight and individual lengths taken at each station. A subsample of specimens (5-15 per station depending on size distribution) are examined for individual length, weight, sex, maturity, age, diet. Age-specific indices can be calculated. • Spotted Seatrout: Incidental catches only.
NJ DEP Delaware River Recruitment Survey, Trenton to Delaware Memorial Bridge, ¼" mesh beach seine, 32 stations twice per month, August-October, 1980-present.	• Spanish mackerel: not targeted, less than 50 caught during entire survey, min/max FL collected, not valuable for index. • Spot: not targeted, avg. annual catch = 439 (annual catch ranged from n = 0-3137), measured FL in mm for subsample (prior to 2002 only min/max lengths taken), yoy, juveniles and adults caught, avg. FL = 106 mm, valuable for potential yoy/juvenile index. • Spotted Seatrout: not targeted, none caught, not valuable for index.
NJ DEP Delaware Bay 16-ft Trawl Survey, eleven nearshore stations between Cohansey River and Villas, April-November, 1991-present.	• Spanish mackerel: not targeted, only 2 caught during the survey (both in 1992), lengths collected, not valuable for index. • Spot: not targeted, avg. annual catch = 156 (annual catch ranged from n = 0-911), measured subsample in mm (mostly FL but some TL), yoy, juveniles and adults caught, avg. length = 101 mm, valuable for potential yoy/juvenile index. • Spotted Seatrout: not targeted, none caught, not valuable for index.
NJ DEP Ocean Trawl Survey, ¼" bar mesh codend liner, from the entrance of NY Harbor to the entrance of Delaware Bay, five nearshore surveys	• Spanish mackerel: not targeted, only caught in 31 tows during entire survey, measured FL in mm, total weight (kg) of catch per tow, not valuable for index. • Spot: not targeted, avg. annual catch = 4,582 (annual catch ranged from n = 2-33965), measured FL in mm, total weight (kg) of catch per tow, avg. FL = 145 mm, juveniles and

in January/February, April, June, August, and October, 1989-present.	adults caught, valuable for potential juvenile/adult index. • Spotted Seatrout: not targeted, none caught, not valuable for index.
DE DFW Juvenile Finfish Trawl Survey, Delaware Bay estuarine waters, 16-ft trawl, ½" mesh codend liner, 39 sites sampled monthly, April – October, 1980-present.	• Spanish mackerel: incidental catches only. • Spot: not targeted but regularly caught, lengths taken, age 0 collected, a YOY index is estimated. • Spotted Seatrout: incidental catches only.
DE DFW Inland Bays Trawl Survey, 16-ft trawl, ½" mesh codend liner, 11 sites sampled monthly, April – October, in Indian River and Rehoboth Bay, 1986-present.	• Spanish mackerel: incidental catches only. • Spot: not targeted but regularly caught, lengths taken, age 0 collected. • Spotted Seatrout: incidental catches only.
DE DFW Adult finfish Trawl Survey, Delaware Bay, 30-ft trawl, 2" mesh codend liner, 9 sites, 1966-1971, 1979-1984, 1990-present.	• Spanish mackerel: incidental catches only. • Spot: not targeted but regulatory caught, lengths taken, age 1+ collected. • Spotted Seatrout: incidental catches only.
MD DNR Blue Crab Trawl Survey, six areas of Maryland's Chesapeake Bay and tributaries, 16-ft bottom trawl, ½" stretched mesh codend liner, 22 stations sampled monthly, May – October, 1977-present.	• Spanish mackerel: Incidental catch, average n=1/year, lengths taken, age 0 • Spot: Not targeted, average n=12,800/year, no biological data, age 0 collected, an index is produced for MD annual report • Spotted Seatrout: Not targeted, average n = 150/year, lengths taken, age 0, low catch rates, but survey does catch more spotted seatrout than any other MD survey
MD DNR Juvenile Seine Survey, five areas of Maryland's Chesapeake Bay, ¼" mesh beach seine, 22 stations sampled monthly July – September, 1954-present.	• Spanish mackerel: Incidental catch, average n = less than 1 per year, no biological data, age 0 • Spot: Secondary species, no biological data, age 0 collected, recommended index for spot management triggers • Spotted Seatrout: Incidental catch, average n=2/year, no biological data, age 0
MD DNR Coastal Bays Trawl Survey, 16-ft bottom trawl, ½" stretched mesh codend liner, 20 stations once per month, April-October, 1972-present (standardized in 1989).	• Spanish mackerel: Incidental catch, average n=1/year, length data taken, age 0 • Spot: Targeted species, average n = 5,500/year, lengths taken, primarily age 0 collected, an index is produced for MD annual report • Spotted Seatrout: Secondary species, average n=60/year, lengths taken, primarily age 0, limited data for an index

MD DNR Coastal Bays Seine Survey, ¼" mesh beach seine, 19 stations once per month, June-September, 1972-present (standardized in 1989).	• Spanish mackerel: Not targeted or captured. • Spot: Targeted species, average n=2,150/year, lengths taken, age 0 collected, index developed for MD annual report • Spotted Seatrout: Secondary species, average n=6/year, lengths taken, age 0
VIMS Juvenile Fish and Blue Crab Trawl Survey, Chesapeake Bay and tributaries, multiple sites monthly, 1955-present (gear standardized in 1979).	• Spanish mackerel: very few captured (< 20 annually). • Spot: primarily age 0 collected (lengths measured). Could provide numbers for Age 1+. Will be adding weight measurements next year • Spotted seatrout: very few captured (<10 annually), excluded from last NC assessment (low n).
ChesMMAP Trawl Survey, main stem of the Chesapeake Bay in MD and VA, 3" codend mesh, 80-90 sites sampled per year across 5 cruises in March, May, July, September, and November, 2002-present.	• Spanish mackerel: Incidental catches only (<10 total for survey). • Spot: primarily ages 0-2 collected. Age, length, sex, weight collected. Important to continue. • Spotted seatrout: Incidental catches only very few (<10 for survey).
NC DMF Estuarine Trawl Survey (Program 120), statewide estuaries, otter trawl with 1/8" bar tailbag mesh, 105+ stations/year, May-June (and July since 2004), 1971-present (standardized in 1989).	• Spanish mackerel: insufficient numbers collected for use in last coastwide assessment. • Spot: One of numerous targeted species, collects primarily juvenile fish, but incidentally larger fish (11-306 mm TL), average annual sample size n=2,005, number, length & habitat information collected. possible juvenile index. • Spotted seatrout: One of numerous targeted species, collects primarily juvenile fish, but incidentally larger fish (12-412 mm TL) , average annual sample size n=50, number, length & habitat information collected. Excluded from NC stock assessment because survey values (low numbers) could not provide an informative abundance index. July data may be more promising, but limited timeline (2004-present).
NC DMF Red Drum Seine Survey (Program 123), 20 sites sampled every other week, September-November, 1992-present.	• Spanish mackerel: insufficient numbers collected for use in last coastwide assessment. • Spot: Not targeted species, but incidentally caught, collects primarily juvenile fish but incidentally larger fish (56-177 mm TL), average annual sample size n=771, length & habitat information collected. Probably not a juvenile or adult abundance index due to the low numbers and seasonality of sampling (Sept-Nov). • Spotted Seatrout: Not targeted species, but incidentally caught, collects primarily juvenile fish but incidentally larger fish (21-283 mm TL), average annual sample size n=26, length & habitat information collected. Excluded from NC stock assessment because survey values (low numbers) could not provide an informative abundance index.

NC DMF Pamlico Sound Survey (Program 195), Pamlico Sound and Pamlico, Neuse, and Pungo rivers, bottom trawl with 1 ½" stretched mesh codend, 52+ stations in June and September, 1987-present.	• Spanish mackerel: insufficient numbers collected for use in last coastwide assessment. • Spot: One of numerous targeted species, collects primarily juvenile fish, but incidentally larger fish (31-261 mm TL), average annual sample size n= 30,265, number, length & habitat information collected, possible juvenile abundance index. • Spotted Seatrout: One of numerous targeted species, collects primarily juvenile fish, but incidentally larger fish (77-332 mm TL), average annual sample size n=6, number, length & habitat information collected. Excluded from N.C. stock assessment because survey values (low numbers) could not provide an informative abundance index.
NC DMF Gill Net Survey (Program 915), Pamlico Sound and Neuse, Pamlico, & Pungo river systems, 3 to 6.5" stretched mesh, 64 samples/month, February-November, 2001-present in sound, 1998-2000 and 2003-present in rivers.	• Spanish mackerel: minimal age 1+ collected. • Spot: One of numerous targeted species, collects adult fish (65-376 mm TL), average annual sample size n=1,276, length, weight, age & habitat information collected, a good source for seasonal abundance, possible annual adult index. • Spotted Seatrout: One of numerous targeted species, collects adult fish (166-650 mm TL), average annual sample size n=109, length, weight, age, maturity, & habitat information collected. Nearly all of dead animals are aged. A good source for cohort abundance, possible annual adult index.
USC Baruch Institute zooplankton time series, North Inlet estuary, 365 micron mesh (half meter mouth area) epibenthic sled on subtidal channel bottom, daytime, mid ebb tows, biweekly 1981-present.	• Spanish mackerel: no data. • Spot: age 0 (larvae/postlarvae during winter-early spring ingress), abundance and environmental data. • Spotted seatrout: very limited data available.
SEAMAP-SA Near-shore Trawl Survey, shallow water (15-30 ft), Cape Hatteras to Cape Canaveral. 75' high-rise trawl, 1 7/8" stretch mesh body, 1 5/8" stretched mesh codend, 3 seasonal cruises in April-May, July, and October, 102 stations per season, 1989-2008. Renamed SEAMAP-SA Coastal Waters Survey. Number of stations increased to ~112, 2009 - present	• Spanish mackerel: ~average of 1,500 individuals/yr. Individual FL (cm) and species biomass/tow collected. Age 0-1 present, based on external analysis of specimens taken in the '90s. Used in coastwide Spanish mackerel assessment. • Spot: ~average of 72,000 individuals/yr. Individual CLFL (cm) and species biomass/tow collected. Primarily age 0 and 1 collected, based on age data collected in 2001. Histological data also collected in 2001. Recommended index for spot management triggers. • Spotted Seatrout: collected rarely.

SC DNR Trammel Net Survey, seven estuarine areas, 7" outer mesh and 2.5" inner mesh, 30 sites per month, 1991-present.	• Spanish mackerel: rarely collected • Spot: Average of 3,000 individuals /yr. Primarily age 0 & 1 collected, based on length (46-276 mm SL). • Spotted Seatrout: Average of 1,800 individuals/yr. Primarily ages 0 – 4, individuals up to age 7 collected; with a size range from 189-718 mm TL.
SC DNR Electroshock Survey, six estuarine areas further inshore than trammel net survey, 2001-present.	• Spanish mackerel: rarely collected • Spot: Average of 4,000 individuals/yr. Primarily age 0 collected, based on length (11-215 mm SL). • Spotted Seatrout: Average of 300 individuals/yr. Primarily age 0 collected; with a size range of 36-299 mm TL.
SCECAP – estuarine habitat quality survey of coastal SC. Trawl net: 18 foot footrope, 1.5" stretched mesh - 3/4" bar. April-May 2006 – present and July-August 1999-present. 30-60 stations per year.	• Spanish mackerel: rarely collected. • Spot: Average of individuals/yr collected in spring and individuals/yr collected in summer. Primarily age 0 and 1 collected, based on length. • Spotted Seatrout: occasionally collected.
GA DNR Marine Sportfish Population Health Survey, multi-gear (gill & trammel net), multi-region (northern & southern), multi-species survey. Gill net: 2.5" stretched mesh, 36+ sampling events/month, June – Aug. Trammel net: 14"/2.75" stretched mesh 300' x 7', 25+ sampling events/month, Sept - Nov. 2002 – present.	• Spanish mackerel: incidental catches only • Spot: - Gill net: 2009 *n*=82, targeted species, primarily adults, Age 1, Index created. 125-272 mm, x=213 mm - Trammel Net: 2009 *n*=96, targeted, primarily adults, Age 1, Index created. 138-245 mm, x=197 mm • Spotted Seatrout: - Gill Net: 2009 *n*=49, targeted species, mostly Age 1, Index created. 266-491mm, x=338 mm. - Trammel Net: *n*=70, targeted, mostly age 1, Index created. 263-449 mm, x=347mm.
GA DNR Ecological Monitoring Trawl Survey, Wassaw, Ossabaw, Sapelo, St. Simons, St. Andrew and Cumberland estuarine systems, 1 and 7/8" mesh, 36 stations monthly, 2003-present.	• Spanish mackerel: Incidental catch only • Spot: *n*=17,496, targeted, primarily YOY. Index created. 15-226 mm, x=135 mm • Spotted Seatrout: *n*=142, primarily YOY, 92-335 mm, x=182 mm

FL FWCC 21.3-m Center-Bag Seine Survey, multi-species survey targets juveniles in ≤1.8 m waters in Northern Indian River Lagoon (1990-present), and St. Johns River area (2001-present).	• Spanish mackerel: incidental catches of age 0 animals (<10 per year), lengths take • Spot: mostly age 0 collected (5,000 to 10,000 animals collected annually), lengths taken, potential to be used to develop YOY index • Spotted seatrout: mostly age 0 collected (700 to 1,200 animals collected annually), lengths taken, data used for YOY indices during Florida spotted seatrout assessments
FL FWCC 6.1-m Trawl Survey, multi-species survey targets juveniles & sub-adults in 1 – 7.6 m waters, in Northern Indian River Lagoon (1990-present), and St. Johns River area (2001-present).	• Spanish mackerel: not collected • Spot: age 0 collected (2,000 to 6,000 animals annually), lengths taken, survey has potential for development of YOY indices • Spotted seatrout: incidental catches (<100 animals annually) of several age classes (mostly age 0), lengths taken
FL FWC 183-m Haul Seine Survey, multi-species survey targets sub-adults and adults in ≤2.5 m waters in Northern Indian River Lagoon (1990-present), Southern Indian River Lagoon (1997-present), and St. Johns River area (2001-present).	• Spanish mackerel: incidental catches (<100 animals collected annually), lengths taken, a few late age 0 collected, but mostly age 1+ • Spot: late age 0 to 1+ collected (1,500 to 3,000 animals collected annually), lengths taken, animals could be culled for age/length relationship, abundance data have potential to be used in developing indices for ages 0 and 1, and possibly age 2 • Spotted seatrout: primarily age 1+ collected (400 to 600 animals collected annually), lengths and weight taken and subset of animals culled for age/growth and sex determination, age/length relationship and abundance data used in Florida spotted seatrout assessments

Table 18. Spot relative abundance indices recommended for inclusion in a spot management trigger by the Spot Plan Review Team.

If implemented, the trigger would prompt the South Atlantic State-Federal Fisheries Management Board to consider management action when the terminal values of two of the indices, at least one of which is from a fishery-independent data source, are equal to or below the data sets' 10th percentile. Yellow highlighting indicates a value below the 10th percentile based on data through 2009.

Year	Commercial Landings (pounds)	Recreational Landings (numbers)	Combined NMFS Survey Index	Combined SEAMAP Survey Index	MD Chesapeake Bay Seine Survey Index
1950	10,165,400				
1951	12,855,900				
1952	14,520,700				
1953	7,936,600				
1954	8,343,000				
1955	8,126,400				
1956	11,037,500				
1957	9,031,700				
1958	9,662,000				
1959	9,008,700				
1960	10,787,600				
1961	7,646,400				
1962	7,438,100				
1963	6,256,200				
1964	8,603,300				
1965	4,786,800				
1966	5,583,600				
1967	10,677,600				0.018
1968	5,895,800				0.596
1969	3,893,900				1.226
1970	9,749,100				0.084
1971	5,899,500				0.864
1972	11,169,500		15.22		1.160
1973	10,419,800		179.66		3.264
1974	10,028,000		137.25		2.297
1975	12,737,000		120.83		4.416
1976	5,461,600		372.89		3.195
1977	7,055,800		472.45		6.891
1978	9,541,925		351.89		3.360
1979	11,165,310		308.18		2.708
1980	10,215,973		354.89		2.529
1981	7,502,660	18,227,092	348.66		1.647
1982	10,440,456	14,119,411	81.70		2.254
1983	7,156,792	20,158,832	200.39		1.074
1984	5,899,725	6,678,762	292.18		3.428
1985	7,175,566	18,636,497	199.64		1.498
1986	6,965,468	13,097,985	278.66		1.766

Year	Commercial Landings (pounds)	Recreational Landings (numbers)	Combined NMFS Survey Index	Combined SEAMAP Survey Index	MD Chesapeake Bay Seine Survey Index
1987	8,100,794	9,994,920	163.70		1.174
1988	6,885,199	7,913,748	181.34		4.495
1989	7,052,068	9,022,104	389.98	325.07	0.697
1990	6,561,641	9,712,267	229.66	538.52	1.046
1991	7,176,842	14,137,171	205.50	599.44	0.809
1992	6,780,932	11,023,214	36.16	243.39	0.441
1993	7,315,749	9,413,956	19.64	129.69	1.425
1994	8,796,302	12,871,694	320.41	218.43	1.486
1995	7,821,606	8,311,446	50.70	364.65	0.096
1996	5,728,204	5,270,362	51.75	141.63	0.283
1997	6,572,247	6,351,489	45.77	203.49	1.343
1998	7,293,876	6,989,184	34.23	105.15	0.437
1999	5,589,301	3,653,547	112.59	79.77	0.607
2000	6,884,987	5,006,778	66.36	124.53	0.828
2001	6,770,063	7,285,279	13.20	177.56	0.367
2002	5,449,586	5,333,030	230.59	76.34	0.357
2003	5,808,772	9,273,502	70.77	345.02	0.306
2004	6,774,376	8,455,423	100.61	226.22	0.805
2005	5,122,037	8,888,119	356.43	438.98	3.485
2006	3,193,544	11,095,917	174.77	276.99	0.342
2007	5,637,154	15,919,835	227.66	75.70	0.609
2008	2,863,714	12,489,855	279.41	183.92	0.867
2009	4,456,467	7,584,109	114.71	216.67	0.443

Trigger Value	**5,416,831**	**5,320,496**	**35.58**	**79.77**	**0.313**