Regulatory Amendment 16

to the Fishery Management Plan for the
Snapper Grouper Fishery of the South Atlantic Region

Changes to the Seasonal Closure for the Black Sea Bass Pot Sector

Including an Draft Environmental Impact Statement

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Abbreviations and Acronyms Used in the FMP

ABC	acceptable biological catch
ACL	annual catch limits
AM	accountability measures
ACT	annual catch target
B	a measure of stock biomass in either weight or other appropriate unit
B_{MSY}	the stock biomass expected to exist under equilibrium conditions when fishing at F_{MSY}
B_{OY}	the stock biomass expected to exist under equilibrium conditions when fishing at F_{OY}
B_{CURR}	The current stock biomass
CPUE	catch per unit effort
DEIS	draft environmental impact statement
EA	environmental assessment
EEZ	exclusive economic zone
EFH	essential fish habitat
F	a measure of the instantaneous rate of fishing mortality
$F_{30\%SPR}$	fishing mortality that will produce a static SPR = 30%
F_{CURR}	the current instantaneous rate of fishing mortality
F_{MSY}	the rate of fishing mortality expected to achieve MSY under equilibrium conditions and a corresponding biomass of B_{MSY}
F_{OY}	the rate of fishing mortality expected to achieve OY under equilibrium conditions and a corresponding biomass of B_{OY}
FEIS	final environmental impact statement
FMP	fishery management plan
FMU	fishery management unit
M	natural mortality rate
MARMAP	Marine Resources Monitoring Assessment and Prediction Program
MFMT	maximum fishing mortality threshold
MMPA	Marine Mammal Protection Act
MRFSS	Marine Recreational Fisheries Statistics Survey
MRIP	Marine Recreational Information Program
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OFL	overfishing limit
OY	optimum yield
RIR	regulatory impact review
SAFMC	South Atlantic Fishery Management Council
SEDAR	Southeast Data Assessment and Review
SEFSC	Southeast Fisheries Science Center
SERO	Southeast Regional Office
SIA	social impact assessment
SPR	spawning potential ratio
SSC	Scientific and Statistical Committee

Regulatory Amendment 16 to the Fishery Management Plan for the Atlantic Snapper Grouper Fishery of the South Atlantic Region

Including a Draft Environmental Impact Statement (EIS)

Abstract: This Draft EIS is prepared pursuant to the National Environmental Policy Act to assess the environmental impacts associated with a regulatory action. The Draft EIS analyzes the impacts of a reasonable range of alternatives intended to evaluate modifying the annual November 1 through April 30 prohibition on the use of black sea bass pot gear and enhance current gear marking requirements for black sea bass pots.

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Summary

Background

A 2003 stock assessment concluded that black sea bass were overfished and undergoing overfishing. In response to the stock assessment and to end overfishing, the allowable harvest of black sea bass was reduced beginning in 2006, and the fishing year was changed from January 1 through December 31 to June 1 through May 31. To reduce overcapacity, measures were implemented in 2012 to limit participation through a black sea bass endorsement program and restrict the number of pots that could be fished. In 2013, a stock assessment concluded that the black sea bass stock in the South Atlantic is not undergoing overfishing, is not overfished, and is rebuilt. In response to the stock assessment, the South Atlantic Fishery Management Council's (Council) Scientific and Statistical Committee (SSC), at their April 2013 meeting, recommended an increase to the acceptable biological catch (ABC) for black sea bass. The increase in the ABC allowed the commercial and recreational annual catch limits (ACL) to increase. The Council and the National Marine Fisheries Service (NMFS,) through Regulatory Amendment 19 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) (SAFMC 2013), modified the ABC, ACLs, recreational annual catch target (ACT), and optimum yield (OY) for the black sea bass stock.

November 1 through April 30 is when endangered whales are present in the South Atlantic. Prior to the increase to the commercial ACL, the trap/pot sector had not fished later than November 1 since the 2009/2010 season, because the smaller ACL was always harvested by that time. Modeling by NMFS indicated the increased commercial ACL, implemented via Regulatory Amendment 19 in 2013, would likely extended fishing activity with black sea bass pot gear past November 1. There is a potential for black sea bass pot gear to entangle endangered large whales. The possibility that pots might be fished past November 1, resulted in the Council and NMFS implementing a prohibition on the use of black sea bass pot gear from November 1 through April 30 each year, beginning in 2013. This allowed the ACL increase to be implemented quickly, while protecting the endangered whales. Additionally, in December 2014 Regulatory Amendment 14 changed the commercial black sea bass fishing year back to January 1 through December 31 each year. The change of the fishing year also increased the chances black sea bass pots would be in the water when Endangered Species Act (ESA)-listed whales, particularly North Atlantic right whales, are migrating through and calving in the South Atlantic.

Without the prohibition on the use of black sea bass pots during the large whale migration and right whale calving season, a re-initiation of formal consultation for the snapper grouper fishery would have been necessary under the ESA prior to the implementation of Regulatory Amendment 19. Formal ESA consultation would have required development of a biological opinion to evaluate the effects of the snapper grouper fishery including black sea bass pot gear on ESA listed species. Those analyses would not have been completed in time to allow the ACL increases to be implemented for the beginning of the 2013-2014 fishing season, which began on June 1. The black sea bass pot prohibition was a precautionary step taken by the Council and NMFS to allow the black sea bass ACL to increase in the 2013-2014 fishing year, while preventing potential entanglements with ESA-listed whales until a comprehensive Environmental Impact Statement and Biological Opinion could be completed.

Through Regulatory Amendment 16, the Council and NMFS are reconsidering the annual November 1 through April 30 prohibition on the use of black sea bass pot gear. Fishery managers are considering adjustments to both the geographical and temporal boundaries of the prohibition to improve socio-economic benefits to black sea bass pot endorsement holders while maintaining protection for ESA-listed whales in the South Atlantic region. During the scoping process for Regulatory Amendment 16, fishermen reported that fishing for black sea bass during winter months is important to them and claim that the fish migrate southward and are generally found closer to shore making them easier to harvest. Fishermen have also reported this time period is important due to the coloration of the fish. Fish tend to be a lot darker during winter months, which commands a higher price on the market.

History of Management of the Black Sea Bass Pot Sector

The black sea bass portion of the snapper grouper fishery has been managed under the Snapper Grouper FMP since the plan was first established in 1983. **Table S-1** shows the actions implemented from 1983 through 2013 that have affected the black sea bass pot sector.

Table S-1. History of **Council** management of the black sea bass pot sector.

Date	Document	Action
8/31/83	Original FMP	8" size limit
1/1/92	Amendment 1	Prohibit black sea bass pots south of Cape Canaveral
8/31/92	Emergency Rule	Modified definition of black sea bass pots Allowed multigear trips for black sea bass Retention of bycatch in the black sea bass fishery
2/24/99	Amendment 9	10" total length size limit Require escape vents and degradable fasteners
12/2/99	Amendment 11	Set overfished level at 3.72 million pounds
10/23/06	Amendment 13c	Commercial step-down in ACL from 477,000 pounds gutted weight (lbs gw) in 2006 to 309,000 lbs gw in 2008 Require 2" mesh on pots Change fishing year to June through May
7/1/12	Amendment 18a	Reduced participation to 32 endorsements 1,000 lbs gw (1,180 pounds whole weight [lbs ww)] commercial trip limit Maximum of 35 pots per vessel Increased size limit to 11" inches total length Pots must be brought to shore at the conclusion of a trip
9/23/13 10/23/13	Reg Amend 19 Reg Amend 19	Increase commercial ACL from 309,000 to 780,020 lbs ww Pot closure from 11/1 through 4/30
12/8/14	Reg Amend 14	Commercial fishing year changed to January - December Hook and line trip limit is 300 lbs gw November 1 - April 30

The Black Sea Bass Pot Sector Since the 2006 Biological Opinion

Snapper Grouper Amendment 13C in 2006 greatly stepped down the commercial ACL for black sea bass, the majority of which is taken in the pot fishery. Two additional amendments, 18A and Regulatory Amendment 19 further affected commercial fishing for black sea bass, but in very different ways.

Amendment 18A saw the implementation of required endorsements to participate in the pot fishery. Thirty-two endorsements were issued. For the first time, there was a commercial trip limit of 1,000 lbs gw (1,180 lbs ww) for the pot fishery. Participants in the fishery were limited to no more than 35 pots per vessel, whereas some were fishing as many as 150 pots. Leaving black sea bass pots to soak unattended was prohibited, as pots were required to be brought back at the end of each trip. The size limit for commercial black sea bass was also increased from 10 to 11 inches total length.

While Amendment 18A generally limited participation and reduced gear presence in the water, Regulatory Amendment 19 increased the commercial ACL from 309,000 to 780,020 lbs ww. Because of the limitations put into place in Amendment 18A, the commercial black sea bass pot fishery season is expected to last much longer than it has in recent years.

All of these changes taken together with those proposed in Regulatory Amendment 16 makes it difficult to predict how fishery participants would modify their behavior in response to new management measures, and in turn, the economic effects in response to the alternatives proposed in Regulatory Amendment 16. Because of the uncertainty, multiple scenarios must be considered where appropriate when estimating economic effects of potential management changes.

Regulatory Amendment 16 considers alternatives to allow pot fishing during all or part of the November 1 through April 30 closed season, in some areas. Selection of any alternative other than **Alternative 1 (No Action)** for **Action 1**, is expected to result in development of a new Biological Opinion (BiOp) for the snapper grouper fishery.

As discussed above, Amendment 18A and Regulatory Amendment 19, as well as other factors such as the general downturn in the economy, greatly changed the black sea bass pot fishery since the 2006 BiOp was published. The 2006 BiOp evaluated the impacts to ESA-listed species, following the Council's development of Snapper Grouper Amendment 13C. The 2006 BiOp assessed potential impacts from the snapper grouper fishery, including management actions for the harvest of snowy grouper, golden tilefish, vermilion snapper, red porgy, and black sea bass.

Table S-2 shows a few of the characteristics of the black sea bass pot fishery. Since the 2006 BiOp went into effect on June 7th of that year, the characteristics for 2006 are split for pre and post 2006 BiOp. While trips and pounds landed are additive for 2006, the number of vessels participating in the fishery are not because many of the vessels that participated in the fishery in the first part of the year also participated in the second part of the fishing year.

Since the 2006 BiOp, the average annual number of vessels participating in the black sea bass pot fishery has been reduced from 54 to 42 (22%) and the average number of trips has been reduced from 822 to 412 (50%). The changes were due largely to Amendment 13C that reduced the overall quota for black sea bass.

Table S-2. Black sea bass pot **sector** characteristics, 2002 through 2014.

	Year (June 1st through May 31st)	Vessels	Trips	Landings (lb gw)
Pre-2006 BiOp	1996-1997	86	1276	609,424
	1997-1998	77	1258	525,920
	1998-1999	70	1277	633,987
	1999-2000	64	808	344,906
	2000-2001	61	903	430,008
	2001-2002	58	1082	423,902
	2002-2003	48	693	308,005
	2003-2004	52	878	591,403
	2004-2005	47	732	458,264
	2005-2006	47	658	298,782
	2006-2007	55	739	409,162
Post-2006 BiOp	2007-2008	49	556	279,888
	2008-2009	56	562	346,765
	2009-2010	41	434	288,059
	2010-2011	52	406	345,118
	2011-2012	40	235	260,464
	2012-2013	26	322	213,509
	2013-2014	27	366	223,633
Averages	1999-2006	54	822	407,896
	2007-2014	42	412	279,634

Source: SEFSC Logbook data (Apr 2015)
Note: Landings from 2006 are excluded from Averages calculated for both Pre and Post 2006 Biological Opinion. Also, the landings in the year column are from June 1st through May 31st in order to retain a consistent time series for comparison purposes. Please note that the black sea bass fishing years for the commercial and recreational sectors prior to October 23, 2006, began on January 1st. On that date, the fishing years were changed to begin June 1st. On December 8, 2014, the fishing years were changed to begin on January 1st and April 1st for the commercial and recreational sectors, respectively.

Purpose for Action

The purpose of Regulatory Amendment 16 is to reevaluate the annual November 1 through April 30 prohibition on the use of black sea bass pot gear and enhance buoy line/weak link gear requirements and buoy line rope marking for black sea bass pots required by the Atlantic Large Whale Take Reduction Plan.

Need for Action

The need for the amendment is to reduce the adverse socioeconomic impacts resulting from the annual November 1 through April 30 prohibition on the use of black sea bass pot gear and increase the flexibility of black sea bass pot endorsement holders to fish with this gear while continuing to protect ESA-listed whales in the South Atlantic region; and reduce the adverse effects on whales if entangled and help identify black sea bass pot lines used in the South Atlantic.

Proposed Actions

Note: All tables and figures for the alternatives are in Chapter 2.

Action 1. Modify the annual November 1 through April 30 prohibition on the use of black sea bass pot gear

There are many alternatives and sub-alternatives under **Action 1**. The Council's intent is to modify the current prohibition to allow the entire commercial black sea bass portion of the snapper grouper fishery (all gear) to open beginning January 1 each year and have it last as long as possible before reaching the ACL and closing prior to December 31. The Council is also factoring in the need to protect critically endangered North Atlantic Right Whales (NARW) that migrate through South Atlantic waters and calve in the South Atlantic roughly during the November through April time-frame. To meet these two objectives, the Council is considering various time frames, water depths, and locations for allowing or not allowing black sea bass pot gear to be in the waters managed by the Council, so as to reduce as much as possible, the potential for interactions between NARWs and black sea bass pot gear. Each of the alternatives and sub-alternatives of **Action 1** manipulate timing and location/depth of prohibited fishing areas to maximize fishing opportunity and protection for whales.

Alternative 1 (No Action). Retention, possession, and fishing for black sea bass is prohibited using black sea bass pot gear, annually, from November 1 through April 30 where black sea bass is managed in the South Atlantic EEZ (south of Cape Hatteras, NC).

The following provisions currently exist that may reduce entanglements of black sea bass pot gear and whales listed under the Endangered Species Act. The South Atlantic Fishery Management Council does not intend to change these provisions through this amendment.

Amendment 18A to the Snapper Grouper Fishery Management Plan of the South Atlantic Region (SAFMC 2012a):

- Established an endorsement program that capped the number of vessels utilizing pot gear at 32;
- Limited the number of pots per vessel to 35;
- Required that pots be brought back to shore after each trip; and
- Established a commercial trip limit of 1,000 lbs gw.

See **Table 1.8.1** in Regulatory Amendment 16 for measures mandated through the Atlantic Large Whale Take Reduction Plan.

Alternative 2. The black sea bass pot closure applies to the area currently designated as North Atlantic right whale critical habitat **(Figure 2.1.2)**. North Atlantic right whale critical habitat encompasses waters between 31° 15'N, (approximately the mouth of the Altamaha River, Georgia) and 30° 15'N (approximately Jacksonville, Florida) from the shoreline out to 15 nautical miles offshore; and the waters between 30° 15'N and 28 °00'N, (approximately Sebastian Inlet, Florida) from the shoreline out to 5 nautical miles. The closure applies to the area annually from November 15 through April 15.

This area represents North Atlantic right whale critical habitat in the South Atlantic region designated on June 3, 1994. The map below provides location of the critical habitat boundary. The critical habitat designation did not provide waypoints for the boundary. The boundary and area in Alternative 2 would not automatically change if the boundary for the right whale critical habitat were to change. North Atlantic right whale critical habitat is currently undergoing a revision based on more current data. On February 20, 2015, NMFS proposed an expansion of the critical habitat area (80 FR 9314).

The following is language describing the North Atlantic right whale critical habitat area from 50 CFR 226.203(c):

> *Southeastern United States: The coastal waters between 31°15′ N and 30°15′ N from the coast out 15 nautical miles; and the coastal waters between 30°15′ N and 28°00' N from the coast out 5 nautical miles (Figure 8 to part 226).*

Note: Federal regulations for **Alternative 2** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations within state waters.

Alternative 3. The black sea bass pot closure applies to waters inshore of points 1-15 listed below **(Table 2.1.1)**; approximately Ponce Inlet, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.3)**. The closure applies to the area annually from November 1 through April 30.

This area likely represents North Atlantic right whale calving habitat. The area identified from Cape Fear, North Carolina, southward to 29°N (approximately Ponce Inlet, Florida) is based on model outputs (i.e., Garrison 2007, Keller et al. 2012, Good 2008). The area from Cape Fear, North Carolina, to Cape Hatteras, North Carolina, is an extrapolation of those model outputs and based on sea surface temperatures and bathymetry.

Note: Federal regulations for **Alternative 3** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations within state waters.

Alternative 4. The black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.2)**; approximately Cape Canaveral, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.4)**. The closure applies to the area annually from November 1 through April 30.

This area generally represents waters 25 m or shallower from 28° 21 N (approximately Cape Canaveral, Florida) to Savannah, Georgia; from the Georgia/South Carolina border to Cape Hatteras, North Carolina, the closure applies to waters under Council management that are 30 m or shallower. This bathymetric area is based on right whale sightings (all demographic segments) and sightings per unit of effort (proxy of density) by depth and captures 97% and 96% of right whale sightings off the North Carolina/South Carolina area, and Florida/Georgia area, respectively. The map below provides an approximate location of the proposed boundary.

Note: Federal regulations for **Alternative 4** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations within state waters.

Alternative 5. The black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.3)**; approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.5)**. The closure applies to the area annually from November 1 through April 30.

This area is based on joint comments received from non-government organizations (dated January 3, 2014) in response to NMFS' December 4, 2013, *Federal Register* Notice of Intent to Prepare this Draft Environmental Impact Statement (DEIS) (78 FR 72868). The non-government organizations proposed the area as a reasonable alternative for consideration. The area, also included in a Center for Biological Diversity et al. petition in 2009 for right whale critical habitat, is off the coasts of Georgia and Florida and based on calving right whale habitat modeling work of Garrison (2007) and Keller et al. (2012). This area represents the 75th percentile of sightings (91% of historical sightings included in their study) off Florida and Georgia (Garrison 2007 and Keller et al. 2012). Off the coasts of North Carolina and South Carolina, the closure extends from the start of the EEZ to 30 nautical miles offshore. The map below provides approximate location of proposed boundary.

Note: Federal regulations for **Alternative 5**would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations within state waters.

Alternative 6. The black sea bass pot closure applies to waters inshore of points 1-20 listed below **(Table 2.1.4)**; approximately Sebastian, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.6)**. The closure applies to the area annually from November 1 through April 30.

This area is also based on joint comments received from a number of environmental groups (dated January 3, 2014) in response to NMFS' December 4, 2013, *Federal*

Register Notice of Intent to Prepare this DEIS (78 FR 72868). The environmental groups proposed the area as a reasonable alternative for consideration. This area represents an existing management area, the Southeast Seasonal Gillnet Restricted Area, under the Atlantic Large Whale Take Reduction Plan; and an additional area off North Carolina. The area off North Carolina includes waters shallower than 30 meters and is northward of the designated ALWTRP Southeast Restricted Area.

Note: Federal regulations for **Alternative 6** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations within state waters.

Alternative 7. The black sea bass pot closure applies to the area currently designated as North Atlantic right whale critical habitat, in addition to waters inshore of points 1-29 listed below **(Table 2.1.5)**; approximately North of the Altamaha River, Georgia, to Cape Hatteras, North Carolina **(Figure 2.1.7)**.

Sub-alternative 7a. The black sea bass pot closure applies to the area annually from November 1 through December 15 and March 15 through April 30.

Sub-alternative 7b. For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and March 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

Sub-alternative 7c. For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

This area represents existing North Atlantic right whale critical habitat in the South Atlantic region designated on June 3, 1994. North Atlantic right whale critical habitat is currently undergoing a revision based on more current data. Proposed changes are published at: 80 FR 9314 (Feb. 20, 2015).. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 25 meters. The eastern boundary of the closure between these two areas was formed by drawing a straight line from the southeastern corner waypoint of the northern portion (NC/SC) to the northeastern corner waypoint of the southern section (FL/GA).

The following is language describing the North Atlantic right whale critical habitat area from 50 CFR 226(c):

> *Southeastern United States: The coastal waters between 31°15′ N and 30°15′ N from the coast out 15 nautical miles; and the coastal waters between 30°15′ N and 28°00’ N from the coast out 5 nautical miles (Figure 8 to part 226).*

Note: Federal regulations for **Alternative 7** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations for the portion of the area within state waters.

Alternative 8. The black sea bass pot closure applies to waters inshore of points 1-35 listed below **(Table 2.1.6)**; approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.8)**.

> **Sub-alternative 8a.** The black sea bass pot closure applies to the area annually from November 1 through April 15.
>
> **Sub-alternative 8b.** For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

In **Alternative 8**, the boundaries off Florida and Georgia are identical to the boundaries in **Alternative 5**. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 25 meters.

Note: Federal regulations for **Alternative 8** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations for the portion of the area within state waters.

Alternative 9. The black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.7)**; approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.9)**.

> **Sub-alternative 9a.** The black sea bass pot closure applies to the area annually from November 1 through April 15.
>
> **Sub-alternative 9b.** For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

In **Alternative 9**, the boundaries off Florida and Georgia are identical to the boundaries in **Alternative 5**. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 20 meters.

Note: Federal regulations for **Alternative 9** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations for the portion of the area within state waters.

Alternative 10. From November 1 through December 15, the black sea bass pot closure applies to waters inshore of points 1-20 listed below **(Table 2.1.8)**, approximately Georgia/South Carolina State Line, to Cape Hatteras, North Carolina **(Figure 2.1.10).**

From February 15 through April 30, the black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.9)**, approximately Georgia/South Carolina State Line, to Cape Hatteras, North Carolina **(Figure 2.1.11).**

From December 16 through February 14, there would be no closure off of the Carolinas.

From November 15 through April 15, the black sea bass pot closure applies to waters inshore of points 20-28 listed below **(Table 2.1.8)**, approximately Georgia/South Carolina State Line, to approximately Daytona Beach, Florida **(Figure 2.1.10).**

Note: In **Alternative 10**, the boundaries off Florida and Georgia are identical to the boundaries in **Alternative 5**. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 20 meters from November 1 through December 15 and 25 meters from February 15 through April 30.

Note: Federal regulations for **Alternative 10** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations for the portion of the area within state waters.

Preferred Alternative 11. From November 1 through 30 and from April 1 through 30 each year, the black sea bass pot closure applies to waters inshore of points 1-35 listed in **Table 2.1.6**; approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.8)**. From December 1 through March 31, the black sea bass pot closure applies to waters inshore of points 1-28 listed below **Table 2.1.2**; approximately Cape Canaveral, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.4)**.

From November 1 through 30 and from April 1 through 30 each year, the boundaries off Florida and Georgia are identical to the boundaries in **Alternative 5**. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 25 meters, corresponding with **Alternative 8**.

From December 1 through March 31, this area generally represents waters 25 m or shallower from 28° 21' N (approximately Cape Canaveral, Florida) to Savannah, Georgia; from the Georgia/South Carolina border to Cape Hatteras, North Carolina, the closure applies to waters under Council management that are 30 m or shallower and corresponds with **Alternative 4**. This bathymetric area is based on right whale sightings (all demographic segments) and sightings per unit of effort (proxy of density) by depth and captures 97% and 96% of right whale sightings off the North Carolina/South Carolina area, and Florida/Georgia area, respectively. The maps in Figures 2.1.7 and 2.1.3 provide an approximate location of the proposed boundaries.

Note: Federal regulations for **Alternative 11** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations within state waters.

Alternative 12. From November 1 through April 30, the black sea bass pot closure applies to waters inshore of points 1-31 listed below **(Table 2.1.10)**; approximately Cape Canaveral, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.12)**.

This closure approximates the midpoints between proposed closure **Alternative 4** and **Sub-Alternative 8a**.

Note: Federal regulations for **Alternative 12** would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement consistent regulations within state waters.

Biological Effects:

Black Sea Bass

Regardless of which alternative the Council chooses, no biological impacts to the black sea bass stock are expected. Adverse effects are prevented because the overall harvest in the commercial sector is currently limited to the commercial ACL by the commercial accountability measures, (AMs) and the ACL is reduced from the overfishing level as required to address assessment uncertainty. In addition, there is no evidence to suggest that changing the timing of harvest within the periods covered by the alternatives would have adverse biological impacts. These alternatives offer no advantages to the black sea bass stock in terms of further reduced harvest because it is estimated that 97-100% of the ACL would be taken (**Table S-3**). Therefore, there is no difference in the biological effects on black sea bass expected to occur from the alternatives.

The expected closure date ranges and the estimated percent of the commercial black sea bass ACL expected to be harvested are shown in **Table S-3**. The ranges of closing dates and expected percentages of the commercial ACL that would be landed are due to different scenarios considered in the analyses (SERO-LAPP-2015-09; included as **Appendix N**). The scenarios considered various combinations of the spatial distribution of landings and effort, and factors that affected catch rate projections.

Table S-3. Expected ACL closure dates for the commercial black sea bass fishery with a January 1 fishing year start date.

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 1	No Closure	No Closure	No Closure	No Closure
Alternative 2	10/2	8/4	10/26 - 11/4	11/19 - 12/3
Alternative 3	11/26 - 12/5	10/4 - 10/17	10/26 - 11/4	11/19 - 12/3
Alternative 4	12/20 - 12/30	12/7 - 12/22	12/11 - 12/18	12/19 - 12/30
Alternative 5	12/16 - 12/24	12/1 - 12/11	12/6 - 12/11	12/15 - 12/23
Alternative 6	12/20 - NC*	12/7 - 12/25	12/10 - 12/20	12/19 - NC
Sub-Alternative 7a	10/11 - 10/12	8/18 - 8/20	10/6 - 10/9	10/7 - -10/9
Sub-Alternative 7b	12/28 - NC	12/18 - 12/30	12/17 - 12/21	12/28 - NC
Sub-Alternative 7c	12/22 - 12/28	12/9 - 12/17	12/11 - 12/14	12/23 - 12/29
Sub-Alternative 8a	12/6 - 12/11	10/14 - 10/25	10/29 - 11/5	12/5 - 12/9
Sub-Alternative 8b	12/29 - NC	12/20 - 12/30	12/18 - 12/21	12/29 - NC
Sub-Alternative 9a	10/28 - 11/9	9/15 - 9/27	10/13 - 10/19	10/24 - 11/3
Sub-Alternative 9b	12/26 - NC	12/15 - 12/28	12/14 - 12/20	12/26 - NC
Alternative 10	12/27 - NC	12/17 - 12/29	12/16 - 12/20	12/28 - NC
Preferred Alternative 11	12/18 – 12/28	12/3 -12/18	12/6 – 12/13	12/17 – 12/27
Alternative 12	12/15 – 12/23	11/21 – 12/10	12/5 – 12/11	12/14 – 12/22

* NC = No Closure

Source: **Appendix N; Appendix R**

Protected Resources

The potential for serious injury or mortality to North Atlantic right whales should be considered for management measures in the black sea bass pot sector because right whales may be found in the Council's jurisdiction from November 1 through April 30 (NMFS 2008). The bulk of the black sea bass pot sector effort traditionally operated from November to April. Since 2010, the black sea bass pot sector has not opened during this time period due to ACL closures (2010, 2011, and 2012) or by regulation (2013 to present). A regulatory closure of the pot sector from November 1 through April 30 was implemented in 2013, via Regulatory Amendment 19. The regulatory closure was implemented to protect endangered right whales and allow a rapid regulatory increase in the ACL. Had the regulatory closure not been implemented, the potential for black sea bass pot gear interactions with right whales would have increased, requiring re-initiation of formal ESA consultation, which would have delayed the ACL increase.

Prior to these ACL and regulatory closures, restrictions were implemented via Amendment 18A, effective in 2012, to prevent AMs from being triggered early each fishing season, and associated negative social and economic impacts. The Council determined action needed to be taken to modify the current rebuilding strategy including the ABC, ACL, and AMs, reduce participation and effort in the black sea bass pot segment of the snapper grouper fishery, and adjust the current system of accountability in the recreational sector. Specifically, the Council established a maximum of 35 pots per fishermen, and required that pots must be removed from the water when the trip is completed, and an endorsement to limit the number of fishermen (32 fishermen) that could use pots to harvest black sea bass. Since these restrictions were enacted, the average number of pots in the water per day is 75 for all endorsement holders combined, with a maximum reported number of pots fished on a day of 278; the total pots fished cannot exceed 1,120 pots (32 fishermen times 35 pots) in the South Atlantic (SAFMC 2014). While not the purpose of the Amendment 18A, many requirements it implemented likely have some ancillary biological benefits to North Atlantic right whales. However, the most notable large whale entanglement risk reduction measure in the Council's commercial black sea bass pot sector is that the black sea bass fishing season has not co-occurred with the right whale season for the last several years (July 16, 2013; 78 FR 42654).

The alternatives under consideration differ substantially in their potential biological effects on ESA-listed large whales. The comparison of alternatives below is based primarily on the analysis in SERO-LAPP-2014-09 as shown in **Table S-4**. The analysis simulated the potential landings of black sea bass pot endorsement holders during a winter season for **Alternatives 1** through **12**. Factoring in landings by other gear, the date the ACL would be met under each scenario was predicted. The analysis also considers overlays of the co-occurrence of the seasonal distribution of black sea bass pot gear and North Atlantic right whales as a proxy for the relative risk of right whale entanglements under each of the proposed alternatives. Overlaying distributions of right whales with fisheries/ships/etc. is an established way of evaluating risk from activities of interest (NMFS 2014, Redfern et al. 2013). Due to differences in right whale sampling protocols and data availability, separate models that overlayed right whale and black sea bass fishing effort were generated for two regions; North Carolina and South Carolina to Florida. The resulting analysis estimated the relative risk of entanglement for a given alternative in those two regions.

Table S-4. Ranked projected risk of right whale entanglement in pot gear vertical lines (in relative risk units; RRU) under proposed Alternatives in Regulatory Amendment 16. The lowest projected relative risk is labeled as "most protective", while the highest projected relative risk is labeled as "least protective". Alternative 1 is the no action alternative.

NARW Protection	Alternative
Most Protective	**Alternative 1:** no relative risk of entanglement (0 RRU)
	Alternative 6: low increase in relative risk off NC (+2-8 RRU); no additional risk off FL-SC (0 RRU).
	Alternative 4: low increase in relative risk off NC (+2-8 RRU); low increase in relative risk off FL-SC (+0-3 RRU).
	Alternative 11 : low increase in relative risk off NC (+3-15 RRU); low risk off FL-SC (+2-9 RRU)
	Alternative 12 : low increase in relative risk off NC (+2-15 RRU); low risk off FL-SC (+0-13 RRU)
	Alternative 5: low increase in relative risk off NC (+1-2 RRU); low to high increase in relative risk off FL-SC (+11-58 RRU).
	Alternative 3: low to moderate increase in relative risk off NC (+10-26 RRU); low to high increase in relative risk off FL-SC (+16-52 RRU).
	Alternative 8a: low to moderate increase in relative risk off NC (+13-36 RRU); low to high increase in relative risk off FL-SC (+13-64 RRU).
	Alternative 9a: moderate to high increase in relative risk off NC (+26-51 RRU); moderate to high increase in relative risk off FL-SC (+30-72 RRU).
	Alternative 7a: high increase in relative risk off NC (+69-74 RRU); very high increase in relative risk off FL-SC (+77-96 RRU).
	Alternative 8b: high increase in relative risk off NC (+51-68 RRU); high to very high increase in relative risk off FL-SC (+61-89 RRU).
	Alternative 10: high to very high increase in relative risk off NC (+55-75 RRU); high to very high increase in relative risk off FL-SC (+62-89 RRU).
	Alternative 9b: high to very high increase in relative risk off NC (+61-87 RRU); high to very high increase in relative risk off FL-SC (+67-94 RRU).
	Alternative 7c: high to very high increase in relative risk off NC (+75-97 RRU) and off FL-SC (+67-100 RRU).
	Alternative 7b: very high increase in relative risk off NC (+77-89 RRU); high to very high increase in relative risk off FL-SC (+70-106 RRU).
Least Protective	**Alternative 2:** very high increase in relative risk off NC (+100 RRU over status quo) and off FL-SC (+100 RRU).
Risk Classification	1-25 RRU = low, 26-50 RRU = moderate, 51-75 RRU= high, 76-100+ RRU = very high

Economic Effects:

The commercial black sea bass sector was closed prior to the end of the fishing year in 2008/2009, on May 15, 2009, when the commercial ACL was met. Prior to that season, the sector operated without closures. **Figure S-1** shows the average percent of total annual commercial black sea bass landings by month from June 2000 through May 2009, the most recent seasons prior to years when there were ACL-related closures. When operating without closures, the months of June through September saw the fewest commercial landings of black sea bass, ranging from 2-4% each month, while landings tended to increase in November with an average of 11% of the landings. However, fall through spring months saw the highest percentage of annual landings. Highest average annual percentage of total landings occurred in December and January at approximately 18% in each month.

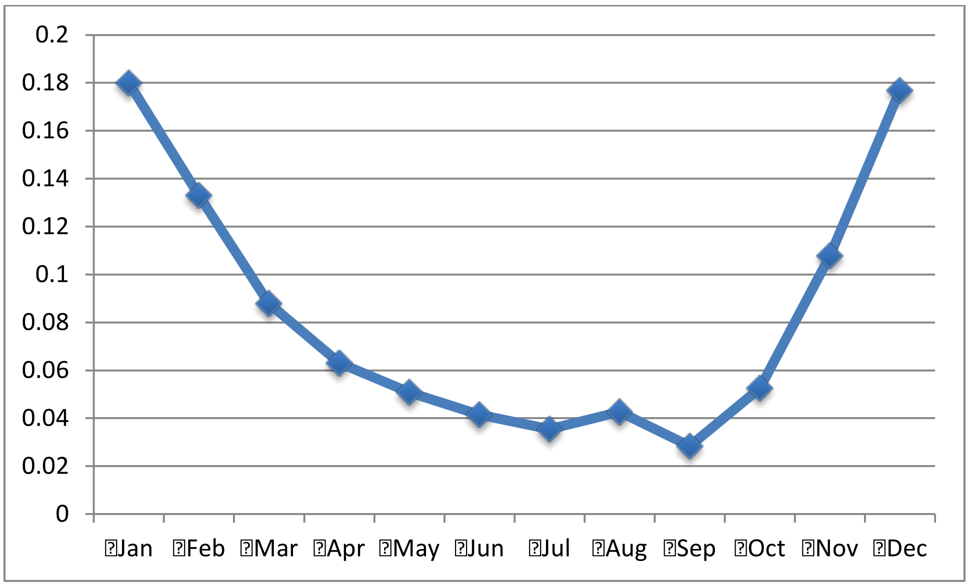

Figure S-1. Percent of average annual commercial black sea bass landings by month from June 2000 through May 2009.
Source: SEFSC/SSRG Economic Panel Data

Expected dockside revenue of the commercial black sea bass portion of the snapper grouper fishery

This analysis of the expected ex-vessel revenue of the alternatives and applied scenarios assumes that consumer demand for black sea bass would at least remain constant regardless of when the fish would be landed. At the very least, demand for black sea bass is assumed to be at the same level as in those years when no closures were in effect.

An expected closure date alone does not give the best estimate of expected value because the price per pound changes from month to month and is influenced also by which gear is being used at the time. The highest expected ex-vessel value will come when the expected landings are highest in months with the highest price per pound. Various estimates of average monthly price per pound, daily expected catch rates, and anticipated closure dates were used to calculate estimated annual dockside values for black sea bass. Estimates are shown for the four catch rate scenarios used in the SERO-LAPP-2014-09 (**Appendix Q**) analysis and are based on the assumption that spatial location of gear in future years would mirror the average of the 2006/2007 through 2008/2009 fishing seasons where there was no closure in the commercial black sea bass season. **Table S-5** shows the differences in expected dockside values for **Alternative 1 (No Action)** subtracted from each of the **Alternatives 2 – 12** for all four catch rate scenarios based on monthly price per pound calculations for two different time series, 2000 – 2013 landings and 2011 – 2013 landings.

Table S-5. Expected difference in dockside value of commercial black sea bass under the alternatives of **Action 1** compared to **Alternative 1 (No Action)** using two price per pound estimates, the four different catch rate scenarios **(Appendix N)**, and estimations of spatial locations of gear based on the 2006/2007 through 2008/2009 fishing seasons (Scenario C; **Appendix N**).

	Price/lb years	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 2	2000-2013	$59,900	$51,900	$59,696	$59,656
	2011-2013	$17,472	$52,095	$48,858	$20,799
Alternative 3	2000-2013	$50,327	-$44,743	-$10,705	-$20,224
	2011-2013	$55,841	-$101,647	-$50,780	-$77,134
Alternative 4	2000-2013	$48,879	$50,540	$45,996	$48,611
	2011-2013	$54,686	$34,589	$46,828	$52,812
Alternative 5	2000-2013	$49,840	$47,459	$45,199	$50,902
	2011-2013	$47,936	$14,259	$35,540	$47,325
Alternative 6	2000-2013	$49,528	$57,678	$52,432	$49,355
	2011-2013	$55,550	$46,337	$57,438	$53,833
Sub-Alternative 7a	2000-2013	$53,711	$45,212	$55,616	$57,184
	2011-2013	$8,208	$36,228	$33,844	$13,623
Sub-Alternative 7b	2000-2013	$37,034	$42,188	$41,028	$33,254
	2011-2013	$57,267	$61,286	$54,823	$50,234
Sub-Alternative 7c	2000-2013	$41,025	$39,037	$38,988	$39,271
	2011-2013	$65,743	$58,893	$52,922	$62,142
Sub-Alternative 8a	2000-2013	$44,100	$52,355	$52,536	$48,748
	2011-2013	$16,390	$11,642	$25,449	$18,889
Sub-Alternative 8b	2000-2013	$35,773	$44,840	$44,765	$31,846
	2011-2013	$55,676	$66,822	$61,715	$48,470
Sub-Alternative 9a	2000-2013	$50,736	$55,008	$56,057	$51,638
	2011-2013	$593	$30,182	$34,179	$2,262
Sub-Alternative 9b	2000-2013	$40,269	$41,898	$43,607	$41,694
	2011-2013	$62,456	$60,190	$57,148	$63,992
Alternative 10	2000-2013	$42,283	$41,630	$41,154	$37,792
	2011-2013	$67,031	$61,774	$55,782	$58,839
Preferred Alternative 11	2000-2013	$45,063	$42,965	$44,992	$48,666
	2011-2013	$46,011	$17,777	$37,742	$53,823
Alternative 12	2000-2013	$45,145	$47,915	$44,363	$46,363
	2011-2013	$37,382	$10,118	$32,071	$36,852

The various alternatives and sub-alternatives of **Action 1** shift the balance among the gear that can harvest black sea bass. While **Table S-5** showed total expected differences in values for all the alternatives/sub-alternatives for each of the four catch rates estimated compared to **Alternative 1 (No Action)** by NMFS (2015), **Table S-6** shows the expected dockside values based on monthly price per pound calculations based two different time series, 2000 – 2013 landings and 2011 – 2013 landings, but just for pot landings. **Table S-7** is similar to **Table S-6**, but includes only the value of landings for all non-pot gear landings. And by way of comparison, **Table S-7** shows the estimated percent of total landings by pot gear for the alternatives/sub-alternatives and for each of the four catch rate scenarios.

Table S-6. Expected dockside value of commercial black sea bass using pot gear only under the alternatives of **Action 1** using two price per pound estimates, the four different catch rate scenarios **(Appendix N)**, and estimations of spatial locations of gear based on the 2006/2007 through 2008/2009 fishing seasons (Scenario C; **Appendix N**).

	Price/lb years	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 1	2000-2013	$463,160	$463,160	$463,160	$463,160
	2011-2013	$488,938	$488,938	$488,938	$488,938
Alternative 2	2000-2013	$727,532	$837,906	$748,978	$737,699
	2011-2013	$835,148	$1,002,798	$890,882	$850,321
Alternative 3	2000-2013	$665,993	$657,340	$660,726	$633,943
	2011-2013	$805,480	$757,249	$771,304	$720,385
Alternative 4	2000-2013	$565,828	$630,932	$611,748	$570,440
	2011-2013	$635,741	$723,962	$711,203	$642,199
Alternative 5	2000-2013	$586,310	$662,012	$635,352	$592,252
	2011-2013	$662,319	$761,957	$741,575	$670,040
Alternative 6	2000-2013	$566,477	$633,190	$613,304	$571,184
	2011-2013	$636,604	$727,378	$713,481	$643,219
Sub-Alternative 7a	2000-2013	$710,039	$804,150	$719,244	$719,351
	2011-2013	$812,133	$956,191	$846,533	$824,560
Sub-Alternative 7b	2000-2013	$500,301	$529,856	$567,738	$496,521
	2011-2013	$546,666	$592,347	$652,540	$539,634
Sub-Alternative 7c	2000-2013	$528,693	$580,388	$594,980	$522,059
	2011-2013	$596,804	$681,606	$700,632	$584,871
Sub-Alternative 8a	2000-2013	$634,252	$699,927	$682,595	$643,781
	2011-2013	$722,427	$805,048	$797,817	$733,258
Sub-Alternative 8b	2000-2013	$499,040	$527,628	$566,595	$495,113
	2011-2013	$545,076	$589,551	$651,100	$537,869
Sub-Alternative 9a	2000-2013	$682,253	$755,850	$709,469	$688,993
	2011-2013	$774,717	$884,926	$834,595	$783,398
Sub-Alternative 9b	2000-2013	$508,417	$544,207	$580,078	$504,961
	2011-2013	$560,188	$616,246	$671,530	$553,392
Alternative 10	2000-2013	$505,551	$539,059	$572,745	$501,059
	2011-2013	$556,431	$609,499	$661,831	$548,239
Preferred Alternative 11	2000-2013	$576,653	$647,757	$635,145	$582,415
	2011-2013	$652,062	$748,810	$743,778	$661,528
Alternative 12	2000-2013	$591,376	$666,177	$639,396	$597,474
	2011-2013	$668,430	$764,288	$746,439	$676,231

Table S-7. Expected dockside value of commercial black sea bass using non-pot gear under the alternatives of **Action 1** using two price per pound estimates, the four different catch rate scenarios **(Appendix N)**, and estimations of spatial locations of gear based on the 2006/2007 through 2008/2009 fishing seasons (Scenario C; **Appendix N**).

	Price/lb years	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 1	2000-2013	$866,606	$866,606	$866,606	$866,606
	2011-2013	$1,111,037	$1,111,037	$1,111,037	$1,111,037
Alternative 2	2000-2013	$662,134	$543,759	$640,484	$651,723
	2011-2013	$782,300	$649,272	$757,952	$770,453
Alternative 3	2000-2013	$714,099	$627,683	$658,334	$675,598
	2011-2013	$850,337	$741,080	$777,892	$802,457
Alternative 4	2000-2013	$812,816	$749,374	$764,013	$807,936
	2011-2013	$1,018,921	$910,603	$935,601	$1,010,589
Alternative 5	2000-2013	$793,295	$715,212	$739,612	$788,415
	2011-2013	$985,593	$852,278	$893,940	$977,261
Alternative 6	2000-2013	$812,816	$754,254	$768,894	$807,936
	2011-2013	$1,018,921	$918,935	$943,933	$1,010,589
Sub-Alternative 7a	2000-2013	$673,437	$570,828	$666,137	$667,598
	2011-2013	$796,050	$680,013	$787,287	$789,038
Sub-Alternative 7b	2000-2013	$866,498	$842,097	$803,055	$866,498
	2011-2013	$1,110,576	$1,068,915	$1,002,259	$1,110,576
Sub-Alternative 7c	2000-2013	$842,097	$788,414	$773,773	$846,977
	2011-2013	$1,068,916	$977,262	$952,266	$1,077,248
Sub-Alternative 8a	2000-2013	$739,613	$682,193	$699,706	$734,733
	2011-2013	$893,939	$806,570	$827,608	$885,607
Sub-Alternative 8b	2000-2013	$866,498	$846,977	$807,935	$866,498
	2011-2013	$1,110,576	$1,077,248	$1,010,591	$1,110,576
Sub-Alternative 9a	2000-2013	$698,248	$628,923	$676,354	$692,410
	2011-2013	$825,852	$745,232	$799,559	$818,841
Sub-Alternative 9b	2000-2013	$861,618	$827,456	$793,294	$866,498
	2011-2013	$1,102,244	$1,043,919	$985,594	$1,110,576
Alternative 10	2000-2013	$866,498	$832,336	$798,174	$866,498
	2011-2013	$1,110,576	$1,052,251	$993,926	$1,110,576
Preferred Alternative 11	2000-2013	$798,175	$724,972	$739,612	$796,016
	2011-2013	$993,925	$868,942	$893,940	$992,270
Alternative 12	2000-2013	$783,535	$711,504	$734,732	$778,655
	2011-2013	$968,928	$845,807	$885,608	$960,596

The alternatives and sub-alternatives of **Action 1** based on when the pot sector is open or closed redistribute the commercial ACL between gear types. **Table S-8** shows the percentage of the total ACL expected to be caught by pot gear by alternative.

Table S-8. Expected dockside value of commercial black sea bass using pot gear only expressed as percent of expected total landings for all gear types under the alternatives of **Action 1** using two price per pound estimates, the four different catch rate scenarios **(Appendix N)**, and estimations of spatial locations of gear based on the 2006/2007 through 2008/2009 fishing seasons (Scenario C; **Appendix N**).

	Price/lb years	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 1	2000-2013	35%	35%	35%	35%
	2011-2013	31%	31%	31%	31%
Alternative 2	2000-2013	52%	61%	54%	53%
	2011-2013	52%	61%	54%	52%
Alternative 3	2000-2013	48%	51%	50%	48%
	2011-2013	49%	51%	50%	47%
Alternative 4	2000-2013	41%	46%	44%	41%
	2011-2013	38%	44%	43%	39%
Alternative 5	2000-2013	42%	48%	46%	43%
	2011-2013	40%	47%	45%	41%
Alternative 6	2000-2013	41%	46%	44%	41%
	2011-2013	38%	44%	43%	39%
Sub-Alternative 7a	2000-2013	51%	58%	52%	52%
	2011-2013	51%	58%	52%	51%
Sub-Alternative 7b	2000-2013	37%	39%	41%	36%
	2011-2013	33%	36%	39%	33%
Sub-Alternative 7c	2000-2013	39%	42%	43%	38%
	2011-2013	36%	41%	42%	35%
Sub-Alternative 8a	2000-2013	46%	51%	49%	47%
	2011-2013	45%	50%	49%	45%
Sub-Alternative 8b	2000-2013	37%	38%	41%	36%
	2011-2013	33%	35%	39%	33%
Sub-Alternative 9a	2000-2013	49%	55%	51%	50%
	2011-2013	48%	54%	51%	49%
Sub-Alternative 9b	2000-2013	28%	40%	42%	37%
	2011-2013	24%	37%	41%	33%
Alternative 10	2000-2013	37%	39%	42%	37%
	2011-2013	33%	37%	40%	33%
Preferred Alternative 11	2000-2013	42%	47%	46%	42%
	2011-2013	40%	46%	45%	40%
Alternative 12	2000-2013	43%	48%	47%	43%
	2011-2013	41%	47%	46%	41%

Given the uncertainty of how fishery participants would change their behavior in the future, each of the four catch rate scenarios are plausible estimates of future fishing behavior. One way to simplify comparisons between alternatives is to use mean values across the four scenarios for each alternative or sub-alternative. **Table S-9** shows the percent of expected ex-vessel value landed by pot gear averaged across the four landings scenarios as a percent of expected black sea bass ex-vessel values for all gear types combined. Regardless of whether 2000 – 2013 or 2011 – 2013 price per pound values were used, **Alternative 1 (No Action)** had a lower percentage of the expected ex-vessel value landed by pot gear than all of the other alternatives/sub-alternatives considered. When using the 2000 – 2013 price per pound values, **Alternative 2**, **Sub-Alternative 7a**, and **Sub-Alternative 9a** had the highest expected percentage of overall ex-vessel values for black sea bass landed by pot gear. When using the 2011 – 2013 price per pound values, **Alternative 2**, **Sub-Alternative 8b**, and **Sub-Alternative 8a** had the highest expected percentage of overall ex-vessel values for black sea bass landed by pot gear.

Table S-9. Mean percentage and ranking of expected ex-vessel value of black sea bass landed by pot gear as a percent of expected ex-vessel value of black sea bass landed by all gear types averaged across the four landings scenarios.

	2000-2013		2011 -2013	
	Mean	Rank	Mean	Rank
Alternative 1	35%	16	31%	16
Alternative 2	55%	1	55%	1
Alternative 3	49%	4	50%	4
Alternative 4	43%	9	39%	10
Alternative 5	45%	7	42%	7
Alternative 6	43%	10	41%	9
Sub-Alternative 7a	53%	2	44%	6
Sub-Alternative 7b	38%	14	39%	11
Sub-Alternative 7c	41%	11	42%	8
Sub-Alternative 8a	48%	5	50%	3
Sub-Alternative 8b	38%	15	53%	2
Sub-Alternative 9a	51%	3	34%	15
Sub-Alternative 9b	39%	12	36%	14
Alternative 10	39%	13	37%	13
Preferred Alternative 11	44%	8	39%	12
Alternative 12	45%	6	44%	5

Economic effects of relative risk to North Atlantic Right Whales and the black sea bass pot sector

Throughout the range of the NARW, the NMFS budgeted $8.7 million in FY 2013 and $8.4 million in FY 2014 in whale recovery budgets. As an example, NMFS (NMFS SERO PRD 2015) estimates that it cost $87,900 for a multi-agency attempt to rescue a

NARW in trap pot gear in 2010/2011. Between FY 2003 and FY 2005, the costs of actions to reduce fishery bycatch of NARW were between $4.9 million and $7.7 million across several federal and NGO organizations (Reeves et al. 2007). During the fiscal years 2003-2005, the multi-agency costs to promote NARW recovery ranged from $13.1 million to $16.7 million throughout the NARW range.

Potential economic outcomes must be weighed against the chance that a NARW would become entangled in black sea bass pot gear. SERO-LAPP-2014-09 (**Appendix N**) analyzed the potential co-occurrence of black sea bass trap pot gear and NARW in space and time across the **Action 1** alternatives for a wide variety of potential scenarios (i.e., different assumptions regarding the distribution of trap gear, catch rates, and NARW responses to environmental conditions). In this analysis, co-occurrence was treated as a proxy for relative entanglement risk, an assumption used in other whale risk assessment models (NMFS 2014; Redfern et al. 2013). The analysis was robust with regards to the differences between alternatives, although the absolute risk of a given alternative cannot be quantified because the entanglement rate of whales in black sea bass pots is unknown.

The **Action 1** alternatives/sub-alternatives can be compared in terms of relative risk as it is operationally defined here. However, the magnitude of the potential relative risk between the alternatives/sub-alternatives in this action cannot be estimated without knowing what the total risk would be if there were no restrictions on using black sea bass pot gear. In this analysis, greater relative risk means the likelihood of entanglements increases when there are more black sea bass pot gear in the water at the same time there is an increase in the presence of whales. In this sense, the alternatives/sub-alternatives can be ranked (e.g., most relative risk to least relative risk); however, the absolute additional amount of risk posed by one alternative/sub-alternative cannot be compared to the absolute amount of risk posed by another alternative/sub-alternative.

Social Effects:

The social effects of removal or modifications to the seasonal closure for black sea bass pots include direct effects on participants in the black sea bass pot fishery, and direct effects on participants in the hook-and-line (and other gear types) portion of the black sea bass fishery. For pot fishermen, the potential effects are primarily associated with foregone economic benefits due to restricted or no access to the black sea bass resource during the winter. For hook-and-line fishermen, the potential effects of removal or modifications to the seasonal closure for black sea bass pots are associated with greater competition with pot fishermen, less access to the increased black sea bass ACL, and a likely shorter fishing season because the ACL would be more available to the pot fishermen, who make up most of the landings. Minimal indirect effects are expected for recreational anglers and for-hire businesses.

Sections 3.3.3 and **3.3.4** provide detailed information about the social environment for the black sea bass fishery. **Figure 3.3.3.2** shows communities with the highest pounds of black sea bass harvested by pots, with the top ten including Sneads Ferry (North Carolina), Georgetown (South Carolina), Little River (South Carolina), Harkers Island

(North Carolina), McClellanville (South Carolina), Ponce Inlet (Florida), Hampstead (North Carolina), Cape Carteret (North Carolina), Wrightsville Beach (North Carolina), and Topsail Beach (North Carolina). **Figure 3.3.3.3** shows communities with the highest pounds of black sea bass harvested by bandit gear, with the top three including Little River (South Carolina), Southport (North Carolina), and Topsail Beach (North Carolina). Additionally, considering engagement and reliance on commercial fishing for each community (**Figure 3.3.3.4**) and social vulnerability (**Figure 3.3.4.1**), the communities of Wanchese (North Carolina) and Sneads Ferry (North Carolina) are those that would be expected to experience positive and negative effects of changes for the black sea bass pot fishermen.

Black sea bass pot fishermen have been affected by multiple management changes in a relatively short period of time through recent Council actions and Atlantic Large Whale Take Reduction Plan (ALWTRP) requirements. Following the restrictive catch limits implemented in the black sea bass rebuilding plan, and an effort shift from other target species due to ACLs and AMs, pot fishermen have experienced increasingly shorter seasons and continual overages. When the endorsement program was implemented through Amendment 18A (SAFMC 2012a), more than half of active pot fishermen did not receive an endorsement and could no longer participate in the pot fishery. Although the landings level of active fishermen who did not qualify for an endorsement was relatively small (to qualify for a black sea bass endorsement, a fishermen with a valid snapper grouper commercial must have had black sea bass landings using black sea bass pot gear averaging at least 2,500 pounds whole weight, annually during the period January 1, 1999, through December 31, 2010), the endorsement program also created an additional barrier for future participants. Overall, the endorsement program permanently locked out most fishermen from this portion of the black sea bass fishery unless they purchase an existing endorsement.

Fishermen who did receive endorsements were placed under a new trip limit, the new pot limit, and requirement to bring pots to shore at the end of each trip. When the final rule for Regulatory Amendment 19 (SAFMC 2013c) indicated that the ACL could be more than doubled, there were only partial positive effects for the pot fishermen due to the closure from November through April that has restricted them from benefitting from the extended season and larger ACL. [While the closure was intended to minimize interaction of pot gear with large whales, it was also included in Regulatory Amendment 19 in order to expedite the increase in the black sea bass ACL due to the additional time that would have been required for NMFS to complete a Section 7 consultation for the snapper grouper fishery (SAFMC 2013c)] Additionally, black sea bass pot fishermen are required to comply with the ALWTRP gear and seasonal requirements (**Tables 1.8.1 – 1.8.5**), which have been in place for the black sea bass pot fishery since 2007, with the most recently added requirements implemented in November 1, 2014.

Under **Alternative 1 (No Action)**, pot fishermen would continue to forego economic benefits that would be available if harvest by pot was allowed into the winter months. Some fishermen report that black sea bass caught in the winter are larger and more abundant, and market prices are better. However, some pot fishermen from the Carolinas have voiced concern that the winter pot fishery for black sea bass would favor Florida fishermen. Weather in Florida is generally better than weather conditions in North Carolina and South Carolina, and Florida pot fishermen could catch a greater proportion of the commercial ACL in winter months. Public input also indicates that some pot fishermen feel that compliance with the ALWTRP requirements, in addition to the measures established with the endorsement program are sufficient to protect right whales and calves, and keeping the seasonal closure invalidates the rationale and purpose for all protection measures under the ALWTRP and the ancillary benefits derived through Amendment 18A.

For black sea bass participants who do not have a black sea bass pot endorsement, **Alternative 1 (No Action)** would be expected to provide the most benefits. The seasonal pot closure allows fishermen without a black sea bass pot endorsement to use gear types other than black sea bass pots to fish for black sea bass in the winter months. If pots are used during the winter months, it is more likely that the commercial ACL for black sea bass would be met before the end of the calendar year. Additionally, hook and line fishermen would have the opportunity to supply the winter market for black sea bass and take advantage of higher market prices.

As noted in **Section 3.3.3**, marine mammal protection has broad social effects as well, as conservation of endangered species can produce societal benefits by protecting species for aesthetic, economic, scientific, and historical value to the U.S. and citizens. Maintaining the seasonal closure for the pot fishery under **Alternative 1 (No Action)** could result in broad social benefits through improved protection of right whales during migration to and from calving grounds during the winter more so than modification to the closure area or period (**Alternatives 2-9b**). As discussed in **Appendix E**, the potential interaction with right whales is expected to be lower for alternatives with pot prohibitions that encompass larger areas and/or time periods during November through April. However, because the baseline value of potential interaction is unknown, the actual increase or decrease in potential interactions cannot be determined, so that any associated social benefits would also be unknown. With all other regulations and management measures in place for the black sea bass pot fishery that contribute to minimizing potential interactions through Council actions and ALWTRP requirements (see **Section 1.6**), the return on investment of additional restrictions such as a spatial/temporal prohibition on black sea bass pot fishing could be low, particularly for a relatively small fishery such as the black sea bass pot fishery. Overall, any social benefits that would be expected to result from improved right whale protection will only be realized when biological benefits to the right whales can be measured and demonstrated.

The effects of **Alternatives 2-12** on fishermen and associated communities vary with the temporal and spatial characteristics of the closures, and effects will be different for pot fishermen and hook and line fishermen. In general, allowing harvest with pots in any way during the winter would be beneficial to pot fishermen, but could have negative effects for all black sea bass fishermen if an increased rate of harvest causes an in-season closure. Additionally, allowing pots during the winter could affect access to the black sea bass commercial ACL for hook and line fishermen, since pots are more efficient gear and could harvest more of the commercial ACL.

Depending on the areas that could be closed to pot fishing and actual areas where fishermen place their pots, **Alternatives 2-12** all provide some way for pot fishing to continue to some degree in the winter months, and would be expected to generate some of the same benefits to pot fishermen**.** However, all possible negative effect due to an earlier in-season closure would be expected under **Alternatives 2-12.** Because of the location of calving areas, there may be less fishing ground available for Florida pot fishermen for most of the winter months (**Alternatives 2-6**, **7b- Preferred Alternative 11**), except for under **Alternative 7/ Sub-Alternative 7a** that would allow fishing in the winter between December 16 through March 14. However, under this sub-alternative, the interaction with adult whales and calves may be more likely, which could result in further fishing restrictions in the future. The alternative(s) with the smallest area of potential fishing grounds for Florida pot fishermen would be expected to the most beneficial to black sea bass pot fishermen in Florida.

For black sea bass pot fishermen in North Carolina and South Carolina, the alternatives with the smallest areas of fishing grounds closed and the shortest period of time would be expected to be the most beneficial. **Alternative 7/ Sub-Alternative 7a, 7b; Alternative 8/Sub-Alternative 8b**; **Alternative 9/ Sub-Alternative 9b**; and **Alternative 10** would allow more time available for harvest with pots in North Carolina and South Carolina than **Alternatives 2-6, Preferred Alternative 11** and **12.**

As discussed in Section 3.3.3, the black sea bass pot endorsement holders participate in several other fisheries throughout the year. As part of their fishing portfolio, many endorsement holders report that the closure in **Alternative 1 (No Action)** has negative effects on their ability to maximize returns in their overall portfolios. Currently, additional information is being collected through public comments about the role of the winter pot fishery for the endorsement holders in fishing portfolios and yearly fishing business plans. This information will be compiled in **Appendix S** and presented at the September 2015 Council meeting.

Action 2. Enhance the existing Atlantic Large Whale Take Reduction Plan (ALWTRP) buoy line/weak link gear requirements and buoy line rope marking for black sea bass pots

One or more actions beyond **Alternative 1 (No Action)** may be chosen.

Alternative 1 (No Action). Commercial black sea bass fishermen are required to abide by the pot configuration restrictions, pot escape mechanism requirements, and pot construction and escape mechanism requirements contained in 50 CFR § 622.189 (see discussion below). Additionally, commercial fishermen will continue to fish in compliance with existing buoy line and weak link gear requirements for black sea bass pots as required by the ALWTRP (50 CFR **§** 229.32).

Alternative 2. In addition to the requirements in 50 CFR § 622.189**,** enhance the current ALWTRP buoy line requirements from November 1 through April 30 in federal waters in the South Atlantic EEZ.

Sub-alternative 2a: The breaking strength must not exceed 2,200 lbs .

Sub-alternative 2b: The breaking line strength must not exceed 1,200 lbs.

Note: Fishermen could decide whether they would want to use the same buoy line from May 1 through October 31.

Alternative 3. In addition to the requirements in 50 CFR § 622.189**,** enhance the current ALWTRP weak link requirements. From November 1 to April 30, the breaking strength of the weak links must not exceed 400 pounds for black sea bass pots in the South Atlantic EEZ.

Note: Fishermen could decide whether they would want to use the same weak link strength from May 1 through October 31.

Preferred Alternative 4. In addition to the requirements in 50 CFR § 622.189**,** enhance the current ALWTRP gear marking requirements. In addition to the ALWTRP's rope marking requirements, include a feature to specifically distinguishing the commercial South Atlantic black sea bass pot component of the snapper grouper fishery. Currently the ALWTRP requires three 12-inch color marks at the top, midway, and bottom sections of the buoy line specified for the individual management area in which the gear are deployed. This alternative will require an additional 12-inch wide purple band be added at the end of each required 12-inch colored mark. Each of the three marks would be a total of 24 inches in length. The additional gear marking requirements of this action are required in federal waters from November 15 through April 15 (Southeast Restricted Area North), September 1 through May 31 (Offshore Trap/Pot Area), and September 1 through May 31 (Southern Nearshore Trap/Pot Waters Area).

<u>Action 2 Discussion</u>
50 CFR § 622.189 Restrictions and requirements for sea bass pots.

(a) *Tending restriction*. A sea bass pot in the South Atlantic EEZ may be pulled or tended only by a person (other than an authorized officer) aboard the vessel permitted to fish such pot or aboard another vessel if such vessel has on board written consent of the owner or operator of the vessel so permitted.

(b) *Configuration restriction*. In the South Atlantic EEZ, sea bass pots may not be used or possessed in multiple configurations, that is, two or more pots may not be attached one to another so that their overall dimensions exceed those allowed for an individual sea bass pot. This does not preclude connecting individual pots to a line, such as a "trawl" or trot line.

(c) *Requirement for escape mechanisms*. (1) A sea bass pot that is used or possessed in the South Atlantic EEZ between 35°15.19' N. lat. (due east of Cape Hatteras Light, NC) and 28°35.1' N. lat. (due east of the NASA Vehicle Assembly Building, Cape Canaveral, FL) is required to have--

(i) On at least one side, excluding top and bottom, a panel or door with an opening equal to or larger than the interior end of the trap's throat (funnel). The hinges and fasteners of each panel or door must be made of one of the following degradable materials:

(A) Ungalvanized or uncoated iron wire with a diameter not exceeding 0.041 inches (1.0 mm), that is, 19 gauge wire.

(B) Galvanic timed-release mechanisms with a letter grade designation (degradability index) no higher than J.

(ii) An unobstructed escape vent opening on at least two opposite vertical sides, excluding top and bottom. The minimum dimensions of an escape vent opening (based on inside measurement) are:

(A) 1 1/8 by 5 3/4 inches (2.9 by 14.6 cm) for a rectangular vent.

(B) 1.75 by 1.75 inches (4.5 by 4.5 cm) for a square vent.

(C) 2.0-inch (5.1-cm) diameter for a round vent.

(2) [Reserved]

(d) *Construction requirements and mesh sizes*. (1) A sea bass pot used or possessed in the South Atlantic EEZ must have mesh sizes as follows (based on centerline measurements between opposite, parallel wires or netting strands):

(i) For sides of the pot other than the back panel:

(A) Hexagonal mesh (chicken wire)--at least 1.5 inches (3.8 cm) between the wrapped sides;

(B) Square mesh--at least 1.5 inches (3.8 cm) between sides; or

(C) Rectangular mesh--at least 1 inch (2.5 cm) between the longer sides and 2 inches (5.1 cm) between the shorter sides.

(ii) For the entire back panel, *i.e.*, the side of the pot opposite the side that contains the pot entrance, mesh that is at least 2 inches (5.1 cm) between sides.

(2) [Reserved]

(e) *Requirements for pot removal*. (1) A sea bass pot must be removed from the water in the South Atlantic EEZ and the vessel must be returned to a dock, berth, beach, seawall, or ramp at the conclusion of each trip. Sea bass pots may remain on the vessel at the conclusion of each trip.

(2) A sea bass pot must be removed from the water in the South Atlantic EEZ when the applicable quota specified in § 622.190(a)(5) is reached. After a closure is in effect, a black sea bass may not be retained by a vessel that has a sea bass pot on board.

(f) *Restriction on number of pots*. A vessel that has on board a valid Federal commercial permit for South Atlantic snapper-grouper and a South Atlantic black sea bass pot endorsement that fishes in the South Atlantic EEZ on a trip with black sea bass pots, may possess only 35 black sea bass pots per vessel per permit year. Each black sea bass pot in the water or onboard a vessel in the South Atlantic EEZ, must have a valid identification tag attached. Endorsement holders must apply for new tags each permit year through NMFS to replace tags from the previous year.

Biological Effects:

Black Sea Bass

The alternatives range from maintaining the current pot gear requirements to specifying buoy line strength and decreasing weak link breaking weight to adding an extra marking on the buoy line. Regardless of which alternative the Council chooses, no biological impacts to the black sea bass stock are expected. Adverse biological effects are prevented because the overall harvest in the commercial sector is limited to the commercial ACL; commercial accountability measures are also in place. The ACL is reduced from the overfishing level as required to address assessment uncertainty. In addition, there is no evidence to suggest that changing the gear requirements for the black sea bass pot sector would have adverse biological impacts. These alternatives are not predicted to reduce harvest and would not provide additional protection to the black sea bass stock. Therefore, there is no difference in the biological effects on black sea bass from the alternatives.

Protected Resources

Alternative 2 is likely to maintain or slightly reduce the overall breaking strength of line used in the commercial black sea bass pot sector throughout the Council's jurisdiction. Reduced line breaking strength can be less life threatening to large whales than lines with higher breaking strength if line breaking strength is below the threshold at which whales can safely break free from the lines. Knowlton et al. (in press) suggest that if buoy line breaking strength was 1,700 pounds or less, the number of life-threatening entanglements to large whales would be reduced substantially. **Sub-alternative 2a** (maximum line strength of 2,200 pounds) would likely maintain the breaking strength of lines currently being used and would have limited, if any, benefits for listed whale species. **Sub-Alternative 2b** (maximum line strength of 1,200 pounds) would likely result in substantially fewer life-threatening entanglements for humpback whales and juvenile and adult right whales. The breaking strength in both **Sub-Alternatives 2a** and **2b** is greater than what minke whales are able to escape from (Knowlton et al in press). Given that very young right whale calves are smaller and weaker than minke whales, the breaking strength of both sub-alternatives is also likely greater than what young calves could shed. Consequently, it is not clear if **Sub-Alternative 2b** would provide very young right whale calves any greater chance of breaking free from line than the lines allowed under **Sub-Alternative 2a**.

The biological impacts from **Alternative 3** on ESA-listed whales is unclear, but are likely beneficial. Weak links break apart when enough opposing pressure is applied to either side of the link. On trap/pot gear, weak links are installed where the surface buoy attaches to the buoy (vertical) line. When the weak link breaks, it releases the buoy from the vertical buoy line and attached pot. A benefit of releasing the buoy is that the remaining entangling line will then be free to slide through baleen or over/around flippers and be shed by a free-swimming whale. Weak link provisions are likely to reduce entanglement risk relative to lines without weak links because the buoys can break away allowing the remaining gear to be potentially shed by the whale. A breaking strength of 400 pounds may be low enough to be broken by very young right whale calves. However, since adequate opposing pressure must be applied to the weak link to break the link, it is unclear how effective this measure will be on a case by case basis.

Preferred Alternative 4 provides a mechanism to identify if a line entangling a whale belongs to the black sea bass pot sector. There are no direct biological benefits from **Preferred Alternative 4**, however, any information gained from entangled whales on fishery type, entanglement location, and entanglement date is important to assess the impacts of a fishery and better understand and possibly work towards reducing future entanglements. However, not all gear remains on the individual after an interaction occurs. Furthermore, many entangled right whales are never seen nor is gear recovered. For line markings to be effective, the gear must be recovered, and the recovered gear must retain the marks. Line markings do improve the chances of identifying recovered gear, particularly as the number and size of marks increases. This alternative provides a mechanism to identify the black sea bass fisherypot sector if an interaction occurs and if the gear remains entangled on the whale. This gear marking would be in addition to the gear marking required in the Large Whale Take Reduction Plan (http://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/docs/2015-12869.pdf).http://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/docs/2015-12869.pdf

None of these alternatives would reduce the potential of interaction between a black sea bass pot and ESA-listed whales. However, the alternatives could reduce the potential of serious injury or mortality (**Preferred Alternatives 2** and **3**) and potentially identify or eliminate the black sea bass fisherypot sector gear implicated in an entanglement (**Preferred Alternative 4**).

The cumulative effects analysis for the biophysical and socio-economic environments are contained in **Chapter 6**.

Economic Effects:

The estimates of costs associated with **Alternatives 2 – 4 (Preferred)** assume that all fishermen would be affected by the additional gear requirements. However, what is not known is how many fishermen have gear that already would meet the additional requirements. Therefore, the estimates in this analysis represent the maximum costs expected.

There are 32 Black Sea Bass Pot Endorsements in the South Atlantic. North Carolina fishermen hold 17 active or renewable endorsements (http://sero.nmfs.noaa.gov/operations_management_information_services/constituency_services_branch/freedom_of_information_act/common_foia/SBPE.htm, accessed on January 29, 2015). Cost estimates were based on values obtained from HamiltonMarine.com (accessed on January 29, 2015) except where noted.

Alternative 2, Sub-Alternative 2a would require minimum line breaking strength of 2,200 lbs for North Carolina, which is already a ALWTRP requirement for South Carolina, Georgia, and Florida (**Alternative 1 – No Action**). A typical black sea bass pot buoy line is 100 to 130' in length (Jack Cox, pers. comm.) Assuming all 17 North Carolina fishermen had 35 pots and needed to replace all the buoy lines, at 125' per pot, to buy four bundles of line would cost $716. The total expected maximum cost associated with **Alternative 2, Sub-Alternative 2a** is $12,172 (17 x $716). Assuming all 32 black sea bass pot endorsement holders had 35 pots and needed to replace all the buoy lines under **Alternative 2, Sub-Alternative 2b**, at 125' per pot, to buy four bundles of line would cost $716. The total expected maximum cost associated with **Alternative 2, Sub-Alternative 2b** is $22,912 (32 x $716).

Alternative 3 would require a step-down from 600 to 400-lb strength weak link. One potential side effect of this step-down in weak links could be an increased probability of the links breaking and resulting in gear loss. However, the probability of such occurrences cannot be estimated at this time. All 32 endorsement holders in all four states could be required to buy new weak links as the current ALWTRP required links have a 600 lb breaking strength. The cost for new weak links for each fisherman is estimated to be $65 (35 traps x $1.85 per weak link). The total cost for **Alternative 3** for all endorsement holders is expected to be $2,080.

Preferred Alternative 4 would require fishermen to mark three 12" bands on each buoy line. If using paint, it is assumed that one quart of marine buoy paint would be sufficient to paint the bands on 35 traps. The cost for a quart of marine buoy paint is $47.35. The total maximum cost associated with **Preferred Alternative 4** if all endorsement holders marked their lines with paint is $1,515 (32 x $47.35). Some fishermen have reported that they mark their lines by weaving in surveyor's tape. Checking various sources online (www.amazon.com, www.uline.com/BL_6423/Flagging-Tape, and www.tigersupplies.com) show that rolls of 300' of surveyor's tape costs $3 - $11 per roll. Presumably, three 12" strips per trap would come out to 105' to initially equip each pot line. Therefore, if an endorsement holder decided to use surveyor's tape to mark lines, one roll would be needed. If all endorsement holders used surveyor's tape, the total cost would be between $96 (32 x $3) and $352 (32 x $11).

Social Effects:

In general, there could be some economic costs for fishermen if gear specifications require purchase of additional line and marking supplies. This could affect business cost decisions, which may have some negative effects on crew and associated shoreside support. Under **Alternative 1 (No Action)**, these effects would not be expected because the black sea bass pot fishermen are already required to have the ALWTRP gear specifications. Changing the specified breaking strength under **Alternatives 2 – 4 (Preferred)** would likely increase business costs for some black sea bass pot fishermen by requiring new gear to meet the requirements. The time periods specified in **Sub-Alternative 2a** and **Sub-Alternative 2b** would likely have similar effects on black sea bass pot fishermen, because if the breaking strength or gear marking is required in only one part of the year (**Sub-alternative 2a**) would likely be as much of a burden in terms of requiring new or additional gear purchases as a year-round requirement (**Sub-alternative 2b**). Changing the specified breaking strength under **Sub-alternative 2a** would have the same effects on fishermen and communities in Florida, South Carolina and Georgia as under **Alternative 1 (No Action).** However, **Sub-alternative 2a** would be expected to have some impact on black sea bass pot fishermen working in North Carolina because different gear would be required. **Sub-alternative 2b** would be expected to affect all black sea bass pot fishermen by increasing gear costs. The gear marking requirement in **Preferred Alternative 4** may be beneficial to the black sea bass pot fishermen by allowing NMFS to better identify gear associated with entanglements, which could help decipher entanglements with gear from other fisheries from black sea bass pot gear.

Chapter 1.
Introduction

1.1 What Actions Are Being Proposed?

Fishery managers are reducing the temporal and spatial scope of the annual prohibition on the use of commercial black sea bass pot gear in the South Atlantic from November 1 through April 30. Fishery managers are also enhancing buoy line/weak link gear requirements and buoy line rope marking for black sea bass pots required by the Atlantic Large Whale Take Reduction Plan.

1.2 Who is Proposing the Actions?

The South Atlantic Fishery Management Council (Council) is proposing the action pursuant to the Magnuson-Stevens Conservation and Management Act.. The Council develops the framework amendment and submits it to the National Marine Fisheries Service (NMFS) who publishes a rule to implement the framework amendment on behalf of the Secretary of Commerce. NMFS is an agency in the National Oceanic and Atmospheric Administration.

South Atlantic Fishery Management Council

- Responsible for conservation and management of fish stocks
- Consists of 13 voting members: 8 appointed by the Secretary of Commerce, 1 representative from each of the 4 South Atlantic states, the Southeast Regional Director of NMFS; and 4 non-voting members
- Responsible for developing fishery management plans and amendments under the Magnuson-Stevens Act and recommends actions to NMFS for implementation
- Management area for most species is from 3 to 200 miles off the coasts of North Carolina, South Carolina, Georgia, and east Florida through Key West with the exception of Mackerel which is from New York to Florida, and Dolphin-Wahoo, which is from Maine to Florida
- Sea bass pots in the South Atlantic EEZ may be used between 35°15.19′ N. lat. (due east of Cape Hatteras Light, NC) and 28°35.1′ N. lat. (due east of the NASA Vehicle Assembly Building, Cape Canaveral, FL)

1.3 Where is the Management Area?

Management of the federal snapper grouper fishery located off the southeastern United States (South Atlantic) in the 3-200 nautical miles U.S. Exclusive Economic Zone (EEZ) is conducted under the Snapper Grouper FMP (SAFMC 1983). Sea bass pots in the Atlantic EEZ may be used between 35°15.19′ N. lat. (due east of Cape Hatteras Light, North Carolina) and 28°35.1′ N. lat. (due east of the NASA Vehicle Assembly Building, Cape Canaveral, Florida) (**Figure 1.3.1**). Black sea bass is one of 59 fish managed by the Council under the Snapper Grouper FMP.

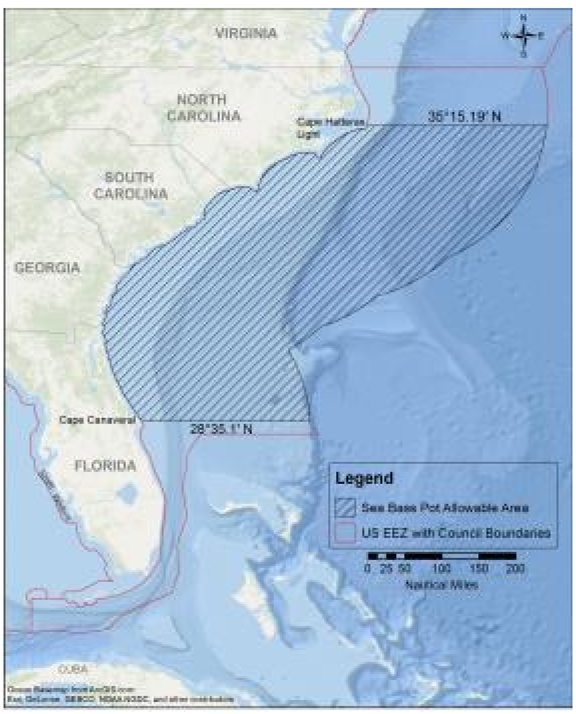

Figure 1.3.1. Jurisdictional boundaries of the South Atlantic Fishery Management Council and the allowable black sea bass pot area.

1.4 Why is the Council Considering Action?

The Council wants to reverse adverse socioeconomic impacts to black sea bass pot endorsement holders created by the annual November 1 through April 30 prohibition on the use of black sea bass pot gear and to increase flexibility to black sea bass pot endorsement holders while continuing to afford protection to ESA-listed whales in the South Atlantic region. In addition, the Council wants to reduce adverse effects to whales if entangled and to help identify black sea bass pot gear used in the South Atlantic.

Purpose for Action

The purpose of Regulatory Amendment 16 is to reevaluate the annual November 1 through April 30 prohibition on the use of black sea bass pot gear and enhance buoy line/weak link gear requirements and buoy line rope marking for black sea bass pots required by the Atlantic Large Whale Take Reduction Plan.

Need for Action

The need for the amendment is to reduce the adverse socioeconomic impacts resulting from the annual November 1 through April 30 prohibition on the use of black sea bass pot gear and increase the flexibility of black sea bass pot endorsement holders to fish with this gear while continuing to protect ESA-listed whales in the South Atlantic region; and reduce the adverse effects on whales if entangled and help identify black sea bass pot lines used in the South Atlantic.

1.5 Why Did the Council and NMFS Implement the November 1 through April 30 Prohibition on the Use of Black Sea Bass Pot Gear?

A 2003 stock assessment concluded that black sea bass were overfished and undergoing overfishing. In response to the stock assessment and to end overfishing, the allowable harvest of black sea bass was reduced beginning in 2006, and the fishing year was changed to June 1 through May 31. In 2013, a stock assessment concluded that the black sea bass stock in the South Atlantic is not undergoing overfishing, is not overfished, and is rebuilt. In response to the stock assessment, the South Atlantic Fishery Management Council's (Council) Scientific and Statistical Committee (SSC), at their April 2013 meeting, recommended an increase to the acceptable biological catch (ABC) for black sea bass. The increase in the ABC allowed the commercial and recreational annual catch limits (ACL) to increase. The Council and the National Marine Fisheries Service (NMFS,) through Regulatory Amendment 19 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region (Snapper Grouper FMP) (SAFMC 2013), modified the ABC, ACLs, recreational annual catch target (ACT), and optimum yield (OY) for the black sea bass stock.

The Council and NMFS implemented the November 1 to April 30 prohibition on the use of black sea bass pots through the final rule for Regulatory Amendment 19 to the Snapper Grouper FMP to ensure protection of North Atlantic right whale (NARW) while allowing for an increase in the commercial ACL in black sea bass in 2013 without significant delay in implementation of regulations.

Increasing the commercial ACL could have extended fishing activity with black sea bass pot gear later into the year. Black sea bass pot gear could potentially be used past November 1, the onset of right whale calving season in the South Atlantic and migration of large Endangered Species Act (ESA)-listed whales, increasing the risk of interactions between these species and this gear type. Therefore, the Council and NMFS implemented a prohibition on the use of black sea bass pot gear from November 1 through April 30 each year, beginning in 2013 to protect large whales from risk of entanglement.

Without the prohibition on the use of black sea bass pots during the large whale migration and right whale calving season, a re-initiation of formal consultation for the snapper grouper fishery probably would be required under the ESA. Formal consultation requires development of a biological opinion to analyze the potential effects of black sea bass pot gear fished during NARW calving season on those ESA listed whale species. That analysis could not have been completed in time to allow the ACL increases to be implemented for the 2013-2014 fishing season, which began on June 1. The black sea bass pot prohibition was a precautionary step taken by the Council and NMFS to allow the black sea bass ACL to increase in the 2013-2014 fishing year, while preventing entanglements with ESA-listed whales until a comprehensive biological opinion and Environmental Impact Statement can be completed.

1.6 Why is Allowing Fishing in the Wintertime Important to Some Fishermen?

Some fishermen have reported a desire to resume fishing in the winter months for black sea bass using pot gear. They have reported that, during winter months, (1) the price per pound is higher (**Figure 1.4.1**), (2) fish migrate southward and are generally found closer to shore making them easier to harvest, and (3) fish tend to be darker and larger, which commands a higher price on the market. The black sea bass stock in the Mid-Atlantic region is closed in winter, which increases the price for fish harvested in the South Atlantic region.

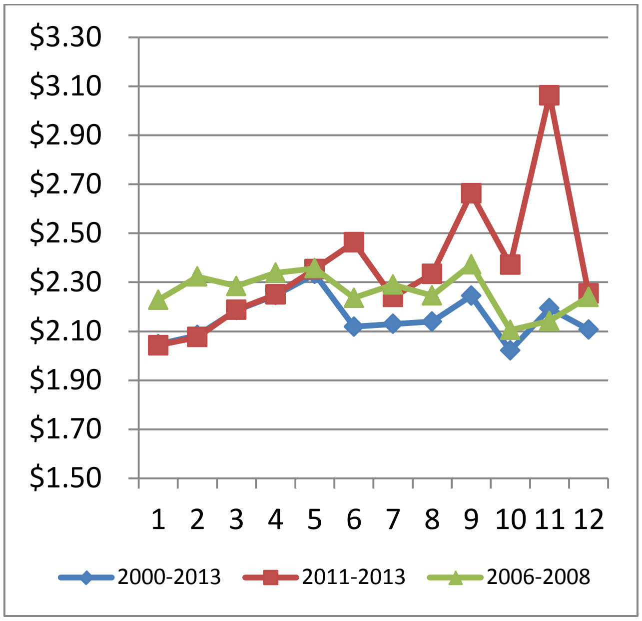

Figure 1.6.1. Average price per pound (whole weight) in the South Atlantic region for black sea bass by month for 2000 – 2013 and 2011 – 2013 (in 2013 dollars).
Source: SEFSC/SSRG Economic Panel Data, ACL_Tables_07102914

1.7 What is the Stock Status of Black Sea Bass in the South Atlantic Region?

The black sea bass stock is not undergoing overfishing, is not overfished, and is rebuilt (**Table 1.5.1**) (SEDAR 25 Update 2013). **Section 3.2.2** includes a detailed description of the stock assessment and results. The stock assessment update was conducted in early 2013, with data through 2012, through the Southeast Data, Assessment, and Review (SEDAR) process. Most of the data sources in this assessment were updated with the two additional years of observations available since the benchmark assessment SEDAR 25 (2011). The Council's SSC met to review the stock assessment in April 2013 and determined it was adequate and suitable to inform management decisions. The actions and alternatives in Regulatory Amendment 19 (SAFMC 2013) to increase the ACL were based on the results of this recent stock assessment update for black sea bass and the SSC's recommendation

Table 1.7.1. Stock status of black sea bass based on the SEDAR 25 Update 2013 assessment.

Status	SEDAR 25 Update 2013 (2012 most recent data)
Overfishing (F_{CURR}/MFMT value)	No (0.659)
Overfished (SSB_{CURR}/MSST value)	No (1.66)
Rebuilt (SSB_{CURR}/SSB_{MSY} value)	Yes (1.03)

- If F_{CURR}>MFMT, then undergoing overfishing. The higher the number, the greater degree of overfishing.
- If SSB_{CURR}<MSST, then overfished. The lower the number, the greater degree of overfished.
- If SSB_{CURR}>SSB_{MSY}, then the stock is rebuilt.

1.8 What Regulations Have the Council and NMFS Implemented Concerning Black Sea Bass in the South Atlantic Region?

1.8.1. Council Amendments

Amendment 13C to the Snapper Grouper FMP (SAFMC 2006) phased-in quota/total allowable catch reductions over 3 years to end overfishing, changed the fishing year from the calendar year to June 1 through May 31, required use of at least 2 inch (") mesh for the entire back panel of pots, required that pots be removed from the water when the commercial quota is met, increased the recreational minimum size limit from 10” total length (TL) to 11” TL in year 1 and 12” TL in year 2 onwards, and reduced the recreational bag limit from 20 to 15 per person per day.

Amendment 15A to the Snapper Grouper FMP (SAFMC 2008a) updated black sea bass management reference points and modified the rebuilding strategy. Amendment 15A to the Snapper Grouper FMP (SAFMC 2008a) established formulas for defining the maximum sustainable yield (MSY) for black sea bass. MSY equals the yield produced by F_{MSY} when the stock is at equilibrium. MSY and F_{MSY} are defined by the most recent SEDAR assessment.

Amendment 17B to the Snapper Grouper FMP (SAFMC 2010b) established ACLs and AMs for black sea bass and other snapper grouper species that were undergoing overfishing at the time.

Regulatory Amendment 9 to the Snapper Grouper FMP (SAFMC 2011a) reduced the recreational bag limit from 15 to 5 per person per day.

The Comprehensive ACL Amendment (SAFMC 2011c) includes ACLs and AMs for federally managed species not undergoing overfishing in four FMPs (Snapper Grouper, Dolphin Wahoo, Golden Crab, and *Sargassum*). The Comprehensive ACL Amendment also established an ABC control rule.

Amendment 18A to the Snapper Grouper FMP (SAFMC 2012a) changed the definition of OY from the average yield associated with fishing at 75% of F_{MSY} when the stock is at equilibrium to a formula setting ACL = ABC = OY. Magnuson-Stevens Act national standard 1 establishes the relationship between conservation and management measures, preventing overfishing, and achieving OY from each stock complex, or fishery. Under this formula, the ACL/OY would be based on the ABC for black sea bass from the most recent SEDAR assessment, which takes into consideration scientific uncertainty to ensure catches are maintained below the MSY/overfishing limit (OFL). Amendment 18A (SAFMC 2012a) also modified the rebuilding strategy, ABC, ACLs, and ACTs; limited participation in the black sea bass pot sector (32 endorsements/vessels); limited pots to 35 per vessel; required that pots be brought back to shore after each trip; modified AMs; established a 1,000 pounds gutted weight (lbs gw) commercial trip limit; increased the recreational minimum size limit from 12” to 13” TL; and increased the commercial minimum size limit from 10” to 11” TL.

Regulatory Amendment 19 (SAFMC 2013) made adjustments to the ACLs (including sector ACLs), recreational ACT, and optimum yield for black sea bass based on the ABC recommendation of the SSC and established an annual prohibition on the use of black sea bass pots from November 1 through April 30 to minimize the probability of interactions between pot gear and ESA-listed whales during large whale migrations and right whale calving season off the southeastern coast. A SEDAR stock assessment update for black sea bass was completed in 2013, and suggested the ACL for this species could be increased based upon the new ABC levels recommended by the SSC. The stock assessment update indicated black sea bass is no longer undergoing overfishing, is not overfished, and the stock is rebuilt. Based on the outcome of the stock assessment update for black sea bass, the SSC applied the approved ABC control rule to black sea bass, revised P* to be 40%, and recommended new ABC values for 2013-2015.

The Council and NMFS changed the commercial and recreational fishing years for black sea bass from June 1 through May 31 to January 1 through December 31 for the commercial sector and April 1 through March 31 for the recreational sector. The changes began in 2015.

For a detailed history of management of the snapper grouper fishery, please refer to **Appendix B**.

1.8.2 Atlantic Large Whale Take Reduction Plan

In addition to the Council regulations, the commercial black sea bass trap/pot sector must adhere to regulations implemented under the Atlantic Large Whale Take Reduction Plan (ALWTRP). The ALWTRP seeks to reduce serious injury to and/or mortality of large whales due to incidental entanglement in U.S. commercial fishing gear. Since its implementation in 1997, NMFS has modified the ALWTRP on several occasions to address the risk of entanglement in gear employed by gillnet and trap/pot fisheries. Although the plan focuses on right, humpback, and fin whales, its implementation also benefits minke whales. The ALWTRP consists of restrictions on where and how gear can be set; research into whale populations, whale behavior, and fishing gear; outreach to inform fishermen of the entanglement problem and to seek their help in understanding and solving the problem; and a program to disentangle whales that do get caught in gear.

ALWTRP trap/pot gear measures that apply to the southern commercial black sea bass trap/pot fishery, as managed by the Council, are listed in **Tables 1.8.1** through **1.8.5** and the times and areas where the restrictions apply in the South Atlantic are illustrated in **Figure 1.8.1**. These measures would remain in place regardless of any actions implemented through Regulatory Amendment 16.

Table 1.8.1. ALWTRP measures that are applicable to the those fishing black sea bass pots.

Area	Requirements
Offshore Trap/Pot Waters	**Year-round**: • No buoy line floating at the surface. • No wet storage of gear (gear must be hauled ≤ 30 days). • Gear marking (color = black; 3 marks of 12 in in length) • Weak links* ≤ 1,500 lbs on floats and/or weights • All ground lines must be made of sinking line.
Southern Nearshore Trap/Pot Waters	**Year-round**: • No buoy line floating at the surface. • No wet storage of gear (gear must be hauled ≤ 30 days). • Gear marking (color = orange; 3 marks of 12 in in length) • Weak links* ≤ 600 lbs on floats and/or weights • All ground lines must be made of sinking line.
* Weak links must be chosen from the list of NMFS approved gear. Source: 50 CFR section 229.32, available online at http://www.nero.noaa.gov/whaletrp/.	

Table 1.8.2. Southeast Trap/Pot Management Areas, Offshore Trap/Pot Waters.

LOCATION DESCRIPTION		
Offshore Trap/Pot Waters off South Carolina, Georgia, and Florida includes all Federal waters of the EEZ offshore of the Southern Nearshore Trap/pot Waters and the Southeast U.S. Restricted Area North south to 27°51'N. lat.		
DATES	**AREA**	**RESTRICTIONS/REQUIREMENTS SUMMARY**
Sept. 1- May 31	North of 32° N. lat.	• Universal requirements • Gear marking -BLACK • Weak links ≤ 1,500 lbs breaking strength and, ≤ 2,000 lbs breaking strength for the red crab trap/pot fishery. • Sinking groundlines
Nov. 15-April 15	Between 32° N. lat and 29° N. lat	• Universal requirements • Gear marking- BLACK • Weak links ≤ 1,500 lbs breaking strength and, ≤ 2,000 lbs breaking strength for the red crab trap/pot fishery. • Sinking groundlines
Dec. 1- March 31	Between 29°N. lat and 27° 51' N. lat	• Universal requirements • Gear marking- BLACK • Weak links ≤ 1,500 lbs breaking strength and, ≤ 2,000 lbs breaking strength for the red crab trap/pot fishery. • Sinking groundlines

Source: NOAA 2014a

Table 1.8.3. Southeast Trap/Pot Management Areas, Southeast Restricted Area North.

LOCATION DESCRIPTION		
The Southeast U.S. Restricted Area North includes waters north of 29°00’ N. (near Ponce de Leon Inlet, FL) to 32°00’ N. (near the GA/SC border) from the shoreline eastward to 80°00’ W, and off South Caro- lina, within 35 nautical miles of the shoreline. Little River Inlet, SC, is not located in the Southeast U.S. Restricted Area North.		
DATES	**AREA**	**RESTRICTIONS/REQUIREMENTS SUMMARY**
November 15 - April 15	ALL of Southeast Restricted Area North	• Universal requirements • Gear markings- SEE BELOW • Buoy lines must be made of sinking line • Buoy lines- Only single traps are allowed. Also, whole buoy line (from trap/pot to buoy) must be the same diameter and free of objects (e.g., weights, floats, etc.) and the buoy line must be made of sinking line.
	FL State Waters	• See above • Weak links- ≤ 200lbs • Vertical line breaking strength ≤ 1,500 lbs • Gear marking- BLUE & ORANGE
	SC/GA State waters	• See above • Weak links- ≤ 600lbs • Vertical line breaking strength ≤ 2,200 lbs • Gear marking- BLUE & ORANGE
	Federal waters	• See above • Weak links- ≤ 600lbs • Vertical line breaking strength ≤ 2,200 lbs • Gear marking-GREEN & ORANGE • Trap/pot gear must be brought back to shore at the conclusion of each trip.

Source: NOAA 2014a

Table 1.8.4. Mid-Atlantic Trap/Pot Management Areas, Southern Nearshore Trap/Pot Waters.

MANAGEMENT AREA DESCRIPTION	
Southern Nearshore Trap/Pot Waters includes all state and Federal waters which fall within EEZ Near- shore Management Area 4, EEZ Nearshore Management Area 5, and EEZ Nearshore Management Area 6 (as defined in the American Lobster Fishery regulations in 50 CFR 697.18), and inside the 100fa contour line from 35°30' N. lat. south to 27°51' N. lat. and extending inshore to the shoreline or exemption line, with the exception of the exempted waters (see Supplement A-Exempted Areas).	
DATES	**RESTRICTIONS/REQUIREMENTS SUMMARY**
Sept. 1- May 31	• Universal requirements • Gear marking- ORANGE • Weak links ≤ 600lbs breaking strength • Sinking groundline • Please note- a small portion of these waters includes portions of LMA 6 (near the mouth of Long Island Sound). These waters follow year-round regulations as described in the "Northeast Trap/Pot Fisheries Management Areas."

Source: NOAA 2014b

Table 1.8.5. Mid-Atlantic Trap/Pot Management Areas, Offshore Trap/Pot Waters (Mid-Atlantic).

LOCATION DESCRIPTION	
Offshore Trap/Pot Waters includes all Federal waters of the EEZ Offshore Management Area 3 (in- cluding the areas known as the Area 2/3 Overlap and 3/5 Overlap, as defined in the American Lobster Fishery regulations found at 50 CFR 697.18), with the exception of the Great South Channel Restricted Trap/Pot Area, and extending south along the 100fa contour line from 35°30' N. lat. south to 27°51' N. lat., and east to the eastern edge of the EEZ.	
DATES	**RESTRICTIONS/REQUIREMENTS SUMMARY**
Sept. 1- May 31	• Universal requirements • Gear marking- BLACK • Weak links ≤ 1,500 lbs breaking strength and, ≤ 2,000 lbs breaking strength for the red crab trap/pot fishery • Sinking groundlines • No trap restrictions in offshore waters south of 40 degrees

Source: NOAA 2014b

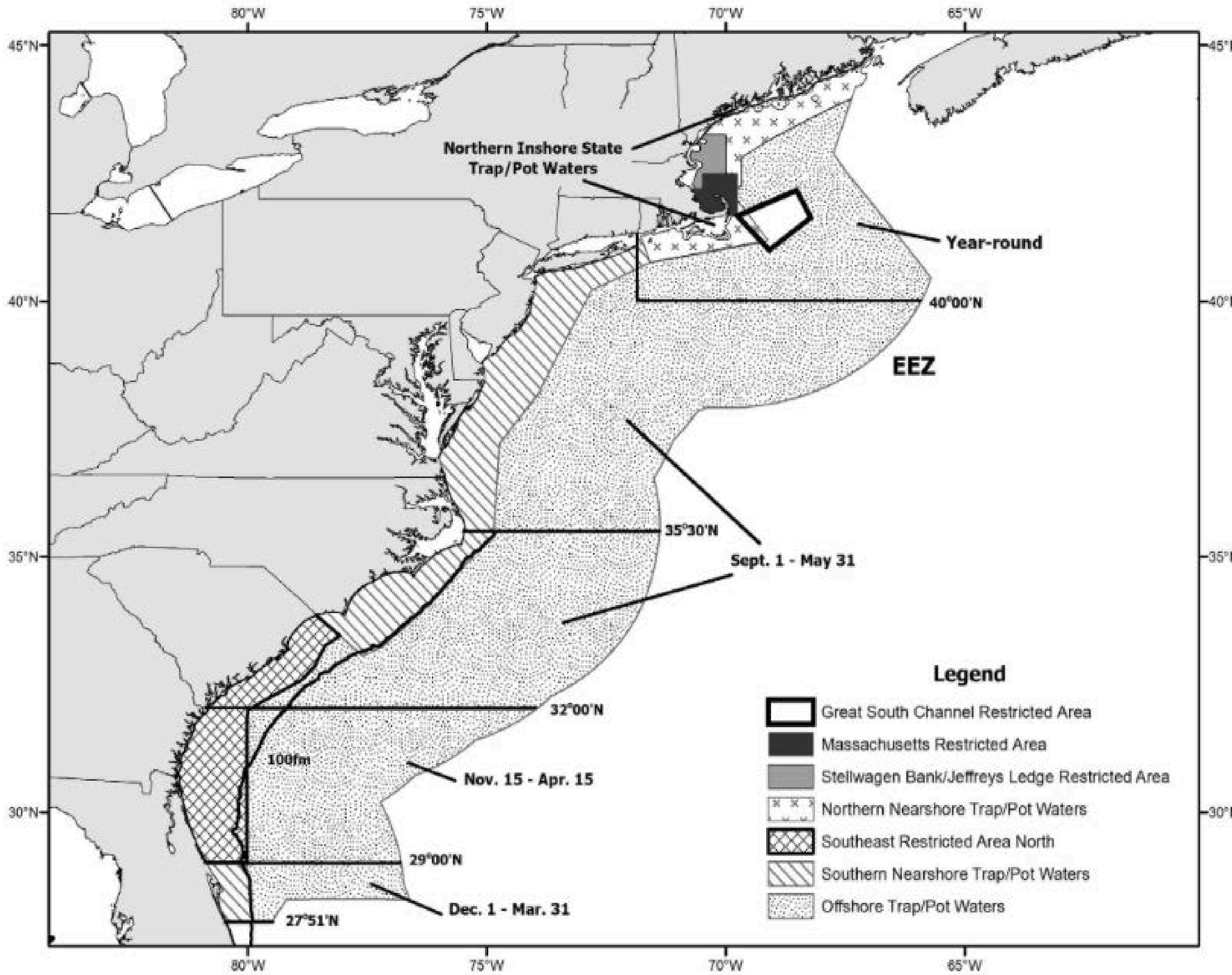

Figure 1.8.1. Times and areas where ALWTRP measures are in effect for the southern commercial black sea bass trap/pot fishery.

Chapter 2. Proposed Actions and Alternatives

Action 1. Modify the annual November 1 through April 30 prohibition on the use of black sea bass pot gear

2.1.1 Action 1 Alternatives

Alternative 1 (No Action). Retention, possession, and fishing for black sea bass is prohibited using black sea bass pot gear, annually, from November 1 through April 30 where black sea bass is managed in the South Atlantic EEZ (south of Cape Hatteras, NC; **Figure 2.1.1**).

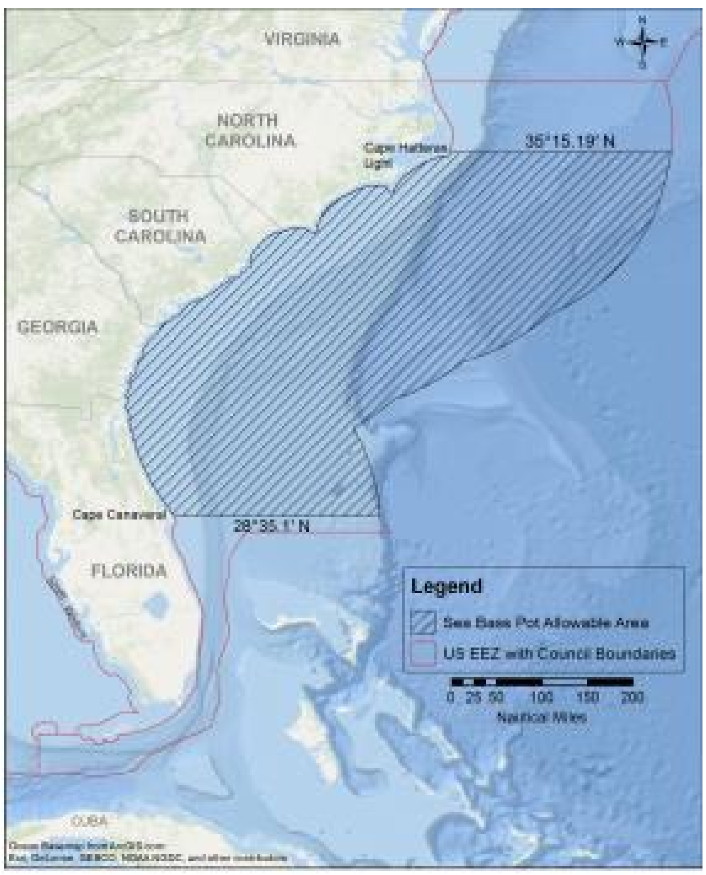

Figure 2.1.1. Jurisdictional boundaries of the South Atlantic Fishery Management Council and the allowable black sea bass pot area.

The following provisions currently exist that may reduce entanglements of whales listed under the Endangered Species Act. The South Atlantic Fishery Management Council does not intend to change these provisions through this amendment.

Amendment 18A to the Snapper Grouper Fishery Management Plan of the South Atlantic Region (SAFMC 2012a):

- Established an endorsement program that capped the number of vessels utilizing pot gear at 32;
- Limited the number of pots per vessel to 35;
- Required that pots be brought back to shore after each trip;
- Established a commercial trip limit of 1,000 lbs gw;

See **Table 1.8.1** through **1.8.5.** for measures mandated through the Atlantic Large Whale Take Reduction Plan.

Alternative 2. The black sea bass pot closure applies to the area currently designated as North Atlantic right whale critical habitat **(Figure 2.1.2)**. North Atlantic right whale critical habitat encompasses waters between 31° 15'N, (approximately the mouth of the Altamaha River, Georgia) and 30° 15'N (approximately Jacksonville, Florida) from the shoreline out to 15 nautical miles offshore; and the waters between 30° 15'N and 28 °00'N, (approximately Sebastian Inlet, Florida) from the shoreline out to 5 nautical miles. The closure applies to the area annually from November 15 through April 15.

This area represents North Atlantic right whale critical habitat in the South Atlantic region designated on June 3, 1994. The map below provides location of the critical habitat boundary. The critical habitat designation did not provide waypoints for the boundary. The boundary would not automatically change if the boundary for the right whale critical habitat were to change. North Atlantic right whale critical habitat is currently undergoing a revision based on more current data. Proposed changes are published at: 80 FR 9314.

The following is language describing the North Atlantic right whale critical habitat area from 50 CFR 226:

> *Southeastern United States: The area designated as critical habitat in these waters encompasses waters between 31 deg.15'N (approximately located at the mouth of the Altamaha River, GA) and 30 deg.15'N (approximately Jacksonville, FL) from the shoreline out to 15 nautical miles offshore; and the waters between 30 deg.15'N and 28 deg.00'N (approximately Sebastian Inlet, FL) from the shoreline out to 5 nautical miles.*

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

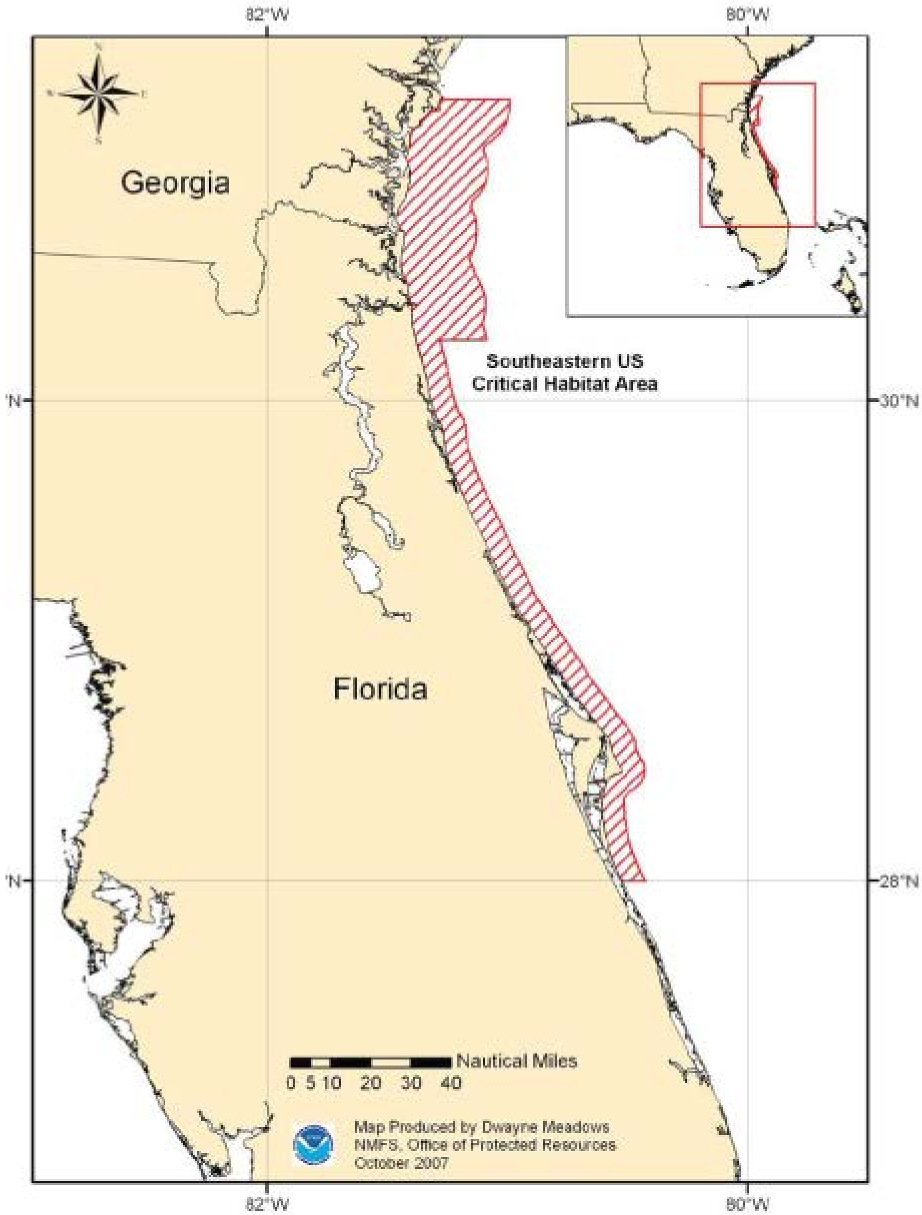

Figure 2.1.2. Area for the proposed black sea bass pot closure in Alternative 2.
Source: http://www.fisheries.noaa.gov/pr/pdfs/criticalhabitat/northatlanticrightwhale.pdf

Alternative 3. The black sea bass pot closure applies to waters inshore of points 1-15 listed below **(Table 2.1.1)**; approximately Ponce Inlet, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.3)**. The closure applies to the area annually from November 1 through April 30.

This area likely represents North Atlantic right whale calving habitat. The area identified from Cape Fear, North Carolina, southward to 29°N (approximately Ponce Inlet, Florida) is based on model outputs (i.e., Garrison 2007, Keller et al. 2012, Good 2008). The area from Cape Fear, North Carolina, to Cape Hatteras, North Carolina, is an extrapolation of those model outputs and based on sea surface temperatures and bathymetry.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Table 2.1.1. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 3**.

Point	N Latitude	W Longitude
1	35°15′ N	State/EEZ boundary
2	35°15’	75°12’
3	34°51’	75°45’
4	34°21’	76°18’
5	34°21’	76°45’
6	34°12’	77°21’
7	33°37’	77°47
8	33°28’	78°33
9	32°59’	78°50’
10	32°17’	79°53’
11	31°31’	80°33’
12	30°43’	80°49’
13	30°30’	81°01’
14	29°45’	81°01’
15	29°00’	State/EEZ boundary

Source: Amanda Frick, NMFS SERO

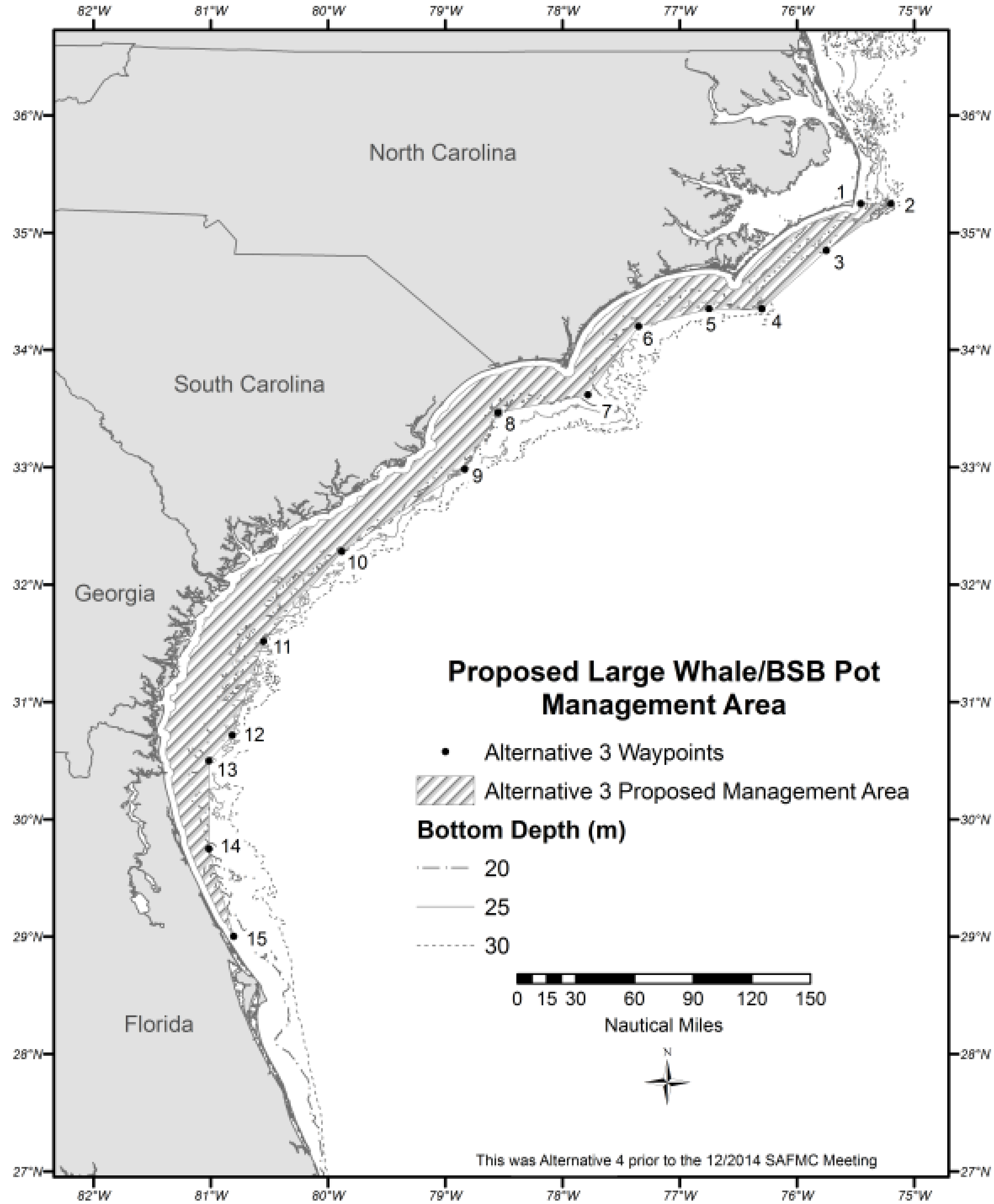

Figure 2.1.3. Area for the proposed black sea bass pot closure in Alternative 3.
Source: Amanda Frick, NMFS SERO

Alternative 4. The black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.2)**; approximately Cape Canaveral, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.4)**. The closure applies to the area annually from November 1 through April 30.

This area generally represents waters 25 m or shallower from 28° 21 N (approximately Cape Canaveral, Florida) to Savannah, Georgia; from the Georgia/South Carolina border to Cape Hatteras, North Carolina, the closure applies to waters under Council management that are 30 m or shallower. This bathymetric area is based on right whale sightings (all demographic segments) and sightings per unit of effort (proxy of density) by depth and captures 97% and 96% of right whale sightings off the North Carolina/South Carolina area, and Florida/Georgia area, respectively. The map below provides an approximate location of the proposed boundary.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Table 2.1.2. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 4**.

Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
1	35° 15’	State/EEZ boundary	15	33° 01’	78° 38’
2	35° 15’	75° 08’	16	32° 40’	79° 01’
3	34° 58’	75° 41’	17	32° 36’	79° 18’
4	34° 49’	75° 50’	18	32° 19’	79° 22’
5	34° 47’	76° 05’	19	32° 16’	79° 37’
6	34° 31’	76° 18’	20	32° 03’	79° 48’
7	34° 20’	76° 13	21	31° 39’	80° 27’
8	34° 12’	77° 00’	22	30° 58’	80° 47’
9	33° 43’	77° 30’	23	30° 13’	81° 01’
10	33° 21’	77° 21’	24	29° 32’	80° 39’
11	33° 18’	77° 41’	25	29° 22’	80° 44’
12	33° 22’	77° 56’	26	28° 50’	80° 22’
13	33° 12’	78° 20’	27	28° 21’	80° 18’
14	33° 05’	78° 22’	28	28° 21’	State/EEZ boundary

Source: Amanda Frick, NMFS SERO

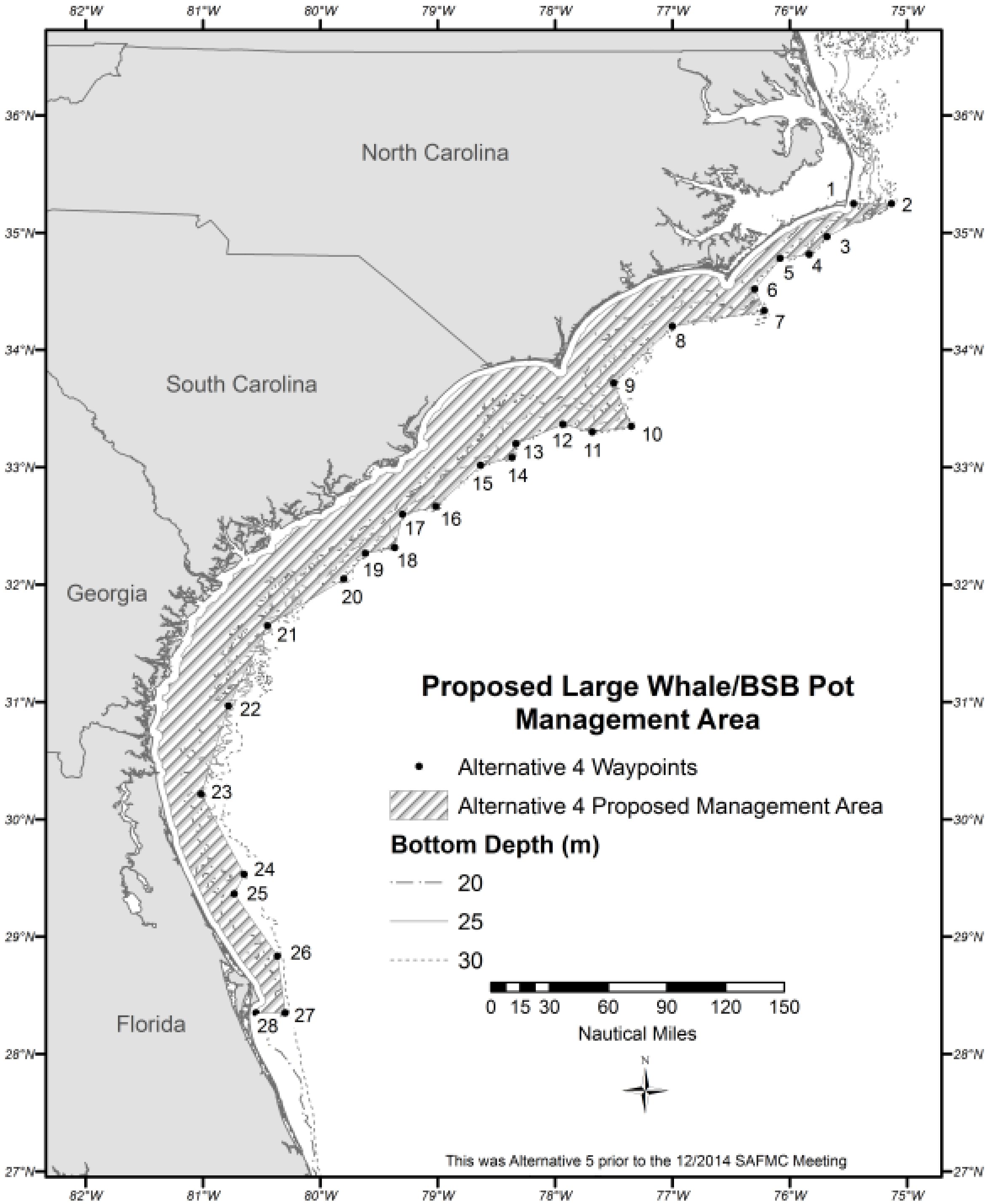

Figure 2.1.4. Area for the proposed black sea bass pot closure in **Alternative 4**.
Source: Amanda Frick, NMFS SERO

Alternative 5. The black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.3)**; approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.5)**. The closure applies to the area annually from November 1 through April 30.

This area is based on joint comments received from non-government organizations (dated January 3, 2014) in response to NMFS' December 4, 2013, *Federal Register* Notice of Intent to Prepare this Draft Environmental Impact Statement (DEIS) (78 FR 72868). The non-government organizations proposed the area as a reasonable alternative for consideration. The area, also included in a Center for Biological Diversity et al. petition in 2009 for right whale critical habitat, is off the coasts of Georgia and Florida and based on calving right whale habitat modeling work of Garrison (2007) and Keller et al. (2012). This area represents the 75th percentile of sightings (91% of historical sightings included in their study) off Florida and Georgia (Garrison 2007 and Keller et al. 2012). Off the coasts of North Carolina and South Carolina, the closure extends from the start of the EEZ to 30 nautical miles offshore. The map below provides approximate location of proposed boundary.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Table 2.1.3. Eastern boundary coordinates for the proposed black sea Bass pot closure in **Alternative 5**.

Point	N Latitude	W Longitude	Point	N Latitude	W Longitude
1	35°15'	State/EEZ Boundary	15	33°21'	77°45'
2	35°15'	74°54'	16	33°19'	78°02'
3	35°03'	74°57'	17	33°24'	78°17'
4	34°51'	75°06'	18	33°14'	78°33'
5	34°45'	75°18'	19	32°55'	78°39'
6	34°43'	75°33'	20	32°39'	78°56'
7	34°26'	75°57'	21	31°42'	80°24'
8	34°12'	76°07'	22	31°31'	80°33'
9	34°04'	76°26'	23	30°43'	80°49'
10	34°05'	76°41'	24	30°30'	81°01'
11	34°10'	76°55'	25	29°45'	81°01'
12	33°58'	77°16'	26	29°31'	80°58'
13	33°41'	77°23'	27	29°13'	80°52'
14	33°28'	77°32'	28	29°13'	State/EEZ boundary

Source: Amanda Frick, NMFS SERO

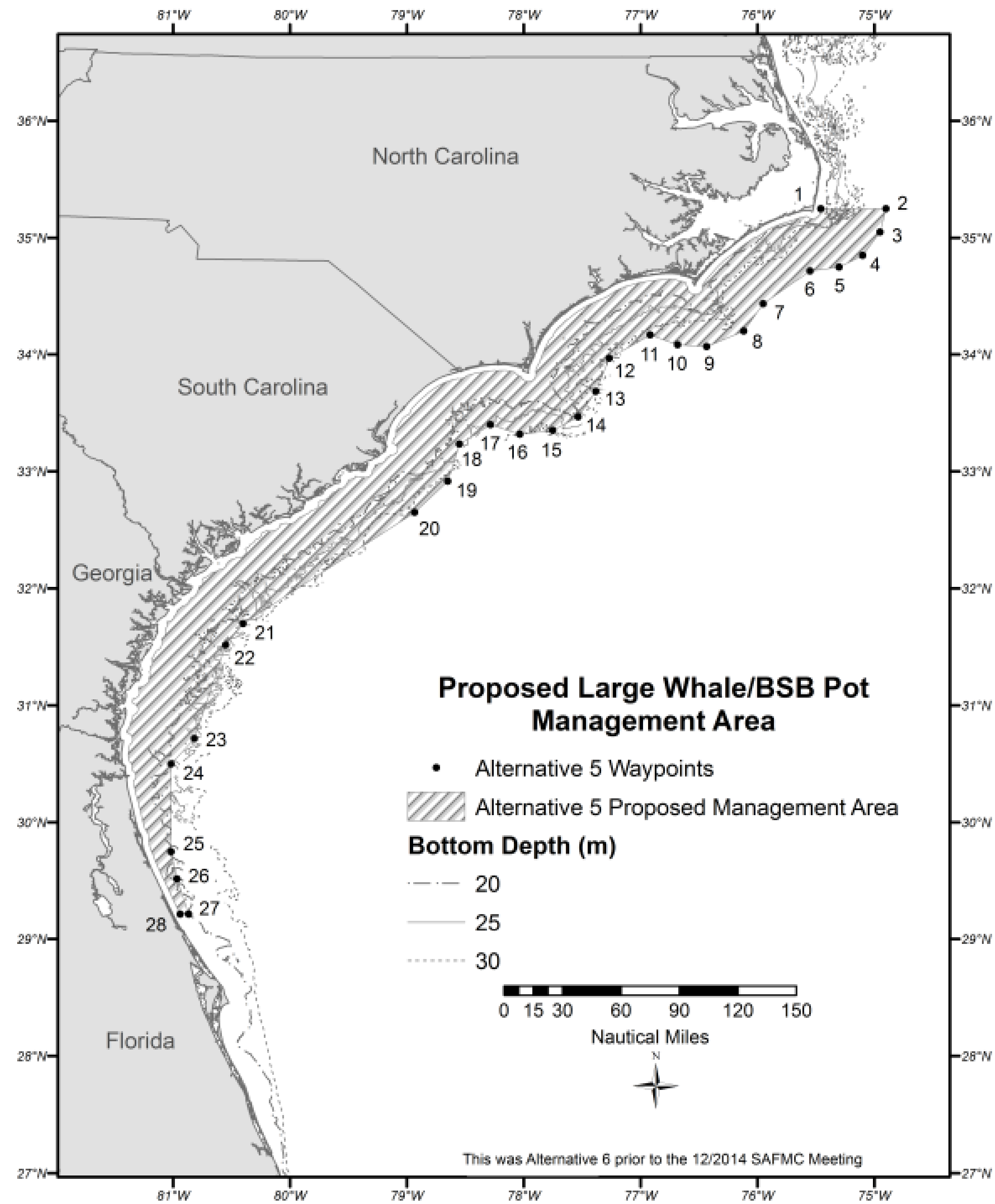

Figure 2.1.5. Area for the proposed black sea bass pot closure in **Alternative 5**.
Source: Amanda Frick, NMFS SERO

Alternative 6. The black sea bass pot closure applies to waters inshore of points 1-20 listed below **(Table 2.1.4)**; approximately Sebastian, Florida, to Cape Hatteras, North Carolina (**Figure 2.1.6**). The closure applies to the area annually from November 1 through April 30.

This area is also based on joint comments received from a number of environmental groups (dated January 3, 2014) in response to NMFS' December 4, 2013, *Federal Register* Notice of Intent to Prepare this DEIS (78 FR 72868). The environmental groups proposed the area as a reasonable alternative for consideration. This area represents an existing management area, the Southeast Seasonal Gillnet Restricted Area, under the Atlantic Large Whale Take Reduction Plan; and an additional area off North Carolina. The area off North Carolina includes waters shallower than 30 meters and is northward of the designated ALWTRP Southeast Restricted Area.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Table 2.1.4. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 6**.

Point	N. Latitude	W Longitude
1	35º ’15’	State/EEZ Boundary
2	35º ’15’	75º 08’
3	34º 58’	75º 41’
4	34º 49’	75º 50’
5	34º 47’	76º 05’
6	34º 31’	76º 18’
7	34º 20’	76º 13’
8	34º 12’	77º 00’
9	33º 43’	77º 30’
10	33º 21’	77º 21’
11	33º 18’	77º 41’
12	33º ’22’	77º ’56’
13	33º 19’	78º 06’
14	32º 58’	78º 39’
15	32º 39’	78º 59’
16	32º 37’	79º 14’
17	32º 22’	79º 22’
18	32º 00’	80º 00’
19	27º 51’	80º 00’
20	27º 51’	State/EEZ Boundary

Source: Amanda Frick, NMFS SERO

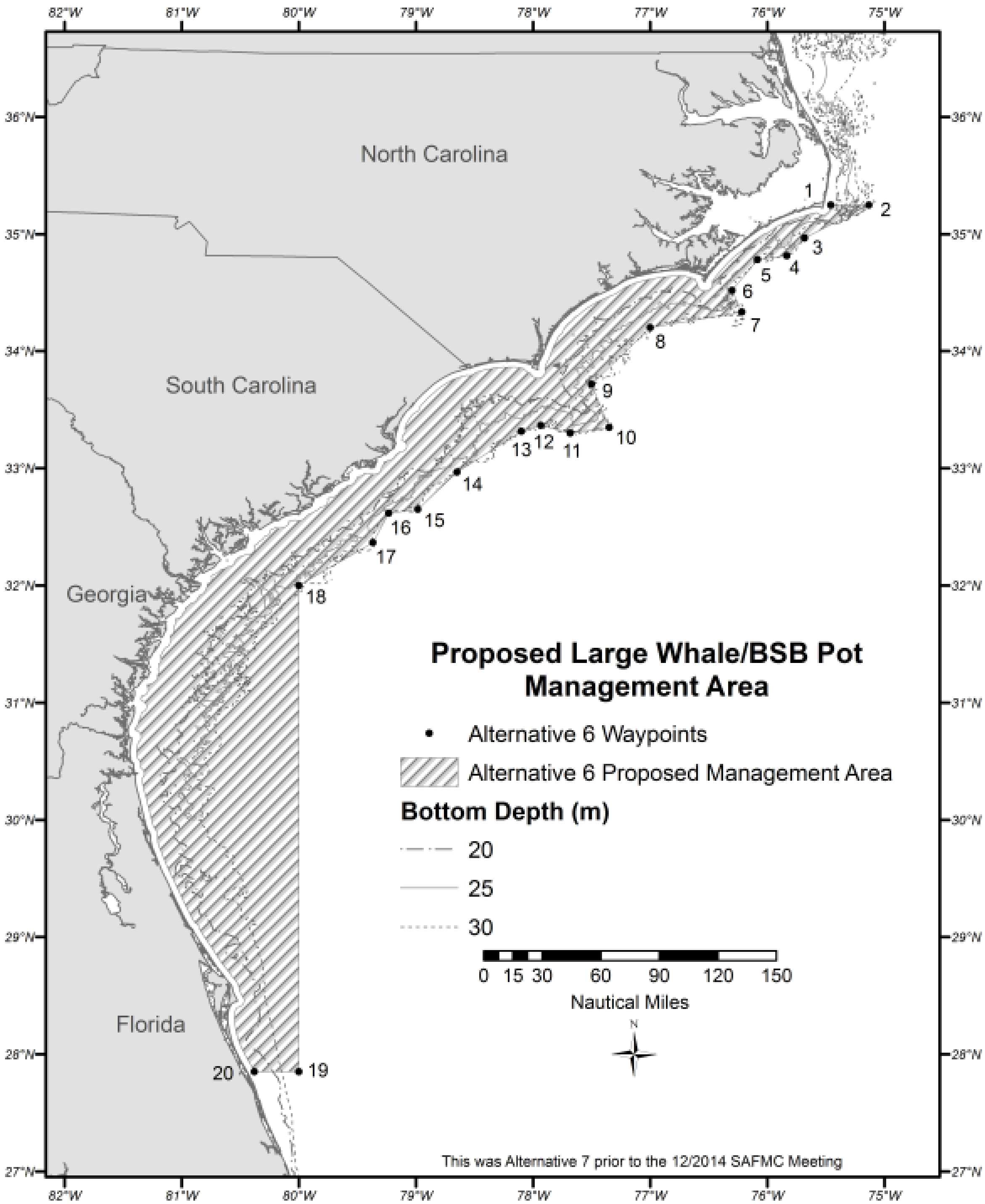

Figure 2.1.6. Area for the proposed black sea bass pot closure in **Alternative 6**.
Source: Amanda Frick, NMFS SERO

Alternative 7. The black sea bass pot closure applies to the area currently designated as North Atlantic right whale critical habitat, in addition to waters inshore of points 1-29 listed below **(Table 2.1.5)**; approximately North of the Altamaha River, Georgia, to Cape Hatteras, North Carolina **(Figure 2.1.7)**.

> **Sub-alternative 7a.** The black sea bass pot closure applies to the area annually from November 1 through December 15 and March 15 through April 30.
>
> **Sub-alternative 7b.** For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and March 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.
>
> **Sub-alternative 7c.** For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

This area represents existing North Atlantic right whale critical habitat in the South Atlantic region designated on June 3, 1994. North Atlantic right whale critical habitat is currently undergoing a revision based on more current data. Proposed changes are published at: 80 FR 9314. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 25 meters. The eastern boundary of the closure between these two areas was formed by drawing a straight line from the southeastern corner waypoint of the northern portion (NC/SC) to the northeastern corner waypoint of the southern section (FL/GA).

The following is language describing the North Atlantic right whale critical habitat area from 50 CFR 226:

> *Southeastern United States: The area designated as critical habitat in these waters encompasses waters between 31 deg.15'N (approximately located at the mouth of the Altamaha River, GA) and 30 deg.15'N (approximately Jacksonville, FL) from the shoreline out to 15 nautical miles offshore; and the waters between 30 deg.15'N and 28 deg.00'N (approximately Sebastian Inlet, FL) from the shoreline out to 5 nautical miles.*

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations for the portion of the area within state waters.

Table 2.1.5. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 7**.

Point	N. Latitude	W Longitude	Point	N. Latitude	W Longitude
1	35° 15'	State/EEZ boundary	22	32° 56'	78° 57'
2	35° 15'	75° 09'	23	32° 44'	79° 04'
3	35° 06'	75° 22'	24	32° 42'	79° 13'
4	35° 06'	75° 39'	25	32° 34'	79° 23'
5	35° 01'	75° 47'	26	32° 25'	79° 25'
6	34° 54'	75° 46'	27	32° 23'	79° 37'
7	34° 52'	76° 04'	28	31° 53'	80° 09'
8	34° 33'	76° 22'	29	31° 15'	80° 59'
9	34° 23'	76° 18'	30	30° 56'	81° 05'
10	34° 21'	76° 27'	31	30° 42'	81° 07'
11	34° 25'	76° 51'	32	30° 15'	81° 05'
12	34° 09'	77° 19'	33	30° 15'	81° 17'
13	33° 44'	77° 38'	34	29° 40'	81° 07'
14	33° 25'	77° 27'	35	29° 08'	80° 51'
15	33° 22'	77° 40'	36	28° 36'	80° 28'
16	33° 28'	77° 41'	37	28° 26'	80° 25'
17	33° 32'	77° 53'	38	28° 20'	80° 31'
18	33° 22'	78° 26'	39	28° 11'	80° 30'
19	33° 06'	78° 31'	40	28° 00'	80° 25'
20	33° 05'	78° 40'	41	28° 00'	State/EEZ Boundary
21	33° 01'	78° 43'			

Source: Amanda Frick, NMFS SERO

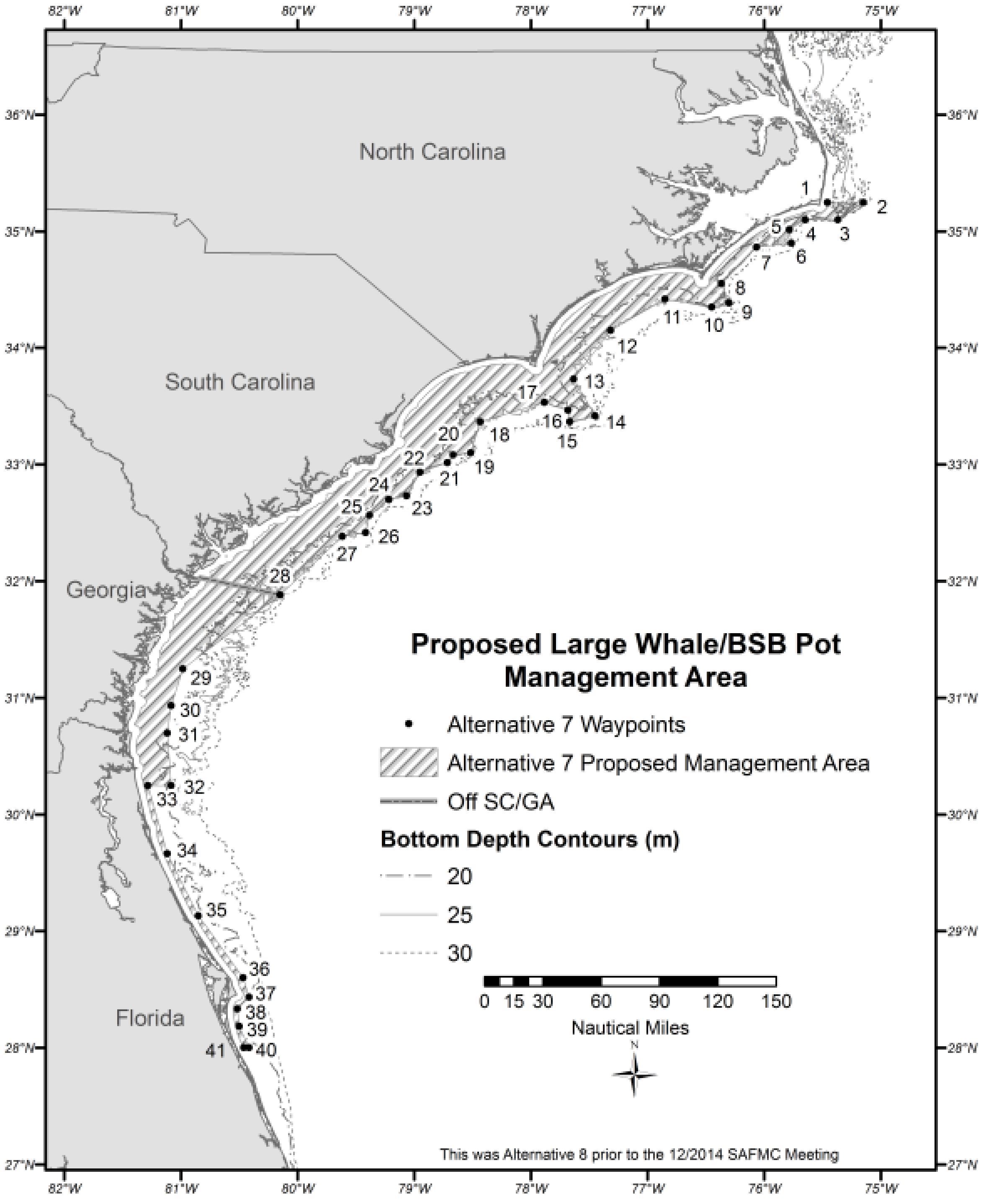

Figure 2.1.7. Area for the proposed black sea bass pot closure in **Alternative 7**.
Source: Amanda Frick, NMFS SERO

Alternative 8. The black sea bass pot closure applies to waters inshore of points 1-35 listed below **(Table 2.1.6)**; approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.8)**.

Sub-alternative 8a. The black sea bass pot closure applies to the area annually from November 1 through April 15.

Sub-alternative 8b. For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

In **Alternative 8**, the boundaries off Florida and Georgia are identical to the boundaries in **Alternative 5**. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 25 meters.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations for the portion of the area within state waters.

Table 2.1.6. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 8**.

Point	N. Latitude	W Longitude	Point	N. Latitude	W Longitude
1	35° 15’	State/EEZ Boundary	19	33° 06’	78° 31’
2	35° 15’	75° 09’	20	33° 05’	78° 40’
3	35° 06’	75° 22’	21	33° 01’	78° 43’
4	35° 06’	75° 39’	22	32° 56’	78° 57’
5	35° 01’	75° 47’	23	32° 44’	79° 04’
6	34° 54’	75° 46’	24	32° 42’	79° 13’
7	34° 52’	76° 04’	25	32° 34’	79° 23’
8	34° 33’	76° 22’	26	32° 25’	79° 25’
9	34° 23’	76° 18’	27	32° 23’	79° 37
10	34° 21’	76° 27’	28	31° 53’	80° 09’
11	34° 25’	76° 51’	29	31º 31’	80º 33’
12	34° 09’	77° 19’	30	30º 43’	80º 49’
13	33° 44’	77° 38’	31	30º 30’	81º 01’
14	33° 25’	77° 27’	32	29º 45’	81º 01’
15	33° 22’	77° 40’	33	29º 31’	80º 58’
16	33° 28’	77° 41’	34	29º 13’	80º 52’
17	33° 32’	77° 53’	35	29º 13’	State/EEZ Boundary
18	33° 22’	78° 26’			

Source: Amanda Frick, NMFS SERO

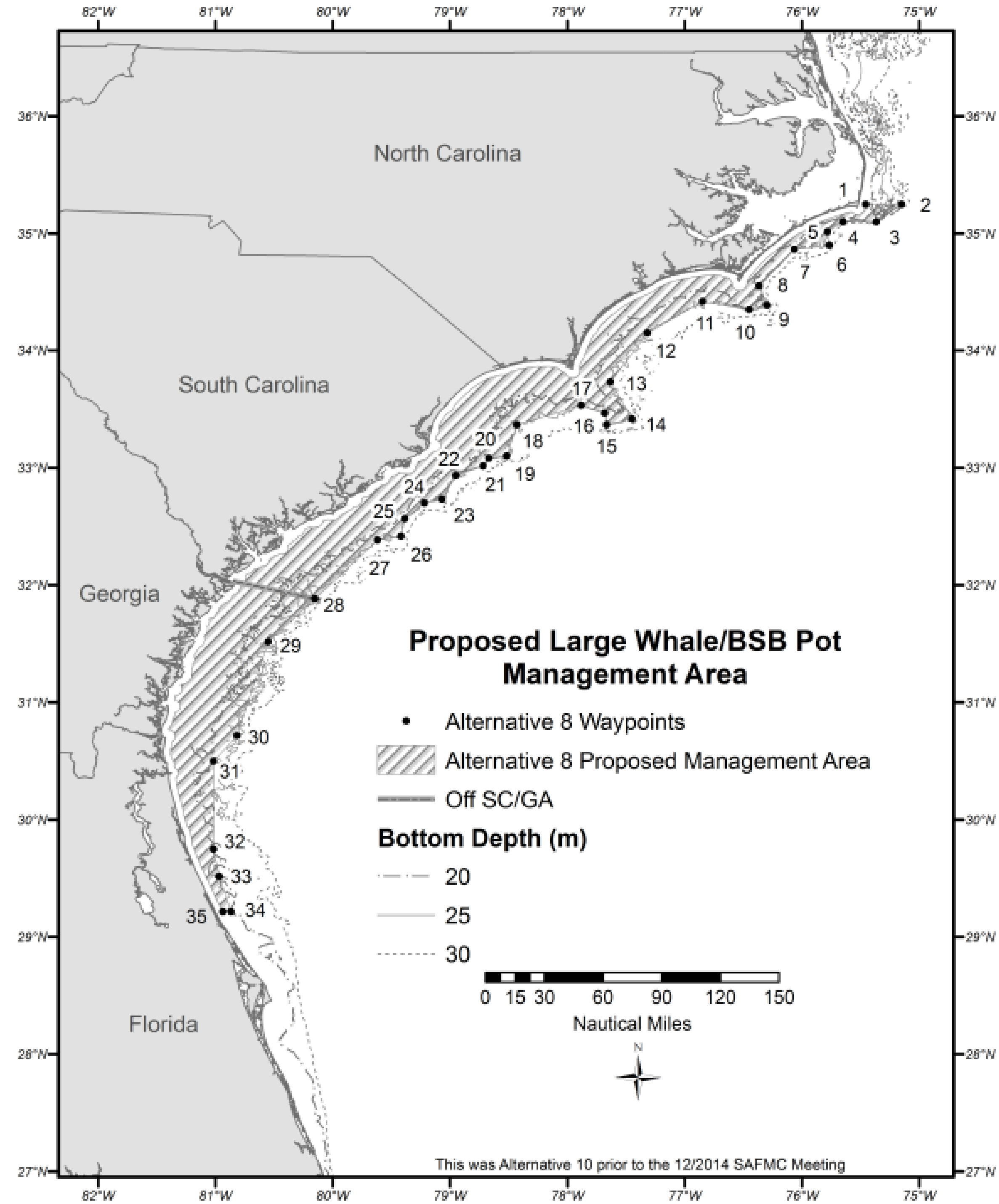

Figure 2.1.8. Area for the proposed black sea bass pot closure in **Alternative 8**.
Source: Amanda Frick, NMFS SERO

Alternative 9. The black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.7)**; approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.9)**.

> **Sub-alternative 9a.** The black sea bass pot closure applies to the area annually from November 1 through April 15.
>
> **Sub-alternative 9b.** For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

In **Alternative 9**, the boundaries off Florida and Georgia are identical to the boundaries in **Alternative 5**. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 20 meters.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations for the portion of the area within state waters.

Table 2.1.7. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 9**.

Point	N. Latitude	W Longitude
1	35° 15′	State/EEZ Boundary
2	35° 15’	75° ’20’
3	35° 05’’	75° ’24’
4	35° 08’’	’75° 38’
5	35° 04’’	’75° 52’
6	34° ’51’	’76° 11’
7	34° 36’’	76° 24’
8	34° 24’’	76° 19’
9	34° 21’’	’76° 27’
10	34° 33’’	’76° 48’
11	34° 16’	77° 25’
12	33° 44’	77° 46’
13	33° 30’	77° 31’
14	33° 28’	77° 35’
15	33° 36’	77° 55’
16	33° 34’	78° 28’
17	32° 59’	78° 52’
18	32° 59’	79° 02’
19	32° 31’	79° 30’
20	31° 57’	80° 27’
21	31° ’42’	80° ’24’
22	31º 31’	80º 33’
23	30º 43’	80º 49’
24	30º 30’	81º 01’
25	29º 45’	81º 01’
26	29º 31’	80º 58’
27	29º 13’	80º 52’
28	29º 13’	State/EEZ Boundary

Source: Amanda Frick, NMFS SERO

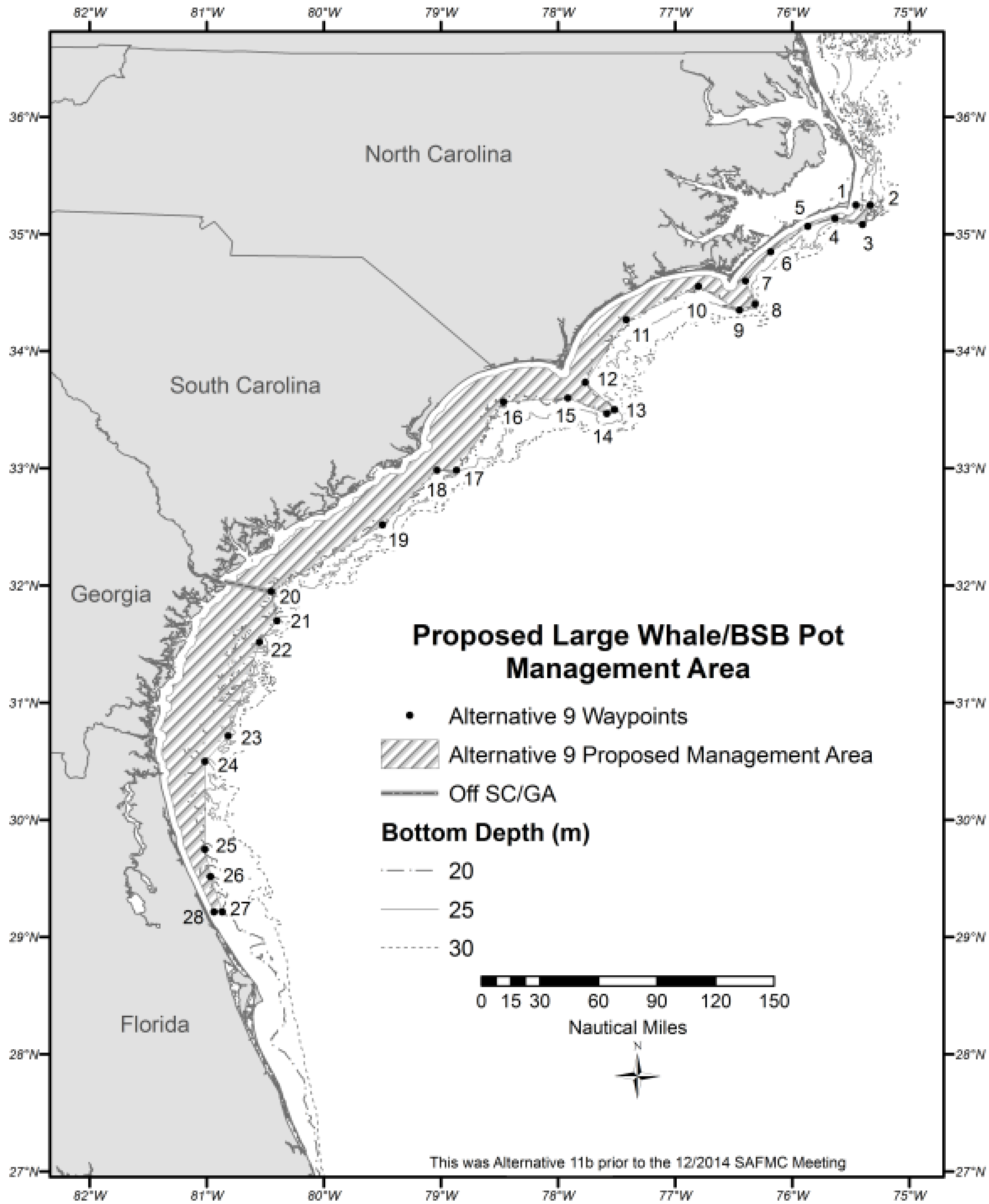

Figure 2.1.9. Area for the proposed black sea bass pot closure in **Alternative 9**.
Source: Amanda Frick, NMFS SERO

Alternative 10. From November 1 through December 15, the black sea bass pot closure applies to waters inshore of points 1-20 listed below **(Table 2.1.8)**, approximately Georgia/South Carolina State Line, to Cape Hatteras, North Carolina **(Figure 2.1.10).**

From February 15 through April 30, the black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.10)**, approximately Georgia/South Carolina State Line, to Cape Hatteras, North Carolina **(Figure 2.1.11).**

From December 16 through February 14, there would be no closure off of the Carolinas.

From November 15 through April 15, the black sea bass pot closure applies to waters inshore of points 20-28 listed below **(Table 2.1.8)**, approximately Georgia/South Carolina State Line, to approximately Daytona Beach, Florida **(Figure 2.1.9).**

In **Alternative 10**, the boundaries off Florida and Georgia are identical to the boundaries in **Alternative 5**. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 20 meters from November 1 through December 15 and 25 meters from February 15 through April 30.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Table 2.1.8. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 10** for November 1 through December 15.

Point	N. Latitude	W Longitude	Point	N. Latitude	W Longitude
1	35° 15′	State/EEZ Boundary	15	33° 36’	77° 55’
2	35° 15’	75° ’20’	16	33° 34’	78° 28’
3	35° 05’’	75° ’24’	17	32° 59’	78° 52’
4	35° 08’’	’75° 38’	18	32° 59’	79° 02’
5	35° 04’’	’75° 52’	19	32° 31’	79° 30’
6	34° ’51’	’76° 11’	20	31° 57’	80° 27’
7	34° 36’’	76° 24’	21	31° ’42’	80° ’24’
8	34° 24’’	76° 19’	22	31º 31’	80º 33’
9	34° 21’’	’76° 27’	23	30º 43’	80º 49’
10	34° 33’’	’76° 48’	24	30º 30’	81º 01’
11	34° 16’	77° 25’	25	29º 45’	81º 01’
12	33° 44’	77° 46’	26	29º 31’	80º 58’
13	33° 30’	77° 31’	27	29º 13’	80º 52’
14	33° 28’	77° 35’	28	29º 13’	State/EEZ Boundary

Source: Amanda Frick, NMFS SERO

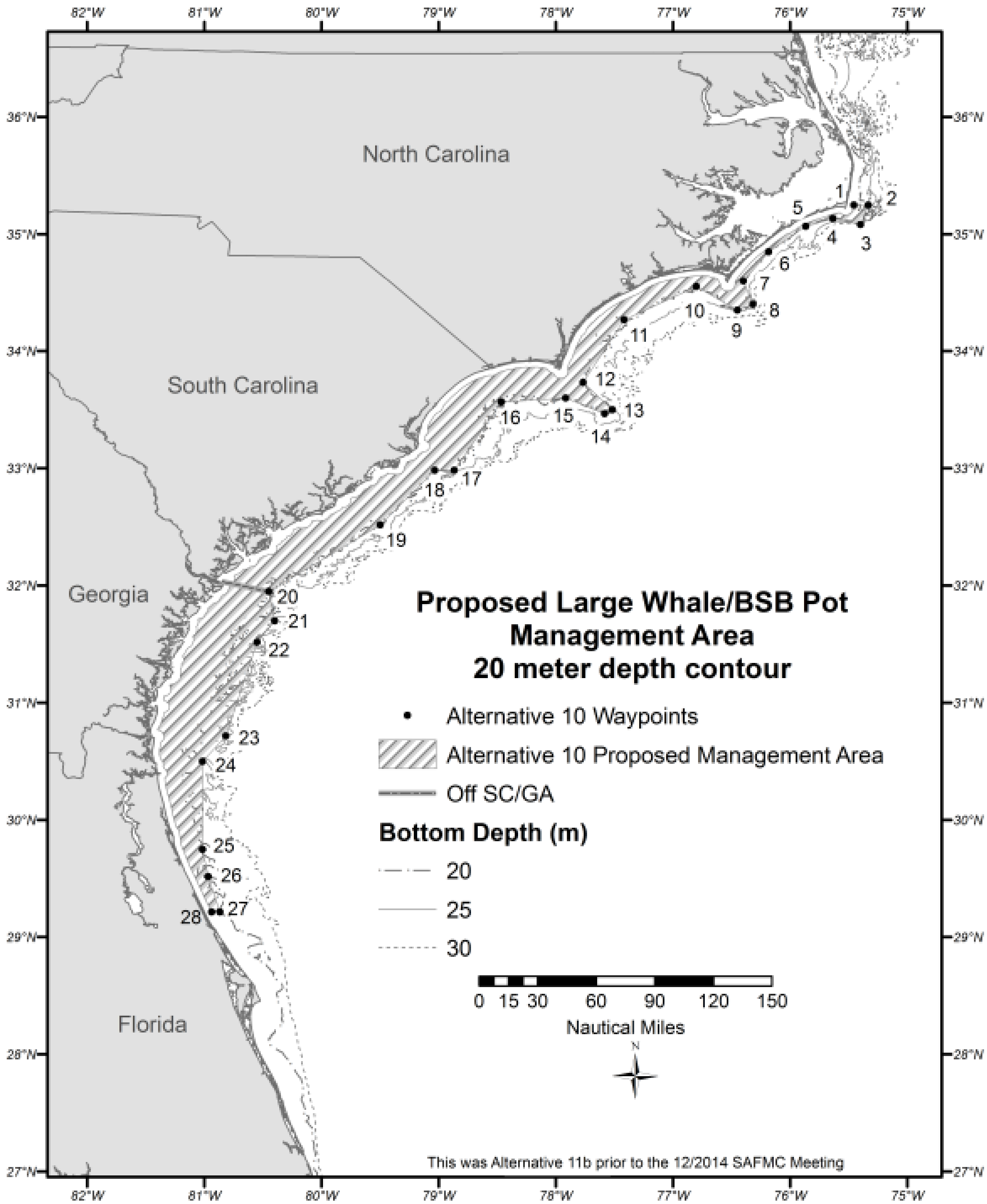

Figure 2.1.10. Area for the proposed black sea bass pot closure in **Alternative 10** from November 1 through December 15.
Source: Amanda Frick, NMFS SERO

Table 2.1.9. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 10** for February 15 through April 30.

Point	N. Latitude	W Longitude	Point	N. Latitude	W Longitude
1	35° 15'	State/EEZ Boundary	19	33° 06'	78° 31'
2	35° 15'	75° 09'	20	33° 05'	78° 40'
3	35° 06'	75° 22'	21	33° 01'	78° 43'
4	35° 06'	75° 39'	22	32° 56'	78° 57'
5	35° 01'	75° 47'	23	32° 44'	79° 04'
6	34° 54'	75° 46'	24	32° 42'	79° 13'
7	34° 52'	76° 04'	25	32° 34'	79° 23'
8	34° 33'	76° 22'	26	32° 25'	79° 25'
9	34° 23'	76° 18'	27	32° 23'	79° 37
10	34° 21'	76° 27'	28	31° 53'	80° 09'
11	34° 25'	76° 51'	29	31º 31'	80º 33'
12	34° 09'	77° 19'	30	30º 43'	80º 49'
13	33° 44'	77° 38'	31	30º 30'	81º 01'
14	33° 25'	77° 27'	32	29º 45'	81º 01'
15	33° 22'	77° 40'	33	29º 31'	80º 58'
16	33° 28'	77° 41'	34	29º 13'	80º 52'
17	33° 32'	77° 53'	35	29º 13'	State/EEZ Boundary
18	33° 22'	78° 26'			

Source: Amanda Frick, NMFS SERO

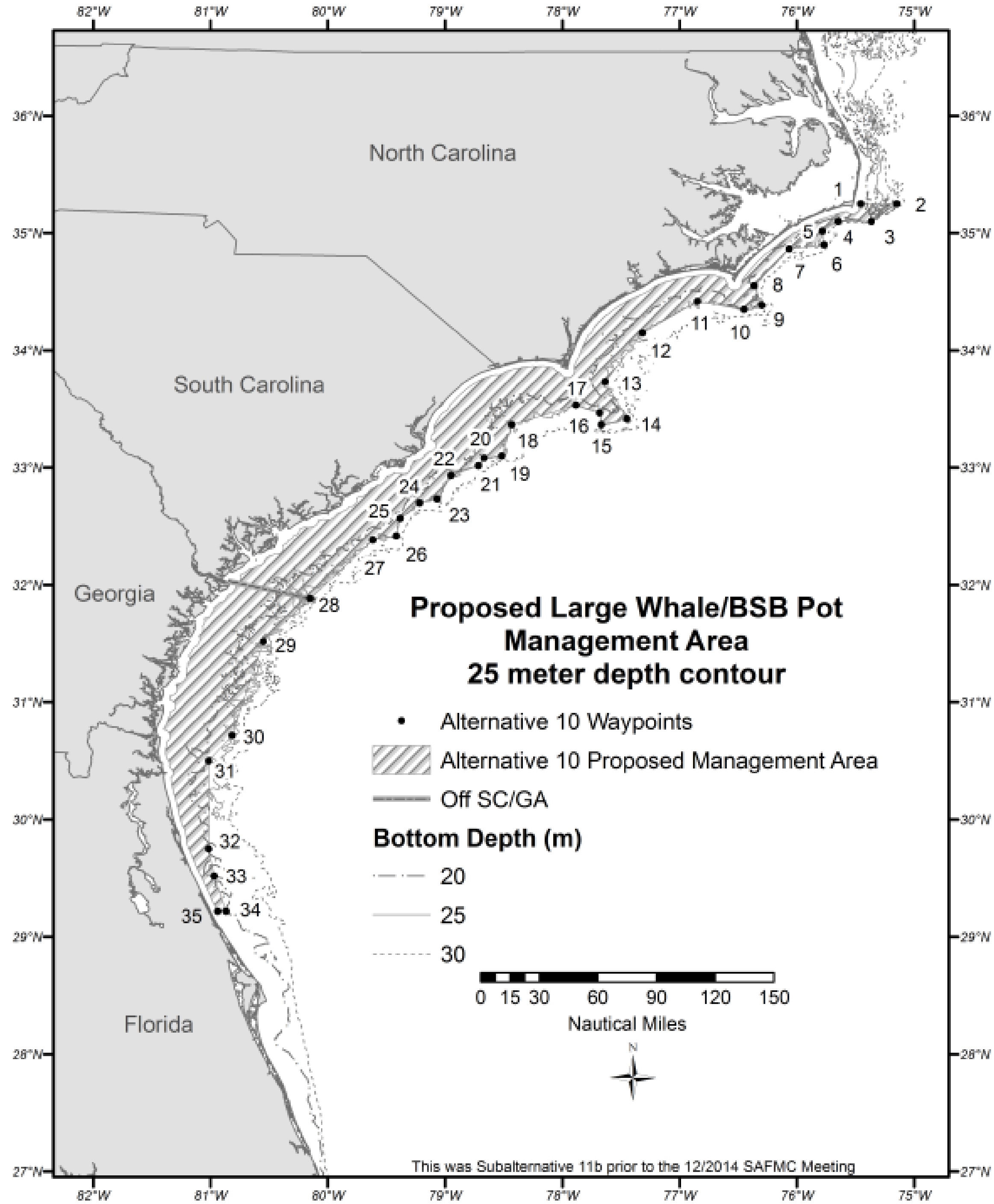

Figure 2.1.11. Area for the proposed black sea bass pot closure in **Alternative 10** from February 15 through April 30.
Source: Amanda Frick, NMFS SERO

Preferred Alternative 11. From November 1 through 30 and from April 1 through 30 each year, the black sea bass pot closure applies to waters inshore of points 1-35 listed in **Table 2.1.6**; approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.8)**. From December 1 through March 31, the black sea bass pot closure applies to waters inshore of points 1-28 listed below **Table 2.1.2**; approximately Cape Canaveral, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.4)**.

From November 1 through 30 and from April 1 through 30 each year, the boundaries off Florida and Georgia are identical to the boundaries in **Alternative 5**. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 25 meters, corresponding with **Alternative 8**.

From December 1 through March 31, this area generally represents waters 25 m or shallower from 28° 21' N (approximately Cape Canaveral, Florida) to Savannah, Georgia; from the Georgia/South Carolina border to Cape Hatteras, North Carolina, the closure applies to waters under Council management that are 30 m or shallower and corresponds with **Alternative 4**. This bathymetric area is based on right whale sightings (all demographic segments) and sightings per unit of effort (proxy of density) by depth and captures 97% and 96% of right whale sightings off the North Carolina/South Carolina area, and Florida/Georgia area, respectively. The maps in Figures 2.1.7 and 2.1.3 provide an approximate location of the proposed boundaries.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Alternative 12. From November 1 through April 30, the black sea bass pot closure applies to waters inshore of points 1-31 listed below **(Table 2.1.10)**; approximately Cape Canaveral, Florida, to Cape Hatteras, North Carolina **(Figure 2.1.12)**.

This closure approximates the midpoints between proposed closure **Alternative 4** and **Sub-Alternative 8a**.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Table 2.1.10. Eastern boundary coordinates for the proposed black sea bass pot closure in **Alternative 12** for November 1 through April 30.

Point	N. Latitude	W Longitude	Point	N. Latitude	W Longitude
1	35° 15'	State/EEZ Boundary	17	33° 05'	78° 26'
2	35° 15'	75° 09'	18	33° 03'	78° 39'
3	35° 06'	75° 22'	19	32° 42'	79° 03'
4	35° 04'	75° 38'	20	32° 37'	79° 18'
5	35° 00'	75° 44'	21	32° 22'	79° 23'
6	34° 54'	75° 46'	22	32° 20'	79° 36'
7	34° 51'	75° 50'	23	31° 31'	80° 32'
8	34° 50'	76° 04'	24	30° 43'	80° 49'
9	34° 32'	76° 20'	25	30° 30'	80° 58'
10	34° 21'	76° 15'	26	30° 13'	81° 01'
11	34° 15'	77° 04'	27	29° 32'	80° 49'
12	33° 43'	77° 34'	28	29° 13'	80° 46'
13	33° 23'	77° 24'	29	28° 37'	80° 20'
14	33° 20'	77° 41'	30	28° 21'	80° 18'
15	33° 27'	77° 54'	31	28° 21'	State/EEZ Boundary
16	33° 17'	78° 22'			

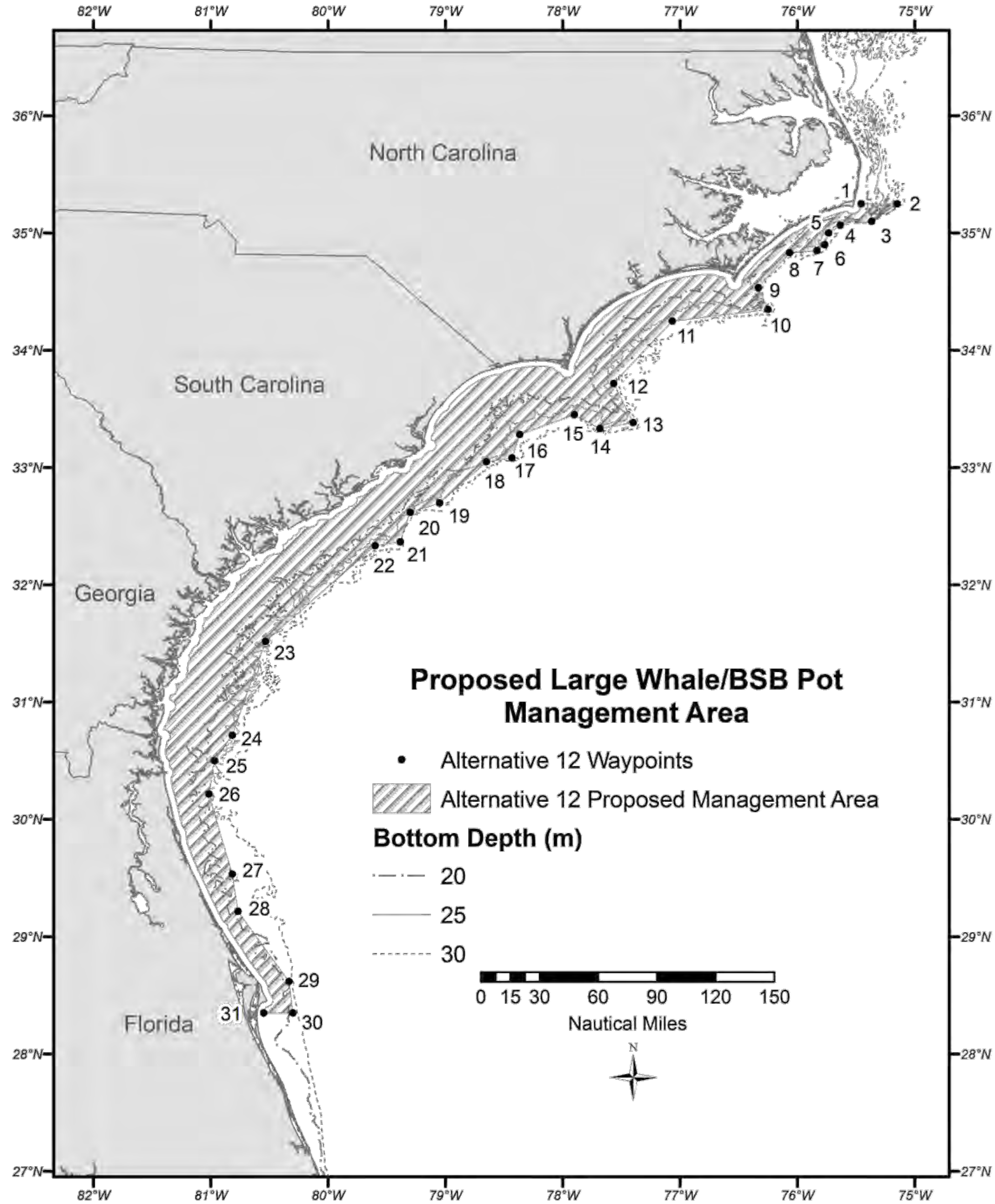

Figure 2.1.12. Area for the proposed black sea bass pot closure in **Alternative 12** from November 1 through April 30.
Source: Amanda Frick, NMFS SERO

2.1.2 Comparison of Alternatives

The attributes of the alternatives vary by alternatives **(Table 2.2)**. The comparison of the effects of the alternatives are in Chapter 4.

Table 2.1.2.1. The attributes of the alternatives for **Action 1.**

	Alternative Attributes				
	Area (mi^2)[1]	**Time period**	**Approximate Depth Contour as Eastern Edge (m)**		**Alternative Based On**
			NC/SC	**GA/FL**	
Alternative 1 (No Action)	148,141	Nov. 1- April 30	Variable		Entire EEZ
Alternative 2	2263	Nov. 15-April 15	Variable		Current right whale critical habitat
Alternative 3	12,203	Nov. 1- April 30	Variable		Models of calving grounds and sea temp/bathymetry
Alternative 4	17,377	Nov. 1- April 30	30	25	97%/96% whale sightings
Alternative 5	17,848	Nov. 1- April 30	30	Variable	Models of calving grounds and 75th percentile of sightings off FL & GA
Alternative 6	27,890	Nov. 1- April 30	30	Variable	Southeast seasonal gillnet restricted area and an additional area off NC
Sub-Alternative 7a	11,325	Nov. 1-Dec.15; March 15-April 30	25	Variable	Current right whale critical habitat; whale sightings
Sub-Alternative 7b	11,325	Nov. 1-Dec.15 (NC/SC); Nov. 15-April 15 (GA/FL)	25	Variable	
Sub-Alternative 7c	11,325	Feb. 15-April 30 (NC/SC); Nov. 15-April 15 (GA/FL)	25	Variable	
Sub-Alternative 8a	12,910	Nov. 1-April 15	25	Variable	75th percentile of sightings off FL & GA
Sub-Alternative 8b	12,910	Nov. 1-Dec. 15/Feb. 15-April 30 (NC/SC); Nov. 15-April 15 (GA/FL)	25	Variable	
Alternative 9a	9,951	Nov. 1-April 15	20	Variable	75th percentile of sightings off FL & GA
Alternative 9b	9,951	Nov. 1-Dec.15/Feb. 15-April 30 (NC & SC); Nov. 15-April 15 (GA & FL)	20	Variable	
Alternative 10	varies	Nov. 1-Dec.15/Feb. 15-April 30 (NC & SC); Nov. 15-April 15 (GA & FL)	20 (first half) and 25 (second half)	Variable	75th percentile of sightings off FL & GA
Alternative 11 (Preferred)	varies	Nov. 1-Nov. 30 (1) Dec. 1-March 31 (2) April 1- April 30 (3)	25	Variable (1) 25 (2) Variable (3)	97%/96% whale sightings, models of calving grounds, and 75th percentile of sightings off FL & GA
Alternative 12	15,648	Nov. 1-April 30	This closure approximates the midpoints between		

			proposed closure **Alternative 4** and **Sub-alternative 8a**

[1]Some alternatives extend south of the allowable black sea bass pot area and the area may be an overestimate.

Action 2. Enhance the existing Atlantic Large Whale Take Reduction Plan (ALWTRP) buoy line/weak link gear requirements and buoy line rope marking for black sea bass pots

2.2.1 Action 2 Alternatives

One or more actions beyond **Alternative 1 (No Action)** may be chosen.

Alternative 1 (No Action). Commercial black sea bass fishermen are required to abide by the pot configuration restrictions, pot escape mechanism requirements, and pot construction and escape mechanism requirements contained in 50 CFR § 622.189 (see discussion below). Additionally, commercial fishermen will continue to fish in compliance with existing buoy line and weak link gear requirements for black sea bass pots as required by the ALWTRP (50 CFR § 229.32).

Alternative 2. In addition to the requirements in 50 CFR § 622.189**,** enhance the current ALWTRP buoy line requirements from November 1 through April 30 in federal waters in the South Atlantic EEZ.

Sub-alternative 2a: The breaking strength must not exceed 2,200 lbs .
Sub-alternative 2b: The breaking line strength must not exceed 1,200 lbs.

Note: Fishermen could decide whether they would want to use the same buoy line from May 1 through October 31.

Alternative 3. In addition to the requirements in 50 CFR § 622.189**,** enhance the current ALWTRP weak link requirements. From November 1 to April 30, the breaking strength of the weak links must not exceed 400 pounds for black sea bass pots in the South Atlantic EEZ.

Note: Fishermen could decide whether they would want to use the same weak link strength from May 1 through October 31.

Preferred Alternative 4. In addition to the requirements in 50 CFR § 622.189**,** enhance the current ALWTRP gear marking requirements. In addition to the ALWTRP's rope marking requirements, include a feature to specifically distinguishing the commercial South Atlantic black sea bass pot component of the snapper grouper fishery. Currently the ALWTRP requires three 12-inch color marks at the top, midway, and bottom sections of the buoy line specified for the individual management area in which the gear are deployed. This alternative will require an additional 12-inch wide purple band be added at the end of each required 12-inch colored mark. Each of the three marks would be a total of 24 inches in length. The additional gear marking requirements of this action are required in federal waters from November 15 through April 15 (Southeast Restricted Area North), September 1 through May 31 (Offshore Trap/Pot Area), and September 1 through May 31 (Southern Nearshore Trap/Pot Waters Area).

Action 2 Discussion

50 CFR § 622.189 Restrictions and requirements for sea bass pots.

(a) *Tending restriction*. A sea bass pot in the South Atlantic EEZ may be pulled or tended only by a person (other than an authorized officer) aboard the vessel permitted to fish such pot or aboard another vessel if such vessel has on board written consent of the owner or operator of the vessel so permitted.

(b) *Configuration restriction*. In the South Atlantic EEZ, sea bass pots may not be used or possessed in multiple configurations, that is, two or more pots may not be attached one to another so that their overall dimensions exceed those allowed for an individual sea bass pot. This does not preclude connecting individual pots to a line, such as a "trawl" or trot line.

(c) *Requirement for escape mechanisms*. (1) A sea bass pot that is used or possessed in the South Atlantic EEZ between 35°15.19' N. lat. (due east of Cape Hatteras Light, NC) and 28°35.1' N. lat. (due east of the NASA Vehicle Assembly Building, Cape Canaveral, FL) is required to have--

(i) On at least one side, excluding top and bottom, a panel or door with an opening equal to or larger than the interior end of the trap's throat (funnel). The hinges and fasteners of each panel or door must be made of one of the following degradable materials:

(A) Ungalvanized or uncoated iron wire with a diameter not exceeding 0.041 inches (1.0 mm), that is, 19 gauge wire.

(B) Galvanic timed-release mechanisms with a letter grade designation (degradability index) no higher than J.

(ii) An unobstructed escape vent opening on at least two opposite vertical sides, excluding top and bottom. The minimum dimensions of an escape vent opening (based on inside measurement) are:

(A) 1 1/8 by 5 3/4 inches (2.9 by 14.6 cm) for a rectangular vent.

(B) 1.75 by 1.75 inches (4.5 by 4.5 cm) for a square vent.

(C) 2.0-inch (5.1-cm) diameter for a round vent.

(2) [Reserved]

(d) *Construction requirements and mesh sizes*. (1) A sea bass pot used or possessed in the South Atlantic EEZ must have mesh sizes as follows (based on centerline measurements between opposite, parallel wires or netting strands):

(i) For sides of the pot other than the back panel:

(A) Hexagonal mesh (chicken wire)--at least 1.5 inches (3.8 cm) between the wrapped sides;

(B) Square mesh--at least 1.5 inches (3.8 cm) between sides; or

(C) Rectangular mesh--at least 1 inch (2.5 cm) between the longer sides and 2 inches (5.1 cm) between the shorter sides.

(ii) For the entire back panel, *i.e.*, the side of the pot opposite the side that contains the pot entrance, mesh that is at least 2 inches (5.1 cm) between sides.

(2) [Reserved]

(e) *Requirements for pot removal*. (1) A sea bass pot must be removed from the water in the South Atlantic EEZ and the vessel must be returned to a dock, berth, beach, seawall, or ramp at the conclusion of each trip. Sea bass pots may remain on the vessel at the conclusion of each trip.

(2) A sea bass pot must be removed from the water in the South Atlantic EEZ when the applicable quota specified in § 622.190(a)(5) is reached. After a closure is in effect, a black sea bass may not be retained by a vessel that has a sea bass pot on board.

(f) *Restriction on number of pots*. A vessel that has on board a valid Federal commercial permit for South Atlantic snapper-grouper and a South Atlantic black sea bass pot endorsement that fishes in the South Atlantic EEZ on a trip with black sea bass pots, may possess only 35 black sea bass pots per vessel per permit year. Each black sea bass pot in the water or onboard a vessel in the South Atlantic EEZ, must have a valid identification tag attached. Endorsement holders must apply for new tags each permit year through NMFS to replace tags from the previous year.

2.2.2 Comparison of Alternatives

The attributes of the alternatives vary by alternatives **(Table 2.2.2.1)**. The comparison of the effects of the alternatives are in Chapter 4.

Table 2.2.2.1. The attributes of the alternatives for Action 2.

	Alternative Attributes		
	Buoy line breaking strength	**Weak link breaking strength**	**Buoy line rope marking**
Alternative 1 (No Action)		From November 15 through April 15, in specified areas, weak link strength must not exceed 200 and 400 pounds off Florida and South Carolina/Georgia, respectively	Three 12-inch color marks at the top, midway, and bottom sections of the buoy line specified for the individual management area in which the gear are deployed
Sub-Alternative 2a	In addition to the requirements under **Alternative 1 (no action)**, the buoy line breaking strength must not exceed 2,200 pounds from November 1 through April 30 in federal waters in the South Atlantic EEZ.	n/a	n/a
Sub-Alternative 2b	In addition to the requirements under **Alternative 1 (no action)**, the buoy line breaking strength must not exceed 1,200 pounds from November 1	n/a	n/a

	through April 30 in federal waters in the South Atlantic EEZ.		
Alternative 3	n/a	In addition to the requirements under **Alternative 1 (no action)**, from November 1 to April 30, the breaking strength of the weak links must not exceed 400 pounds for black sea bass pots in the South Atlantic EEZ	n/a
Alternative 4 (Preferred)	n/a	n/a	In addition to the requirements under **Alternative 1 (no action)**, require an additional 12-inch wide purple band be added at the end of each required 12-inch colored mark. The additional gear marking requirements of this action are required in federal waters from November 15 through April 15 (Southeast Restricted Area North), September 1 through May 31 (Offshore Trap/Pot Area), and September 1 through May 31 (Southern Nearshore Trap/Pot Waters Area).

Chapter 3. Affected Environment

This section describes the affected environment in the proposed project area. The affected environment is divided into four major components:

Affected Environment

- **Habitat environment (Section 3.1)**

  Examples include coral reefs and sea grass beds

- **Biological end ecological environment (Section 3.2)**

  Examples include populations of red snapper, corals, turtles

- **Human environment (Section 3.3)**

  Examples include fishing communities and economic descriptions of the fisheries

- **Administrative environment (Section 3.4)**

  Examples include the fishery management process and enforcement activities

3.1 Habitat Environment

3.1.1 Inshore/Estuarine Habitat

Many snapper grouper species utilize both pelagic and benthic habitats during several stages of their life histories; larval stages of these species live in the water column and feed on plankton. Most juveniles and adults are demersal (bottom dwellers) and associate with hard structures on the continental shelf that have moderate to high relief (e.g., coral reef systems and artificial reef structures, rocky hard-bottom substrates, ledges and caves, sloping soft-bottom areas, and limestone outcroppings). Juvenile stages of some snapper grouper species also utilize inshore seagrass beds, mangrove estuaries, lagoons, oyster reefs, and embayment systems. In many species, various combinations of these habitats may be utilized during daytime feeding migrations or seasonal shifts in cross-shelf distributions. Additional information on the habitat utilized by species in the Snapper Grouper Complex is included in Volume II of the Fishery Ecosystem Plan (FEP, SAFMC 2009b) and incorporated here by reference. The FEP can be found at: http://www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx.

3.1.2 Offshore Habitat

Predominant snapper grouper offshore fishing areas are located in live bottom and shelf-edge habitats where water temperatures range from 11º to 27º C (52º to 81º F) due to the proximity of the Gulf Stream, with lower shelf habitat temperatures varying from 11º to 14º C (52º to 57º F). Water depths range from 16 to 27 meters (54 to 90 ft) or greater for live-bottom habitats, 55 to 110 meters (180 to 360 ft) for the shelf-edge habitat, and from 110 to 183 meters (360 to 600 ft) for lower-shelf habitat areas.

The exact extent and distribution of productive snapper grouper habitat on the continental shelf north of Cape Canaveral, Florida, is unknown. Current data suggest from 3 to 30% of the shelf is suitable habitat for these species. These live-bottom habitats may include low relief areas, supporting sparse to moderate growth of sessile (permanently attached) invertebrates, moderate relief reefs from 0.5 to 2 meters (1.6 to 6.6 ft), or high relief ridges at or near the shelf break consisting of outcrops of rock that are heavily encrusted with sessile invertebrates such as sponges and sea fan species. Live-bottom habitat is scattered irregularly over most of the shelf north of Cape Canaveral, Florida, but is most abundant offshore from northeastern Florida. South of Cape Canaveral, Florida, the continental shelf narrows from 56 to 16 kilometers (35 to 10 mi) wide off the southeast coast of Florida and the Florida Keys. The lack of a large shelf area, presence of extensive, rugged living fossil coral reefs, and dominance of a tropical Caribbean fauna are distinctive benthic characteristics of this area.

Rock outcroppings occur throughout the continental shelf from Cape Hatteras, North Carolina to Key West, Florida (MacIntyre and Milliman 1970; Miller and Richards 1979; Parker et al. 1983), which are principally composed of limestone and carbonate sandstone (Newton et al. 1971), and exhibit vertical relief ranging from less than 0.5 to over 10 meters (33 ft). Ledge systems formed by rock outcrops and piles of irregularly sized boulders are also common. Parker et al. (1983) estimated that 24% (9,443 km^2) of the area between the 27 and 101-meter (89 and 331 ft) depth contours from Cape Hatteras, North Carolina, to Cape Canaveral, Florida, is reef habitat. Although the bottom communities found in water depths between 100 and 300 meters (328 and 984 ft) from Cape Hatteras, North Carolina, to Key West, Florida, is relatively small compared to the whole shelf, this area, based upon landing information of fishers, constitutes prime reef fish habitat and probably significantly contributes to the total amount of reef habitat in this region.

Artificial reef structures are also utilized to attract fish and increase fish harvests; however, research on artificial reefs is limited and opinions differ as to whether or not these structures promote an increase of ecological biomass or merely concentrate fishes by attracting them from nearby, natural un-vegetated areas of little or no relief.

The distribution of coral and live hard bottom habitat as presented in the Southeast Area Monitoring, Assessment, and Prediction Program (SEAMAP) bottom mapping project is a proxy for the distribution of the species within the snapper grouper complex. The method used to determine hard bottom habitat relied on the identification of reef obligate species including members of the snapper grouper complex. The Florida Fish and Wildlife Research Institute

(FWRI), using the best available information on the distribution of hard bottom habitat in the South Atlantic region, prepared ArcView maps for the four-state project. These maps, which consolidate known distribution of coral, hard/live bottom, and artificial reefs as hard bottom, are available on the South Atlantic Council's online map services provided by the newly developed SAFMC Habitat and Ecosystem Atlas: http://ocean.floridamarine.org/safmc_atlas/. An introduction to the system is found at: http://www.safmc.net/EcosystemManagement/EcosystemBoundaries/MappingandGISData/tabid/632/Default.aspx .

Plots of the spatial distribution of offshore species were generated from the Marine Resources Monitoring, Assessment, and Prediction Program (MARMAP) data. The plots serve as point confirmation of the presence of each species within the scope of the sampling program. These plots, in combination with the hard bottom habitat distributions previously mentioned, can be employed as proxies for offshore snapper grouper complex distributions in the south Atlantic region. Maps of the distribution of snapper grouper species by gear type based on MARMAP data can also be generated through the South Atlantic Council's Internet Mapping System at the above address.

3.1.3 Essential Fish Habitat

Essential fish habitat (EFH) is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S. C. 1802(10)). Specific categories of EFH identified in the South Atlantic Bight, which are utilized by federally managed fish and invertebrate species, include both estuarine/inshore and marine/offshore areas. Specifically, estuarine/inshore EFH includes: Estuarine emergent and mangrove wetlands, submerged aquatic vegetation, oyster reefs and shell banks, intertidal flats, palustrine emergent and forested systems, aquatic beds, and estuarine water column. Additionally, marine/offshore EFH includes: live/hard bottom habitats, coral and coral reefs, artificial and manmade reefs, *Sargassum* species, and marine water column.

EFH utilized by snapper grouper species in this region includes coral reefs, live/hard bottom, submerged aquatic vegetation, artificial reefs and medium to high profile outcroppings on and around the shelf break zone from shore to at least 183 meters [600 ft (but to at least 2,000 ft for wreckfish)] where the annual water temperature range is sufficiently warm to maintain adult populations of members of this largely tropical fish complex. EFH includes the spawning area in the water column above the adult habitat and the additional pelagic environment, including *Sargassum*, required for survival of larvae and growth up to and including settlement. In addition, the Gulf Stream is also EFH because it provides a mechanism to disperse snapper grouper larvae.

For specific life stages of estuarine- dependent and near shore snapper grouper species, EFH includes areas inshore of the 30 meter (100-ft) contour, such as attached macroalgae; submerged rooted vascular plants (seagrasses); estuarine emergent vegetated wetlands (saltmarshes, brackish marsh); tidal creeks; estuarine scrub/shrub (mangrove fringe); oyster reefs and shell banks; unconsolidated bottom (soft sediments); artificial reefs; and coral reefs and live/hard bottom habitats.

3.1.4 Habitat Areas of Particular Concern

Areas which meet the criteria for Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPCs) for species in the snapper grouper management unit include medium to high profile offshore hard bottoms where spawning normally occurs; localities of known or likely periodic spawning aggregations; near shore hard bottom areas; The Point, The Ten Fathom Ledge, and Big Rock (North Carolina); The Charleston Bump (South Carolina); mangrove habitat; seagrass habitat; oyster/shell habitat; all coastal inlets; all state-designated nursery habitats of particular importance to snapper grouper (e.g., Primary and Secondary Nursery Areas designated in North Carolina); pelagic and benthic *Sargassum*; Hoyt Hills for wreckfish; the Oculina Bank Habitat Area of Particular Concern; all hermatypic coral habitats and reefs; manganese outcroppings on the Blake Plateau; and South Atlantic Council-designated Artificial Reef Special Management Zones (SMZs).

Areas that meet the criteria for EFH-HAPCs include habitats required during each life stage (including egg, larval, postlarval, juvenile, and adult stages).

In addition to protecting habitat from fishing related degradation though fishery management plan regulations, the South Atlantic Council, in cooperation with National Marine Fisheries Service (NMFS), actively comments on non-fishing projects or policies that may impact essential fish habitat. With guidance from the Habitat Advisory Panel, the South Atlantic Council has developed and approved policies on: energy exploration, development, transportation and hydropower re-licensing; beach dredging and filling and large-scale coastal engineering; protection and enhancement of submerged aquatic vegetation; alterations to riverine, estuarine and near shore flows; offshore aquaculture; and marine invasive species and estuarine invasive species.

3.2 Biological and Ecological Environment

3.2.1 Fish Stocks

3.2.1.1 Black Sea Bass, *Centropristis striata*

Life History

Black sea bass, *Centropristis striata*, occur in the Western Atlantic, from Maine to northeastern Florida, and in the eastern Gulf of Mexico. The species can be found in extreme south Florida during cold winters (Robins and Ray 1986). Separate populations were reported to exist to the north and south of Cape Hatteras, North Carolina (Wenner et al. 1986). However, genetic similarities suggest that this is one stock (McGovern et al. 2002). This species is common around rock jetties and on rocky bottoms in shallow water (Robins and Ray 1986) at depths from 2-120 m (7-394 ft). Most adults occur at depths from 20-60 m (66-197 ft) (Vaughan et al. 1995).

Maximum reported size is 66.0 cm (26.1 in) TL and 3.6 kg (7.9 lbs) (McGovern et al. 2002). The minimum size and age of maturity for females studied off the southeastern U.S. coast is 10 cm (3.6 in) SL and age 0. All females are mature by 18 cm (7.1 in) SL and age 3 (McGovern et al. 2002). Wenner et al. (1986) reported that spawning occurs from March through May in the South Atlantic Bight. McGovern et al. (2002) indicated that black sea bass females are in spawning condition during March-July, with a peak during March through May (McGovern et al. 2002). Some spawning also occurs during September and November. Spawning takes place in the evening (McGovern et al. 2002). Black sea bass change sex from female to male (protogyny). McGovern et al. (2002) noted that the size at maturity and the size at transition of black sea bass was smaller in the 1990s than during the early 1980s. Black sea bass appear to compensate for the loss of larger males by changing sex at smaller sizes and younger ages.

In the eastern Gulf of Mexico and off North Carolina, females dominate the first 5-year classes. Individuals over the age of 5 are more commonly males. Black sea bass live for at least 10 years. The diet of this species is generally composed of shrimp, crab, and fish (Sedberry 1988). Sedberry (1988) indicated that black sea bass consume primarily amphipods, decapods, and fishes off the Southeastern United States. Smaller black sea bass ate more small crustaceans and larger individuals fed more on decapods and fishes.

Descriptions of other South Atlantic Council-managed species may be found in Volume II of the Fishery Ecosystem Plan (SAFMC 2009b) or at the following web address: http://www.safmc.net/ecosystem/Home/EcosystemHome/tabid/435/Default.aspx.

Biomass and Landings

The following description of the biomass of black sea bass is from the SEDAR 25 Update report: In general, estimated abundance at age showed truncation of the older ages through the mid-1990s, and more stable or increasing values since. Total estimated abundance at the end of the assessment period showed some general increase from a low in 1999. In the most recent decade, a notably strong year class (age-0 fish) was predicted to have occurred in 2001 and 2010, and better than expected recruitment (i.e., positive residuals) from 2006 to 2011. Estimated biomass at age followed a similar pattern as abundance at age. Total biomass and spawning biomass showed similar trends – general decline from early 1980s until the mid-1990s, a relatively stable period from 1993-2006, and a steadily increasing since 2007 (**Figure 3.2.1**).

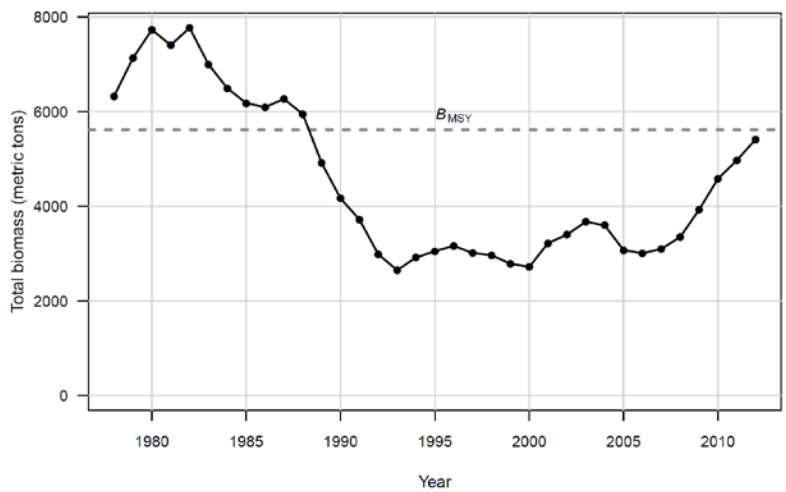

Figure 3.2.1. Estimated total biomass (metric tons) at start of year Source: SEDAR 25 Update 2013)

Prior to the recent increase in commercial ACL for black sea bass, the commercial ACL was exceeded every year but one (2007-2008) (**Table 3.2.1**).

Table 3.2.1. Commercial landings in relation to the commercial ACL.

Fishing Year	Fishing Season	Total Landings	ACL/Quota	Units	Quota %	Closure Date
2014	June 1 - Dec 31	212,435	780,020	ww	27.23	
2013-2014	June 1 - May 31	776,723	780,020	ww	99.58	
2012-2013	July* 1 - May 31	383,292	309,000	gw	124.04	10/08/2012
2011-2012	June 1 - May 31	385,639	309,000	gw	124.80	7/15/2011
2010-2011		436,360	309,000	gw	144.22	10/7/2010
2009-2010		336,735	309,000	gw	108.98	12/20/2009
2008-2009		394,708	309,000	gw	127.74	5/15/2009
2007-2008		298,917	423,000	gw	70.67	

*The black sea bass fishing season opening was pushed back to July 1 for the 2012-2013 fishing season.

Bycatch

See **Section 4.1.1** and the **Bycatch Practabilibilty Analysis (Appendix K)** for detail descriptions of bycatch when fishing for black sea bass.

Stock Status

An update to the black sea bass assessment was conducted in 2013 with data through 2012. Most of the data sources were simply updated with the 2 additional years of observations available since SEDAR 25 (2011) benchmark assessment that contained data through 2010. Additional changes made in some sources, such as recreational catch records, indices, and discards are detailed below. In addition, some datasets were unable to be updated due to management actions, regulations, and data availability issues.

Substantial changes are underway in recreational harvest surveys with implementation of the Marine Recreational Information Program (MRIP) in place of the prior Marine Recreational Fisheries Statistics Survey (MRFSS). Although the MRIP program promises improved data for the future, assessments must also consider the past and will continue to include the earlier data from the MRFSS program. However, these historical landings were calibrated to MRIP landings based on the years where overlapping data exists. At the time this update was prepared, recreational landings based upon MRIP methods were only available for 2004-2011.

General recreational landings, general recreational discards, headboat landings, and headboat discards from 2012 were not available by the data deadline for the 2013 update. In order to continue with the assessment, these data gaps were filled by taking the geometric mean of the landings and discards data for the previous 3 years (2009-2011). In addition, changes in the recreational and commercial fishing regulations, coupled with the early closure of both sectors of the fishery in 2011 and 2012, made the use of the fishery dependent indices of abundance questionable. These regulations include a decrease in the recreational bag limit from 15 fish to 5 fish, and a new commercial trip limit of 1,000 lb gutted weight. Due to the new regulations and closures, catch per unit effort (CPUE) from either fishery may not coincide with abundance, but instead may be driven by the regulatory changes and closures. For example, a higher percentage of anglers reached the lower bag limit, at which point they were expected to stop keeping black sea bass even though more fish were available to them. Since the regulation forces anglers to stop retaining fish even if fish are available, the CPUE from this segment of the fishery will be lower than it otherwise would. When this happens, CPUE becomes unreliable as a measure of population abundance and could lead to biased estimate of abundance in the assessment results. Therefore, it was decided not to update the headboat index of abundance and the commercial handline index of abundance with the most recent years of data. The headboat at-sea observer program discard index was updated through 2011, however 2012 data were not available for this assessment.

The MARMAP/SEFIS chevron trap index of abundance used in the model is standardized, meaning that the catch per unit effort (CPUE) is adjusted through a statistical model to account for factors, other than changes in the population, which may affect the observed CPUE. Examples of such factors that are commonly addressed include yearly variation, environmental factors, depth, and sampling characteristics. While this approach improves the information obtained from the index, estimates of the parameters included in the standardization model change each time additional years of data are added, therefore changing the CPUE index for the entire time series. This index was also standardized in the SEDAR 25 (2011) benchmark assessment.

Uncertainty in the model was characterized using a technique called a "mixed Monte Carlo Bootstrap" (MCB) which enables estimates of model uncertainty to better reflect the true underlying uncertainty in model estimates. For the SEDAR 25 Update 2013, the MCB runs were modified to account for using the geometric mean in estimating landings and discards in the recreational sector. The recreational landings and discards were varied for 2012 by choosing new values for each data point from a truncated normal distribution with a mean equal to the geometric mean of the previous 3 years and a standard deviation that was obtained by examining each time series to investigate how well the geometric mean of the previous 3 years estimates the current year's value. This resulted in widening the confidence intervals around the estimate of spawning stock biomass (SSB) in the terminal year.

The SEDAR 25 Update 2013 concluded that black sea bass are not overfished and overfishing is not occurring. The stock is very close to B_{MSY} (B_{2012}/B_{MSY}=0.96) and the SSB in 2012 is just above SSB_{MSY} (SSB_{2012}/SSB_{MSY}=1.032, **Table 3.2.2.1**). SSB in 2012 was estimated to be above $SSB_{MSY,}$ indicating that the stock is rebuilt. Spawning stock biomass decreased significantly from the beginning of the assessment period, dropping below SSB_{MSY} in 1989, until finally stabilizing and remaining at a low level from 1994-2007 (**Figure 3.2.2.1** in red). The SSB has been increasing consistently since 2008, crossing SSB_{MSY} in the terminal year of the assessment. Current fishing mortality (F) is well below F_{MSY} ($F_{Current}/F_{MSY}$=0.659, **Table 3.2.2.1**). The trend in F shows a rapid increase from the late-1970s until 1988, when it surpassed F_{MSY} by a significant amount (**Figure 3.2.2.1** in blue). F remained above F_{MSY}, with large inter-annual variability, until it dropped below F_{MSY} in 2011.

There were several concerns addressed by the assessment scientists, all related to the final estimate of SSB. The MCB runs indicate a high level of uncertainty around the terminal estimate of SSB. Approximately 32% of the MCB runs indicate that the stock is still below SSB_{MSY}. Some of the increased uncertainty in these terminal year estimates concerns the use of a geometric mean of past landings and discards in the recreational sector to estimate the 2012 landings and discards. The other concern involves the estimates of recruitment BECAUSE in the model. The increasing trend in biomass is dependent on the estimate of a strong year class in 2010. The conclusion that the stock is rebuilt is also critically dependent on the estimate of this 2010 year class. However, there is a high level of uncertainty surrounding this estimate of R in 2010. The issue is that the fish do not appear in the age samples until age 2 and the estimates of the composition of age 2 fish from this year class do not agree well with respect to the strength of this year class. In addition, R has declined in the last 2 years of the assessment and shows a cyclical pattern throughout the time series (**Figure 3.2.2.2**). The pattern shows a good year class followed by several smaller year classes. If we did have a strong year class in 2010, there may not be another one for several years or more.

Table 3.2.2.1. Benchmarks and status parameters estimated in the 2013 update to SEDAR 25 for black sea bass.
M is the average Lorenzen natural mortality, $F_{Current}$ is the geometric mean of F_{2011} and F_{2012}, F_{MSY} is the fishing mortality that produces MSY, SSB_{2012} is the estimated spawning stock biomass in 2012, SSB_{MSY} is the SSB when the stock is at MSY equilibrium, MSST is the minimum stock size threshold, B_{MSY} is the stock biomass when the stock is at MSY equilibrium, R_{MSY} is the expected number of age-0 fish when the stock is at MSY equilibrium, D_{MSY} is the expected dead discards when the stock is at MSY equilibrium, and MSY is the maximum sustainable yield. Data are from the 2013 assessment update report for black sea bass.

Quantity	Units	Estimate
M	per year	0.38
$F_{current}$	per year	0.402
F_{MSY}	per year	0.61
SSB_{2012}	1E10 eggs	265
SSB_{MSY}	1E10 eggs	256
MSST	1E10 eggs	159
B_{MSY}	1,000 lb	12,383
R_{MSY}	1,000 age-0 fish	35,843
D_{MSY}	1,000 fish	288
MSY	1,000 lb	1,780
SSB_{2012}/SSB_{MSY}	-	1.032
SSB_{2012}/MSST	-	1.66
$F_{current}/F_{MSY}$	-	0.659

3.2.3 Protected Species

There are 49 species, or distinct population segments (DPSs) of species, protected by federal law that may occur in the exclusive economic zone (EEZ) of the South Atlantic Region (Wynne and Schwartz 1999; Waring et al. 2013). Thirty-one of these species are marine mammals protected under the Marine Mammal Protection Act (MMPA). The MMPA requires that each commercial fishery be classified by the number of marine mammals they seriously injure or kill. NMFS's List of Fisheries (LOF) classifies U.S. commercial fisheries or fishery's with analogous gear types into three categories based on the number of incidental mortality or serious injury they cause to marine mammals. More information about the LOF and the classification process can be found at: http://www.nmfs.noaa.gov/pr/interactions/lof/. Six of the marine mammal species (sperm, sei, fin, blue, humpback, and North Atlantic right whales) protected by the MMPA, are also listed as endangered under the Endangered Species Act (ESA). In addition to those six marine mammals, five species of sea turtles (green, hawksbill, Kemp's ridley, leatherback, and loggerhead); the smalltooth sawfish; five DPSs of Atlantic sturgeon; and seven species of coral (elkhorn coral [*Acropora palmata*], staghorn coral [*A. cervicornis*] ("*Acropora*" collectively); lobed star coral [*Orbicella annularis*], mountainous star coral [*O. faveolata*], and boulder star coral [*O. franksi*] ("*Orbicella*" collectively); pillar coral [*Dendrogyra cylindrus*] and rough cactus coral [*Mycetophyllia ferox*]) are also protected under the ESA. Portions of designated critical habitat for North Atlantic right whales, the Northwest Atlantic (NWA) DPS of loggerhead sea turtles, and *Acropora* corals occur within the South Atlantic Council's jurisdiction. NMFS has conducted specific analyses ("Section 7 consultations") to evaluate the potential adverse effects from the South Atlantic Snapper-Grouper Fishery on species and critical habitat protected under the ESA. Summaries of those consultations and their determination are in **Appendix P**. Because of this Amendment's emphasis on large whale interactions with black sea bass pot gear, we have provided additional information on ESA and MMPA listings histories and threats on North Atlantic right and humpback whales in **Appendix M**.

Large Whales

North Atlantic Right Whales

North Atlantic right whales generally have a stocky body, black coloration (although some have white patches on their bellies), no dorsal fin, a large head (about 1/4 of the body length), strongly bowed lower lip, and callosities (raised patches of roughened skin) on their head. Two rows of long (up to 8 ft) dark baleen plates hang from their upper jaw, with about 225 plates on each side. Their tail is broad, deeply notched, and all black with a smooth trailing edge. Right whale life expectancy is unclear, but one individual is known to have reached 65+ years of age (Hamilton et al. 1998, Kenney 2002). Adult North Atlantic right whales are generally between 13 and 16 m long and can weigh up to 71 metric tons. Females are larger than males.

Range

There are six known major habitats or aggregation areas for the North Atlantic right whales: the coastal waters of the southeastern United States; the Great South Channel; Georges Bank/Gulf of Maine; Cape Cod and Massachusetts Bays; the Bay of Fundy; and the Scotian Shelf. North Atlantic right whales follow a general annual pattern of migration between low latitude winter calving grounds and high latitude summer foraging grounds (Perry *et al*. 1999, Kenney 2002). However, movements within and between habitats are extensive. In 2000, one whale was photographed in Florida waters on January 12, then again eleven days later (January 23) in Cape Cod Bay, less than a month later off Georgia (February 16), and back in Cape Cod Bay on March 23; effectively making the round-trip migration to the Southeast and back at least twice during the winter season (Brown and Marx 2000). Results from satellite tags clearly indicate that sightings separated by perhaps two weeks should not necessarily be assumed to indicate a stationary or resident animal. Instead, telemetry data have shown rather lengthy and somewhat distant excursions, including into deep water off the continental shelf (Mate *et al.* 1997, Baumgartner and Mate 2005).

The coastal waters of the southeastern United States are the only known calving area for right whales. Right whales generally occur off South and North Carolina from November 1 through April 30 (NMFS 2008) and have been sighted as far as about 30 nautical miles offshore (Knowlton et al. 2002, Pabst et al. 2009). Sighting records of right whales spotted in the core calving area off Georgia and Florida consist of mostly mother-calf pairs and juveniles but also some adult males and females without calves (Jackson et al 2012a). As many as 243 right whales have been documented in the southeastern United States during a single calving season (P. Hamilton, personal communication, April 11, 2014). Studies indicate that right whale concentrations are highest in the core calving area from November 15 through April 15 (NMFS 2008); on rare occasions, right whales have been spotted as early as September and as late as July (Taylor et al. 2010). Most calves are likely born early in the calving season. Right whale distribution off Georgia and Florida is restricted by the warm waters of the Gulf Stream, which serves as a thermal barrier (Keller et al. 2006).

Water temperature, bathymetry, and surface chop are factors in the distribution of calving right whales in the southeastern United States (Keller et al. 2012, Good 2008). Additional factors that are considered significant predictors of right whale abundance in the Southeast United States include year, distance to shore, and distance to the 22˚C sea surface temperature isotherm (Gowan and Ortega-Ortiz 2014). Gowan and Ortega-Ortiz (2014) also identified right whale behavior, unrelated to any specific physical or environmental feature, as factor for predicting abundance. Systematic surveys conducted off the coast of North Carolina during the winters of 2001 and 2002 sighted eight calves, suggesting the calving grounds may extend as far north as Cape Fear. Four of the calves were not sighted by surveys conducted further south. One of the females photographed was new to researchers, having effectively eluded identification over the period of its maturation (McLellan et al. 2004).

Abundance and Population Dynamics

Analysis of data on the minimum number of whales alive during 1990–2009 (based on 2011 analysis) indicate an increase in the number of catalogued whales during the period, a mean growth rate of 2.6%, but with high inter-annual variation in numbers (Waring et al., 2012). These population trends are low compared to those for populations of other large whales that are recovering, such as South Atlantic right whales and taxonomically similar western Arctic bowhead whales, which have had growth rates of 4% to 7% or more per year for decades. An analysis of the age structure of North Atlantic right whales suggests that it contains a smaller proportion of juvenile whales than expected (Hamilton et al. 1998; Best et al. 2001), which may reflect lowered recruitment and/or high juvenile mortality.

Because of the North Atlantic Right Whales' low reproductive output and small population size, even low levels of human-caused mortality can pose a significant obstacle for their recovery. Population modeling studies in the late 1990s (Caswell et al. 1999; Fujiwara and Caswell, 2001) indicated that preventing the death of two adult females per year could be sufficient to reverse the slow decline detected in right whale population trends in the 1990s.

Potential Biological Removal (PBR) Level is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its maximum productivity (16 U.S.C. 1362(3)(9)]. The PBR is calculated using the following factors–

- the minimum population estimate of the stock;
- one-half the maximum theoretical or estimated net productivity rate of the stock at a small population size; and
- a recovery factor for endangered, depleted, threatened stocks of between 0.1 and 1.0 (MMPA Sec. 3. 16 U.S.C. 1362) (Wade and Angliss, 1997).

The recovery factor for right whales is 0.10 because this species is listed as endangered under the ESA. The minimum population size is 455 and the maximum net productivity is 0.04; thus, PBR for the North Atlantic right whale is 0.9 (Waring et al. 2013). This means that if more than a single (because 1.0 is > 0.9) right whale is killed or seriously injured from non-natural causes in a single year, than the population cannot achieve its optimum sustainable population.

Threats

North Atlantic right whales were severely depleted by commercial whaling. By the early 1900s, the remaining population off North America was reduced to no more than a few hundred whales. Despite protection from commercial whaling since 1935, the remaining population has not recovered. Given the small population size and low annual reproductive rate of North Atlantic right whales, human sources of mortality, particularly vessel collision and fishing gear entanglements (Clapham et al. 1999; Knowlton and Kraus 2001; Moore et al. 2005; NMFS 2005) may have a greater effect to relative population growth rate than for other large whale species (Waring et al. 2013). NMFS has identified a number of additional threats to the species that are indirectly related to this action. Other threats to right whales may include decreased reproductive rate, reduced genetic diversity, environmental contamination, biotoxins, nutritional stress, interspecific competition, and climate change. **Appendix M** provides a discussion of these potential threats.

The primary causes of the right whale's failure to recover are deaths resulting from collisions with ships and entanglement in commercial fishing gear (Clapham et al. 1999; Knowlton and Kraus 2001; Moore et al. 2005; NMFS 2005). Right whales may not die immediately as the result of a vessel strike or entanglement but may gradually weaken or otherwise be affected so that further injury or death is likely (Waring et al. 2013). Collisions or entanglements may result in systemic infection or debilitation from tissue damage. Additionally, any injury or entanglement that: restricts a right whale from rotating its jaw while feeding; prevents it from forming a hydrostatic oral seal; compromises the integrity of its baleen; or prevents it from swimming at speeds necessary to capture prey; will reduce its foraging capabilities and may lead to starvation (Cassof et al. 2011, van der Hoop et al. 2012).

An average of approximately 2 *known* vessel collision-related right whale deaths have occurred annually over the last decade (Henry et al. 2012 Waring et al. 2012) and an average of 1.2 known vessel-strike related fatalities occurred in the period 2006–2010 (Waring et al. 2012). NMFS believes the actual number of deaths is likely higher than those documented, as some deaths likely go undetected or unreported, and in many cases when deaths are observed it is not possible to determine the cause of death from recovered carcasses due, for example, to advanced decomposition.

Similarly, entanglement in fixed fishing gear (e.g. trap pot and gillnet gear) is another leading cause of right whale mortality (NMFS 2005, Knowlton et al. 2012). Entanglement mortality and its effects on the right whale population are likely underestimated because some entanglements are undocumented or unreported and it is likely that carcasses from offshore are not detected or recovered (Cole et al. 2006). From 2006 through 2010, 9 of 15 records of mortality or serious injury involved entanglement or fishery interactions (Waring et al. 2012). Entanglement records from 1990 through 2010 (NMFS, unpublished data) included 74 confirmed right whale entanglements, including right whales in weirs, gillnets, and trailing line and buoys. Knowlton et al. 2005 examined 447 individual animals for evidence of scars left by fishing gear. Of the 447 whales examined, 338 of the whales (75.6%) had been entangled at least once and 608 separate entanglement interactions were documented between 1980 and 2002 (Knowlton *et al.* 2005). Further research using the North Atlantic Right Whale Catalogue has indicated that, annually, between 14% and 51% of right whales are involved in entanglements (Knowlton et al. 2005). Over time, there has been an increasing trend in entanglement rates, including an increase in the proportion of serious entanglements (Knowlton et al. 2005).

Information from an entanglement event often does not include the detail necessary to assign the entanglements to a particular fishery or location. Johnson *et al.* (2005) analyzed entanglements of 31 right whales and found that all types of fixed fishing gear and any part of the gear was involved in entanglements. When gear type was identified, pot gear and gillnet gear represented 71% and 14% of entanglements, respectively. The authors pointed out that buoy lines were involved in 51% of entanglements and suggested that entanglement risk is elevated by any line that rises in the water column. Mouth entanglements for right whales were the most common point of entanglement (77.4%) and were particularly deadly; 55.6% of right whales seen with mouth entanglements died (Johnson et al. 2005). Mouth entanglements likely occur when a whale's mouth is open giving rise to speculation that entanglements occur when whales are feeding (Johnson et al. 2005). Occasionally, right whales with open mouths are observed in the southeastern U.S. calving area (Jackson et al. 2012b, Jackson et al. 2011). In a recent compilation of data from 2007-2014, there were 17 entangled whales and none of these were attributed to a specific fishery (Waring et al. 2014). As evidenced by these compilations, information from an entanglement event often does not include the detail necessary to assign the entanglements to a particular fishery or location, and scarring studies suggest the vast majority of entanglements are not observed (Waring et al. 2014).

Calves and juveniles become entangled more frequently than adults and are more likely to suffer deep wounds (> 8cm) from entanglement. Knowlton et al. (2011) studied ropes that were removed from entangled right whales (dead and alive) and suggested that a whale's ability to break free of entangling gear is related to its age. Breaking strength of rope also influences a whale's ability to break free of entangling gear. Adults appear to be able to break free of ropes with a breaking strength of less than 3,300 lbs, but calves and juveniles cannot and are more prone to drowning (Knowlton et al. 2011, Cassof et al. 2011). Right whale calves would likely need a line breaking strength of 600lbs or lighter in order to have some chance of breaking free (S. Krause, 2014 ALWTRT Meeting; Knowlton et al., in press)

Gear trailing behind a right whale creates substantial drag and may inhibit foraging (van der Hoop *et al.* 2013). Entanglements may also reduce a whale's ability to maneuver, making it more susceptible to ship strikes (NMFS 2006).

Humpback Whales

Humpback whales are known for their long pectoral fins, which can be up to 15 feet long. These long fins give them increased maneuverability; they can be used to slow down or even go backwards. Similar to all baleen whales, adult females are larger than adult males, reaching lengths of up to 60 feet. Their body coloration is primarily dark grey, but individuals have a variable amount of white on their pectoral fins and belly. This variation is so distinctive that the pigmentation pattern on the undersides of their "flukes" is used to identify individual whales, similar to a human fingerprint.

<u>Range</u>

Like right whales, humpback whales follow a general annual pattern of migration between low latitude winter calving grounds (in the West Indies) and high latitude summer foraging grounds. Humpback whales feed during spring, summer, and fall in the Gulf of Maine, the Gulf of St. Lawrence, Newfoundland/ Labrador, and western Greenland. In the Gulf of Maine, sightings are most frequent from mid-March through November between 41°N and 43°N, from the Great South Channel north along the outside of Cape Cod to Stellwagen Bank and Jeffreys Ledge, and peak in May and August (CETAP, 1982). Small numbers of individuals may be present in New England waters year-round, including the waters of Stellwagen Bank (Clapham et al, 1993). In winter, humpback whales calve primarily in the West Indies, specifically in the Antilles, primarily on Silver and Navidad Banks, north of the Dominican Republic (Clapham et al. 1993; Katona and Beard, 1990; Palsboll et al. 1997; Stevick et al. 1998). The primary winter range also includes the Virgin Islands and Puerto Rico.

Humpback whales are assumed to use the Mid-Atlantic as a migratory pathway to and from the calving/mating grounds. The Mid-Atlantic may also be an important winter feeding area for juveniles. Since 1989, observations of juvenile humpbacks in the Mid-Atlantic have been increasing during the winter months, peaking from January through March (Swingle et al. 1993). Biologists theorize that non-reproductive animals may be establishing a winter feeding range in the Mid-Atlantic since they are not participating in reproductive behavior in the Caribbean (Barco et al. 2002). Swingle et al. (1993) identified a shift in distribution of juvenile humpback whales in the nearshore waters of Virginia, primarily in winter months. Identified whales using the Mid-Atlantic area were found to be residents of the Gulf of Maine and Atlantic Canada (Gulf of St. Lawrence and Newfoundland) feeding groups, suggesting a mixing of different feeding populations in the Mid-Atlantic region (Barco et al. 2002). Strandings of humpback whales have increased between New Jersey and Florida since 1985, consistent with the increase in Mid-Atlantic whale sightings. Strandings were most frequent from September through April in North Carolina and Virginia waters, and involved primarily juvenile humpback whales of no more than 35 feet long (Wiley et al. 1995).

Life History and Reproductive Success

It is generally believed that copulation and calving take place on the winter range in the Greater and Lesser Antilles. The gestation period in humpback whales is 12 months and females give birth every 2 to 3 years, usually between December and May (Clapham and Mayo, 1987).

Abundance and Population Dynamics

Modeling using data obtained from photographic mark-recapture studies estimates the growth rate of the Gulf of Maine feeding population at 6.5% (Barlow and Clapham, 1997). More recent studies have found lower growth rates of 0.0 percent to 4.0 percent, although these results may be a product of shifts in humpback distribution (Clapham et al. 2003). Current data suggest that the Gulf of Maine humpback whale stock is steadily increasing in size (Waring et al. 2012). With respect to the North Atlantic population overall, there are indications of increasing abundance. One study estimated a growth rate of 3.1 percent for the period from 1979 to 1993 (Stevick et al. 2001).

Potential Biological Removal for the Gulf of Maine humpback whale stock is 2.7 whales per year. As noted, PBR is the product of minimum population size, one-half the maximum productivity rate, and a “recovery” factor (MMPA Sec. 3. 16 U.S.C. 1362) (Wade and Angliss, 1997). The minimum population size for the Gulf of Maine stock is 823 whales. The maximum productivity rate is 0.065. The “recovery” factor is assumed to be 0.10 because the humpback whale is listed as endangered under the ESA.

Threats

As with right whales, the major known sources of human-caused mortality and injury of humpback whales are commercial fishing gear entanglements and ship strikes. Sixty percent of closely investigated Mid-Atlantic humpback whale mortalities showed signs of entanglement or vessel collision (Wiley et al. 1995). From 2008 through 2012, there were at least 7 reports of mortalities as a result of collision with a vessel and 41 serious injuries and mortalities attributed to entanglement (80 FR 4881; January 29, 2015). Many carcasses also washed ashore or were spotted floating at sea for which the cause of death could not be determined. Robbins (2009) found that 64.9% of the North Atlantic population had entanglement scarring, which corresponds to approximately 66 entanglement cases per year. These estimates are based on sightings of free-swimming animals that initially survive the encounter. Some whales may drown immediately, others may be too decomposed for analysis, and some may never be examined. For these reasons, it is likely the actual number of interactions with fishing gear is higher than recorded (Waring et al. 2006).

Johnson et al. (2005) noted that any part of the gear (buoy line, groundline, floatline, and surface system line) creates a risk for entanglement. Johnson et al. (2005) also reported that of the 30 humpback whale entanglements examined in the study, 16 (53%) involved entanglements in the tail region and 13 (43%) involved entanglements in the mouth (note that in both cases, some entanglements included other points of gear attachment on the body). Although the sample size was small for cases in which the point of gear attachment and the associated gear part could be examined, 2 out of 2 floating groundline entanglements and 4 out of 7 (57%) buoy line entanglements involved the mouth.[1] In addition, 5 out of 7 (71%) buoy line entanglements and 3 out of 4 (75%) gillnet floatline entanglements involved the tail (Johnson et al. 2005).[2]

Based on studies of humpback whale caudal peduncle scars, Robbins and Mattila (2000) reported that calves (approximately 0-1 year) had a lower entanglement risk than yearlings (1 year old), juveniles, and mature whales; the latter 3 maturational classes exhibited comparable levels of high probability scarring. Based on these data as well as evidence that animals acquire new injuries when mature, the authors concluded that actively feeding whales may be at greater risk of entanglement. In any case, juveniles seemed to be at the most risk, possibly due to their relative inexperience.

Humpback whales employ a variety of foraging techniques, which may create entanglement risk (Hain et al. 1982, Weinrich et al. 1992). They feed on a number of species of small schooling fishes and krill (Wynne and Schwartz 1999), by targeting fish schools and filtering large amounts of water for their associated prey. One such technique is lunge feeding, in which the whale swims toward a patch of krill or small fish, then lunges into the patch with its mouth agape. The flippers may aid in concentrating the prey or in maneuvering. Another feeding

[1] Note that one humpback whale was entangled in both buoy line and groundline and was placed in both categories.
[2] Note that the entanglements in buoy line exceed the total of 7 because some animals were entangled in multiple locations on their body (e.g., both the mouth and the tail).

method, called "flick-feeding," involves flexing the tail forward when the whale is just below the surface, which propels water over the whale's head, temporarily disorienting its prey. The whale then swims with its mouth open, through the wave it created. A third foraging strategy is bubble feeding, in which whales swim upwards, while blowing nets or clouds of bubbles, in a spiral under a concentration of prey. This creates a barrier through which the disoriented fish cannot escape. The whales then swim up through the bubble formation, engulfing their prey. These techniques demonstrate that humpback whales commonly use their mouths, flippers, and tails to aid in feeding. Thus, while foraging, all body parts are at risk of entanglement.

Turtles

Green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles are all highly migratory and travel widely throughout the South Atlantic. The following sections are a brief overview of the general life history characteristics of the sea turtles found in the South Atlantic region. Several volumes exist that cover the biology and ecology of these species more thoroughly (i.e., Lutz and Musick (eds.) 1997, Lutz et al. (eds.) 2003).

Green sea turtle hatchlings are thought to occupy pelagic areas of the open ocean and are often associated with *Sargassum* rafts (Carr 1987, Walker 1994). Pelagic stage green sea turtles are thought to be carnivorous. Stomach samples of these animals found ctenophores and pelagic snails (Frick 1976, Hughes 1974). At approximately 20 to 25 cm carapace length, juveniles migrate from pelagic habitats to benthic foraging areas (Bjorndal 1997). As juveniles move into benthic foraging areas a diet shift towards herbivory occurs. They consume primarily seagrasses and algae, but are also know to consume jellyfish, salps, and sponges (Bjorndal 1980, 1997; Paredes 1969; Mortimer 1981, 1982). The diving abilities of all sea turtles species vary by their life stages. The maximum diving range of green sea turtles is estimated at 110 m (360 ft) (Frick 1976), but they are most frequently making dives of less than 20 m (65 ft.) (Walker 1994). The time of these dives also varies by life stage. The maximum dive length is estimated at 66 minutes with most dives lasting from 9 to 23 minutes (Walker 1994).

The **hawksbill's** pelagic stage lasts from the time they leave the nesting beach as hatchlings until they are approximately 22-25 cm in straight carapace length (Meylan 1988, Meylan and Donnelly 1999). The pelagic stage is followed by residency in developmental habitats (foraging areas where juveniles reside and grow) in coastal waters. Little is known about the diet of pelagic stage hawksbills. Adult foraging typically occurs over coral reefs, although other hard-bottom communities and mangrove-fringed areas are occupied occasionally. Hawksbills show fidelity to their foraging areas over several years (van Dam and Diéz 1998). The hawksbill's diet is highly specialized and consists primarily of sponges (Meylan 1988). Gravid females have been noted ingesting coralline substrate (Meylan 1984) and calcareous algae (Anderes Alvarez and Uchida 1994), which are believed to be possible sources of calcium to aid in eggshell production. The maximum diving depths of these animals are not known, but the maximum length of dives is estimated at 73.5 minutes. More routinely, dives last about 56 minutes (Hughes 1974).

Kemp's ridley hatchlings are also pelagic during the early stages of life and feed in surface waters (Carr 1987, Ogren 1989). Once the juveniles reach approximately 20 cm carapace length they move to relatively shallow (less than 50m) benthic foraging habitat over unconsolidated substrates (Márquez-M. 1994). They have also been observed transiting long distances between foraging habitats (Ogren 1989). Kemp's ridleys feeding in these nearshore areas primarily prey on crabs, though they are also known to ingest mollusks, fish, marine vegetation, and shrimp (Shaver 1991). The fish and shrimp Kemp's ridleys ingest are not thought to be a primary prey item but instead may be scavenged opportunistically from bycatch discards or from discarded bait (Shaver 1991). Given their predilection for shallower water, Kemp's ridleys most routinely make dives of 50 m or less (Soma 1985, Byles 1988). Their maximum diving range is unknown. Depending on the life stage a Kemp's ridleys may be able to stay submerged anywhere from 167 minutes to 300 minutes, though dives of 12.7 minutes to 16.7 minutes are much more common (Soma 1985, Mendonca and Pritchard 1986, Byles 1988). Kemp's ridleys may also spend as much as 96% of their time underwater (Soma 1985, Byles 1988).

Leatherbacks are the most pelagic of all ESA-listed sea turtles and spend most of their time in the open ocean. Although they will enter coastal waters and are seen over the continental shelf on a seasonal basis to feed in areas where jellyfish are concentrated. Leatherbacks feed primarily on cnidarians (61ssue61, siphonophores) and tunicates. Unlike other sea turtles, leatherbacks' diets do not shift during their life cycles. Because leatherbacks' ability to capture and eat jellyfish is not constrained by size or age, they continue to feed on these species regardless of life stage (Bjorndal 1997). Leatherbacks are the deepest diving of all sea turtles. It is estimated that these species can dive in excess of 1000 m (Eckert et al. 1989) but more frequently dive to depths of 50 m to 84 m (Eckert et al. 1986). Dive times range from a maximum of 37 minutes to more routines dives of 4 to 14.5 minutes (Standora et al. 1984, Eckert et al. 1986, Eckert et al. 1989, Keinath and Musick 1993). Leatherbacks may spend 74% to 91% of their time submerged (Standora et al. 1984).

Loggerhead hatchlings forage in the open ocean and are often associated with *Sargassum* rafts (Hughes 1974, Carr 1987, Walker 1994, Bolten and Balazs 1995). The pelagic stage of these sea turtles are known to eat a wide range of things including salps, jellyfish, amphipods, crabs, syngnathid fish, squid, and pelagic snails (Brongersma 1972). Stranding records indicate that when pelagic immature loggerheads reach 40-60 cm straight-line carapace length they begin to live in coastal inshore and nearshore waters of the continental shelf throughout the U.S. Atlantic (Witzell 2002). Here they forage over hard- and soft-bottom habitats (Carr 1986). Benthic foraging loggerheads eat a variety of invertebrates with crabs and mollusks being an important prey source (Burke et al. 1993). Estimates of the maximum diving depths of loggerheads range from 211 m to 233 m (692-764 ft.) (Thayer et al. 1984, Limpus and Nichols 1988). The lengths of loggerhead dives are frequently between 17 and 30 minutes (Thayer et al. 1984, Limpus and Nichols 1988, Limpus and Nichols 1994, Lanyon et al. 1989) and they may spend anywhere from 80 to 94% of their time submerged (Limpus and Nichols 1994, Lanyon et al. 1989).

<u>Fish</u>

Historically the **smalltooth sawfish** in the U.S. ranged from New York to the Mexico border. Their current range is poorly understood but believed to have contracted from these historical areas. In the South Atlantic region, they are most commonly found in Florida, primarily off the Florida Keys (Simpfendorfer and Wiley 2004). Only two smalltooth sawfish have been recorded north of Florida since 1963 (the first was captured off North Carolina in 1963 and the other off Georgia in 2002 (National Smalltooth Sawfish Database, Florida Museum of Natural History)). Historical accounts and recent encounter data suggest that immature individuals are most common in shallow coastal waters less than 25 meters (Bigelow and Schroeder 1953, Adams and Wilson 1995), while mature animals occur in waters in excess of 100 meters (Simpfendorfer pers. comm. 2006). Smalltooth sawfish feed primarily on fish. Mullet, jacks, and ladyfish are believed to be their primary food resources (Simpfendorfer 2001). Smalltooth sawfish also prey on crustaceans (mostly shrimp and crabs) by disturbing bottom sediment with their saw (Norman and Fraser 1938, Bigelow and Schroeder 1953).

North Atlantic Right Whale Critical Habitat

In 1994, NMFS published a final rule designating critical habitat for right whales (59 FR 28793, June 3, 1994). The currently designated critical habitat included portions of Cape Cod Bay and Stellwagen Bank, the Great South Channel (each off the coast of Massachusetts), and the waters adjacent to the coast of Georgia and the east coast of Florida. These areas were determined to be essential to the conservation of right whales because of their importance as foraging, calving, and nursing habitats. For example, Cape Cod Bay and the Great South Channel represent two of the four known principal feeding grounds for adult right whales in the Western North Atlantic and the only two within U.S. waters. In addition, the waters off Georgia and Northern Florida have been identified as the only known calving ground for right whales. This area was originally based on 303 sightings from 1950-1989. All the designations were based primarily on right whale sightings data as opposed to an analysis of the physical and biological habitat features essential to the conservation of the species.

In July 2002, NMFS received a petition requesting revision of the current critical habitat designation for right whales, by combining and expanding the current Cape Cod Bay and Great South Channel critical habitats in the Northeast and by expanding the current critical habitat in the Southeast. In August 2003, NMFS determined that the requested revision, as specified by the petitioner, was not warranted at that time. On October 1, 2009, NMFS received another petition, this time from the Center for Biological Diversity (CBD), Defenders of Wildlife, Humane Society of the United States, Ocean Conservancy, and the Whale and Dolphin Conservation Society (the Petitioners) to revise the designated North Atlantic right whale critical habitat. The petition wanted to expand the existing North Atlantic right whale critical habitat by including more areas designated as critical feeding and calving habitat, and including a migratory corridor. On October 6, 2010, NMFS announced the 90-day finding: that the petition, in conjunction with the information readily available in the files, presents substantial scientific information indicating that the requested revision may be warranted. The October 6, 2010, Federal Register notice also included a 12-month determination on how to proceed with the petition: that NMFS would continue the ongoing rulemaking process which would result in the publication of a proposed rule in the Federal Register regarding North Atlantic right whale critical habitat. On February

20, 2015, NMFS published the proposed rule outlined the proposed changes to North Atlantic right whale critical habitat, available at: 80 FR 9314.

3.3 Social and Economic Environment

3.3.1 Economic Description of the Commercial Sector

Snapper Grouper Fishery

The South Atlantic Fishery Management Council manages 6 key species groups, in addition to sargassum and coral/coral reefs. From 2009 through 2013, the snapper grouper complex accounted for the highest percentage of commercial landings (gw) at 39% followed by coastal migratory pelagics at 37% and spiny lobster at 14%. The rest of the species groups represented 10% of commercial landings, with golden crap accounting for 4% of total landings. In terms of dockside revenues (2013 $), the snapper grouper complex represented the highest share at 38%, followed by spiny lobster at 33%, with coastal migratory pelagics ranking third at 19%. Golden crab accounted for 3% of total dockside revenues.

Any fishing vessel that harvests and sells any of the snapper grouper species from the South Atlantic EEZ must have a valid South Atlantic commercial snapper grouper permit, which is a limited access permit. There are currently 547 valid South Atlantic Snapper Grouper Unlimited Permits and 117 valid 225 lb Trip Limited Permits (**Table 3.3.1.1**). After a permit expires, it can be renewed and transferred up to one year after it expires. The numbers of valid and transferrable/renewable permits have declined since 2009 (**Table 3.3.1.2**). For harvesting black sea bass using traps, a black sea bass pot endorsement is required. This is a limited access form of a system, so no new black sea bass pot endorsement will be issued. Like a permit, an endorsement may be transferred, subject to certain requirements. There are 32 endorsements established through Amendment 18A.

Table 3.3.1.1. Valid and transferrable/renewable South Atlantic commercial snapper grouper permits as of January 30, 2014.

South Atlantic S-G Permits	Unlimited lb	225 lb
Valid	547	117
Transferrable/Renewable	22	8
Total	569	125

Source**:** NMFS SERO PIMS, 2014.

Table 3.3.1.2. Number of South Atlantic commercial snapper grouper permits.

	Unlimited	Limited 225 lb
2009	640	144
2010	624	139
2011	569	126
2012	558	123
2013	593	130
Average	597	132

Source: NMFS SERO PIMS, 2014

The following focuses on commercial landings and revenues for black sea bass. The major sources of data summarized in this description are the SEFSC Commercial ACL Dataset, as summarized by SERO-LAPP-2014-09, and Federal Logbook System (FLS), supplemented by average prices calculated from the Accumulated Landings System (ALS) and price indices taken from the Bureau of Labor Statistics. Landings from the FLS do not include all landings shown from the ACL dataset due to landings by fishermen who do not have the federal snapper grouper permit and are not required to complete the logbook; non-reporting in the logbook program is also an issue. Additional information on the commercial snapper grouper sector is contained in previous amendments and is incorporated herein by reference [see Amendment 13C (SAFMC 2006), Amendment 15A (SAFMC 2008a), Amendment 15B (SAFMC 2008b), Amendment 16 (SAFMC 2009a), Regulatory Amendment 9 (SAFMC 2011a), Comprehensive ACL Amendment for the South Atlantic Region (SAFMC 2011c), Amendment 18A (SAFMC 2012, and Regulatory Amendment 19 (SAFMC 2013)] .

Total Annual Landings and Revenues for Black Sea Bass

The commercial black sea bass fishing fleet in the South Atlantic is composed of vessels using primarily black sea bass pots and hook and line gear. Other gear types have also been used for harvesting black sea bass. The commercial fishing season for black sea bass used to be from January 1 through December 31, but it was changed to June 1 through May 31 under Amendment 13C (SAFMC 2006). Regulatory Amendment 14 will change this fishing year back to January 1 through December 31, starting in 2015. It is noted that a one-month delay for the 2012/2013 season was enacted to allow for some changes in regulations to take effect before the start of the fishing season. For presentation purposes, a fishing year is defined as June 1 through May 31. For each fishing year from 2000/01 through 2012/13 and on average, traps were the dominant gear type for harvesting black sea bass by weight and by revenue (**Table 3.3.1.3**). Notable, nonetheless, are the relatively large increases in hook-and-line landings and revenues in the 2012/2013 season. It will be shown later that, based on logbook reports, landings and revenues for gear other than traps also substantially increased in the 2013/14 fishing season.

In Table 3.3.1.3, the other gear category includes dredges, hand, gigs and spears, gillnets, lift nets, trap nets, unclassified, and diving. Each of this other gear, with the exception of “unclassified gear,” accounted for less than one percent of total black sea bass landings for the entire period. Unclassified landings accounted for approximately 7 percent of all landings by “other gear” for the entire period. Since the 2008/2009 fishing year, however, “unclassified gear” accounted for 99 percent to 100 percent of total landings by other gear types. Landings information using logbooks (see **Table 3.3.1.7** below) indicates that most of the unclassified landings cannot be assigned to the pot gear. Based on the history of landings by other gear, particularly before the 2008/09 fishing season, it is likely that a good part of unclassified landings are by the hook and line gear.

Table 3.3.1.3. Black sea bass commercial landings (lb gw) and dockside revenues (2013 $) by gear type, fishing year 2000/01--2012/13.

	Total	Traps	Hook and Line	Others
Landings (lb gw)				
2000/01	470,412	79.1%	17.4%	3.6%
2001/02	491,204	83.4%	14.5%	2.1%
2002/03	341,092	80.8%	17.7%	1.5%
2003/04	676,227	84.2%	14.1%	1.7%
2004/05	541,550	82.8%	17.0%	0.2%
2005/06	342,636	84.8%	15.0%	0.1%
2006/07	458,439	86.8%	12.9%	0.3%
2007/08	298,917	81.4%	18.2%	0.4%
2008/09	394,708	68.0%	11.3%	20.7%
2009/10	336,735	70.2%	15.6%	14.3%
2010/11	436,360	66.4%	11.9%	21.7%
2011/12	385,639	61.0%	10.4%	28.6%
2012/13	383,292	46.6%	21.8%	31.6%
Average	427,478	75.8%	15.1%	9.1%
Revenues (2013 $)				
2000/01	$1,122,137	77.1%	19.9%	3.0%
2001/02	$1,095,327	81.4%	16.3%	2.3%
2002/03	$744,893	79.0%	19.2%	1.7%
2003/04	$1,490,984	83.1%	15.2%	1.7%
2004/05	$1,195,576	81.1%	18.6%	0.2%
2005/06	$876,038	83.7%	16.1%	0.1%
2006/07	$1,259,167	85.6%	14.1%	0.3%
2007/08	$811,005	80.3%	19.4%	0.3%
2008/09	$1,017,498	67.1%	12.7%	20.2%
2009/10	$860,831	66.2%	16.4%	17.3%
2010/11	$1,168,691	63.5%	11.6%	24.8%
2011/12	$864,484	54.4%	11.9%	33.7%
2012/13	$1,104,440	44.3%	23.0%	32.7%
Average	$1,047,005	73.3%	16.4%	10.3%

Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014.

Among the various states, North Carolina accounted for the largest amount of landings for black sea bass by weight and revenue (**Table 3.3.1.4**). South Carolina generally came in second, and Florida/Georgia third. In 2011/12, however, Florida/Georgia landings by weight and revenues increased quite substantially, topping South Carolina. North Carolina landings include black sea bass landings that were likely caught in the South Atlantic but reported by dealers in the Northeast. Such landings annually averaged about 49,000 lb gw with a dockside value of $137,000 for fishing years 2010/11 through 2012/13. Prior to those fishing years, there were virtually no such reported landings.

Table 3.3.1.3. Black sea bass commercial landings (lb gw) and dockside revenues (2013 $) by gear type, fishing year 2000/01--2012/13.

	Total	Traps	Hook and Line	Others
Landings (lb gw)				
2000/01	470,412	79.1%	17.4%	3.6%
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2002/03	341,092	80.8%	17.7%	1.5%
2003/04	676,227	84.2%	14.1%	1.7%
2004/05	541,550	82.8%	17.0%	0.2%
2005/06	342,636	84.8%	15.0%	0.1%
2006/07	458,439	86.8%	12.9%	0.3%
2007/08	298,917	81.4%	18.2%	0.4%
2008/09	394,708	68.0%	11.3%	20.7%
2009/10	336,735	70.2%	15.6%	14.3%
2010/11	436,360	66.4%	11.9%	21.7%
2011/12	385,639	61.0%	10.4%	28.6%
2012/13	383,292	46.6%	21.8%	31.6%
Average	427,478	75.8%	15.1%	9.1%
Revenues (2013 $)				
2000/01	$1,122,137	77.1%	19.9%	3.0%
2001/02	$1,095,327	81.4%	16.3%	2.3%
2002/03	$744,893	79.0%	19.2%	1.7%
2003/04	$1,490,984	83.1%	15.2%	1.7%
2004/05	$1,195,576	81.1%	18.6%	0.2%
2005/06	$876,038	83.7%	16.1%	0.1%
2006/07	$1,259,167	85.6%	14.1%	0.3%
2007/08	$811,005	80.3%	19.4%	0.3%
2008/09	$1,017,498	67.1%	12.7%	20.2%
2009/10	$860,831	66.2%	16.4%	17.3%
2010/11	$1,168,691	63.5%	11.6%	24.8%
2011/12	$864,484	54.4%	11.9%	33.7%
2012/13	$1,104,440	44.3%	23.0%	32.7%
Average	$1,047,005	73.3%	16.4%	10.3%

Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014.

Among the various states, North Carolina accounted for the largest amount of landings for black sea bass by weight and revenue (**Table 3.3.1.4**). South Carolina generally came in second, and Florida/Georgia third. In 2011/12, however, Florida/Georgia landings by weight and revenues increased quite substantially, topping South Carolina. North Carolina landings include black sea bass landings that were likely caught in the South Atlantic but reported by dealers in the Northeast. Such landings annually averaged about 49,000 lb gw with a dockside value of $137,000 for fishing years 2010/11 through 2012/13. Prior to those fishing years, there were virtually no such reported landings.

Table 3.3.1.4. Black sea bass commercial landings (lb gw) and dockside revenues (2013 $) by state/area, fishing year 2000/01--2012/13.

	Total	Florida/Georgia	South Carolina	North Carolina
Landings (lb gw)				
2000/01	470,412	1.1%	18.8%	80.1%
2001/02	491,204	1.7%	10.4%	88.0%
2002/03	341,092	1.8%	12.1%	86.0%
2003/04	676,227	1.5%	29.1%	69.4%
2004/05	541,550	2.5%	22.0%	75.5%
2005/06	342,636	2.1%	18.9%	79.0%
2006/07	458,439	2.2%	22.0%	75.8%
2007/08	298,917	2.5%	35.1%	62.3%
2008/09	394,708	2.2%	28.7%	69.1%
2009/10	336,735	12.1%	17.9%	70.0%
2010/11	436,360	17.9%	19.0%	63.1%
2011/12	385,639	29.6%	21.9%	48.5%
2012/13	383,292	15.9%	26.0%	58.1%
Average	427,478	6.7%	21.7%	71.6%
Revenues (2013 $)				
2000/01	$1,122,137	0.8%	18.2%	81.0%
2001/02	$1,095,327	1.4%	11.1%	87.5%
2002/03	$744,893	1.7%	14.2%	84.1%
2003/04	$1,490,984	1.5%	29.0%	69.5%
2004/05	$1,195,576	2.5%	22.5%	75.1%
2005/06	$876,038	2.0%	20.1%	77.9%
2006/07	$1,259,167	2.1%	22.6%	75.3%
2007/08	$811,005	2.3%	33.3%	64.4%
2008/09	$1,017,498	2.1%	28.0%	69.8%
2009/10	$860,831	10.7%	21.4%	67.8%
2010/11	$1,168,691	13.3%	19.3%	67.4%
2011/12	$864,484	19.7%	21.8%	58.5%
2012/13	$1,104,440	12.0%	27.8%	60.2%
Average	$1,047,005	5.3%	22.4%	72.2%

Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

Most commercial fisheries are subject to seasonality, perhaps due to weather, regulations, markets for the fish, and the like. The commercial black sea bass segment of the snapper grouper fishery is no exception. For purposes of showing how seasonality possibly changed over time, three sub-periods are considered, 2000/01-2005/06, 2006/07-2009/10, and 2010/11-2012/13. The second sub-period starts right about the time the fishing season was changed from a calendar year to June 1-May 31, and the third sub-period starts at about the time closures to commercial harvest of black sea bass began to be implemented. Overall, a relatively strong seasonality characterizes the commercial landings (and revenues) for black sea bass (**Figure 3.3.1.1**). The first two sub-periods show about similar seasonality pattern: landings started at relatively low levels from June through October, rose in November with a peak in December and dropped thereafter. Apparently, the change in the fishing season did not alter the seasonality pattern of landings. The third sub-period is markedly different from the other two. Peak landings occurred at the start of the fishing season and dropped rather steeply through November, with a spike in December. The landings spike in December is similar to that of the other two sub-periods. The change in seasonality pattern in the third period may be mainly attributed to fishing closures that reduced landings in the latter part of the season and that also motivated fishermen to fish harder at the start of the next fishing season. The three sub-periods also show different levels of average landings per month. From October through May, average monthly landings were highest in the first sub-period and lowest in the third sub-period, with those in the second sub-period falling between those of the first and third sub-periods. The reverse holds for the months of June through September, with the third sub-period showing the highest monthly landings and the first sub-period, the lowest monthly landings.

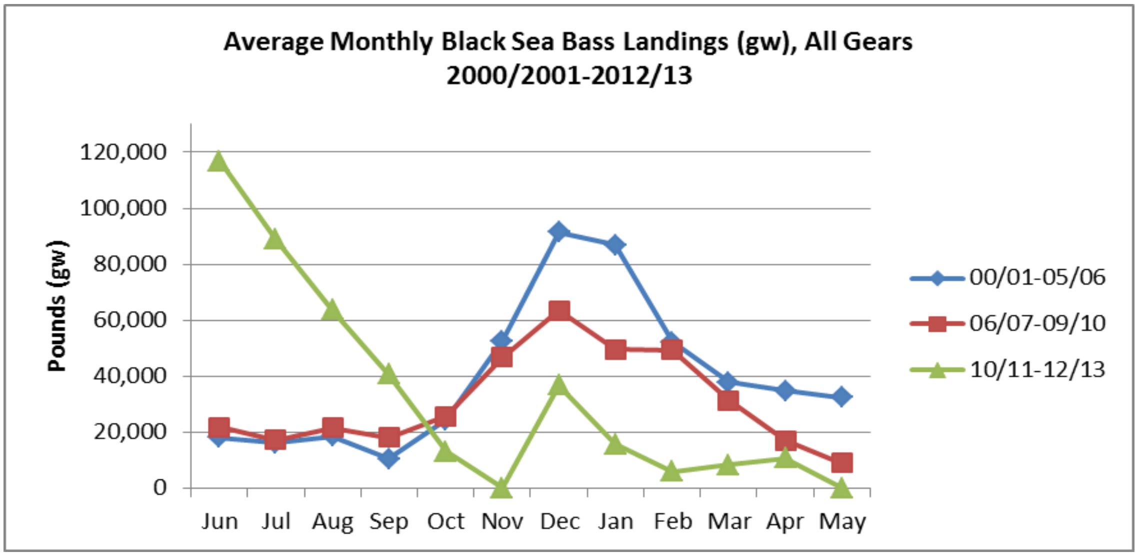

Figure 3.3.1.1. Average monthly black sea bass landings (lb gw), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

The seasonality pattern for, and the level of, black sea bass landings by traps only appear similar to that for all gear types in each of the three sub-periods (**Figure 3.3.1.2)**. This is probably as expected because traps have been the dominant gear type for black sea bass commercial landings.

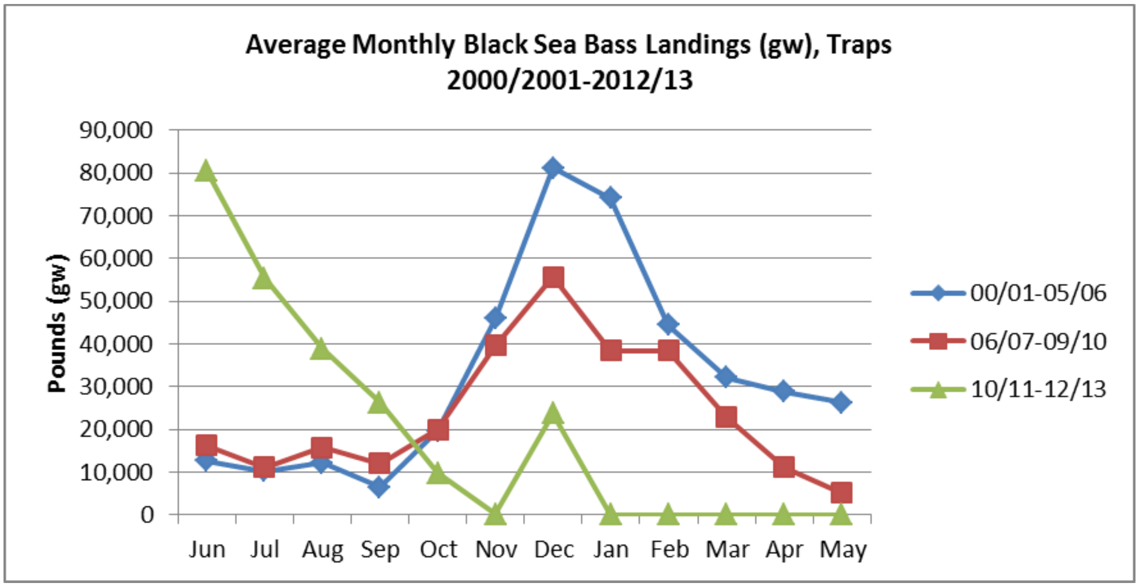

Figure 3.3.1.2. Average monthly black sea bass landings (lb gw), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

The seasonality pattern for landings by other gear types is quite different from that for landings by all gear types (**Figure 3.3.1.3).** Peak landings in the first two sub-periods occurred in January, whereas peak landings for all gear types occurred in December. The landings spike in the third sub-period also occurred in January and not in December. Also observable for the third sub-period is the smaller landings spike that occurred in April. However, peak landings in the third sub-period occurred in June, similar to that for landings by all gear types. Considering that trap landings were generally zero from January through May, the seasonality pattern observed in the landings by all gear types during these months could be mainly conditioned by the seasonal pattern of landings by other gear types. In terms of level of landings, the third sub-period recorded higher landings in the second half of the fishing year (except February and May) than the other two sub-periods.

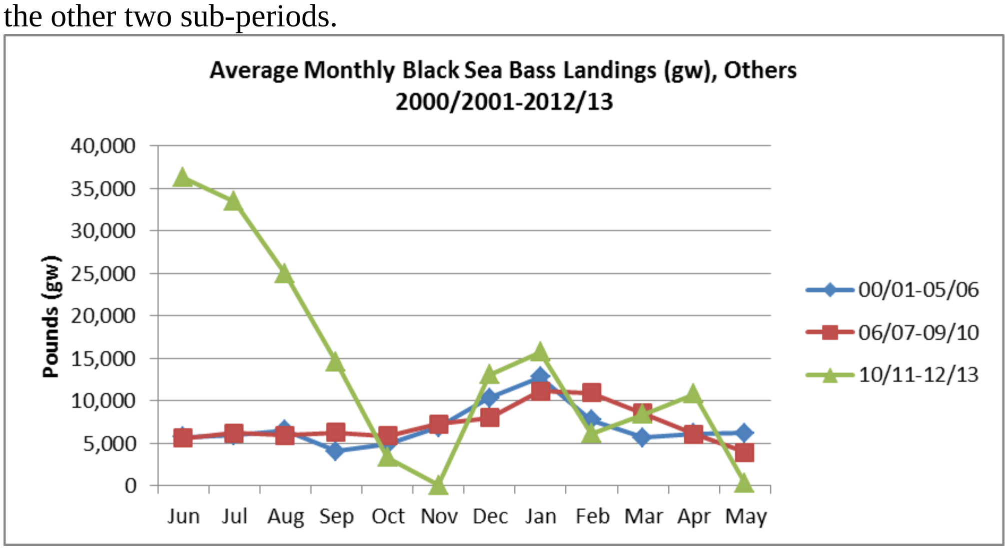

Figure 3.3.1.3. Average monthly black sea bass landings (lb gw), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

Landings in the Florida/Georgia area show no apparent seasonal pattern for the first two sub-periods, although the second sub-period shows a slight spike in September (**Figure 3.3.1.3**). Seasonality of landings in the third sub-period generally follows that of landings for all gear types, with peak landings in June and a landings spike in December.

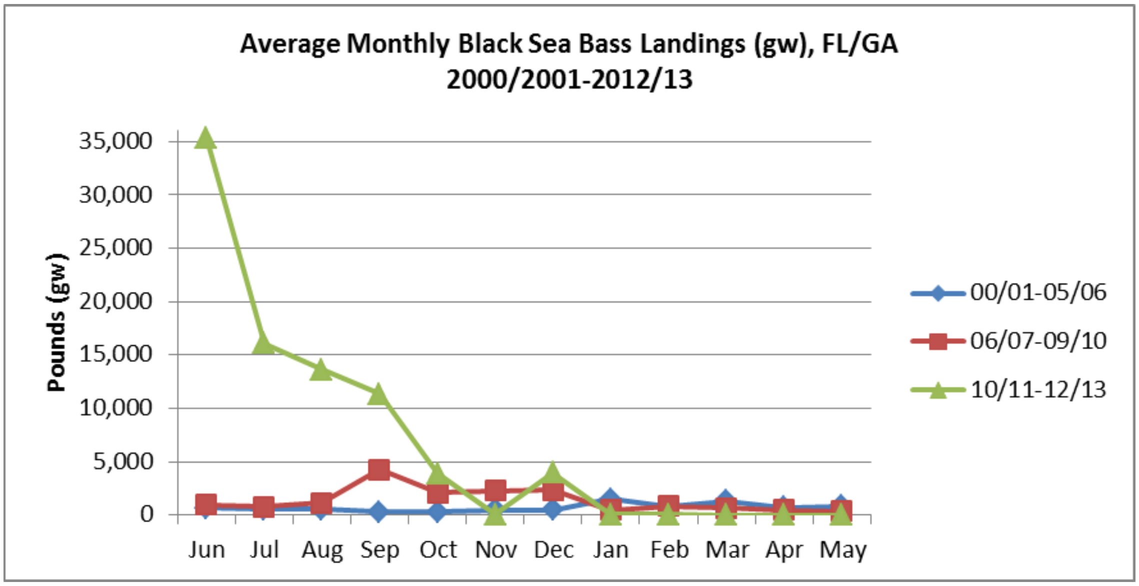

Figure 3.3.1.4. Average monthly black sea bass landings (lb gw), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

On average, peak landings in South Carolina differed across the three sub-periods. The first sub-period shows peak landings in January, the second sub-period in February, and the third sub-period in June with a spike in December (**Figure 3.3.1.5**). Other than the occurrence of peak landings, the seasonal pattern of landings in South Carolina appears to follow that for landings by traps only.

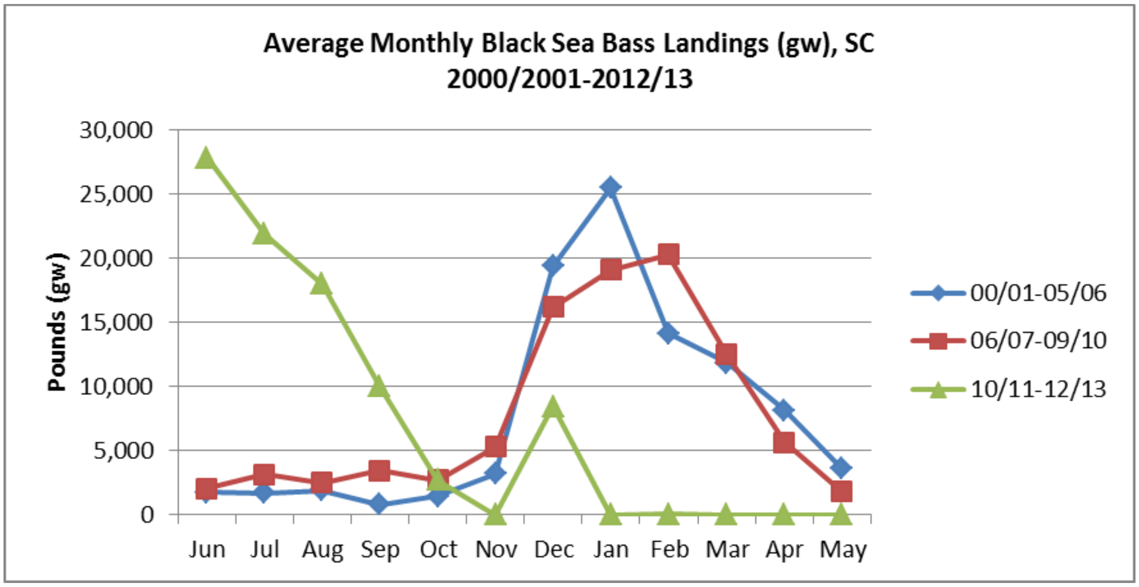

Figure 3.3.1.5. Average monthly black sea bass landings (lb gw), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

The seasonality of landings in North Carolina is slightly similar to that of landings by all gear types. Peak landings occurred in December for the first two sub-periods and in June for the third sub-period with a spike in December (**Figure 3.3.1.6**). This is almost as expected since North Carolina has been the dominant state for black sea bass landings. However, unlike the case with landings by all gear types, peak landings for the third sub-period in North Carolina were lower than peak landings for the first sub-period.

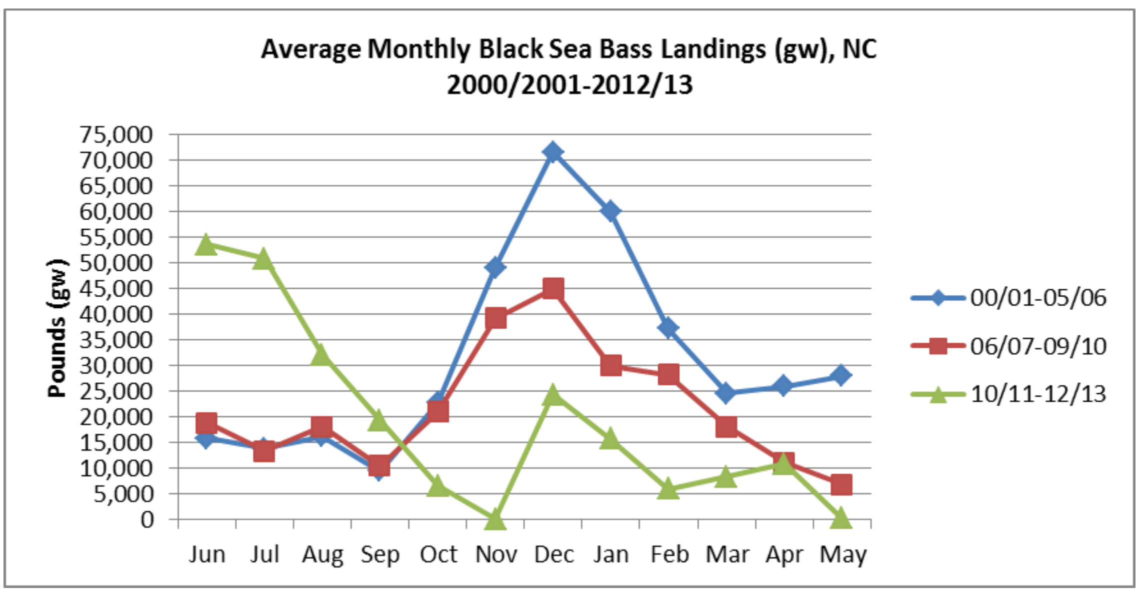

Figure 3.3.1.6. Average monthly black sea bass landings (lb gw), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

There are many techniques for analyzing prices of a commodity including fish. The current approach is simple and straightforward with the main intent of providing a general description of monthly black sea bass prices. For the current purpose, prices are derived by dividing total revenues by total pounds, averaged for each month over the years within a sub-period, and expressed in 2013 dollars.

In general, prices varied across months for black sea bass landings by all gear types (**Figure 3.3.1.7**). Price variation appears to be within a narrow band for the first two sub-periods and over a wider range for the third sub-period. The lowest prices occurred in November for the first sub-period, October for the second sub-period, and June for the third sub-period. The lowest price coincided with peak landings for the third period, but not quite for the first two periods. As noted earlier, peak landings for each of the first two sub-periods occurred in December. The highest prices occurred in May for the three sub-periods, although the September price was about the same or slightly higher than the May price for the first sub-period. While the first two sub-periods show about similar seasonal pattern in prices, the third period is very different. For the third period, price rose quite sharply in July and August, remained steady in the next two months, spiked in November, fell in the next month, and rose sharply thereafter before reaching its peak in May. In general, prices increased over the years, with the first sub-period showing the lowest monthly prices and the last sub-period, the highest monthly prices. An exception to this is that prices for the third sub-period were not the highest in June and July.

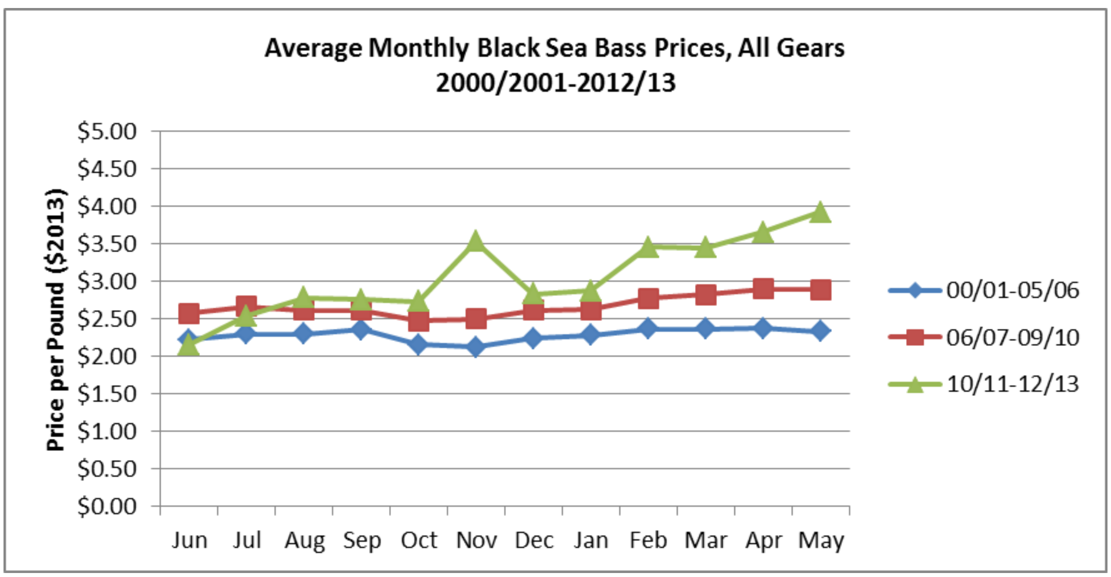

Figure 3.3.1.7. Average monthly black sea bass prices (2013 $), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

The price pattern for trap landings closely mimics that for landings by all gear types, except that there are not reported prices for trap landings from January through due to zero trap landings for these months (**Figure 3.3.1.8**). As with the seasonality of landings, this finding on price patterns for all gear types and traps is almost as expected because traps are the predominant gear in harvesting black sea bass. The absence of trap landings from January through May could also be one reason for the overall prices to be generally higher during these months. This, of course, assumes that, at least, black sea bass demand during these months remained steady as in the previous sub-periods.

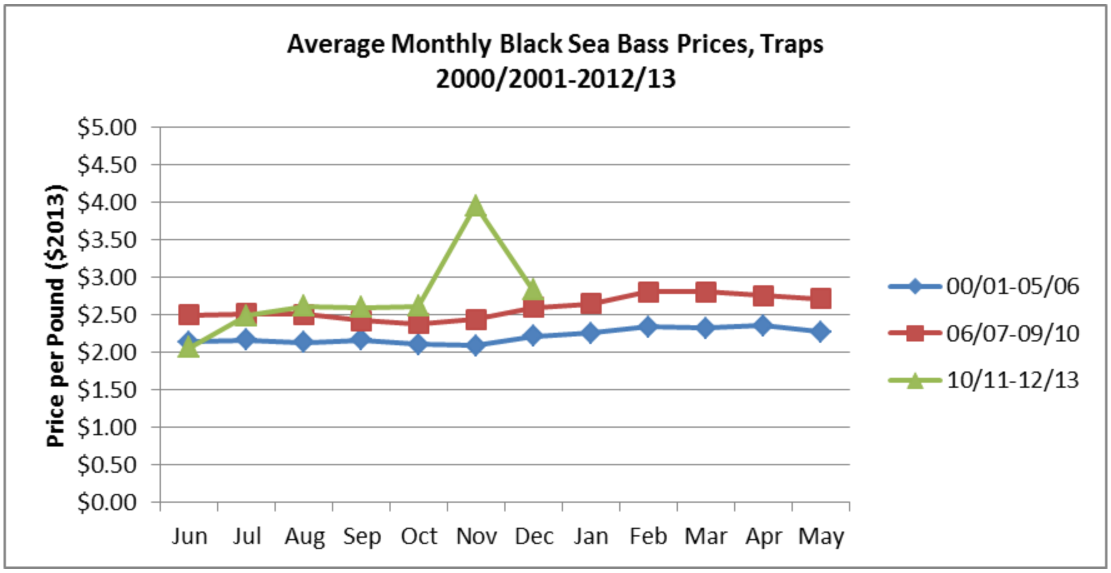

Figure 3.3.1.8. Average monthly black sea bass prices (2013 $), fishing years 2000/01-2012/13. Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

Although in general, the pattern of monthly prices for landings by the other gear types is about similar to that of landings by all gear types, there are some differences worth noting. The lowest prices occurred in October (vs. November) for the first sub-period and January (vs. October) for the second sub-period (**Figure 3.3.1.9**). Moreover, for the third sub-period, price spiked in November for landings by all gear types but dipped for landings by the other gear types. This indicates that the price spike for landings by all gear types was primarily due to the price spike for trap landings. In addition, for the third sub-period, the pattern of prices for landings by all gear types during January through May exactly matches that for landings by the other gear types.

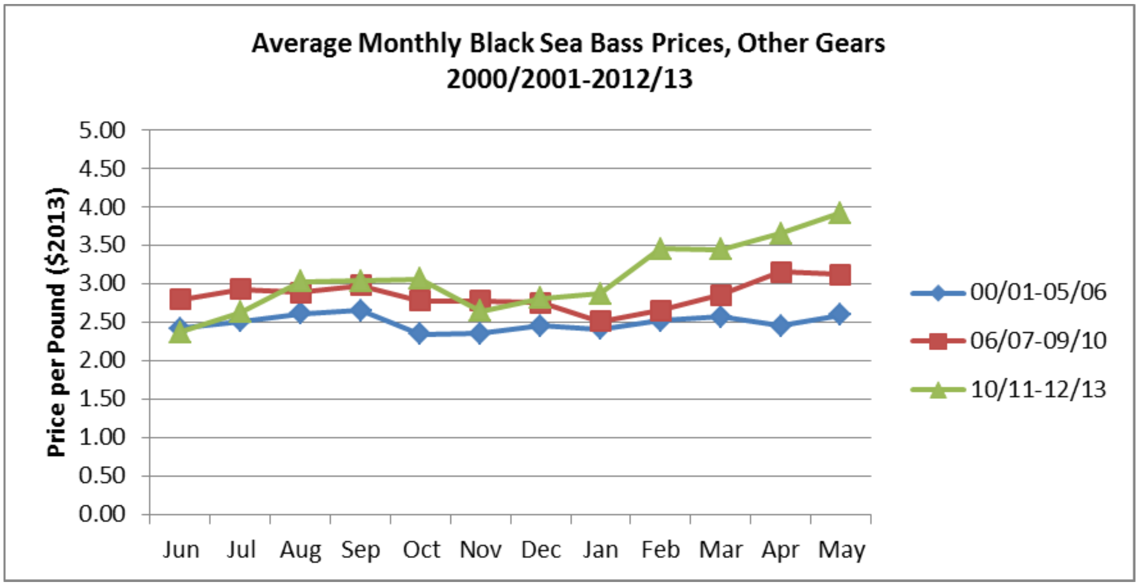

Figure 3.3.1.9. Average monthly black sea bass prices (2013 $), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

Seasonality of prices can also be examined on a state-by-state basis. Peak landings in Florida/Georgia occurred in March for the first two periods, although June also registered a high price for the second period (**Figure 3.3.1.10**). For the third period, prices peaked in November; high prices in April and May are less accurate because of very low landings for these months. For the first two sub-periods, prices appear to be relatively stable, fluctuating within a narrow range. The last sub-period shows wider fluctuations in prices, particularly in the latter part of the fishing year. Moreover, prices for the third sub-period were generally not higher than those in the earlier sub-periods.

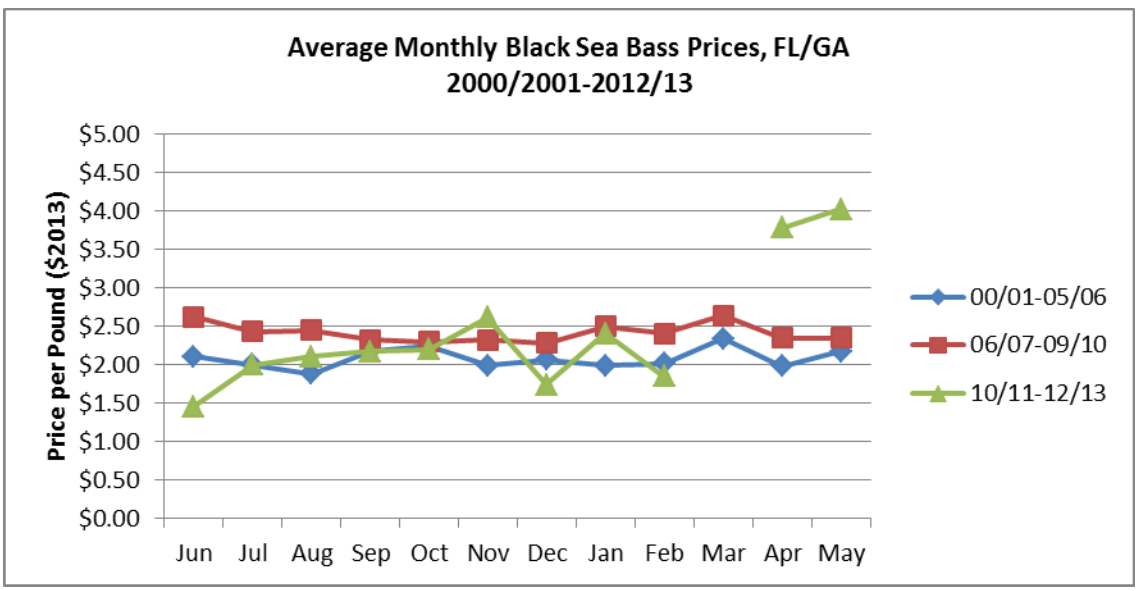

Figure 3.3.1.10. Average monthly black sea bass prices (2013 $), fishing years 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

In South Carolina, prices generally rose in the first four months, fell in subsequent months until reaching their lowest levels in January, and steadily rose thereafter (**Figure 3.3.1.11**). However, lowest price in the third sub-period occurred in June. There are no reported prices starting in January for the third sub-period; price for February is unreliable due to very low landings. South Carolina prices for the third sub-period were higher than those for the earlier sub-periods only in October through December.

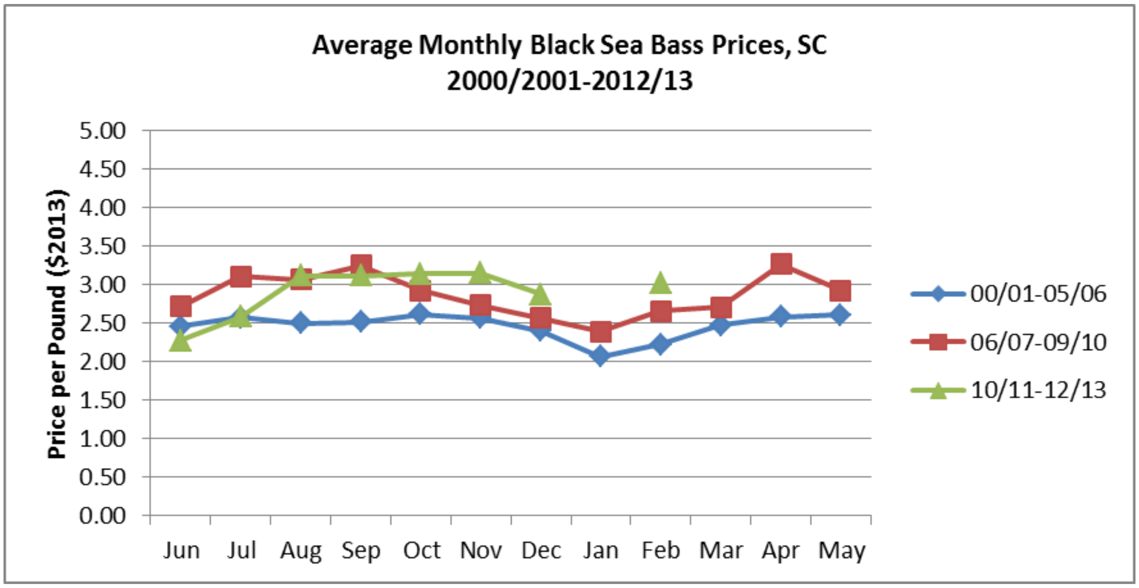

Figure 3.3.1.11. Average monthly black sea bass prices (2013 $), fishing year 2000/01-2012/13. Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

The seasonality of prices in North Carolina closely mirrors that for landings by all gear types (**Figure 3.3.1.12**). This close similarity in the seasonality pattern of prices is almost as expected because of the dominance of North Carolina in black sea bass landings and revenues. In general, prices increased over time, with the third sub-period registering the highest price levels among the three sub-periods.

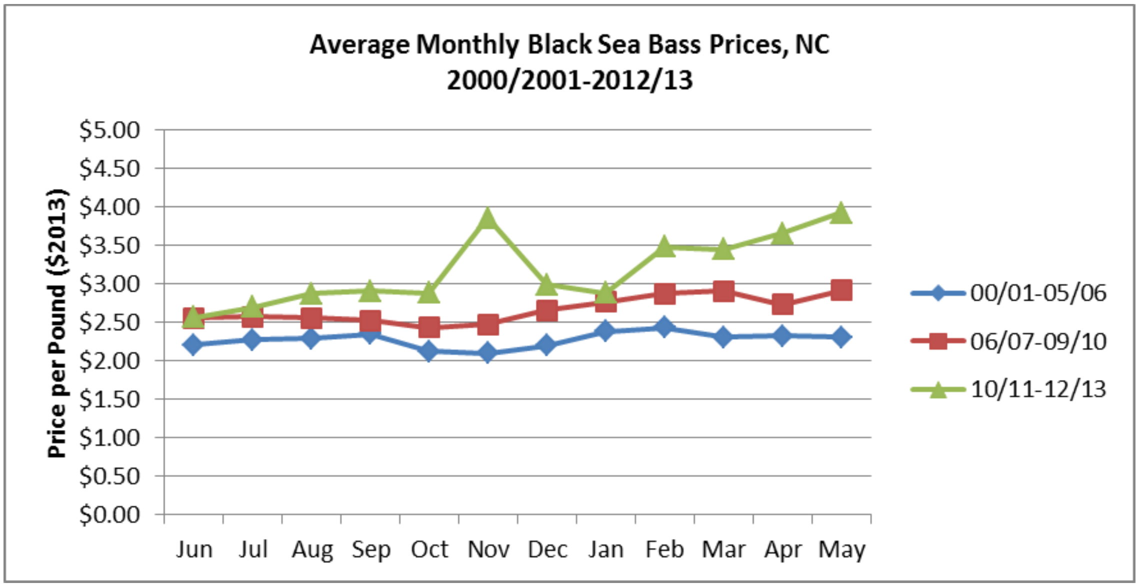

Figure 3.3.1.12. Average monthly black sea bass prices (2013 $), fishing year 2000/01-2012/13.
Source: SEFSC Commercial ACL Dataset, ACL_Tables_07102014

Trip Level Landings and Dockside Revenues for Black Sea Bass

Landings information in the tables below is solely based on logbook data and so would not exactly match with landings shown in the earlier tables. From 2000/01 through 2013/14, an annual average of 234 vessels took 2,013 commercial trips that combined landed an average of 422,200 lb gw of black sea bass annually with a dockside value (2013 dollars) of $1,094,059 (**Table 3.3.1.5**). Average annual dockside revenue from black sea bass landings represented approximately 22% of total dockside revenue from trips that landed black sea bass from 2000/01 through 2013/14. Fishing year 2008/09 had the most number of vessels landing black sea bass, but the highest black sea bass landings occurred in 2003/04 and highest dockside revenues from black sea bass occurred in 2013/14. Including revenues from black sea bass and other species jointly caught and landed with black sea bass, the highest total revenues occurred in 2001/02, with the second highest occurring in 2013/14. The recent increase in the black sea bass ACL immediately translated into a relatively large landings increase in 2013/14. The number of vessel trips more than doubled in 2013/14 from that in 2012/13.

Table 3.3.1.5. Vessels and trips with black sea bass landings by weight (lb gw) and dockside revenue (2013 $), fishing years 2000/01–2013/14. **ALL GEAR.**

Year	Number vessels that landed black sea bass	Number trips that landed black sea bass	Black sea bass landings (lb gw)	Dockside revenue from black sea bass (2013 $)	'Other species' landed and jointly caught with black sea bass (lb gw)	Dockside revenue from 'other species' from trips with black sea bass landings (2013 $)	Total dockside revenue (2013 $) from trips with black sea bass landings
2000/01	248	2,589	506,450	$1,278,557	1,501,126	$4,485,103	$5,763,660
2001/02	250	3,019	495,863	$1,165,505	1,928,448	$5,546,695	$6,712,199
2002/03	235	2,244	361,497	$853,225	1,484,873	$4,193,030	$5,046,256
2003/04	239	2,365	656,446	$1,511,486	1,428,869	$4,102,985	$5,614,471
2004/05	240	2,319	533,149	$1,270,898	1,637,229	$4,600,940	$5,871,838
2005/06	224	2,058	346,034	$974,884	1,434,845	$4,250,338	$5,225,222
2006/07	242	2,107	452,314	$1,327,408	1,357,072	$4,155,409	$5,482,817
2007/08	254	1,921	318,249	$914,222	1,339,664	$4,115,800	$5,030,021
2008/09	270	1,968	388,629	$1,066,824	1,458,016	$4,287,517	$5,354,341
2009/10	248	1,637	326,906	$848,990	1,147,186	$3,287,444	$4,136,434
2010/11	210	1,336	391,631	$1,022,432	903,470	$2,590,011	$3,612,444
2011/12	178	666	300,665	$644,100	324,237	$970,480	$1,614,580
2012/13	198	1,262	304,776	$886,002	747,860	$2,297,386	$3,183,388
2013/14	234	2,697	528,187	$1,552,294	1,532,890	$4,891,735	$6,444,028
Average	234	2,013	422,200	$1,094,059	1,301,842	$3,841,062	$4,935,121

Source: SEFSC Coastal Fisheries Logbook for weight and NMFS ALS for revenues, L. Perruso, pers. comm., 2015

On average, the vessels that harvested black sea bass also took 3,759 trips per year without black sea bass landings. Combining all sources of revenues, the average annual dockside revenues of vessels that landed black sea bass was about $53,986 (2013 $) (**Table 3.3.1.6**). Annual dockside revenue from black sea bass landings represented, on average, approximately 9% of the total dockside revenue from all commercial landings from 2000/01 through 2013/14. Average annual dockside revenue per vessel from all landings was $53,986 as compared to $4,864 per vessel from black sea bass only. Dockside revenues from species caught and landed on trips without black sea bass were highest in 2011/12 while total dockside revenues from all species were highest in 2008/09.

Table 3.3.1.6. Dockside revenues (2013 $) from all sources for vessels that landed black sea bass, fishing years 2000/01–2013/14. **ALL GEAR.**

Year	Number vessels that landed black sea bass	Dockside revenue from black sea bass (2013 $)	Dockside revenue from 'other species' jointly landed with black sea bass (2013 $)	Dockside revenue from 'other species' landed on trips without black sea bass (2013 $)	Total dockside revenue (2013 $)	Average total dockside revenue per vessel (2013 $)
2000/01	248	$1,278,557	$4,485,103	$8,350,093	$14,113,753	$56,910
2001/02	250	$1,165,505	$5,546,695	$7,105,720	$13,817,919	$55,272
2002/03	235	$853,225	$4,193,030	$6,638,633	$11,684,889	$49,723
2003/04	239	$1,511,486	$4,102,985	$6,648,805	$12,263,276	$51,311
2004/05	240	$1,270,898	$4,600,940	$6,883,410	$12,755,247	$53,147
2005/06	224	$974,884	$4,250,338	$6,539,420	$11,764,642	$52,521
2006/07	242	$1,327,408	$4,155,409	$7,945,898	$13,428,715	$55,491
2007/08	254	$914,222	$4,115,800	$9,183,652	$14,213,674	$55,959
2008/09	270	$1,066,824	$4,287,517	$9,048,602	$14,402,943	$53,344
2009/10	248	$848,990	$3,287,444	$8,658,037	$12,794,471	$51,591
2010/11	210	$1,022,432	$2,590,011	$7,602,809	$11,215,253	$53,406
2011/12	178	$644,100	$970,480	$8,669,596	$10,284,176	$57,776
2012/13	198	$886,002	$2,297,386	$7,333,275	$10,516,662	$53,114
2013/14	234	$1,552,294	$4,891,735	$6,420,098	$12,864,127	$54,975
Average	234	$1,094,059	$3,841,062	$7,644,861	$12,579,982	$53,896

Source: SEFSC Coastal Fisheries Logbook for weight and NMFS ALS for revenues, L. Perruso, pers. comm., 2015

From 2000/01 through 2013/14, an annual average of 45 vessels took 591 commercial trips using traps that combined landed an average of 348,952 lb gw of black sea bass annually with a dockside value (2013 dollars) of $897,671 (**Table 3.3.1.7**). Average annual dockside revenue from black sea bass landings represented approximately 93% of total dockside revenue from trips that landed black sea bass from 2000/01 through 2013/14. This very high proportion indicates that vessels harvesting black sea bass using traps are highly dependent on black sea bass. Fishing year 2000/01 had the most number of vessels landing black sea bass using traps, but the highest black sea bass landings using traps occurred in 2003/04 and highest dockside revenues from black sea bass also occurred in 2003/04. Including revenues from black sea bass and other species jointly caught and landed with black sea bass, the highest total revenues occurred in 2003/04. The recent increase in the black sea bass ACL translated into a slight landings increase in 2013/14 for vessels using traps, despite a relative good increase in the number of trips. It is quite apparent that the November 1-April 30 ban on the use of traps for harvesting black sea bass constrained the landings of vessels that used traps.

Table 3.3.1.7. Vessels and trips with black sea bass landings by weight (lb gw) and dockside revenue (2013 $), fishing years 2000/01–2013/14. **TRAPS.**

Year	Number vessels that landed black sea bass	Number trips that landed black sea bass	Black sea bass landings (lb gw)	Dockside revenue from black sea bass (2013 $)	'Other species' landed and jointly caught with black sea bass (lb gw)	Dockside revenue from 'other species' from trips with black sea bass landings (2013 $)	Total dockside revenue (2013 $) from trips with black sea bass landings
2000/01	59	881	438,135	$1,100,732	61,015	$86,457	$1,187,188
2001/02	55	1,045	423,652	$994,401	81,912	$97,236	$1,091,636
2002/03	44	663	304,547	$715,649	60,634	$75,088	$790,737
2003/04	51	846	587,633	$1,355,015	39,404	$61,842	$1,416,857
2004/05	47	699	457,126	$1,088,347	41,773	$63,185	$1,151,532
2005/06	46	628	295,954	$839,219	47,763	$70,881	$910,099
2006/07	52	712	406,142	$1,193,016	58,937	$89,180	$1,282,196
2007/08	46	519	277,314	$796,999	51,582	$79,252	$876,251
2008/09	51	526	344,227	$945,912	41,655	$65,349	$1,011,261
2009/10	39	409	279,601	$722,645	47,146	$69,653	$792,299
2010/11	48	390	342,530	$895,796	28,293	$39,240	$935,036
2011/12	39	221	256,589	$550,520	10,928	$15,697	$566,216
2012/13	25	317	212,758	$615,397	20,213	$33,297	$648,694
2013/14	29	420	259,128	$753,742	22,701	$49,808	$803,550
Average	45	591	348,952	$897,671	43,854	$64,012	$961,682

Source: SEFSC Coastal Fisheries Logbook for weight and NMFS ALS for revenues, L. Perruso, pers. comm., 2015

On average, the vessels that harvested black sea bass using traps also took 6 trips per year without black sea bass landings. Combining all sources of revenues, the average annual dockside revenues of vessels that landed black sea bass using traps was about $21,609 (2013 $) (**Table 3.3.1.8**). Annual dockside revenue from black sea bass landings represented, on average, approximately 93% of the total dockside revenue from all commercial landings from 2000/01 through 2013/14, indicating strong dependence of these vessels on black sea bass. Average annual dockside revenue per vessel from all landings was $21,609 as compared to $19,916 per vessel from black sea bass only. Dockside revenues from species caught and landed on trips without black sea bass were highest in 2003/04 and total dockside revenues from all species were also highest in 2003/04.

Table 3.3.1.8. Dockside revenues (2013 $) from all sources for vessels that landed black sea bass, fishing years 2000/01–2013/14. **TRAPS**.

Year	Number vessels that landed black sea bass	Dockside revenue from black sea bass (2013 $)	Dockside revenue from 'other species' jointly landed with black sea bass (2013 $)	Dockside revenue from 'other species' landed on trips without black sea bass (2013 $)	Total dockside revenue (2013 $)	Average total dockside revenue per vessel (2013 $)
2000/01	59	$1,100,732	$86,457	$2,896	$1,190,084	$20,171
2001/02	55	$994,401	$97,236	$3,194	$1,094,830	$19,906
2002/03	44	$715,649	$75,088	$2,602	$793,339	$18,030
2003/04	51	$1,355,015	$61,842	$7,225	$1,424,082	$27,923
2004/05	47	$1,088,347	$63,185	$1,766	$1,153,298	$24,538
2005/06	46	$839,219	$70,881	$6,935	$917,034	$19,936
2006/07	52	$1,193,016	$89,180	$2,740	$1,284,936	$24,710
2007/08	46	$796,999	$79,252	$8,419	$884,670	$19,232
2008/09	51	$945,912	$65,349	$2,042	$1,013,303	$19,869
2009/10	39	$722,645	$69,653	$2,216	$794,514	$20,372
2010/11	48	$895,796	$39,240	$237	$935,273	$19,485
2011/12	39	$550,520	$15,697	$0	$566,216	$14,518
2012/13	25	$615,397	$33,297	$3,885	$652,579	$26,103
2013/14	29	$753,742	$49,808	$638	$804,188	$27,731
Average	45	$897,671	$64,012	$3,200	$964,882	$21,609

Source: SEFSC Coastal Fisheries Logbook for weight and NMFS ALS for revenues, L. Perruso, pers. comm., 2015

From 2000/01 through 2013/14, an annual average of 215 vessels took 1,422 commercial trips using other gear that combined landed an average of 73,247 lb gw of black sea bass annually with a dockside value (2013 dollars) of $196,388 (**Table 3.3.1.9**). Average annual dockside revenue from black sea bass landings represented approximately 5% of total dockside revenue from trips that landed black sea bass from 2000/01 through 2013/14. It is worth noting, however, that this proportion was 14% for the 2013/14 fishing year. The average proportion indicates that vessels harvesting black sea bass using other gear are dependent on species other than black sea bass. Fishing year 2008/09 had the most number of vessels landing black sea bass using other gears, but the highest black sea bass landings and revenues from black sea bass using other gears occurred in 2013/14. Including revenues from black sea bass and other species jointly caught and landed with black sea bass, the highest total revenues occurred in 2013/14. The recent increase in the black sea bass ACL translated into a rather substantial landings increase in 2013/14 for vessels using other gear. Apparently, these vessels took advantage of the November 1-April 30 ban on the use of traps for harvesting black sea bass. Trips by vessels using other gear in harvesting black sea bass more than doubled in 2013/14 from the prior fishing year. Some of the increase in vessels harvesting black sea bass by non-pot gear could be some of the vessels that previously had used pot gear, but did not qualify for an endorsement.

Table 3.3.1.9. Vessels and trips with black sea bass landings by weight (lb gw) and dockside revenue (2013 $), fishing years 2000/01–2013/14. **OTHER GEAR.**

Year	Number vessels that landed black sea bass	Number trips that landed black sea bass	Black sea bass landings (lb gw)	Dockside revenue from black sea bass (2013 $)	'Other species' landed and jointly caught with black sea bass (lb gw)	Dockside revenue from 'other species' from trips with black sea bass landings (2013 $)	Total dockside revenue (2013 $) from trips with black sea bass landings
2000/01	228	1,708	68,315	$177,825	1,440,111	$4,398,647	$4,576,472
2001/02	231	1,974	72,211	$171,104	1,846,536	$5,449,459	$5,620,563
2002/03	220	1,581	56,951	$137,577	1,424,239	$4,117,942	$4,255,519
2003/04	220	1,519	68,813	$156,471	1,389,466	$4,041,143	$4,197,614
2004/05	224	1,620	76,023	$182,551	1,595,456	$4,537,755	$4,720,306
2005/06	212	1,430	50,080	$135,666	1,387,082	$4,179,457	$4,315,123
2006/07	224	1,395	46,172	$134,392	1,298,135	$4,066,229	$4,200,621
2007/08	239	1,402	40,935	$117,222	1,288,082	$4,036,548	$4,153,770
2008/09	254	1,442	44,402	$120,912	1,416,361	$4,222,168	$4,343,080
2009/10	229	1,228	47,305	$126,345	1,100,039	$3,217,790	$3,344,135
2010/11	183	946	49,101	$126,636	875,177	$2,550,771	$2,677,408
2011/12	153	445	44,076	$93,581	313,310	$954,783	$1,048,364
2012/13	174	945	92,018	$270,605	727,647	$2,264,089	$2,534,693
2013/14	222	2,277	269,059	$798,552	1,510,190	$4,841,927	$5,640,478
Average	215	1,422	73,247	$196,388	1,257,988	$3,777,051	$3,973,439

Source: SEFSC Coastal Fisheries Logbook for weight and NMFS ALS for revenues, L. Perruso, pers. comm., 2015

On average, the vessels that harvested black sea bass using other gear also took 3,684 trips per year without black sea bass landings. Combining all sources of revenues, the average annual dockside revenues of vessels that landed black sea bass using other gear was $53,779 (2013 $) (**Table 3.3.1.10**). Annual dockside revenue from black sea bass landings represented, on average, approximately 2% of the total dockside revenue from all commercial landings from 2000/01 through 2013/14. In 2013/14, this proportion was about 7%. Average annual dockside revenue per vessel from all landings was $53,779 as compared to $913 per vessel from black sea bass only. Dockside revenues from species caught and landed on trips without black sea bass were highest in 2007/08 and total dockside revenues from all species were highest in 2008/09.

Table 3.3.1.10. Dockside revenues (2013 $) from all sources for vessels that landed black sea bass, fishing years 2000/01–2013/14. **OTHER GEAR**.

Year	Number vessels that landed black sea bass	Dockside revenue from black sea bass (2013 $)	Dockside revenue from 'other species' jointly landed with black sea bass (2013 $)	Dockside revenue from 'other species' landed on trips without black sea bass (2013 $)	Total dockside revenue (2013 $)	Average total dockside revenue per vessel (2013 $)
2000/01	228	$177,825	$4,398,647	$8,273,088	$12,849,560	$56,358
2001/02	231	$171,104	$5,449,459	$7,037,642	$12,658,205	$54,797
2002/03	220	$137,577	$4,117,942	$6,616,611	$10,872,130	$49,419
2003/04	220	$156,471	$4,041,143	$6,630,744	$10,828,358	$49,220
2004/05	224	$182,551	$4,537,755	$6,856,488	$11,576,793	$51,682
2005/06	212	$135,666	$4,179,457	$6,528,495	$10,843,618	$51,149
2006/07	224	$134,392	$4,066,229	$7,942,298	$12,142,919	$54,209
2007/08	239	$117,222	$4,036,548	$9,145,699	$13,299,470	$55,646
2008/09	254	$120,912	$4,222,168	$9,007,804	$13,350,884	$52,563
2009/10	229	$126,345	$3,217,790	$8,587,857	$11,931,992	$52,105
2010/11	183	$126,636	$2,550,771	$7,368,545	$10,045,952	$54,896
2011/12	153	$93,581	$954,783	$8,423,689	$9,472,053	$61,909
2012/13	174	$270,605	$2,264,089	$6,989,299	$9,523,993	$54,736
2013/14	222	$798,552	$4,841,927	$6,394,837	$12,035,316	$54,213
Average	215	$196,388	$3,777,051	$7,557,364	$11,530,803	$53,779

Source: SEFSC Coastal Fisheries Logbook for weight and NMFS ALS for revenues, L. Perruso, pers. comm., 2015

Trip Level Landings and Dockside Revenues for Black Sea Bass: Endorsement Holders Using Traps

The following describes the performance of vessels used by endorsement holders for the period 2000/01 through 2013/14. The trap endorsement system was implemented in 2012, so data for earlier years was generated by tracking back in the time the trips and catches made by vessels used by endorsement holders (SERO-LAPP-2014-09). This dataset was merged with the logbook-based dataset provided by SEFSC (L. Perruso, pers. comm., 2015) to generate the corresponding revenue information. Due to incomplete linking of all vessels that endorsement holders used for the 2012/13 and 2013/14 fishing seasons, only trips by vessels with an endorsement that used pots are included for these fishing years.

From 2000/01 through 2013/14, an annual average of 31 vessels with an endorsement took 539 commercial trips using traps that combined landed an average of 276,160 lb gw of black sea bass annually with a dockside value (2013 dollars) of $721,021 (**Table 3.3.1.11**). These vessels also caught other species jointly with black sea bass at an annual average of 90,357 lb gw with a dockside value of $224,821. Fishing years 2001/02 and 2008/09 had the most number of vessels landing black sea bass, but the most number of trips occurred in 2001/02. The highest black sea bass landings occurred in 2003/04 but the highest dockside revenues from black sea bass was in 2006/07. In the last three fishing years (2011/13-2013/14), landings and revenues (except for 2013/14) from black sea bass were below the average for the entire period.

Table 3.3.1.11. Vessels and trips with black sea bass landings by weight (lb gw) and dockside revenue (2013 $), fishing years 2000/01–2013/14. **ENDORSEMENT HOLDERS.**

Year	Number vessels that landed black sea bass	Number trips that landed black sea bass	Black sea bass landings (lb gw)	Dockside revenue from black sea bass (2013 $)	'Other species' landed and jointly caught with black sea bass (lb gw)	Dockside revenue from 'other species' from trips with black sea bass landings (2013 $)	Total dockside revenue (2013 $) from trips with black sea bass landings
2000/01	33	607	238,879	$589,903	92,467	$233,778	$823,680
2001/02	35	786	261,521	$614,122	159,220	$397,211	$1,011,333
2002/03	33	617	209,662	$493,839	109,716	$277,488	$771,327
2003/04	30	713	402,176	$925,927	92,721	$247,004	$1,172,931
2004/05	32	644	384,120	$919,044	109,363	$273,552	$1,192,596
2005/06	31	643	263,156	$748,200	123,611	$311,317	$1,059,517
2006/07	32	714	368,824	$1,084,298	122,511	$305,648	$1,389,946
2007/08	31	545	237,158	$690,107	132,968	$347,443	$1,037,550
2008/09	36	525	280,935	$782,136	94,689	$233,245	$1,015,381
2009/10	28	448	255,549	$652,247	89,754	$207,271	$859,518
2010/11	29	388	308,512	$804,169	54,157	$129,409	$933,578
2011/12	32	179	183,861	$421,165	40,902	$101,019	$522,184
2012/13	25	317	212,758	$615,397	20,213	$33,297	$648,694
2013/14	29	420	259,128	$753,742	22,701	$49,808	$803,550
Average	31	539	276,160	$721,021	90,357	$224,821	$945,842

Note: For 2012/13 and 2013/14, trips taken by vessels that used traps within the fishing year are assumed to be made by vessels with a trap endorsement.
Source: SEFSC Coastal Fisheries Logbook for weight, NMFS ALS for revenues, and SERO-Permits for endorsement holders, L. Perruso, pers. comm., 2015; SERO-LAPP-2014-09.

Combining all sources of revenues, the average annual dockside revenues of vessels with an endorsement that landed black sea bass was $38,097 (2013 $) (**Table 3.3.1.12**). As noted, the 2012/13 and 2013/14 data assumes trips taken by vessels using traps anytime during the fishing year were made by vessels with an endorsement.

Table 3.3.1.12. Dockside revenues (2013 $) from all sources for vessels that landed black sea bass, fishing years 2000/01–2013/14. **ENDORSEMENT HOLDERS**.

Year	Number vessels that landed black sea bass	Dockside revenue from black sea bass (2013 $)	Dockside revenue from 'other species' jointly landed with black sea bass (2013 $)	Dockside revenue from 'other species' landed on trips without black sea bass (2013 $)	Total dockside revenue (2013 $)	Average total dockside revenue per vessel (2013 $)
2000/01	33	$589,903	$233,778	$238,618	$1,062,298	$32,191
2001/02	35	$614,122	$397,211	$226,014	$1,237,347	$35,353
2002/03	33	$493,839	$277,488	$282,867	$1,054,194	$31,945
2003/04	30	$925,927	$247,004	$146,798	$1,319,729	$43,991
2004/05	32	$919,044	$273,552	$245,078	$1,437,674	$44,927
2005/06	31	$748,200	$311,317	$189,003	$1,248,520	$40,275
2006/07	32	$1,084,298	$305,648	$212,851	$1,602,797	$50,087
2007/08	31	$690,107	$347,443	$366,890	$1,404,440	$45,305
2008/09	36	$782,136	$233,245	$399,694	$1,415,076	$39,308
2009/10	28	$652,247	$207,271	$280,625	$1,140,143	$40,719
2010/11	29	$804,169	$129,409	$276,179	$1,209,756	$41,716
2011/12	32	$421,165	$101,019	$556,560	$1,078,744	$33,711
2012/13	25	$615,397	$33,297	$3,885	$652,579	$26,103
2013/14	29	$753,742	$49,808	$638	$804,188	$27,731
Average	31	$721,021	$224,821	$244,693	$1,190,535	$38,097

Note: For 2012/13 and 2013/14, trips taken by vessels that used traps within the fishing year are assumed to be made by vessels with a trap endorsement.
Source: SEFSC Coastal Fisheries Logbook for weight, NMFS ALS for revenues, and SERO-Permits for endorsement holders, L. Perruso, pers. comm., 2015; SERO-LAPP-2014-09.

3.3.2 Economic Description of the Recreational Sector

The following focuses on recreational landings and effort (angler trips) for black sea bass. The major sources of data summarized in this description are the Recreational ACL Dataset (SEFSC MRIPACLspec_rec81_13wv6_21Feb14), as summarized by SERO-LAPP-2014-09, for landings and the NOAA fisheries website for accessing recreational data file://localhost/(http/::www.st.nmfs.noaa.gov:recreational-fisheries:access-data:run-a-data-query:index) for effort. The 2013 data are preliminary or incomplete, including the unavailability of the 2013 headboat landings. Additional information on the recreational sector of the snapper grouper fishery contained in previous or concurrent amendments is incorporated herein by reference [see Amendment 13C (SAFMC 2006), Amendment 15A (SAFMC 2008a), Amendment 15B (SAFMC 2008b), Amendment 16 (SAFMC 2009a), Amendment 17A (SAFMC 2010a), Amendment 17B (SAFMC 2010b), Regulatory Amendment 9 (SAFMC 2011a), Regulatory Amendment 11 (SAFMC 2011b), Comprehensive ACL Amendment for the South Atlantic Region (SAFMC 2011c), and Amendment 24 (SAFMC 2011d)].

The recreational fishery is comprised of the private sector and for-hire sector. The private sector includes anglers fishing from shore (all land-based structures) and private/rental boats. The for-hire sector is composed of the charter boat and headboat (also called partyboat) sectors. Charter boats generally carry fewer passengers and charge a fee on an entire vessel basis, whereas headboats carry more passengers and payment is per person.

Harvest

The private/rental mode was the dominant sector in the harvest for black sea bass, followed by headboats, charter boats, and shore mode (**Table 3.3.2.1**). This is true for recreational landings in the South Atlantic and in other states. The annual trend of recreational black sea bass landings was not uniform across fishing modes during 2009/10-2012/13. Landings were highest in 2009/10 for all fishing modes, except headboats whose highest landings occurred in 2010/11. In the mid- and North Atlantic, landings peaked in 2012/13 for the headboats and charter boats. The other modes recorded their highest landings in 2011/11 for the private mode and in 2009/10 for the shore mode. Quite apparent in **Table 3.3.2.1** is that for each fishing mode the mid- and North Atlantic dominated their counterparts in the South Atlantic.

Among the states in the South Atlantic, Florida dominated all other states in the harvest for black sea bass in 2010/11 and 2011/12; South Carolina was the dominant state in 2009/10 and 2012/13; and, North Carolina had higher landings than Florida in 2012/13 (**Table 3.3.2.2**). Again some caution has to be recalled here regarding the incompleteness of the 2013 landings. Every year from 2009/10 through 2012/13, the Northern states recorded more landings than the combined landings of the four South Atlantic states.

Seasonality is quite apparent in black sea bass recreational landings (**Figure 3.3.2.1**). Landings peaked at the start of the fishing season, declined in the next two waves, and picked up again in March/April. The main reason July/August recorded higher landings than June is the two-month composition of this wave. Seasonality could be partly due to the opening and closing dates of the fishing season.

Table 3.3.2.1. Black sea bass recreational landings (lb ww) by mode, fishing year 2009/10–2012/13.

	Charter	Headboat	Private	Shore	Total
South Atlantic					

2009/10	123,016	209,720	402,828	5,189	740,754
2010/11	107,744	253,604	207,537	2,147	571,033
2011/12	100,907	201,957	334,139	1,309	638,312
2012/13	48,425	95,669	237,572	1,940	383,605
Average	95,023	190,238	295,519	2,646	583,426
Mid- and North Atlantic (NE)					
2009/10	292,747	255,840	2,081,436	26,638	2,656,660
2010/11	194,140	355,062	2,320,994	7,587	2,877,782
2011/12	238,469	285,894	1,012,176	13,461	1,550,000
2012/13	485,581	433,792	1,787,764	13,817	2,720,954
Average	302,734	332,647	1,800,592	15,376	2,451,349

Source: SEFSC MRIPACLspec_rec81_13wv6_21Feb14; SERO-LAPP-2014-09.
Note: Landings for 2013 are incomplete and headboat landings for 2013 are not yet available.

Table 3.3.2.2. Black sea bass recreational landings (lb ww) by state, fishing year 2009/10–2012/13.

	FL	GA	SC	NC	NE	Total
2009/10	232,928	32,169	285,718	189,940	2,656,660	3,397,414
2010/11	221,968	41,436	156,218	151,410	2,877,782	3,448,815
2011/12	246,449	48,748	179,657	163,458	1,550,000	2,188,312
2012/13	106,209	13,548	138,706	125,143	2,720,954	3,104,560
Average	201,888	33,975	190,075	157,488	2,451,349	3,034,775

Source: SEFSC MRIPACLspec_rec81_13wv6_21Feb14; SERO-LAPP-2014-09
Note: Landings for 2013 are incomplete and headboat landings for 2013 are not yet available.

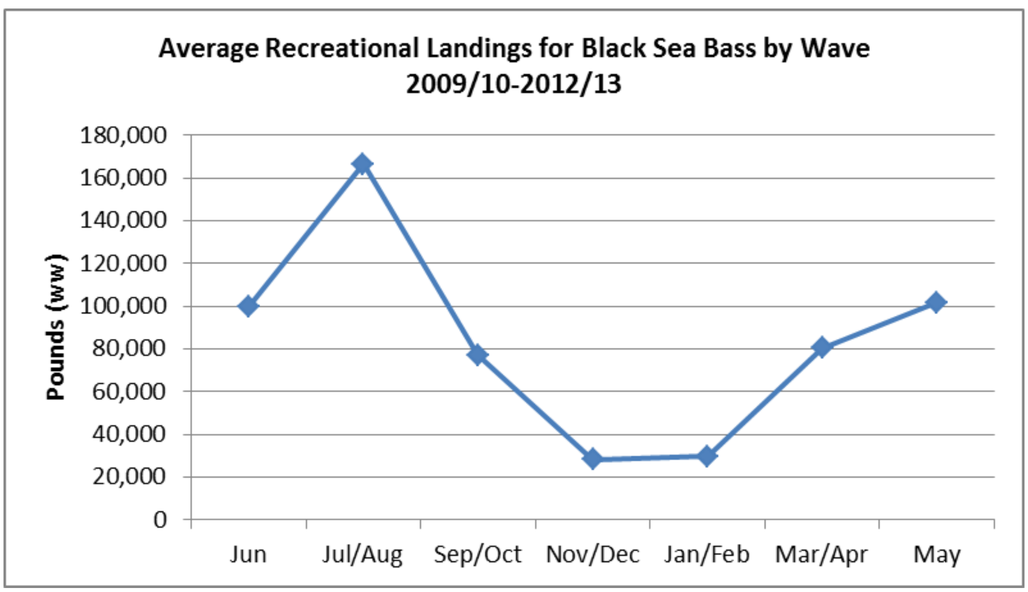

Figure 3.3.2.1. South Atlantic average recreational landings for black sea bass by wave, fishing year 2009/10-2012/13.
Source: SEFSC MRIPACLspec_rec81_13wv6_21Feb14; SERO-LAPP-2014-09
Note: Landings for 2013 are incomplete and headboat landings for 2013 are not yet available.

Effort

Recreational effort can be characterized in terms of the number of trips as follows:

1. Target effort - The number of individual angler trips, regardless of trip duration, where the intercepted angler indicated that the species was targeted as either the first or the second primary target for the trip. The species did not have to be caught.
2. Catch effort - The number of individual angler trips, regardless of trip duration and target intent, where the individual species was caught. The fish caught did not have to be kept.
3. All recreational trips - The total estimated number of recreational trips taken, regardless of target intent or catch success.

The source of the following target and catch trips is NOAA fisheries website for accessing recreational data: **http://www.st.nmfs.noaa.gov/recreational-fisheries/access-data/run-a-data-query/index**.

Estimates of target and catch effort for black sea bass by fishing mode are presented in **Table 3.3.2.3** and those by state are shown in **Table 3.3.2.4**. Clearly apparent in these tables is the substantial difference between target and catch trips, with target trips being generally less than 10 percent (significantly less for some modes) of catch trips. The private mode dominated in both target and catch trips. The charter mode reported higher target trips but lower catch trips than the shore mode. On average, North Carolina recorded the highest target and catch trips, followed by South Carolina for target trips and Florida for catch trips.

Similar to harvests and likely for the same reasons, there is an apparent seasonality of both target and catch trips for black sea bass (**Figure 3.3.2.2**). Catch trips peaked in July/August, declined thereafter through January/February, and picked up in the next two waves. This is the same pattern as that for harvests shown in **Figure 3.3.2.1**. Target trips followed almost the same pattern from wave to wave, except that they troughed in November/December.

Table 3.3.2.3. Target and catch trips for black sea bass in the South Atlantic by fishing mode, fishing year 2009/10-2012/13.

	Charter	Private	Shore	Total
Target Trips				
2009/10	2,185	30,062	404	32,652
2010/11	2,153	37,383	648	40,184
2011/12	506	44,063	175	44,744
2012/13	31	26,895	0	26,926
Average	1,219	34,601	307	36,126
Catch Trips				
2009/10	30,613	381,891	98,925	511,429
2010/11	35,245	450,206	99,899	585,350
2011/12	34,767	542,699	119,211	696,677
2012/13	21,283	464,412	87,706	573,401
Average	30,477	459,802	101,435	591,714

Table 3.3.2.4. Target and catch trips for black sea bass in the South Atlantic by state, fishing year 2009/10-2012/13.

	FL	GA	NC	SC
Target Trips				
2009/10	7,411	2,016	14,627	8,597

2010/11	11,444	3,755	16,876	8,512
2011/12	12,247	4,687	15,055	13,403
2012/13	2,974	526	9,526	13,900
Average	8,519	2,746	14,021	11,103
Catch Trips				
2009/10	157,848	38,677	214,857	100,047
2010/11	211,034	46,255	243,760	84,301
2011/12	275,153	43,059	264,399	114,066
2012/13	175,076	38,048	262,819	97,457
Average	204,778	41,510	246,459	98,968

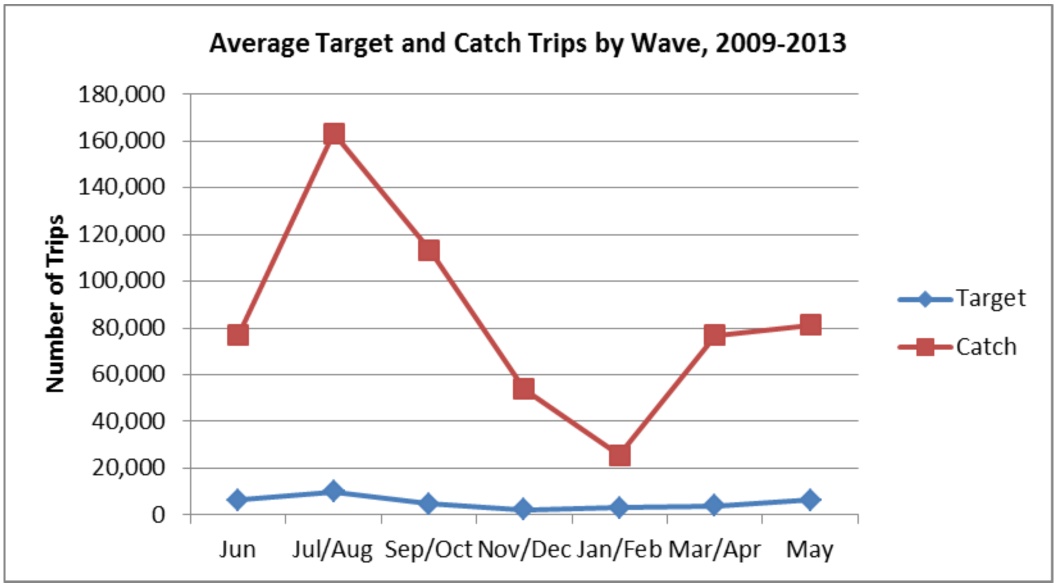

Figure 3.3.2.2. South Atlantic average target and catch trips by wave, fishing year 2009//10-2012/13.

Similar analysis of recreational effort is not possible for the headboat sector because headboat data are not collected at the angler level. Estimates of effort in the headboat sector are provided in terms of angler days, or the number of standardized 12-hour fishing days that account for the different half-, three-quarter-, and full-day fishing trips by headboats. **Table 3.3.2.5** displays the annual angler days by state for 2009/10-2012/13 and **Table 3.3.2.6** displays their average (2009/10-2012/13) monthly distribution. Confidentiality issues required combining Georgia estimates with those of Northeast Florida.

Headboat angler days (trips) varied from year to year across various states. Total headboat angler trips fell followed a see-saw pattern, increasing in 2010/11, falling in the next year, and increasing the following year (**Table 3.3.2.5**). Southeast Florida registered the highest number of angler trips, followed by Georgia/Northeast Florida, South Carolina, and North Carolina. Clearly Florida dominated all other states in terms of headboat angler days.

On average (2009/10-2012/13), overall angler days peaked in July and troughed in November (**Table 3.3.2.6**). All states recorded peak angler trips in July, similar to the overall peak month. None of the states, however, had the same trough month as the overall angler trips.

North Carolina had a trough in February, South Carolina in January, Georgia/Northeast Florida in November, and Southeast Florida in October.

Table 3.3.2.5. South Atlantic headboat angler days, by state, fishing year 2009/10-2012/13.

	2009/10	2010/11	2011/12	2012/13	AVERAGE
NC	19,353	20,325	18,656	20,402	19,684
SC	40,703	46,175	44,126	39,510	42,629
GA/NEFL	61,108	50,859	31,239	28,509	42,929
SEFL	67,457	76,613	99,466	111,665	88,800
TOTAL	188,621	193,972	193,487	200,086	194,042

Source: SEFSC Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab

Table 3.3.2.6. Average monthly distribution of headboat angler days in the South Atlantic, by state, fishing year 2009/10-2012/13.

	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
NC	3,978	4,605	3,574	2,059	1,794	320	3	15	0	175	898	2,263
SC	9,081	11,401	8,239	3,382	2,283	583	107	44	97	1,098	2,834	3,481
GA/NEFL	6,909	7,277	4,576	2,531	2,312	1,526	2,030	1,673	1,917	3,341	4,228	4,610
SEFL	8,998	10,371	7,524	4,545	3,806	4,559	6,223	6,609	7,406	9,974	9,920	8,867
TOTAL	28,965	33,654	23,913	12,517	10,194	6,987	8,363	8,340	9,420	14,588	17,879	19,221

Source: SEFSC Headboat Survey, NOAA Fisheries, SEFSC, Beaufort Lab

Economic Values and For-Hire Vessel Financials

Participation, effort, and harvest are indicators of the value of saltwater recreational fishing. However, a more specific indicator of value is the satisfaction that anglers experience over and above their costs of fishing. The monetary value of this satisfaction is referred to as consumer surplus. The value or benefit derived from the recreational experience is dependent on several quality determinants, which include fish size, catch success rate, and the number of fish kept. These variables help determine the value of a fishing trip and influence total demand for recreational fishing trips.

The NMFS Southeast Science Center (Carter and Liese 2012) developed estimates of consumer surplus per fish, per angler trip. These estimates were culled from various studies – Haab et al. (2009), Dumas et al. (2009), and NOAA SEFSC SSRG (2009). The values/ranges of consumer surplus estimates are (in 2013 dollars) $121 to $139 for red snapper, $134 to $139 for grouper, $11.9 for other snappers, and $87 for snapper grouper. Haab *et al.* (2009) also estimated consumer surplus for snapper in general to range from $12 to $34 (2013 dollars) for one additional fish caught and kept.

While anglers receive economic value as measured by the consumer surplus associated with fishing, for-hire businesses receive value from the services they provide. Producer surplus is the measure of the economic value these operations receive. Producer surplus is the difference between the revenue a business receives for a good or service, such as a charter or headboat trip, and the cost the business incurs to provide that good or service. Estimates of the producer surplus associated with for-hire trips are not available. However, proxy values in the form of net operating revenues are available (Christopher Liese, NMFS SEFSC, personal communication, August 2010). These estimates were culled from several studies – Liese al et. (2009), Dumas et al. (2009), Holland et al. (1999), and Sutton *et al.* (1999). Estimates of net operating revenue per angler trip (2013 dollars) on representative charter trips (average charter trip regardless of area fished) are $158 for Louisiana through east Florida, $147 for east Florida, $170 for northeast Florida, and $139 for North Carolina. For charter trips into the EEZ only, net operating revenues are $153 in east Florida and $161 in northeast Florida. For full-day and overnight trips only, net operating revenues are estimated to be $169-$174 in North Carolina. Comparable estimates are not available for Georgia, South Carolina, or Texas.

Net operating revenues per angler trip are lower for headboats than for charter boats. Net operating revenue estimates (2013 dollars) for a representative headboat trip are $52 in the Gulf of Mexico (all states and all of Florida), and $68-$74 in North Carolina. For full-day and overnight headboat trips, net operating revenues are estimated to be $81-$84 in North Carolina. Comparable estimates are not available for Georgia and South Carolina.

A study of the North Carolina for-hire fishery provides some information on the financial status of the for-hire fishery in the state (Dumas *et al.* 2009). Depending on vessel length, regional location, and season, charter fees per passenger per trip ranged from $182.58 to $273.20 for a full-day trip and from $101.70 to $134.63 for a half-day trip; headboat fees ranged from $78.71 to $88.75 for a full-day trip and from $41.32 to $46.60 for a half-day trip. Charter boats generated a total of $60.48 million in passenger fees, $3.5 million in other vessel income (e.g., food and beverages), and $5.2 million in tips. The corresponding figures for headboats were $10.67 million in passenger fees, $0.22 million in other vessel income, and $0.97 million in tips. Non-labor expenditures (e.g., boat insurance, dockage fees, bait, ice, fuel) amounted to $46.6 million for charter boats and $5.8 million for headboats. Summing across vessel lengths and regions, charter vessels had an aggregate value (depreciated) of $130.70 million and headboats had an aggregate value (depreciated) of $11.08 million. All these values are in 2013 dollars.

A more recent study of the for-hire sector provides estimates on gross revenues generated by the charter boats and headboats in the South Atlantic (Holland *et al.* 2012). Average annual revenues (2013 dollars) per charter boat are estimated to be $130,524 for Florida vessels, $55,348 for Georgia vessels, $104,417 for South Carolina vessels, and $105,593 for North Carolina vessels. For headboats, the corresponding per vessel estimates are $216,975 for Florida vessels and $159,332 for vessels in the other states.

3.3.3 Social and Cultural Environment

Black sea bass are commercially harvested using a variety of gear including hook and line gear and pots. Before the winter prohibition on pot fishing, the majority of commercial harvest was landed using pot gear off the coasts of North and South Carolina. In the recent Amendment 18A, the Council implemented restrictions on the number of pots (35) and a prohibition on overnight soaking of pots (leaving them in the water). These were considered to be viable alternatives to reduce interactions with marine mammals (SAFMC 2011).

In addition, Amendment 18A added an endorsement to limit participation in the pot sector, reducing the number of active fishermen from approximately 55-60 (SAFMC 2011) to 32 valid or renewable endorsements. As of August 20, 2015, 14 endorsements are associated with communities in North Carolina, 8 endorsements with communities in South Carolina, two endorsements in Georgia, and 8 endorsements with Florida communities. It should be noted that in recent months, several endorsements have been transferred to different businesses, including two endorsements now associated with Georgia.Most of the North Carolina endorsements are associated with areas in Onslow County, primarily Sneads Ferry, with other communities with black sea bass pot fishermen in Carteret County and further north into the Outer Banks (Wanchese) (see **Figure 3.3.1**). In South Carolina, communities associated with black sea bass pot fishing include Little River and Charleston. The Florida communities of note include several communities north of Cape Canaveral, including Port Orange, Ormond Beach, and Ponce Inlet. Until the summer months of 2015, few endorsements had been transferred from the original issue to a different snapper grouper permit holder. However, recently several endorsements have been transferred to other snapper grouper permit holders, indicating that the fishery is transitioning to adapt to recent changes to the fishery.

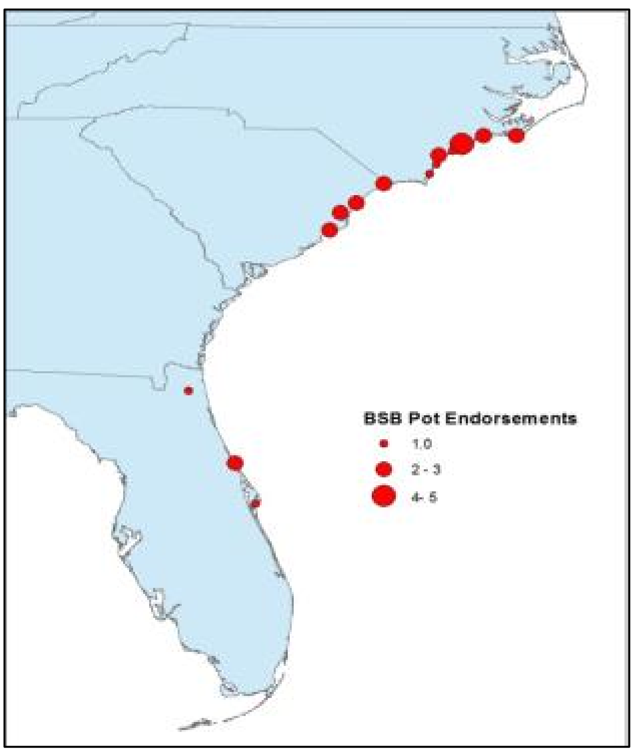

Figure 3.3.3.1. Black sea bass pot endorsements by homeport community.
Source: SERO Permits 2013

Black sea bass is part of the larger snapper grouper complex and while this species is harvested commercially using several different gear types, the proposed regulatory action within this amendment will primarily affect commercial black sea bass pot fishermen, with some indirect effects for black sea bass fishermen using other types of gear.

Figure3.3.3.2 shows South Atlantic the top fishing communities by the combined vessel local quotient (LQ). The vessel LQ is a measure of the proportion of an individual vessel's total landings of one species (in this case, black sea bass) in a fishing year compared to landings of all species in that year. An individual vessel LQ illustrates if a species is a large part of a vessel's catch, which can indicate that the vessel (and associated captain, owner, crew, fish house) is relatively more reliant on a species. For **Figure 3.3.3.2**, the vessel LQs in each community are combined to allow for a comparison among communities, and to show how vessels' reliance in a community on black sea bass has changed in recent years.

Figure 3.3.3.2 suggests that the communities of Sneads Ferry, North Carolina; Georgetown, South Carolina; and Little River, South Carolina, have vessels with relatively higher reliance on black sea bass harvested with pots within the region over the last few years. It should be noted that **Figure 3.3.3.2** also shows how the combined vessel LQs for a community changed after the endorsement program was implemented. Sneads Ferry, Georgetown and Little River have almost always been the top three communities, while most other communities have fluctuated. In particular, the graph shows that Ponce Inlet, Florida, and Cape Carteret, North Carolina, have increased combined vessel LQs over recent years, suggesting growth in one or several black sea bass pot businesses in those communities.

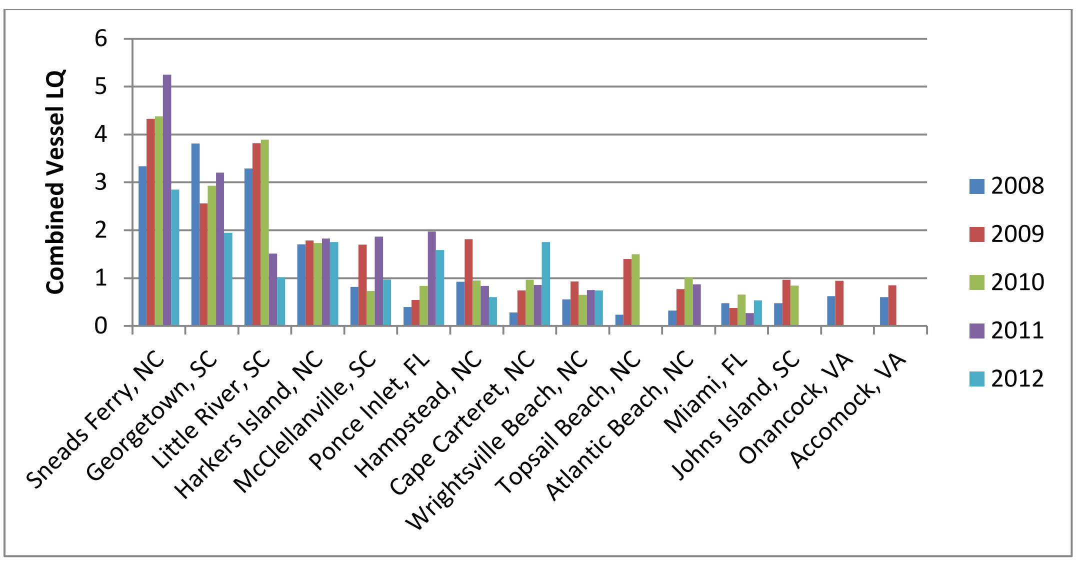

Figure 3.3.3.2. Combined vessel local quotients (LQs) for black sea bass harvested with pots in the top communities for 2008-2012.
Source: ?

Figure 3.3.3.3 shows the combined vessel LQs for black sea bass harvested with bandit gear in the top communities in recent years. This figure illustrates how communities may compare to one another in terms of reliance on black sea bass hook and line fishing, and how this has changed over the past few years. Communities in North Carolina and South Carolina are dominant in the region for black sea bass harvest with bandit gear, particularly Little River, South Carolina. **Figure 3.3.3.3** also suggests growth in black sea bass harvest with bandit gear for fishing businesses in several communities since the pot endorsement program began.

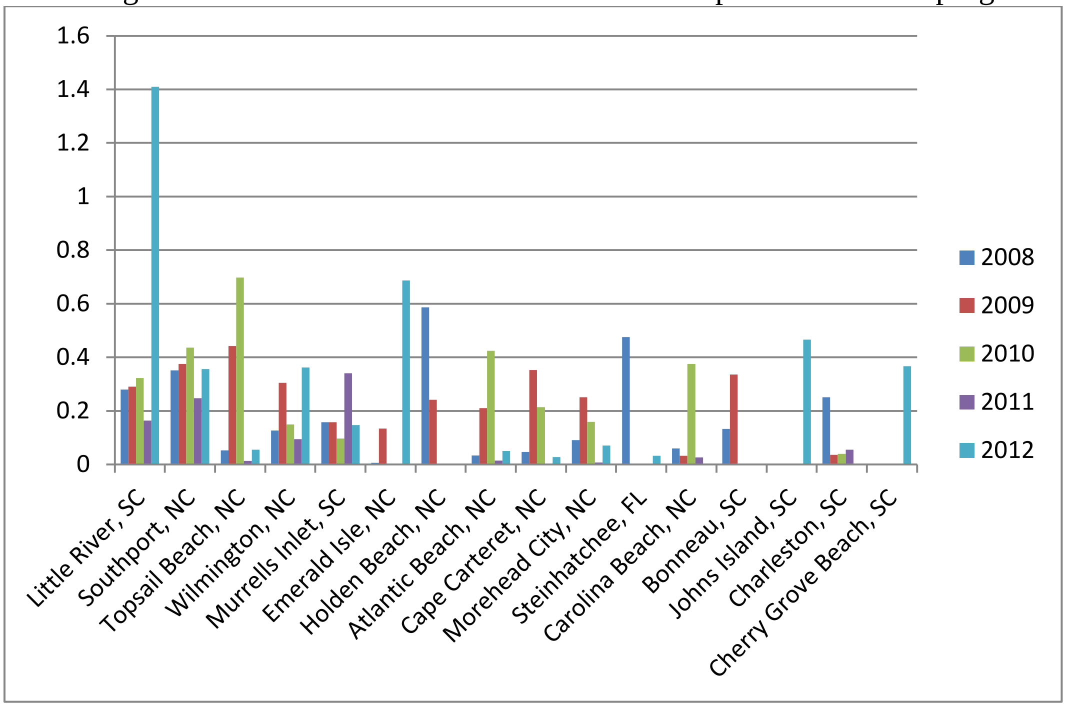

Figure 3.3.3.3. Combined vessel local quotients (LQs) for black sea bass harvested with bandit gear in the top communities for 2008-2012.
Source: ?

Commercial Fishing Engagement and Reliance

While we can characterize the fleet landings with regard to those communities that have high regional quotients for landings and value, it is more difficult to characterize the fleet and its labor force regarding demographics and places of residence for captains and crew of vessels. There is little to no information on captains and crew, including demographic makeup of crew, so we are left with descriptions regarding the engagement and reliance of fishing communities and their social vulnerability. To further delineate which communities are more dependent upon fishing, a suite of measures has been developed which uses the top communities identified in the RQ graphics and applies indices of fishing engagement and reliance.

Several indices composed of existing permit and landings data were created to provide a more empirical measure of fishing dependence (Jacob et al. 2012; Colburn and Jepson 2013; Jepson and Colburn 2013). Fishing engagement uses the absolute numbers of permits, landings and value, while fishing reliance includes many of the same variables as engagement, but divides by population to give an indication of the per capita impact of this activity.

Using a principal component and single solution factor analysis each community receives a factor score for each index to compare to other communities. Factor scores are represented by colored bars and are standardized, therefore the mean is zero. Two thresholds of 1 and ½ standard deviation above the mean are plotted onto the graphs to help determine thresholds for significance. Because the factor scores are standardized, a score above 1 is also above one standard deviation.

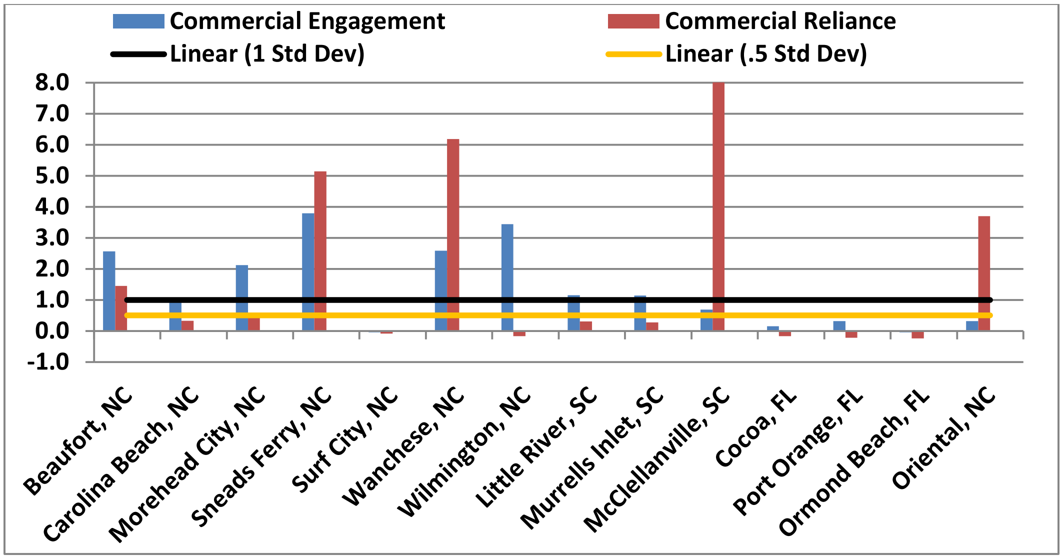

Figure 3.3.3.4. Commercial fishing engagement and reliance for top black sea bass fishing communities. Source: SERO Social Indicator Database 2013

The communities included in **Figures 3.3.3.4** have varying combinations of reliance and engagement. The communities of Beaufort, Sneads Ferry and Wanchese, North Carolina are considered likely dependent upon fishing overall as they exceed both thresholds for fishing reliance and engagement measures. Other communities might be considered commercially engaged as they exceed the highest threshold for commercial engagement. Those communities are: Morehead City, and Wilmington, North Carolina; Little River and Murrell's Inlet, South Carolina. Finally, communities like McClellanville, South Carolina and Oriental are commercially reliant as they exceed the highest threshold for commercial reliance.

Broader Affected Social Environment

In addition to fishermen and fishing communities as part of the social environment, this amendment may also have a broader Affected Social Environment because it addresses protection of North Atlantic right whales, which are protected under two federal laws, the MMPA and ESA. The mandates and authority under these laws were established with the end-goal that protection of these species is important to U.S. citizens and society. Specifically, the MMPA states that:

> ..marine mammals have proven themselves to be resources of **great international significance, esthetic and recreational as well as economic,** and it is the sense of the Congress that they should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary

> objective of their management should be to maintain the health and stability of the marine ecosystem. (16 U.S. Code § 1361) (emphasis added)

The ESA also includes language that states:

> …these species of fish, wildlife, and plants are **of esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people**;
>
> …encouraging the States and other interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs which meet national and international standards is a key to meeting the Nation's international commitments and to better safeguarding, **for the benefit of all citizens**, the Nation's heritage in fish, wildlife, and plants. (16 U.S. Code § 1531) (emphasis added)

Therefore, the United States and its citizens are included in the social environment for purposes of analysis of potential social effects in **Section 4.3**.

3.3.4 Environmental Justice

In order to assess whether a community may be experiencing EJ issues, a suite of indices created to examine the social vulnerability of coastal communities (Colburn and Jepson 2012; Jacob et al. 2012) is presented in **Figure 3.3.4.1**. The three indices are poverty, population composition, and personal disruptions. The variables included in each of these indices have been identified through the literature as being important components that contribute to a community's vulnerability. Indicators such as increased poverty rates for different groups, more single female-headed households and children under the age of 5, disruptions such as higher separation rates, higher crime rates, and unemployment all are signs of vulnerable populations. These indicators are closely aligned to previously used measures of EJ, which used thresholds for the number of minorities and those in poverty, but are more comprehensive in their assessment. Again, for those communities that exceed the threshold it would be expected that they would exhibit vulnerabilities to sudden changes or social disruption that might accrue from regulatory change. It should be noted that some communities may not appear in these figures as there are no census data available to create the indices.

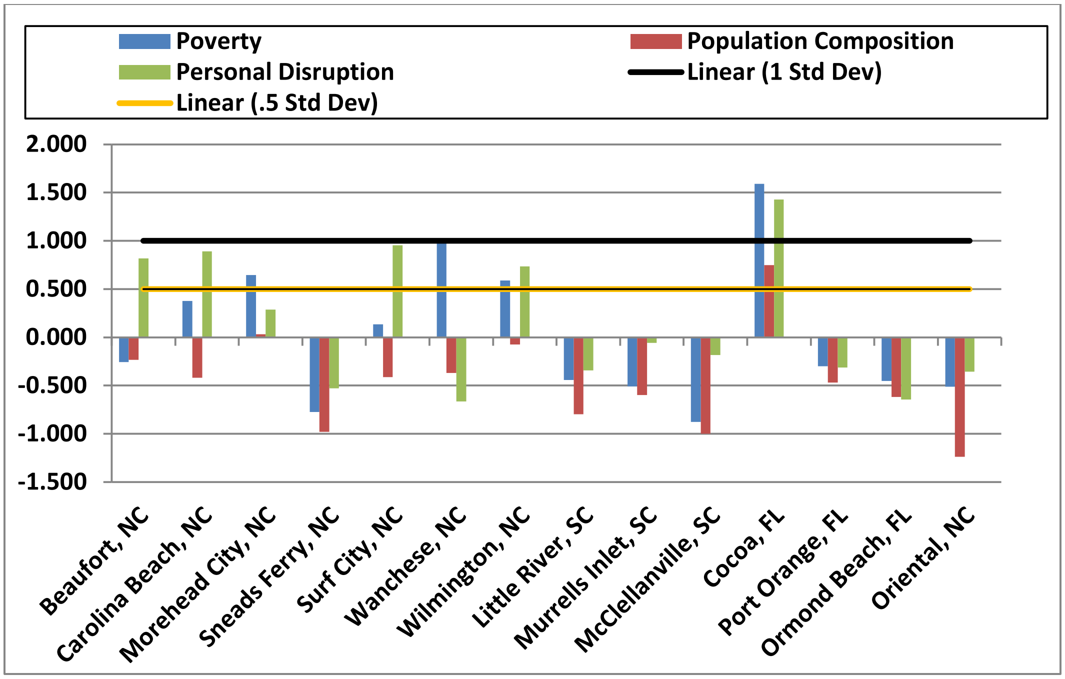

Figure 3.3.4.1. Social Vulnerability indices for black sea bass fishing communities in terms of pounds and value regional quotient in the South Atlantic.
Source: SERO Social Indicator Database 2014

There is one community in **Figure 3.3.4.1** that exceeds both thresholds for at least two indices: Cocoa, Florida. Wilmington, North Carolina, exceeds the lower threshold for poverty and personal disruption, with a few other communities exceeding the lower threshold for one or the other: Beaufort, Carolina Beach, Morehead City and Wanchese, North Carolina. While most communities in **Figure 3.4.4.1** are not experiencing much social vulnerability, there could still be some negative social effects that are exacerbated by other vulnerabilities that occur but are not represented by these indicators. However, these measures of social vulnerability are representative of many common social vulnerability factors.

Finally, the general participatory process used in the development of fishery management measures (e.g., scoping meetings, public hearings, and open South Atlantic Council meetings) is expected to provide sufficient opportunity for meaningful involvement by potentially affected individuals to participate in the development process of this amendment and have their concerns factored into the decision process. Public input from individuals who participate in the fishery has been considered and incorporated into management decisions throughout development of the amendment.

3.5 Administrative Environment

3.5.1 The Fishery Management Process and Applicable Laws

3.5.1.1 Federal Fishery Management

Federal fishery management is conducted under the authority of the Magnuson-Stevens Act (16 U.S.C. 1801 et seq.), originally enacted in 1976 as the Fishery Conservation and Management Act. The Magnuson-Stevens Act claims sovereign rights and exclusive fishery management authority over most fishery resources within the EEZ, an area extending 200 nm from the seaward boundary of each of the coastal states, and authority over U.S. anadromous species and continental shelf resources that occur beyond the U.S. EEZ.

Responsibility for federal fishery management decision-making is divided between the U.S. Secretary of Commerce (Secretary) and eight regional fishery management councils that represent the expertise and interests of constituent states. Regional councils are responsible for preparing, monitoring, and revising management plans for fisheries needing management within their jurisdiction. The Secretary is responsible for collecting and providing the data necessary for the councils to prepare fishery management plans and for promulgating regulations to implement proposed plans and amendments after ensuring that management measures are consistent with the Magnuson-Stevens Act and with other applicable laws. In most cases, the Secretary has delegated this authority to NMFS.

The South Atlantic Council is responsible for conservation and management of fishery resources in federal waters of the U.S. South Atlantic. These waters extend from 3 to 200 miles offshore from the seaward boundary of North Carolina, South Carolina, Georgia, and east Florida to Key West. The South Atlantic Council has thirteen voting members: one from NMFS; one each from the state fishery agencies of North Carolina, South Carolina, Georgia, and Florida; and eight public members appointed by the Secretary. On the South Atlantic Council, there are two public members from each of the four South Atlantic States. Non-voting members include representatives of the U.S. Fish and Wildlife Service, U.S. Coast Guard, State Department, and Atlantic States Marine Fisheries Commission (ASMFC). The South Atlantic Council has adopted procedures whereby the non-voting members serving on the South Atlantic Council Committees have full voting rights at the Committee level but not at the full South Atlantic Council level. South Atlantic Council members serve three-year terms and are recommended by state governors and appointed by the Secretary from lists of nominees submitted by state governors. Appointed members may serve a maximum of three consecutive terms.

Public interests also are involved in the fishery management process through participation on Advisory Panels and through council meetings, which, with few exceptions for discussing personnel matters, are open to the public. The South Atlantic Council uses its SSC to review the data and science being used in assessments and fishery management plans/amendments. In addition, the regulatory process is in accordance with the Administrative Procedure Act, in the form of “notice and comment” rulemaking.

3.5.1.2 State Fishery Management

The state governments of North Carolina, South Carolina, Georgia, and Florida have the authority to manage fisheries that occur in waters extending three nautical miles from their respective shorelines. North Carolina's marine fisheries are managed by the Marine Fisheries Division of the North Carolina Department of Environment and Natural Resources. The Marine Resources Division of the South Carolina Department of Natural Resources regulates South Carolina's marine fisheries. Georgia's marine fisheries are managed by the Coastal Resources Division of the Department of Natural Resources. The Marine Fisheries Division of the Florida Fish and Wildlife Conservation Commission is responsible for managing Florida's marine fisheries. Each state fishery management agency has a designated seat on the South Atlantic Council. The purpose of state representation at the South Atlantic Council level is to ensure state participation in federal fishery management decision-making and to promote the development of compatible regulations in state and federal waters.

The South Atlantic States are also involved through the Atlantic States Marine Fisheries Commission (ASMFC) in management of marine fisheries. This commission was created to coordinate state regulations and develop management plans for interstate fisheries. It has significant authority, through the Atlantic Striped Bass Conservation Act and the Atlantic Coastal Fisheries Cooperative Management Act, to compel adoption of consistent state regulations to conserve coastal species. The ASFMC is also represented at the South Atlantic Council level, but does not have voting authority at the South Atlantic Council level.

NMFS's State-Federal Fisheries Division is responsible for building cooperative partnerships to strengthen marine fisheries management and conservation at the state, inter-regional, and national levels. This division implements and oversees the distribution of grants for two national (Inter-jurisdictional Fisheries Act and Anadromous Fish Conservation Act) and two regional (Atlantic Coastal Fisheries Cooperative Management Act and Atlantic Striped Bass Conservation Act) programs. Additionally, it works with the ASMFC to develop and implement cooperative State-Federal fisheries regulations.

3.5.1.3 Enforcement

Both the NMFS Office for Law Enforcement (NOAA/OLE) and the United States Coast Guard (USCG) have the authority and the responsibility to enforce South Atlantic Council regulations. NOAA/OLE agents, who specialize in living marine resource violations, provide fisheries expertise and investigative support for the overall fisheries mission. The USCG is a multi-mission agency, which provides at-sea patrol services for the fisheries mission.

Neither NOAA/OLE nor the USCG can provide a continuous law enforcement presence in all areas due to the limited resources of NOAA/OLE and the priority tasking of the USCG. To supplement at-sea and dockside inspections of fishing vessels, NOAA entered into Cooperative Enforcement Agreements with all but one of the states in the Southeast Region (North Carolina), which granted authority to state officers to enforce the laws for which NOAA/OLE has jurisdiction. In recent years, the level of involvement by the states has increased through Joint Enforcement Agreements, whereby states conduct patrols that focus on federal priorities and, in some circumstances, prosecute resultant violators through the state when a state violation has occurred.

Administrative monetary penalties and permit sanctions are issued pursuant to the guidance found in the Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions for the NOAA Office of the General Counsel – Enforcement Section. This Policy is published at the Enforcement Section's website: http://www.gc.noaa.gov/enforce-office3.html .

Chapter 4. Environmental Consequences and Comparison of Alternatives

4.1 Action 1

4.1.1 Biological/ Ecological Effects

***Action 1 Alternatives*[1]**
(preferred alternative in bold)

1. No action. Closure would remain.
2. Closure of the currently designated North Atlantic right whale critical habitat area Nov 15 – April 15.
3. Closure from Nov 1 – April 30 between Ponce Inlet, FL and Cape Hatteras, NC based on extrapolated model outputs.
4. Closure from Nov 1 – April 30 in depths 25 m or shallower from Daytona Beach to Savannah and 30 m or shallower from Savannah to C. Hatteras.
5. Closure from Nov 1 – April 30 between Daytona Beach & C. Hatteras based on NGO comments.
6. Closure from Nov 1 – April 30 between Sebastian, FL & C. Hatteras, NC based on NGO comments.
7. Closure of the currently designated North Atlantic right whale critical habitat area & north to C. Hatteras in depths 25 m or shallower.
   7a. Nov 1 – Dec 15 & Mar 15 – Apr 30.
   7b. Off NC/SC Nov 1 – Dec 15/Mar 15 – April 30 and off FL/GA Nov 15 – April 15.
   7c. Off NC/SC Feb 15 – Apr 30. Off FL/GA Nov 15 – Apr 15.
8. Off FL/GA same as Alt 5. Off SC/NC < 25 m.
   8a. Closure Nov 1 – Apr 15.
   8b. FL/GA closure Nov 15 – Apr 1 SC/NC closure Nov 1 – Dec 15 and Feb 15 – Apr 30.
9. Off FL/GA same as Alt 5. Off SC/NC < 20 m.
   9a. Closure Nov 1 – Apr 15.
   9b. FL/GA closure Nov 15 – Apr 15. SC/NC closure Nov 1 – Dec 15 and Feb 15 – Apr 30.
10. Off FL/GA same as Alt 5 with closure Nov 15 – Apr 15. Off SC/NC Nov 1 – Dec 15 < 20 m. Off SC/NC Feb 15 1 – Apr 30 < 25 m.
11. **Nov 1 – 30 and Apr 1 - 30 off FL/GA same as Alt 5, off SC/NC same as Alt 8. Dec 1 – Mar 31, off FL/GA closure < 25 m, off SC/NC closure < 30 m.**
12. Nov 1 – Apr 30, midpoints between proposed closure Alts 4 and 8.

[1]See Chapter 2 for a more detailed description of the alternatives.

<u>Black Sea Bass</u>

The alternatives range from maintaining the current prohibition on use of black sea bass pots in the entire exclusive economic zone (EEZ) from November 1 through April 30, annually (**Alternative 1 (No Action))** to allowing the black sea bass pot sector to operate based on varying spatial and seasonal closures. **Alternative 2** would prohibit black sea bass pots within the currently designated North Atlantic Right Whale NARW) critical habitat, annually, from November 15 through April 15. **Alternatives 3-6** include various areas in which use of black sea bass pots would be prohibited, annually, from November 1 through April 30. **Alternatives 7a-7c** combine the area designated for NARW critical habitat with additional area off the Carolinas and northern Georgia that would close the areas for differing times. **Alternatives 8a** and **8b** combine the area closure for Florida and Georgia in **Alternative 5** with the area closure for North Carolina and South Carolina from **Alternative 7** over differing time frames. **Alternative 9a** combines **Alternative 5** for the closure off Florida and Georgia with a closure off North Carolina and South Carolina based on the 20 m depth contour from November 1 through April

15. **Alternative 9b** has the same area closure as **Alternative 9a** but would close from November 15 through April 15 off Florida and Georgia and would close off North Carolina and South Carolina from November 1 through December 15 and February 15 through April 30. **Alternative 10** has the same area closure off Florida and Georgia as Alternative 5 with a seasonal closure from November 15 through April 15 and would close off North Carolina and South Carolina from November 1 through December 15 in waters less than 20 meters (66 feet) and from February 15 through April 30 in waters less than 25 meters (82 feet). **Preferred Alternative 11** has the same area closure as **Alternative 5** off Florida and Georgia and **Alternative 8** off North and South Carolina from November 1 through November 30 and April 1 through April 30 and **Alternative 4** for all areas from December 1 through March 31. **Alternative 12** is the mid-point between **Alternative 4** and **Sub-Alternative 8a** and would apply from November 1 through April 30.

The expected closure date ranges and the estimated percent of the commercial black sea bass ACL expected to be harvested are shown in **Table 4.1.1.1**. The ranges of closing dates and expected percentages of the commercial ACL that would be landed are due to different scenarios considered in the analyses (SERO-LAPP-2015-09; included as **Appendix N**). The scenarios considered various combinations of the spatial distribution of landings and effort, and factors that affected catch rate projections.

Regardless of which alternative the South Atlantic Fishery Management Council (Council) chooses, no biological impacts to the black sea bass stock are expected. Adverse biological effects are prevented because overall harvest in the commercial sector is limited to the commercial ACL; commercial accountability measures (AMs) are also in place. The ACL is reduced from the overfishing level as required to address assessment uncertainty. In addition, there is no evidence to suggest that changing the timing of harvest within the periods covered by the alternatives would have adverse biological impacts. These alternatives are predicted to harvest 97-100% of the ACL and would not provide additional protection to the black sea bass stock in terms of reduced harvest (**Table 4.1.1.1**). Therefore, there is no difference in the biological effects on black sea bass from the alternatives.

Table 4.1.1.1. Expected closure dates for the commercial black sea bass fishery with a January 1 fishing year start date.

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 1	No Closure	No Closure	No Closure	No Closure
Alternative 2	10/2	8/4	10/26 - 11/4	11/19 - 12/3
Alternative 3	11/26 - 12/5	10/4 - 10/17	10/26 - 11/4	11/19 - 12/3
Alternative 4	12/20 - 12/30	12/7 - 12/22	12/11 - 12/18	12/19 - 12/30
Alternative 5	12/16 - 12/24	12/1 - 12/11	12/6 - 12/11	12/15 - 12/23
Alternative 6	12/20 - NC*	12/7 - 12/25	12/10 - 12/20	12/19 - NC
Sub-Alternative 7a	10/11 - 10/12	8/18 - 8/20	10/6 - 10/9	10/7 - -10/9
Sub-Alternative 7b	12/28 - NC	12/18 - 12/30	12/17 - 12/21	12/28 - NC
Sub-Alternative 7c	12/22 - 12/28	12/9 - 12/17	12/11 - 12/14	12/23 - 12/29
Sub-Alternative 8a	12/6 - 12/11	10/14 - 10/25	10/29 - 11/5	12/5 - 12/9
Sub-Alternative 8b	12/29 - NC	12/20 - 12/30	12/18 - 12/21	12/29 - NC
Sub-Alternative 9a	10/28 - 11/9	9/15 - 9/27	10/13 - 10/19	10/24 - 11/3
Sub-Alternative 9b	12/26 - NC	12/15 - 12/28	12/14 - 12/20	12/26 - NC
Alternative 10	12/27 - NC	12/17 - 12/29	12/16 - 12/20	12/28 - NC
Preferred Alternative 11	12/18 – 12/28	12/3 -12/18	12/6 – 12/13	12/17 – 12/27
Alternative 12	12/15 – 12/23	11/21 – 12/10	12/5 – 12/11	12/14 – 12/22

* NC = No Closure
Source: **Appendix N**; **Appendix R**

Bycatch

Catch in the black sea bass pot sector consists of two components: landed fish and discarded bycatch. The landed catch was analyzed using logbook data reported by fishermen for trips with landings of black sea bass reported. The total number of trips catching black sea bass, total catch of each species or category, and catch per trip was summarized. The catch per trip was simply the total landings for each market category divided by the total number of trips. Data on landed catch might have changed over time due to seasonal restrictions, desirability of the species, gear restrictions, and improved reporting. It cannot be determined if a change in landings or average catch per trip is due to regulation effects or population effects. The landings are associated with the pot sector; however, the species could have been harvested using other gear.

Besides black sea bass, landed catch, which averaged greater than 2 pounds per trip associated with the black sea bass pot sector from 2000 to 2011, consisted of white grunt, king mackerel, cero mackerel, triggerfishes, king mackerel, blueline tilefish), and unclassified scups or porgies (**Figure 4.1.1.1**). The average landings of catch per trip of species other than black sea bass was 78 pounds from 2000 to 2011, while the average catch of black sea bass per trip was 629 pounds. The time period selected was based on the timing of the pot endorsement becoming effective in 2012.

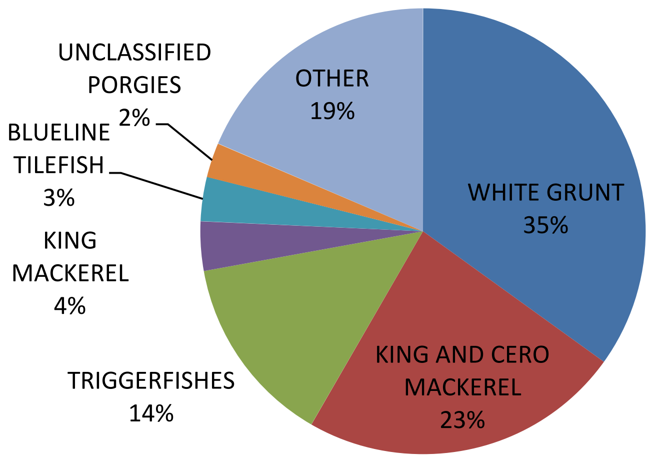

Figure 4.1.1.1. Percentage of landed catch in the black sea bass pot sector for landings categories from 2000 to 2011.

In 2012 and 2013, the landed catch from black sea bass pots (other than black sea bass), which averaged greater than 2 pounds per trip associated consisted of white grunt, triggerfishes, greater amberjack, red porgy, wahoo, king mackerel, bluefish, gag, and red snapper (Figure 4.1.1.2). The average landings of catch per trip for species besides black sea bass was 63 pounds from 2012 and 2013. The average landings of black sea bass was 645 pounds. In both time periods, white grunt, triggerfish, and king mackerel were commonly landed species associated with the black sea bass pot sector. The remaining species varied over the time period. The change in the landed species could have resulted from different seasons of fishing, restrictions on the pot sector, change in the distribution of the pot sector, change in abundance, or change in desirability of different species. It cannot be determined the effect of the different alternatives on the landed incidental catch in black sea bass pots. The hook and line sector has a much higher diversity in landing categories than pot gear. Thus, if black sea bass pot fishermen shift to hook and line gear, it would be difficult to determine the targeted species.

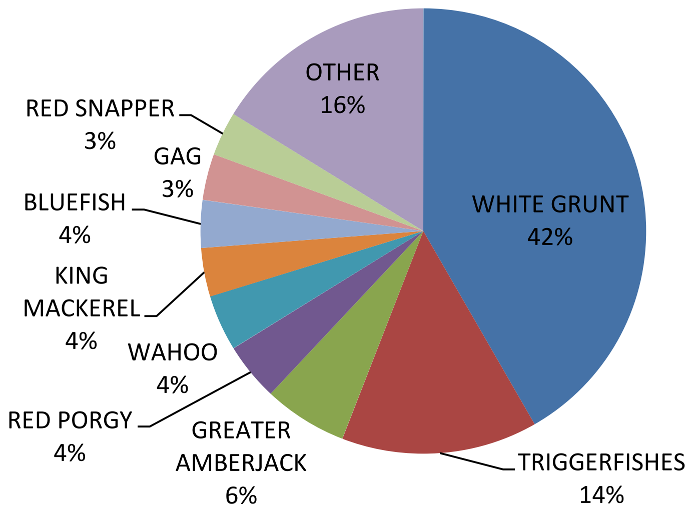

Figure 4.1.1.2. Percentage of landed bycatch in the black sea bass pot sector for landings categories from 2012 and 2013.

The discarded bycatch greater than 10 fish per trip included black sea bass, spottail pinfish, gray triggerfish, white grunt, and scup (**Table 4.1.1.2**). The greatest number of fish discarded was black sea bass and averaged 3,709 fish per year. Fishermen did not report discarding greater than 100 fish per year for any other species.

Table 4.1.1.2. Top ten stocks with mean estimated South Atlantic commercial discards (#fish) during snapper grouper trips (defined as trips with >50% of landings from snapper grouper stocks), sorted from largest to smallest, by gear, for the 2009-2013 period. Source: SEFSC Commercial Logbook (accessed May 2015) and Commercial Discard Logbook (accessed November 2014).

Stock	Handline /Electric	Stock	Trap
yellowtail snapper	5483.2	black sea bass	3708.8
gray snapper	1887.4	pinfish spottail	59
black sea bass	1274.6	gray triggerfish	54.8
red snapper	1132.6	white grunt	43.6
vermilion snapper	721.6	grunts	32.7
red porgy	640.7	scup	30.8
gag	492.3	red porgy	27.6
unc amberjack	172.2	finfishes unc	8.3
unc groupers	143.9	gag	8.2
unc snappers	130.9	vermilion snapper	5.8

Source: SEFSC Commercial Logbook (accessed May 2015) and Commercial Discard Logbook (accessed November 2014).

Protected Resources

The South Atlantic black sea bass pot sector is listed as part of the larger "Atlantic mixed species trap/pot fishery" under the List of Fisheries (LOF). The National Marine Fisheries Service (NMFS) publishes annually the List of Fisheries (LOF) as required by the Marine Mammal Protection Act (MMPA). The LOF classifies U.S. commercial fisheries into one of three categories according to the level of incidental mortality or serious injury of marine mammals:

I. **frequent** incidental mortality or serious injury of marine mammals
II. **occasional** incidental mortality or serious injury of marine mammals
III. **remote likelihood of/no known** incidental mortality or serious injury of marine mammals.

The classification of a fishery on the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan (TRP) requirements.

The black sea bass pot sector is a Category II fishery because occasional incidental mortality or serious injury of marine mammals occur in the fishery. The Atlantic mixed species trap/pot fishery has had interactions with threatened and endangered species including fin and humpback whales (January 28, 2015, 79 FR 77919). Some pot gear in other areas are Category I fisheries under the LOF because they are known to frequently cause incidental mortalities or serious injuries of marine mammals. Category I fisheries have been documented to cause serious injury and death to NARW (Johnson et al. 2005, Knowlton et al. 2012). Other trap pot fisheries are classified as Category III fisheries because there is a remote likelihood of or no known incidental mortality or serious injury of marine mammals.

Entanglements incidental to commercial fishing are the primary threat to right whales; however, less is known about the source of entanglement. In a study of 31 right whale entanglements, Johnson et al. (2005) found 14 cases where gear type could be identified; pot gear represented 71% of these cases (8 lobster pots, 1 crab pot, 1 unknown pot). In a recent compilation of data from 2007-2014, there were 17 entangled whales and none of these were attributed to a specific fishery (Waring et al. 2014). These data indicate information from an entanglement event often does not include the detail necessary to assign the entanglements to a particular fishery or location, and scarring studies suggest the vast majority of entanglements are not observed (Waring et al. 2014). Consequently, while black sea bass pot gear has not been definitively identified in a right whale entanglement, right whales entanglements in gear consistent with that used in the commercial black sea bass sector have been documented. Knowlton et al. (in press) examined line characteristics of fishing gear removed from live and dead entangled whales from the U.S. East Coast and Canada from 1994-2010. Of 132 ropes from 70 cases, they found 26% of ropes were in the range of 0.312 in (~5/16 in) to .654 in (11/16 in) diameter and made out of polypropylene (Knowlton et al, in press). Levesque (2009) interviewed 42 black sea bass pot fishermen from major fishing ports in the area Georgia through North Carolina. Fishermen reporting using 1/4 in, 5/16 in, or 3/8 in diameter buoy lines and most used line made out of polypropolene (Levesque 2009).

The western NARW stock is endangered and the minimum population size was 455 individuals in 2012 (Waring et al. 2014). The potential biological removal (PBR) for right whales is 0.9 individuals, and any mortality or serious injury is considered significant (Waring et al. 2014). (PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population.) Serious injury and mortality due to human anthropogenic impacts has exceeded the PBR from 2006 to 2011 (Waring et al. 2013, Waring et al. 2014). Specifically, the current rate of fishery entanglements averages 3.25 animals per year and is 3.6 times over PBR (Waring et al. 2014). Additionally, an increase in mortality in 2004 and 2005 was cause for serious concern (Kraus et al. 2005; Waring et al. 2014). Calculations based on demographic data through 1999 (Fujiwara and Caswell 2001) indicated that this mortality rate increase would reduce population growth by approximately 10% per year (Kraus et al. 2005; Waring et al. 2014). Of those mortalities, six were adult females, three of which were carrying near-term fetuses. Furthermore, four of these females were just starting to bear calves, losing their complete lifetime reproduction potential. From 1998-2000, strong evidence suggested a flat or negative growth in the minimum number of animals alive, which coincided with very low calf production in 2004 (Waring et al. 2014). However, the population has continued to grow since that apparent interval of decline. Examination of the minimum population estimates for NARW indicates an estimated population growth rate of 2.8% per year from the 1990s to 2010s (Waring et al. 2014).

Potential serious injury or mortality to right whales should be considered for management measures in the black sea bass pot sector because right whales may be found in the Council's jurisdiction from November 1 through April 30 (NMFS 2008). The bulk of the black sea bass pot effort traditionally operated from November to April. Since 2010, the black sea bass pot sector has not fished during this time due to ACL closures (2010, 2011, and 2012) or by regulation (2013 to present). A regulatory closure of the pot sector from November 1 through April 30 was implemented in 2013, via Regulatory Amendment 19 to the Snapper Grouper FMP. The regulatory closure was implemented to protect endangered right whales while allowing an increase in the ACL. Had the regulatory closure not been implemented, the potential for black sea bass pot gear interactions with right whales would have increased, requiring reinitiation of formal consultation under the Endangered Species Act (ESA) which would have delayed the ACL increase.

Throughout the range of the NARW, the NMFS budgeted $8.7 million in fiscal year (FY) 2013 and $8.4 million in FY 2014 in whale recovery budgets. As an example, NMFS (NMFS SERO PRD 2015) estimates that it cost $87,900 for a multi-agency attempt to rescue a right whale in trap pot gear in 2010/2011. Between FY 2003 and FY 2005, the costs of actions to reduce fishery bycatch of NARW were between $4.9 million and $7.7 million across several federal and non-governmental organizations (Reeves et al. 2007). During the FY 2003-2005, the multi-agency costs to promote NARW recovery ranged from $13.1 million to $16.7 million throughout the NARW range.

Prior to these ACL and regulatory closures, restrictions were implemented via Amendment 18A to the Snapper Grouper FMP, effective in 2012. The Council determined action needed to be taken to modify the rebuilding strategy including the ABC, ACL, and AMs, reduce participation and effort in the black sea bass pot segment of the snapper grouper fishery, and adjust the system of accountability in the recreational sector. Specifically, the Council established a maximum of 35 pots per fishermen, required that pots be removed from the water when a trip is completed, and established an endorsement to limit the number of fishermen (32 fishermen) that could use pots to harvest black sea bass. Since these restrictions were enacted, the average number of pots in the water per day is 75 for all endorsement holders combined, with a maximum reported number of pots fished on a day of 278; the total pots fished in one day cannot exceeded 1,120 pots (32 fishermen times 35 pots) in the South Atlantic (SAFMC 2014). While not the purpose of the Amendment 18A, many requirements it implemented likely have some ancillary biological benefits to NARW. However, the most notable large whale entanglement risk reduction measure in the Council's commercial black sea bass pot sector is that the black sea bass fishing season has not co-occurred with the right whale season for the last several years (July 16, 2013; 78 FR 42654).

To provide the Council with means to quantify the different alternatives in Action 1, an entanglement relative risk analysis. was conducted Data on actual interactions between black sea bass pots and NARW is unavailable so the co-occurrence of gear and whales was used as a proxy for entanglement risk. The model estimated the relative risk of entanglement relative to each alternative. This analysis was reviewed by the Southeast Fishery Science Center, the Atlantic Scientific Review Group (SRG), and the Council's Scientific and Statistical Committee (SSC). SRGs advise NMFS and U.S. Fish and Wildlife Service (FWS) on the status of marine mammal stocks (under Section 117 of the Marine Mammal Protection Act. These scientific review bodies agreed that the whale interaction prediction model provided a reasonable proxy for the relative entanglement risk associated with each of the proposed alternatives. The analysis of uncertainty in the model indicated that the differences between alternatives were robust. The Atlantic SRG found that the additional model developed for the distribution of right whales off North Carolina was valid and consistent with the expectations of experts on right whale biology. In April 2015, the SSC agreed that the updated analysis addressed all the concerns they had raised in their October 2014 meeting, and the analysis represented the best available scientific information on right whale entanglement relative risk associated with the proposed alternatives in Regulatory Amendment 16.

Due to uncertainty in how the black sea bass pot sector would proceed with their first winter opening since December 2010, many different scenarios were considered in the entanglement relative risk analyses (**Appendix N**). The scenarios considered various combinations of the spatial distribution of landings and effort, and factors that affected catch rate projections. These scenarios produced a range of potential closure dates **(Table 4.1.1.1)**.

Regardless of which alternative the Council chooses, no biological impacts to the black sea bass stock are expected. No adverse effects are anticipated because overall harvest in the commercial sector is limited to the commercial ACL by the commercial AM, and the ACL is reduced from the overfishing level as required to address assessment uncertainty. In addition, there is no evidence to suggest that changing the timing of harvest within the periods covered by the alternatives would have adverse biological impacts. These alternatives offer no advantages to the black sea bass stock in terms of further reduced harvest because it is estimated that 97-100% of the ACL would be taken (**Appendix N**). Therefore, there is no difference in the biological effects on black sea bass from the alternatives.

The alternatives under consideration differ substantially in their potential biological effects on ESA-listed large whales. The comparison of alternatives below is based primarily on the analysis in SERO-LAPP-2014-09 (**Appendix N; Table 4.1.1.2**). The analysis simulated the potential landings of black sea bass pot endorsement holders during a winter season for **Alternatives 1** through **12**. Factoring in landings by other gear, the date the ACL would be met under each scenario was predicted. The analysis also considers overlays of the co-occurrence of the seasonal distribution of black sea bass pot gear and North Atlantic right whales as a proxy for the relative risk of right whale entanglements under each of the proposed alternatives. Overlaying distributions of right whales with fisheries/ships/etc. is an established way of evaluating risk from activities of interest (NMFS 2014, Redfern et al. 2013). Due to differences in right whale sampling protocols and data availability, separate models that overlayed right whale and black sea bass fishing effort were generated for two regions; for North Carolina and for South Carolina to Florida. The resulting analysis estimated the relative risk of entanglement for a given alternative in those two regions.

Table 4.1.1.2. Ranked projected risk of right whale entanglement in pot gear vertical lines (in relative risk units; RRU) under proposed Alternatives in Regulatory Amendment 16. Alternative 1 is the no action alternative.

NARW Protection	Alternative
Most Protective	**Alternative 1:** no relative risk of entanglement (0 RRU)
	Alternative 6: low increase in relative risk off NC (+2-8 RRU); no additional risk off FL-SC (0 RRU).
	Alternative 4: low increase in relative risk off NC (+2-8 RRU); low increase in relative risk off FL-SC (+0-3 RRU).
	Alternative 11: low increase in relative risk off NC (+3-15 RRU); low risk off FL-SC (+2-9 RRU)
	Alternative 12: low increase in relative risk off NC (+2-15 RRU); low risk off FL-SC (+0-13 RRU)
	Alternative 5: low increase in relative risk off NC (+1-2 RRU); low to high increase in relative risk off FL-SC (+11-58 RRU).
	Alternative 3: low to moderate increase in relative risk off NC (+10-26 RRU); low to high increase in relative risk off FL-SC (+16-52 RRU).
	Alternative 8a: low to moderate increase in relative risk off NC (+13-36 RRU); low to high increase in relative risk off FL-SC (+13-64 RRU).
	Alternative 9a: moderate to high increase in relative risk off NC (+26-51 RRU); moderate to high increase in relative risk off FL-SC (+30-72 RRU).
	Alternative 7a: high increase in relative risk off NC (+69-74 RRU); very high increase in relative risk off FL-SC (+77-96 RRU).
	Alternative 8b: high increase in relative risk off NC (+51-68 RRU); high to very high increase in relative risk off FL-SC (+61-89 RRU).
	Alternative 10: high to very high increase in relative risk off NC (+55-75 RRU); high to very high increase in relative risk off FL-SC (+62-89 RRU).
	Alternative 9b: high to very high increase in relative risk off NC (+61-87 RRU); high to very high increase in relative risk off FL-SC (+67-94 RRU).
	Alternative 7c: high to very high increase in relative risk off NC (+75-97 RRU) and off FL-SC (+67-100 RRU).
	Alternative 7b: very high increase in relative risk off NC (+77-89 RRU); high to very high increase in relative risk off FL-SC (+70-106 RRU).
Least Protective	**Alternative 2:** very high increase in relative risk off NC (+100 RRU over status quo) and off FL-SC (+100 RRU).
Risk Classification	1-25 RRU = low, 26-50 RRU = moderate, 51-75 RRU= high, 76-100+ RRU = very high

Alternative 1 (No Action) introduces no additional entanglement risk to ESA-listed large whales. North Atlantic right whales follow a general annual pattern of migration between low latitude winter calving grounds and high latitude summer foraging grounds (Perry et al. 1999, Kenney 2002). The coastal waters of the southeastern United States are the only known calving area for right whales. As many as 243 right whales have been documented in the southeastern United States during a single calving season (P. Hamilton, personal communication, April 11, 2014). Studies indicate that right whale concentrations are highest in the core calving area off Florida and Georgia from November 15 through April 15 (NMFS 2008), but they may occur from North Carolina to Florida from November 1 through April 30 (NMFS 2008). Systematic

surveys conducted off the coast of North Carolina during the winters of 2001 and 2002 sighted eight calves, suggesting the calving grounds may actually extend as far north as Cape Fear, North Carolina (McLellan et al. 2004). The amount of time non-calving right whales spend in the southeastern United States is typically less than one month (A. Krzystan, June 2014 SEIT meeting) indicating a steady stream of right whales travel between habitats in the northeastern and southeastern United States during fall, winter, and spring. For example, two right whales tagged off Florida in January 2015 and radio-tracked for more than 24 hours migrated northward, mid-season, within days of being tagged. On rare occasions, right whales have been spotted as early as September and as late as July in the southeastern United States (Taylor et al. 2010). There is also increasing evidence that juvenile humpback whales remain in the Mid-Atlantic during the winter to feed instead of travelling to the Caribbean to breed.

Entanglement in fixed fishing gear is a leading cause of right whale mortality (Knowlton et al. 2012). Rope from trap/pot gear was more frequently found on entangled right whales than rope associated with gillnets when gear from entangled whales could be identified (Johnson et al. 2005). Knowlton et al. (2012) report that approximately 83% of all right whales have been entangled at least once, and 60% of those animals had been entangled multiple times. The authors further clarify that this is a minimum estimate (Knowlton et al. 2012). Based on the current known information about North Atlantic right and humpback whales in the southeastern United States, **Alternative 1 (No Action)** removes temporal and spatial overlap between the black sea bass pot sector and these species; essentially eliminating entanglement risk. Maintaining status quo ensures that no black sea bass trap lines would be in the water when ESA-listed large whales are likely to be in or transiting through waters under the Council's jurisdiction.

Alternative 2 introduces the greatest amount of entanglement risk relative to all the other alternatives. The SERO-LAPP-2014-09 analysis indicates a very high increase in entanglement risk for right whales off North Carolina and from South Carolina to Florida for **Alternative 2**, relative to **Alternative 1 (No Action)**. The very high relative risk associated with **Alternative 2** is because predicted North Atlantic right whale presence is high outside of the spatial boundaries of Alternative 2. **Alternative 2** is based on the currently designated North Atlantic right whale critical habitat, designated in the 1994. This area was originally based on 303 sightings from 1950-1989. In the 20+ years since designation, the understanding of where North Atlantic right whales occur, or are most likely to occur, in southeastern United States has grown significantly. The current Right Whale Critical Habitat includes state waters. The SERO-LAPP-2014-09 analysis does not include data from state waters as the Council does not have authority to prohibit the use of black sea bass pots in state waters. North Atlantic right whale critical habitat is currently undergoing a revision based on more current data. A Notice of Proposed Rulemaking to modify North Atlantic right whale critical habitat was published in the Federal Register on February 20, 2015 (80 FR 9314).

Alternative 3 would likely introduce less entanglement risk that most alternatives (i.e., **Alternative 2** and **10** and **Sub-Alternatives 7a, 7b, 7c, 8a, 8b, 9a,** and **9b**), but introduce more entanglement risk than others (i.e., **Alternative 1 (No Action), 4, 5,** and **6)**. The SERO-LAPP-2014-09 analysis indicates a low to moderate increased entanglement risk in right whales off

North Carolina, for this alternative, relative to **Alternative 1 (No Action)**. However, that analysis indicates a low to high increased risk of entanglement from South Carolina to Florida for this alternative, relative to **Alternative 1 (No Action)**. **Alternative 3** considers the entire period when ESA-listed large whales may be in the southeastern United States (i.e., November 1 through April 30). However, the increase in relative risk is likely because the area proposed in **Alternative 3** is based on habitat features preferred by pregnant right whales and mother/calf pairs only (Good 2008, Keller et al. 2012). It does not consider juveniles, non-reproducing adults, or account for the north/south migratory behavior of right whales (i.e., whales that may occur outside of predicted areas due to behavioral reasons). Juvenile right whales are the age class most prone to entanglement and entangle at a higher rate (Knowlton et al. 2012).

Alternative 4 likely introduces relatively little entanglement risk relative to almost all of the alternatives. Only **Alternative 1 (No Action)** and **Alternative 6** would introduce less entanglement risk than **Alternative 4**. The SERO-LAPP-2014-09 analysis indicates a low increased risk of entanglement both off North Carolina and from South Carolina to Florida, for this alternative, relative to **Alternative 1 (No Action)**. The area proposed under this alternative is based on bathymetry, 2005/06-2012/13 right whale Early Warning System data, and South Carolina/Georgia aerial survey data and 2001/02, 2005/06, and 2006/07 surveys by the University of North Carolina-Wilmington (Garrison 2014). These data sources are more expansive and recent than those used to develop the area proposed in **Alternative 3**. These newer data sources are particularly more robust off the state of South Carolina, and include all right whale demographic segments (i.e., mother/calf pairs, pregnant females, non-reproducing females, adult males, and juveniles). This alternative considers the entire period when ESA-listed large whales may be in the southeastern United States (i.e., November 1 through April 30) and captures approximately 97% and 96% of right whale sightings in the North Carolina/South Carolina region and the Florida/Georgia region, respectively.

Alternative 5 introduces the less entanglement risk relative to most of the alternatives (i.e., **Alternatives 2, 3, and 10** and **Sub-Alternatives 7a, 7b, 7c, 8a, 8b, 9a,** and **9b**) but more than others (i.e., **Alternatives 1 (No Action)**, **4,** and **6**). The SERO-LAPP-2014-09 analysis indicates a low increased entanglement risk in right whales off North Carolina, for this alternative, relative to **Alternative 1 (No Action)**. However, that analysis indicates a low to high increased risk of entanglement from South Carolina to Florida for this alternative, relative to **Alternative 1 (No Action)**. The area closure for pots proposed off Florida/Georgia under this alternative is based on the right whale calving habitat model that is also the basis for **Alternative 3**. Off the coasts of North Carolina/South Carolina, the closure extends offshore 30 nautical miles. This alternative considers the entire period when ESA-listed large whales may be in the southeastern United States (i.e., November 1 through April 30). However, the increase in relative risk from South Carolina to Florida is the result of estimated commercial black sea bass pot gear effort south and east of the proposed pot area closure from St. Augustine to Cape Canaveral, Florida. This alternative provides less protection in the core calving area because the protected area likely does not extend far enough into South Florida waters to capture the full extent of right whale occurrence based on updated information.

Alternative 6 would likely introduce very little entanglement risk; only **Alternative 1 (No Action)** is expected to have lower entanglement risks**.** The SERO-LAPP-2014-09 analysis indicates a low increased entanglement risk in right whales off North Carolina, and no increased risk from South Carolina to Florida for this alternative, relative to **Alternative 1 (No Action)**. This area represents an existing federal management area, the Southeast Restricted Area for gillnets, under the Atlantic Large Whale Take Reduction Plan (ALWTRP); and an additional area off North Carolina. The area off North Carolina includes waters shallower than 30 meters. This alternative considers the entire period when ESA-listed large whales may be in the southeastern United States (i.e., November 1 through April 30). This area extends substantially further offshore of Florida and Georgia than areas included in other alternatives. Thus, no increase in relative risk to right whales is anticipated off Florida and Georgia and a negligible increase in relative risk is projected off South Carolina.

Sub-Alternative 7a would likely introduce less entanglement risk than **Sub-Alternative 7b** or **7c,** as well as **Alternatives 2** and **10** and **Sub-Alternative 8b** and **9b,** but would likely introduce more entanglement risk than the remaining alternatives. The SERO-LAPP-2014-09 analysis indicates a high increased entanglement risk for right whales off North Carolina, and a very high increased risk of entanglement for right whales off from South Carolina to Florida for **Sub-Alternative 7a**, relative to **Alternative 1 (No Action)**. The SERO-LAPP-2014-09 analysis indicates a high to very high increased risk of entanglement under **Sub-Alternatives 7b** and **7c** in right whales off North Carolina and from South Carolina to Florida. Each sub-alternative establishes a "book end" closure period for the area off North Carolina/South Carolina and for the area off Florida/Georgia. As noted previously, North Atlantic right whales may be found in the southeastern United States from November 1 through April 30, and do not mass migrate only at the beginning and end of the calving season but rather there is a steady stream of animals traveling between the northeastern and southeastern United States habitats in fall, winter and spring. As a result, the closure periods for black sea bass pots proposed under these sub-alternatives does not cover the entire period when these animals occur in the region. **Sub-Alternative 7c** covers more of the period when North Atlantic right whales would occur in the southeastern United States; however, the fishery is anticipated to reach its ACL soonest under **Sub-Alternative 7a** (somewhere between early August and early October), followed by **Sub-Alterative 7c** and **Sub-Alterative 7b**. Thus, the SERO-LAPP-2014-09 analysis indicates **Sub-Alternative 7a** would introduce less entanglement risk than **Sub-Alternatives 7c** and **7b**, respectively.

Sub-Alternative 8a would likely introduce less entanglement risk than a number of others (i.e., **Alternatives 2** and **10** and **Sub-Alternatives 7a, 7b, 7c, 9a,** and **9b**) including **Sub-Alternative 8b**, but would likely introduce more than others (i.e., **Alternative 1, 3, 4, 5,** and **6**)**.** The SERO-LAPP-2014-09 analysis indicates a low to moderate increase in entanglement risk for right whales off North Carolina, and a low to high increased risk of entanglement from South Carolina to Florida for **Sub-Alternative 8a**, relative to **Alternative 1 (No Action)**. Conversely, the SERO-LAPP-2014-09 analysis indicates a high increased risk of entanglement under **Sub-Alternatives 8b** off North Carolina and a high to very high increase in entanglement risk from South Carolina to Florida. **Sub-Alternative 8a** would likely introduce less entanglement risk relative to **Sub-Alternative 8b** for two primary reasons. As noted previously, North Atlantic right whales may be found in the southeastern United States from November 1 through April 30, and do not mass migrate only at the beginning and end of the calving season but rather there is a steady stream of animals traveling between the northeastern and southeastern United States habitats in fall, winter and spring. The closure under **Sub-Alternative 8a** spans almost the entire period North Atlantic right whales will occur in the southeastern United States, whereas Sub-**Alternative 8b** establishes a "book-end" closure that does not. The ACL is also projected to be met sooner (between mid-October and mid-December) under **Sub-Alternative 8a** than under **Sub-Alternative 8b** (mid-December or not met at all). The sooner the ACL is met, the less likely trap pots would be in the water when right whales may be in the region.

Sub-Alternative 9a would likely introduce less entanglement risk than **Alternatives 2** and **10** and **Sub-Alternatives 7a, 7b, 7c, 8b,** and **9b,** but would likely introduce more entanglement risk than **Alternative 1, 3, 4, 5, 6,** and **Sub-Alternative 8a).** The SERO-LAPP-2014-09 analysis indicates a moderate to high increase in entanglement risk for right whales off North Carolina, and from South Carolina to Florida for **Sub-Alternative 9a**, relative to **Alternative 1 (No Action)**. Conversely, the SERO-LAPP-2014-09 analysis indicates a high to very high increased risk of entanglement under **Sub-Alternatives 9b** off North Carolina and from South Carolina to Florida. **Sub-Alternative 9a** would likely introduce less entanglement risk relative to **Sub-Alternative 9b** for two primary reasons. As noted previously, North Atlantic right whales may be found in the southeastern United States from November 1 through April 30, and do not mass migrate only at the beginning and end of the calving season but rather there is a steady stream of animals traveling between the northeastern and southeastern United States habitats in fall, winter and spring. The closure under **Sub-Alternative 9a** spans almost the entire period North Atlantic right whales will occur in the southeastern United States,; whereas, Sub-**Alternative 9b** establishes a "book-end" closure that does not. The ACL is projected to be met sooner under **Sub-Alternative 9a** (between mid-September and early November) than under **Sub-Alternative 9b** (mid-December or not met at all). The sooner the ACL is met, the less likely trap pots would be in the water when right whales may be in the region.

Alternative 10 would likely introduce more entanglement risk than the majority of alternatives and sub-alternatives (i.e., **Alternatives 1, 3, 4, 5, 6**, and **Sub-Alternatives 7a** and **8b**); though is likely to introduce less risk than a few (i.e., **Alternative 2** and **Sub-Alternatives 7b, 7c,** and **9b**). The SERO-LAPP-2014-09 analysis indicates a high to very high increase in entanglement risk for right whales off North Carolina and from South Carolina to Florida for **Alternative 10**, relative to **Alternative 1 (No Action)**. As with other alternative and sub-alternatives, **Alternative 10** establishes "book-end" closure periods for areas off North Carolina and South Carolina with a no closure period from December 16 through February 14th, while establishing a year-round closure off Florida and Georgia. As noted previously, North Atlantic right whales may be found in the southeastern United States from November 1 through April 30, and do not mass migrate only at the beginning and end of the calving season but rather there is a steady stream of animals traveling between the northeastern and southeastern United States habitats in fall, winter and spring. As a result, the "book-end" closure of November 1 through December 15 and February 15 through April 20 off North Carolina and South Carolina is likely to have limited biological benefits. The closure period off Florida and Georgia is likely to be more biologically beneficial, but does not encompass the entire period when North Atlantic right whales will occur in the southeastern United States.

Preferred Alternative 11 would likely introduce relatively little entanglement risk compare to most alternatives (i.e., **Alternatives 2, 3, 5, 10,** and **12,** and **Sub-Alternatives 7a, 7b, 7c, 8a, 8b, 9a,** and **9b**) but would likely introduce more entanglement risk than **Alternatives 1 (No Action)**, **4,** and **6**. The analysis found in **Appendix R** indicates a low increased entanglement risk in right whales off North Carolina and from South Carolina to Florida, for this alternative, relative to **Alternative 1 (No Action)**. This alternative is a hybrid of **Alternative 4** and **8a**. **Preferred Alternative 11** would implement a "book-end" closure, closing fishing only from November 1-30 and April 1-30 in the area proposed for closure under **Alternative 8a**. However, it would also implement a much longer closure from December 1-March 31 in the area currently proposed for closure under **Alternative 4**. This alternative provides a protection to whales during the primary "shoulder season" when whales are migrating to and from the calving grounds. As noted previously, North Atlantic right whales do not mass migrate only at the beginning and end of the calving season but rather there is a steady stream of animals traveling between the northeastern and southeastern United States habitats in fall, winter and spring. As a result, the "book-end" closure may expose some late/early migrating animals to entanglement risk. However, the alternative does provide a high level of protection to the core calving area, including young calves that are likely to persist off Florida throughout the primary calving season.

Alternative 12 would likely introduce less entanglement risk than all alternatives other than **Alternatives 1 (No Action)**, **4, 6,** and **11**). The analysis found in **Appendix R** indicates a low increased entanglement risk in right whales off North Carolina and from South Carolina to Florida, for this alternative, relative to **Alternative 1 (No Action)**. **Alternative 12** essentially "splits the difference" between the western boundaries of **Alternative 4** and **8a**. **Alternative 12** would implement an annual closure for the proposed area from November 1 through April 30. This alternative considers the entire period when ESA-listed large whales may be in the southeastern United States (i.e., November 1 through April 30).

There is uncertainty in the predicted distribution of right whales, especially off North Carolina, where limited data with relatively few sightings are available. However, limited data should not be confused with limited right whale use of the area. Right whales use the mid-Atlantic as a migratory corridor, among other uses such as calving grounds, so right whale presence off North and South Carolina is likely underestimated by visual detection surveys. As previously mentioned, the Atlantic SRG found that the additional model developed for the distribution of right whales off North Carolina was valid and consistent with the expectations of experts on right whale biology.

With respect to non-marine mammal ESA-listed species, **Alternative 1 (No Action)** would perpetuate the existing level of risk for interactions between these species and the fishery. Previous ESA consultations determined the snapper-grouper fishery (including the black sea bass pot sector) would have no effect on ESA-listed corals and was not likely to adversely affect any distinct population segments of Atlantic sturgeon. For the species that may interact with the snapper grouper fishery (i.e., sea turtles and smalltooth sawfish), it is unclear how the other alternatives would affect existing levels of risks for fishery interactions with sea turtles and smalltooth sawfish. Both sea turtles and smalltooth sawfish are known to interact with pot/trap gear. Thus, any alternative besides **Alternative 1 (No Action)** is likely to increase the risk of entanglement, relative to status quo. Area prohibitions on the use of black sea bass pots are likely to provide some level of biological benefit to these species by reducing the likelihood of interaction between these species and black sea bass pots.

However, the potential for interactions between these species and hook-and-line gear is generally considered greater than for trap/pot gear, because both species can be attracted to, and may actively pursue, bait used during hook-and-line fishing. Thus, if black sea bass pot fishermen switch to hook-and-line gear to target black sea bass or other species during proposed pot closures, the likelihood of interactions between the fishery and sea turtles and smalltooth sawfish may actually increase. Similarly, if black sea bass pot fishermen switch to hook-and-line gear when the ACL is met, then alternatives leading to the ACL being caught faster may be less biologically beneficial to sea turtles and smalltooth sawfish. So while this action may have some biological benefits to these species by reducing the likelihood of interaction with black sea bass pot gear, the potential likelihood of capture on hook-and-line gear may actually increase.

4.1.2 Economic Effects

Additional economic effects analyses not directly related to the comparison of alternatives for this action are presented in **Appendix Q**.

Expected closure date

Table 4.1.1.1 shows the expected closure dates for **Alternatives/Sub-alternatives 1** through **12** for the three pot placement scenarios considered in NMFS (2015). **Table 4.1.2.1** shows the expected closure dates for **Alternatives/Sub-alternatives 1-12** for pot placement Scenario C (placement for 2006/2007-2008/2009 seasons) assuming that mean conditions exist for each of the four catch rate scenarios.

Table 4.1.2.1. Expected closure dates for each alternative/sub-alternative of Action 1 using Scenario C (last three complete year around seasons with no closures prior to current management for mean conditions) for each of the four catch rate scenarios (Scenarios 1-4).

Scenario C	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 1	No Closure	No Closure	No Closure	No Closure
Alternative 2	2-Oct	4-Aug	20-Sep	27-Sep
Alternative 3	26-Nov	4-Oct	26-Oct	19-Nov
Alternative 4	20-Dec	7-Dec	11-Dec	19-Dec
Alternative 5	16-Dec	1-Dec	6-Dec	15-Dec
Alternative 6	20-Dec	7-Dec	10-Dec	19-Dec
Sub-Alternative 7a	11-Oct	18-Aug	6-Oct	7-Oct
Sub-Alternative 7b	No Closure	27-Dec	19-Dec	No Closure
Sub-Alternative 7c	27-Dec	16-Dec	13-Dec	28-Dec
Sub-Alternative 8a	6-Dec	17-Oct	29-Oct	5-Dec
Sub-Alternative 8b	No Closure	28-Dec	20-Dec	No Closure
Sub-Alternative 9a	28-Oct	15-Sep	13-Oct	24-Oct
Sub-Alternative 9b	31-Dec	24-Dec	17-Dec	No Closure
Alternative 10	No Closure	25-Dec	18-Dec	No Closure
Preferred Alternative 11	8-Dec	3-Dec	6-Dec	17-Dec
Alternative 12	15-Dec	21-Nov	5-Dec	14-Dec

Because the commercial black sea bass fishing year was changed to start January 1 through the implementation of Regulatory Amendment 14 to the Snapper Grouper FMP (SAFMC 2014), alternatives that would be expected to keep the black sea bass fishing season open until December would be expected to have the highest positive economic effect because historically ex-vessel price per pound tends to be higher than average for black sea bass in winter months. A longer season has additional benefits for fishermen such as better business cash flow and fewer potential economic losses due to regulatory discards (releasing fish while targeting other species). A longer season has economic benefits beyond those realized by fishermen. A longer season will provide for a more steady market supply benefitting processors, fish houses, and restaurants, as well as the consumer.

Expected dockside revenue of the commercial black sea bass sector

The expected changes in dockside revenue under each of the proposed alternatives are provided in **Table 4.1.2.2** and shows the differences in expected dockside values for **Alternative 1 (No Action)** subtracted from each of the **Alternatives 2 – 12** for all four catch rate scenarios based on monthly price per pound calculations for two different time series, 2000 – 2013 landings and 2011 – 2013 landings (**Figure 4.1.2.1**).

Table 4.1.2.2. Expected difference in dockside value of commercial black sea bass (for all gear) under the alternatives of Action 1 compared to **Alternative 1 (No Action)** using two price per pound estimates, the four different catch rate scenarios (**Appendix N**), and estimations of spatial locations of gear based on the 2006/2007-2008/2009 fishing seasons (Scenario C; **Appendix N**).

	Price/lb years	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 2	2000-2013	$59,900	$51,900	$59,696	$59,656
	2011-2013	$17,472	$52,095	$48,858	$20,799
Alternative 3	2000-2013	$50,327	-$44,743	-$10,705	-$20,224
	2011-2013	$55,841	-$101,647	-$50,780	-$77,134
Alternative 4	2000-2013	$48,879	$50,540	$45,996	$48,611
	2011-2013	$54,686	$34,589	$46,828	$52,812
Alternative 5	2000-2013	$49,840	$47,459	$45,199	$50,902
	2011-2013	$47,936	$14,259	$35,540	$47,325
Alternative 6	2000-2013	$49,528	$57,678	$52,432	$49,355
	2011-2013	$55,550	$46,337	$57,438	$53,833
Sub-Alternative 7a	2000-2013	$53,711	$45,212	$55,616	$57,184
	2011-2013	$8,208	$36,228	$33,844	$13,623
Sub-Alternative 7b	2000-2013	$37,034	$42,188	$41,028	$33,254
	2011-2013	$57,267	$61,286	$54,823	$50,234
Sub-Alternative 7c	2000-2013	$41,025	$39,037	$38,988	$39,271
	2011-2013	$65,743	$58,893	$52,922	$62,142
Sub-Alternative 8a	2000-2013	$44,100	$52,355	$52,536	$48,748
	2011-2013	$16,390	$11,642	$25,449	$18,889
Sub-Alternative 8b	2000-2013	$35,773	$44,840	$44,765	$31,846
	2011-2013	$55,676	$66,822	$61,715	$48,470
Sub-Alternative 9a	2000-2013	$50,736	$55,008	$56,057	$51,638
	2011-2013	$593	$30,182	$34,179	$2,262
Sub-Alternative 9b	2000-2013	$40,269	$41,898	$43,607	$41,694
	2011-2013	$62,456	$60,190	$57,148	$63,992
Alternative 10	2000-2013	$42,283	$41,630	$41,154	$37,792
	2011-2013	$67,031	$61,774	$55,782	$58,839
Preferred Alternative 11	2000-2013	$45,063	$42,965	$44,992	$48,666
	2011-2013	$46,011	$17,777	$37,742	$53,823
Alternative 12	2000-2013	$45,145	$47,915	$44,363	$46,363
	2011-2013	$37,382	$10,118	$32,071	$36,852

Figure 4.1.2.3 and **Figure 4.1.2.4** show the expected differences in economic value for each of the alternatives under Scenarios 1 – 4 using each of the price per pound calculation methods.

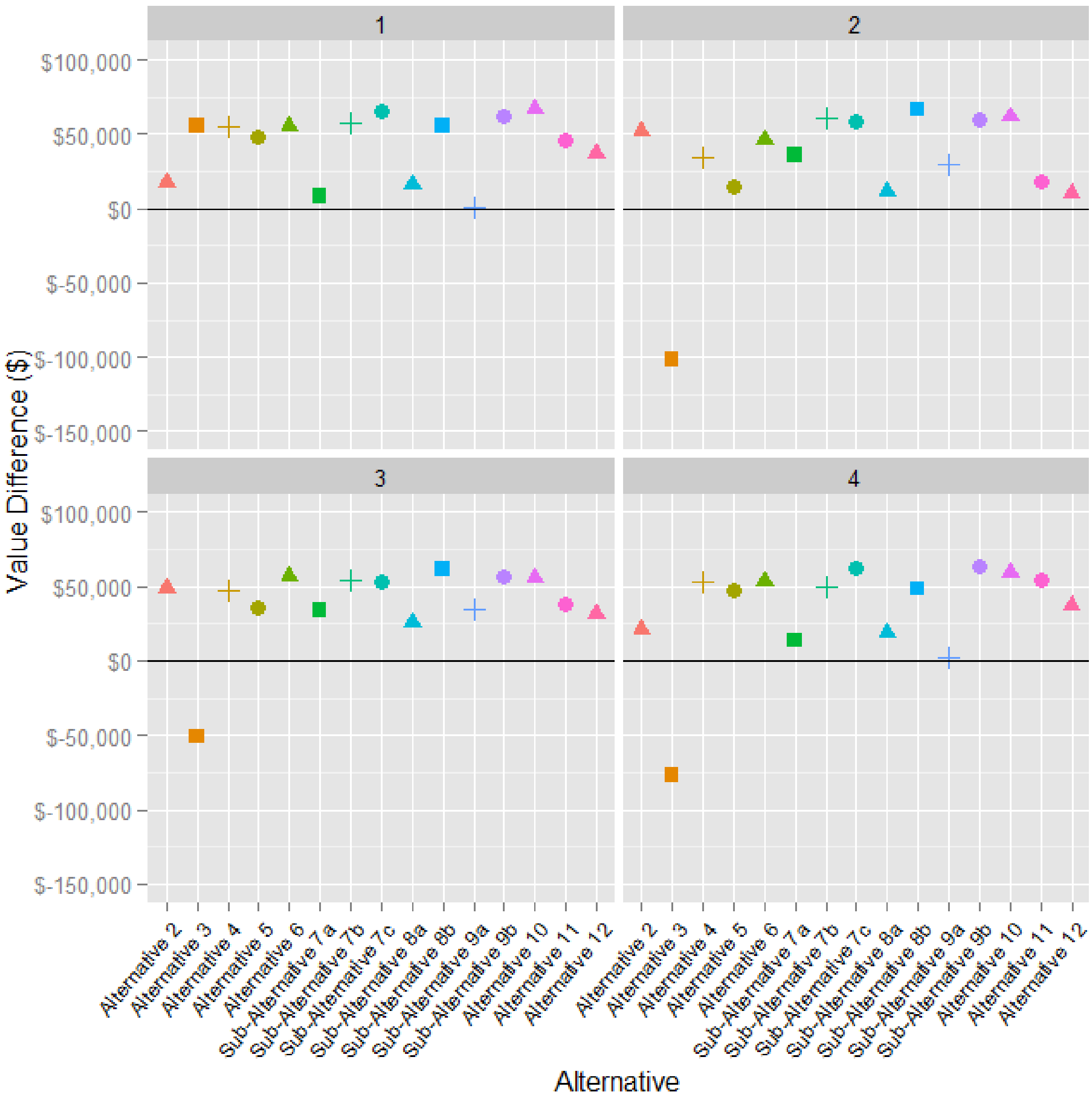

Figure 4.1.2.3. Expected difference in value (in 2013 dollars) between **Alternative 1 (No Action)** and the other Alternatives/Sub-Alternatives by catch rate scenario for Action 1, using the monthly price per pound calculations from 2011 – 2013.

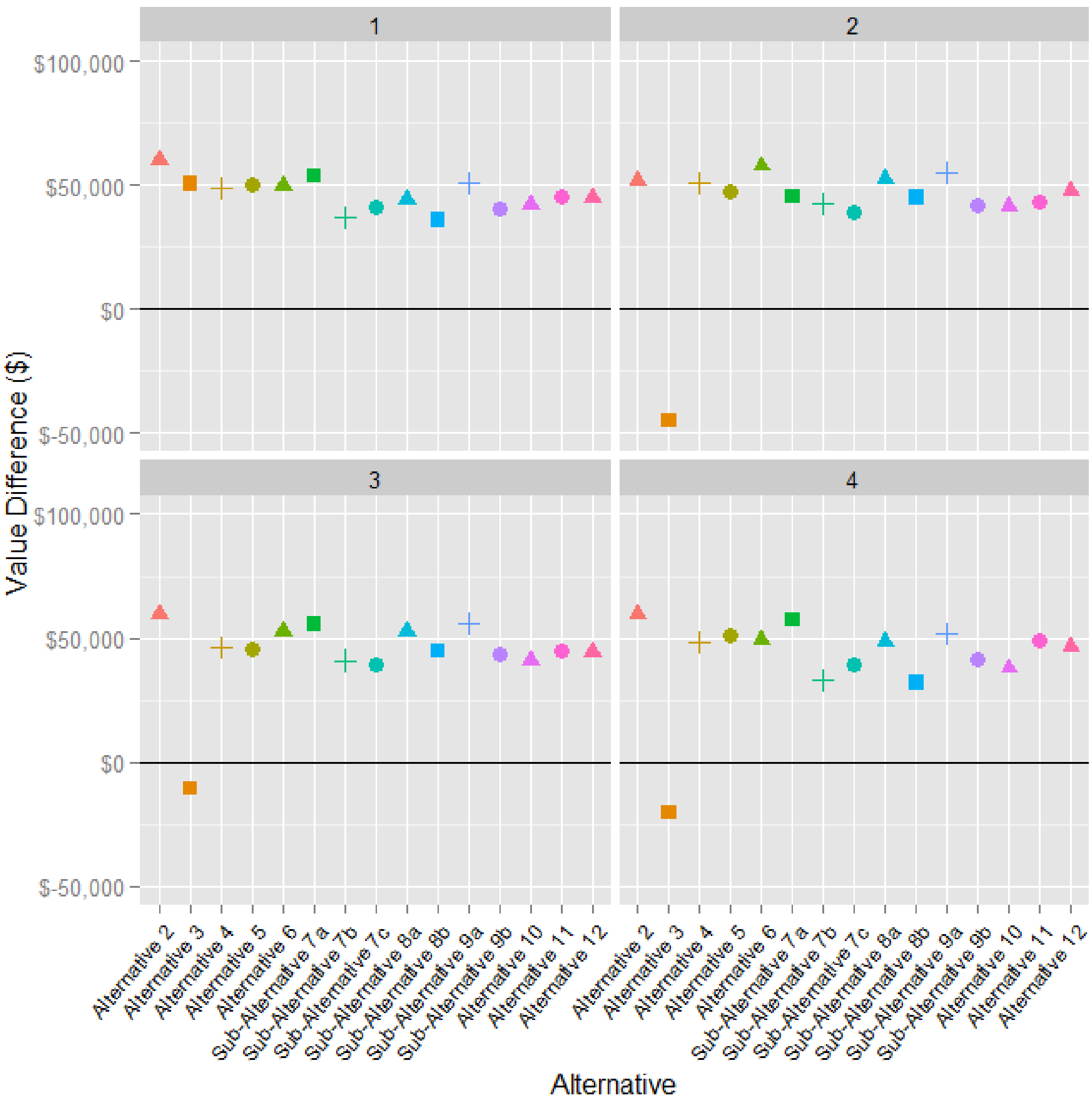

Figure 4.1.2.4. Expected difference in value (in 2013 dollars) between **Alternative 1 (No Action)** and the other Alternatives/Sub-Alternatives by catch rate scenario for Action 1, using the monthly price per pound calculations from 2000 – 2013.

The various alternatives and sub-alternatives of **Action 1** shift the balance among the gear that can harvest black sea bass. While **Table 4.1.2.2** showed total expected differences in dockside values for **Alternatives/Sub-alternatives 2-12** compared to **Alternative 1 (No Action)** for each of the four catch rates estimated by NMFS (2015), **Table 4.1.2.3** shows the same information as **Table 4.1.2.2**, but just for pot landings. **Table 4.1.2.4** shows the same information as **Table 4.1.2.2**, but only for all non-pot gear landings. All alternatives/sub-alternatives increase the total ex-vessel value for landings by pot gear compared to **Alternative 1 (No Action)**. And conversely, all alternatives/sub-alternatives decrease the total ex-vessel value for landings by non-pot gear compared to **Alternative 1 (No Action)**.

Table 4.1.2.3. Expected difference in dockside value of commercial black sea bass (for pot gear only) under the alternatives of Action 1 compared to **Alternative 1 (No Action)** using two price per pound estimates, the four different catch rate scenarios (**Appendix N**), and estimations of spatial locations of gear based on the 2006/2007-2008/2009 fishing seasons (Scenario C; **Appendix N**).

	Price/lb years	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 2	2000-2013	$264,372	$374,746	$285,818	$274,539
	2011-2013	$346,210	$513,860	$401,944	$361,383
Alternative 3	2000-2013	$202,833	$194,180	$197,566	$170,783
	2011-2013	$316,542	$268,311	$282,366	$231,447
Alternative 4	2000-2013	$102,668	$167,772	$148,588	$107,280
	2011-2013	$146,803	$235,024	$222,265	$153,261
Alternative 5	2000-2013	$123,150	$198,852	$172,192	$129,092
	2011-2013	$173,381	$273,019	$252,637	$181,102
Alternative 6	2000-2013	$103,317	$170,030	$150,144	$108,024
	2011-2013	$147,666	$238,440	$224,543	$154,281
Sub-Alternative 7a	2000-2013	$246,879	$340,990	$256,084	$256,191
	2011-2013	$323,195	$467,253	$357,595	$335,622
Sub-Alternative 7b	2000-2013	$37,141	$66,696	$104,578	$33,361
	2011-2013	$57,728	$103,409	$163,602	$50,696
Sub-Alternative 7c	2000-2013	$65,533	$117,228	$131,820	$58,899
	2011-2013	$107,866	$192,668	$211,694	$95,933
Sub-Alternative 8a	2000-2013	$171,092	$236,767	$219,435	$180,621
	2011-2013	$233,489	$316,110	$308,879	$244,320
Sub-Alternative 8b	2000-2013	$35,880	$64,468	$103,435	$31,953
	2011-2013	$56,138	$100,613	$162,162	$48,931
Sub-Alternative 9a	2000-2013	$219,093	$292,690	$246,309	$225,833
	2011-2013	$285,779	$395,988	$345,657	$294,460
Sub-Alternative 9b	2000-2013	$45,257	$81,047	$116,918	$41,801
	2011-2013	$71,250	$127,308	$182,592	$64,454
Alternative 10	2000-2013	$42,391	$75,899	$109,585	$37,899
	2011-2013	$67,493	$120,561	$172,893	$59,301
Preferred Alternative 11	2000-2013	$113,493	$184,597	$171,985	$119,255
	2011-2013	$163,124	$259,872	$254,840	$172,590
Alternative 12	2000-2013	$128,216	$203,017	$176,236	$134,314
	2011-2013	$179,492	$275,350	$257,501	$187,293

Table 4.1.2.4. Expected difference in dockside value of commercial black sea bass (for non-pot gear only) under the alternatives of Action 1 compared to **Alternative 1 (No Action)** using two price per pound estimates, the four different catch rate scenarios (**Appendix N**), and estimations of spatial locations of gear based on the 2006/2007-2008/2009 fishing seasons (Scenario C; **Appendix N**).

	Price/lb years	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Alternative 2	2000-2013	-$204,472	-$322,847	-$226,122	-$214,883
	2011-2013	-$328,737	-$461,765	-$353,085	-$340,584
Alternative 3	2000-2013	-$152,507	-$238,923	-$208,272	-$191,008
	2011-2013	-$260,700	-$369,957	-$333,145	-$308,580
Alternative 4	2000-2013	-$53,790	-$117,232	-$102,593	-$58,670
	2011-2013	-$92,116	-$200,434	-$175,436	-$100,448
Alternative 5	2000-2013	-$73,311	-$151,394	-$126,994	-$78,191
	2011-2013	-$125,444	-$258,759	-$217,097	-$133,776
Alternative 6	2000-2013	-$53,790	-$112,352	-$97,712	-$58,670
	2011-2013	-$92,116	-$192,102	-$167,104	-$100,448
Sub-Alternative 7a	2000-2013	-$193,169	-$295,778	-$200,469	-$199,008
	2011-2013	-$314,987	-$431,024	-$323,750	-$321,999
Sub-Alternative 7b	2000-2013	-$108	-$24,509	-$63,551	-$108
	2011-2013	-$461	-$42,122	-$108,778	-$461
Sub-Alternative 7c	2000-2013	-$24,509	-$78,192	-$92,833	-$19,629
	2011-2013	-$42,121	-$133,775	-$158,771	-$33,789
Sub-Alternative 8a	2000-2013	-$126,993	-$184,413	-$166,900	-$131,873
	2011-2013	-$217,098	-$304,467	-$283,429	-$225,430
Sub-Alternative 8b	2000-2013	-$108	-$19,629	-$58,671	-$108
	2011-2013	-$461	-$33,789	-$100,446	-$461
Sub-Alternative 9a	2000-2013	-$168,358	-$237,683	-$190,252	-$174,196
	2011-2013	-$285,185	-$365,805	-$311,478	-$292,196
Sub-Alternative 9b	2000-2013	-$4,988	-$39,150	-$73,312	-$108
	2011-2013	-$8,793	-$67,118	-$125,443	-$461
Alternative 10	2000-2013	-$108	-$34,270	-$68,432	-$108
	2011-2013	-$461	-$58,786	-$117,111	-$461
Preferred Alternative 11	2000-2013	-$68,431	-$141,634	-$126,994	-$70,590
	2011-2013	-$117,112	-$242,095	-$217,097	-$118,767
Alternative 12	2000-2013	-$83,071	-$155,102	-$131,874	-$87,951
	2011-2013	-$142,109	-$265,230	-$225,429	-$150,441

Given the uncertainty of how fishery participants will change their behavior, each of the four four catch rate scenarios are assumed to be plausible estimates of future fishing behavior sufficient to bracket actual pot placement and associated harvest. One way to simplify comparisons between alternatives is to use mean values across the four scenarios for each alternative or sub-alternative. **Table 4.1.2.5** shows the percent of expected ex-vessel revenue of black sea bass landed with pot gear averaged across the four landings scenarios as a percent of the expected black sea bass ex-vessel revenue for all gear types combined. Regardless of whether 2000 – 2013 or 2011 – 2013 prices are used, **Alternative 1 (No Action)** would be expected to result in a lower percentage of the expected total ex-vessel revenue harvested with pot gear than all of the other alternatives/sub-alternatives considered. When using the 2000–2013 prices, **Alternative 2**, **Sub-Alternative 7a**, and **Sub-Alternative 9a** had the highest expected percentage of total ex-vessel revenues from black sea bass harvested with pot gear. When using the 2011–2013 price per pound values, the comparable alternatives (highest percentage) are **Alternative 2**, **Sub-Alternative 8b**, and **Sub-Alternative 8a**. Any alternative or sub-alternative other than **Alternative 1 (No Action)** would likely result in a greater percentage of the commercial ACL for black sea bass being caught by pot gear and a lower percentage of the ACL being caught by other gear.

Table 4.1.2.5. Mean percentage and ranking of expected ex-vessel value of black sea bass landed by pot gear as a percent of expected ex-vessel value of black sea bass landed by all gear types averaged across the four landings scenarios.

	2000-2013		2011 -2013	
	Mean	Rank	Mean	Rank
Alternative 1	35%	16	31%	16
Alternative 2	55%	1	55%	1
Alternative 3	49%	4	50%	4
Alternative 4	43%	9	39%	10
Alternative 5	45%	7	42%	7
Alternative 6	43%	10	41%	9
Sub-Alternative 7a	53%	2	44%	6
Sub-Alternative 7b	38%	14	39%	11
Sub-Alternative 7c	41%	11	42%	8
Sub-Alternative 8a	48%	5	50%	3
Sub-Alternative 8b	38%	15	53%	2
Sub-Alternative 9a	51%	3	34%	15
Sub-Alternative 9b	39%	12	36%	14
Alternative 10	39%	13	37%	13
Preferred Alternative 11	44%	8	39%	12
Alternative 12	45%	6	44%	5

Table 4.1.2.6 shows the percent of expected ex-vessel revenue of black sea bass landed with non-pot gear averaged across the four landings scenarios as a percent of the expected black sea bass ex-vessel revenue for all gear types combined. Regardless of whether 2000 – 2013 or 2011 – 2013 prices are used, **Alternative 1 (No Action)** would be expected to result in the highest

percentage of the expected total ex-vessel revenue harvested with non-pot gear than all of the other alternatives/sub-alternatives considered. When using the either the 2000–2013 or 2011-2013 price per pound values, **Sub-Alternative 9b**, **Sub-Alternative 8b** had the second and third highest expected percentage of total ex-vessel revenues from black sea bass harvested with non-pot gear.

Table 4.1.2.6. Mean percentage and ranking of expected ex-vessel value of black sea bass landed by non-pot gear as a percent of expected ex-vessel value of black sea bass landed by all gear types averaged across the four landings scenarios.

	2000-2013		2011-2013	
	Mean	Rank	Mean	Rank
Alternative 1	65%	1	69%	1
Alternative 2	45%	16	45%	16
Alternative 3	51%	13	51%	13
Alternative 4	57%	7	59%	7
Alternative 5	55%	10	57%	10
Alternative 6	57%	7	59%	7
Sub-Alternative 7a	47%	15	47%	15
Sub-Alternative 7b	62%	4	65%	4
Sub-alternative 7c	60%	6	62%	6
Sub-Alternative 8a	52%	12	53%	12
Sub-Alternative 8b	62%	3	65%	3
Sub-Alternative 9a	49%	14	50%	14
Sub-Alternative 9B	63%	2	66%	2
Alternative 10	61%	5	64%	5
Preferred Alternative 11	56%	9	57%	9
Alternative 12	55%	11	56%	11

Economic effects of relative risk to North Atlantic Right Whales and the black sea bass pot fishery

The expected economic gains from any of the **Alternatives/Sub-Alternatives 2 - 12** are less than the cost associated with the estimated costs of disentangling a North Atlantic right whale from unspecified fishing gear in the Biological Effects for **Action 1** in **Section 4.1.1** (Protected Resources). Additionally, should an entanglement occur in the South Atlantic management region, it is possible that the use of black sea bass pot gear may be suspended, resulting in economic loss to pot fishermen.

Potential economic outcomes must be weighed against the chance that a NARW would become entangled in black sea bass pot gear. SERO-LAPP-2014-09 (**Appendix N**) analyzed the potential co-occurrence of black sea bass trap pot gear and NARW in space and time across the **Action 1** alternatives for a wide variety of potential scenarios (i.e. different assumptions regarding the distribution of trap gear, catch rates, and NARW responses to environmental conditions). In this analysis, co-occurrence was treated as a proxy for relative entanglement risk, an assumption used in other whale risk assessment models (NMFS 2014; Redfern et al. 2013).

The analysis was robust with regards to the differences between alternatives, although the absolute risk of a given alternative cannot be quantified because the entanglement rate of whales in black sea bass pots is unknown.

The **Action 1** alternatives/sub-alternatives can be compared in terms of relative risk as it is operationally defined here. However, the magnitude of the potential relative risk between the alternatives/sub-alternatives in this action cannot be estimated without knowing what the total risk would be if there were no restrictions on using black sea bass pot gear. In this analysis greater relative risk means the likelihood of entanglements increases when there are more black sea bass pot gear in the water at the same time there is an increase in the presence of whales. In this sense, the alternatives/sub-alternatives can be ranked (e.g. most relative risk to least relative risk); however, the absolute additional amount of risk posed by one alternative/sub-alternative cannot be compared to the absolute amount of risk posed by another alternative/sub-alternative.

Given these caveats for understanding the relative risk, **Figure 4.1.2.6** shows the two separate price per pound time series, the two models used to estimate NARW relative risk from black sea bass pot gear, and the difference between each of the alternatives/sub-alternatives for **Action 1** compared to **Alternative 1 (No Action)**. For Florida through South Carolina, **Alternatives 4** and **6** provide the least relative risk to the NARW while **Alternative 2** provides the greatest relative risk to the NARW. For North Carolina, **Alternatives 4 - 6** provide the least relative risk to the NARW while **Alternative 2** provides the greatest relative risk to the NARW. Using 2011-2013 price per pound estimates, **Sub-Alternative 8b** has the potential to provide the highest level of ex-vessel value for all the South Atlantic States. Using 2000-2013 price per pound estimates, **Alternative 2** has the potential to provide the highest level of ex-vessel value for all the South Atlantic States.

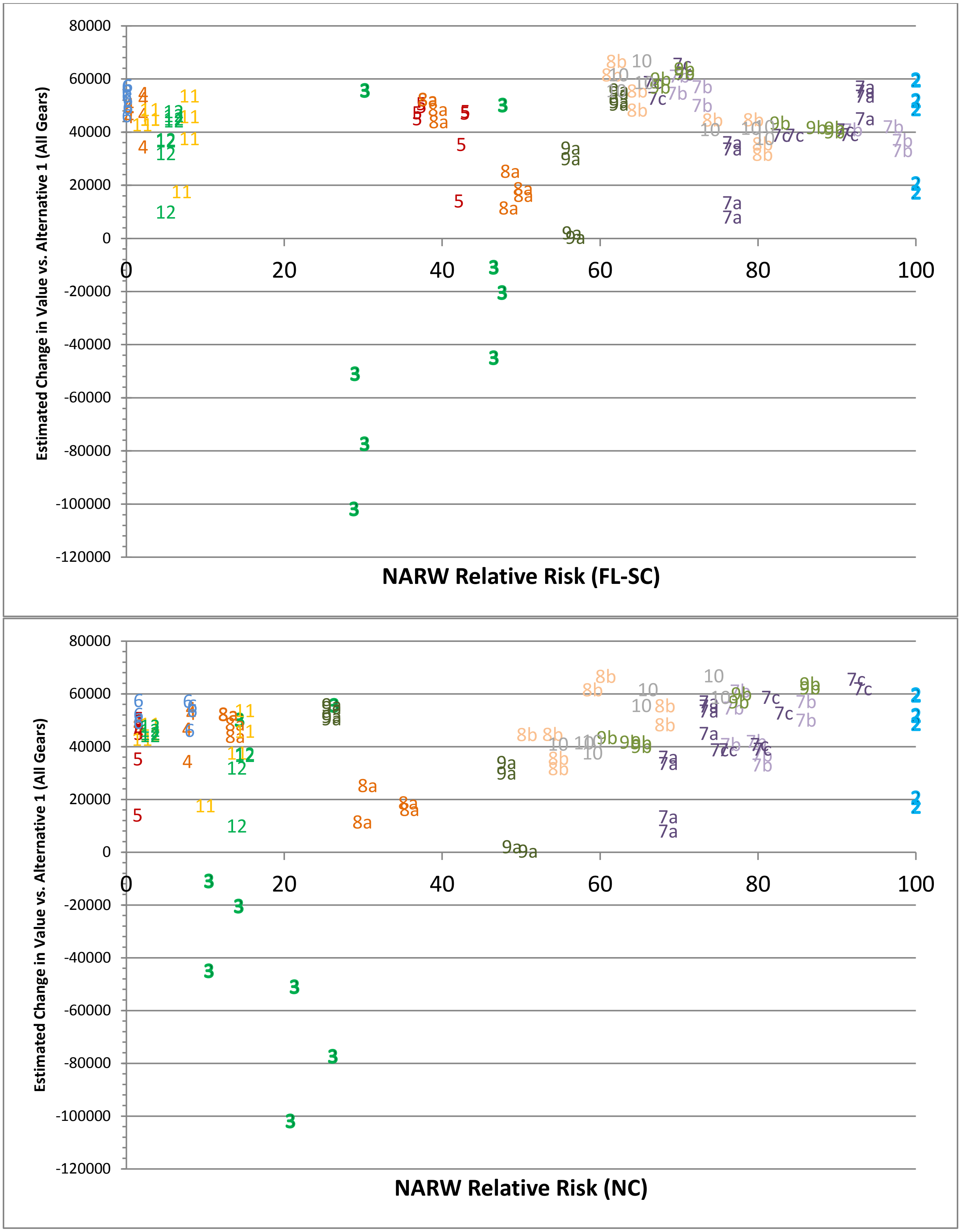

Figure 4.1.2.6. Estimated change in value of commercial black sea bass fishery versus relative right whale risk off FL-SC (left) and NC (right) for spatial closure alternatives proposed in Regulatory Amendment 16.

4.1.3 Social Effects

The social effects of removal or modifications to the seasonal closure for black sea bass pots include direct effects on participants in the black sea bass pot sector, and direct effects on participants in the hook-and-line (and other gear types) sector who target black sea bass. For pot fishermen, the potential effects are primarily associated with foregone economic benefits due to restricted or no access to the black sea bass resource during the winter. For hook-and-line fishermen, the potential effects of removal or modifications to the seasonal closure for black sea bass pots are associated with greater competition with pot fishermen, less access to the increased black sea bass ACL, and a likely shorter fishing season because the ACL would be more available to the pot fishermen, who make up most of the landings. Minimal indirect effects are expected for recreational anglers and for-hire businesses.

Sections 3.3.3 and **3.3.4** provide detailed information about the social environment for the black sea bass sector. **Figure 3.3.3.2** shows communities with the highest pounds of black sea bass harvested by pots, with the top ten including Sneads Ferry (North Carolina), Georgetown (South Carolina), Little River (South Carolina), Harkers Island (North Carolina), McClellanville (South Carolina), Ponce Inlet (Florida), Hampstead (North Carolina), Cape Carteret (North Carolina), Wrightsville Beach (North Carolina), and Topsail Beach (North Carolina). **Figure 3.3.3.3** shows communities with the highest pounds of black sea bass harvested by bandit gear, with the top three including Little River (South Carolina), Southport (North Carolina), and Topsail Beach (North Carolina). Additionally, considering engagement and reliance on commercial fishing for each community (**Figure 3.3.3.4**) and social vulnerability (**Figure 3.3.4.1**), the communities of Wanchese (North Carolina) and Sneads Ferry (North Carolina) are those that would be expected to experience positive and negative effects of changes for the black sea bass pot fishermen.

Black sea bass pot fishermen have been affected by multiple management changes in a relatively short period of time through recent Council actions and ALWTRP requirements. Following the restrictive catch limits implemented in the rebuilding plan, and an effort shift from other target species due to ACLs and AMs, pot fishermen have experienced increasingly shorter seasons and continual overages. When the endorsement program was implemented through Amendment 18A (SAFMC 2012a), more than half of active pot fishermen did not receive an endorsement and could no longer participate in the pot sector. Although the landings level of active fishermen who did not qualify for an endorsement was relatively small (to qualify for a black sea bass endorsement, a fishermen with a valid snapper grouper commercial permit must have had black sea bass landings using black sea bass pot gear averaging at least 2,500 pounds whole weight, annually during the period January 1, 1999 through December 31, 2010), the endorsement program also created an additional barrier for future participants. Overall, the endorsement program restricted the number of fishermen who could target black sea bass fwith pot gear.

Fishermen who did receive endorsements were placed under a 1,000 pound trip limit, a new 35 pot limit, and were required to bring pots to shore at the end of each trip. When the final rule for Regulatory Amendment 19 (SAFMC 2013c) indicated that the ACL could be more than doubled, there were only partial positive effects for the pot fishermen due to the pot prohibition from November through April that has restricted them from benefitting from the extended season and larger ACL. [While the November-April pot prohibition was intended to minimize interaction of pot gear with large whales, it was also included in Regulatory Amendment 19 to expedite the increase in the black sea bass ACL due to the additional time that would have been required for NMFS to complete an ESA section 7 consultation for the snapper grouper fishery (SAFMC 2013c)] Additionally, black sea bass pot fishermen are required to comply with the ALWTRP gear and seasonal requirements (**Tables 1.8.1 – 1.8.5**), which have been in place for the black sea bass pot fishery since 2007, with the most recently added requirements implemented in November 1, 2014.

Under **Alternative 1 (No Action)**, pot fishermen would continue to forego economic benefits that would be available if harvest by pot was allowed into the winter months. Some fishermen report that black sea bass caught in the winter are larger and more abundant, and market prices are better. However, some pot fishermen from the Carolinas have voiced concern that fishing black sea bass pots in the winter would favor Florida fishermen because weather in Florida is generally better than weather conditions in North Carolina and South Carolina, and Florida pot fishermen could catch a greater proportion of the commercial ACL in winter months. Public input also indicates that some pot fishermen feel that compliance with the ALWTRP requirements, in addition to the measures established with the endorsement program are sufficient to protect right whales and calves, and keeping the seasonal prohibition for black sea bass pots invalidates the rationale and purpose for all protection measures under the ALWTRP and the ancillary benefits derived through Amendment 18A.

For black sea bass participants who do not have a black sea bass pot endorsement, **Alternative 1 (No Action)** would be expected to provide the most benefits. The seasonal pot closure allows fishermen without a black sea bass pot endorsement to use gear types other than black sea bass pots to fish for black sea bass in the winter months. If pots are used during the winter months, it is more likely that the commercial ACL for black sea bass would be met before the end of the calendar year. Additionally, hook and line fishermen would continue to have the opportunity to supply the winter market for black sea bass and take advantage of higher market prices.

As noted in **Section 3.3.3**, marine mammal protection has broad social effects as well, as conservation of endangered species can produce societal benefits by protecting species for aesthetic, economic, scientific, and historical value to the U.S. and citizens. Maintaining the seasonal closure for the pot sector under **Alternative 1 (No Action)** could result in broad social benefits through improved protection of right whales during migration to and from calving grounds during the winter more so than modification to the closure area or period (**Alternatives 2-9b**). As discussed in **Appendix E**, the potential interaction with right whales is expected to be lower for alternatives with pot prohibitions that encompass larger areas and/or time periods during November through April. However, because the baseline value of potential interaction is unknown, the actual increase or decrease in potential interactions cannot be determined, so that any associated social benefits would also be unknown. With all other regulations and management measures in place for the black sea bass pot sector that contribute to minimizing potential interactions through Council actions and ALWTRP requirements (see **Section 1.6**), the return on investment of additional restrictions such as a spatial/temporal prohibition on black sea bass pot fishing could be low, particularly for a relatively small fishery such as the black sea bass pot sector. Overall, any social benefits that would be expected to result from improved right whale protection would only be realized when biological benefits to the right whales can be measured and demonstrated.

The effects of **Alternatives 2-12** on fishermen and associated communities vary with the temporal and spatial characteristics of the closures, and effects would be different for pot fishermen and hook and line fishermen. In general, allowing harvest with pots in any way during the winter would be beneficial to pot fishermen, but could have negative effects all black sea bass fishermen if an increased rate of harvest causes an in-season closure. Additionally, allowing pots during the winter could affect access to the black sea bass commercial ACL for hook and line fishermen, since pots are more efficient gear and could use up more of the commercial ACL.

Depending on the areas that could be closed to pot fishing and actual areas where fishermen place their pots, **Alternatives 2-12** all provide some way for pot fishing to continue to some degree in the winter months, and would be expected to generate some of the same benefits to pot fishermen**.** However, all possible negative effect due to an earlier in-season closure would be expected under **Alternatives 2-12.** Because of the location of calving areas, there may be less fishing ground available for Florida pot fishermen for most of the winter months (**Alternatives 2-6**, **7b- 11**), except for under **Alternative 7/ Sub-Alternative 7a** that would allow fishing in the winter between December 16-March 14. However, under this sub-alternative, the interaction with adult whales and calves may be more likely, which could result in further fishing restrictions in the future. The alternative(s) with the smallest area of potential fishing grounds for Florida pot fishermen would be expected to the most beneficial to black sea bass pot fishermen in Florida.

For black sea bass pot fishermen in North Carolina and South Carolina, the alternatives with the smallest areas of fishing grounds closed and the shortest period of time would be expected to be the most beneficial. **Alternative 7/ Sub-Alternative 7a, 7b; Alternative 8/Sub-Alternative 8b**; **Alternative 9/ Sub-Alternative 9b**; and **Alternative 10** would allow more time available for harvest with pots in North Carolina and South Carolina than **Alternatives 2-6, Preferred Alternative 11** and **12.**

4.1.4 Administrative Effects

Alternative 1 (No Action) would retain the year-long prohibition of fishing with black sea bass pots in the entire South Atlantic region. As such, the alternative would retain the current level of administrative effects. There are logistical and economic costs of monitoring spatial and temporal fishing closures by law enforcement personnel. The costs may be mitigated by public compliance with the regulations. **Alternatives 2-Alternative 12** would likely increase the result in adverse administrative effects to enforcement compared to **Alternative 1 (No Action)** as these alternatives would specify the prohibition in certain areas during certain times. Such changes could make enforcement more difficult. **Alternatives 10** and **12** would likely have the greatest burden of the alternatives to law enforcement as the eastern boundary of the area changes during the year.

4.2 Action 2

4.2.1 Biological Effects

> ***Action 2 Alternatives[1]***
> *(preferred alternative in bold)*
>
> 1. No action. Status quo gear marking requirements.
> 2. Modify buoy line strength Nov 1 – Apr 30
>   2a. less than or equal to 2,200 lbs in federal waters of the South Atlantic.
>   2b. less than or equal to 1,200 lbs in federal waters of the South Atlantic.
> 3. Modify weak links to no more than 400 lbs Nov 1 – Apr 30.
> 4. **Add a purple 12" color mark adjacent to ALWTRP required line markings from Nov 1 – Apr 30.**

Black Sea Bass

The alternatives range from maintaining the current pot gear requirements to specifying buoy line strength and decreasing weak link breaking weight to adding an extra marking on the buoy line. Regardless of which alternative the Council chooses, no biological impacts to the black sea bass stock are expected. Adverse biological effects are prevented because overall harvest in the commercial sector is limited to the commercial ACL; commercial AMs are also in place. The ACL is reduced from the overfishing level as required to address assessment uncertainty. In addition, there is no evidence to suggest that changing the gear requirements for the black sea bass pot sector would have adverse biological impacts. These alternatives are not predicted to reduce harvest and would not provide additional protection to the black sea bass stock or other non-target species. Therefore, there is no difference in the biological effects on black sea bass from the alternatives.

The alternatives range from maintaining the current pot gear requirements (**Alternative 1 – No Action)** to specifying buoy line strength (**Alternative 2**) and decreasing weak link breaking weight (**Alternative 3**) to adding an extra marking on the buoy line (**Preferred Alternative 4**). Regardless of which alternatives or sub-alternatives the Council chooses, no biological impacts to the black sea bass stock are expected. Adverse effects are prevented because overall harvest in the commercial sector is limited to the commercial ACL; commercial accountability measures are also in place. The ACL is reduced from the overfishing level as required to address assessment uncertainty. In addition, there is no evidence to suggest that changing the gear requirements for the black sea bass pot fishery would have adverse biological impacts. These alternatives are not predicted to reduce harvest and would not provide additional protection to the black sea bass stock or other non-target species. Therefore, there are no biological effects on the black sea bass stock from the alternatives/sub-alternatives in **Action 2**.

Protected Resources

The South Atlantic black sea bass pot sector is listed as part of the larger "Atlantic mixed species trap/pot fishery" under the List of Fisheries (LOF). The National Marine Fisheries Service (NMFS) publishes annually List of Fisheries (LOF) as required by the Marine Mammal Protection Act (MMPA). The LOF classifies U.S. commercial fisheries into one of three categories according to the level of incidental mortality or serious injury of marine mammals:

I. **frequent** incidental mortality or serious injury of marine mammals
II. **occasional** incidental mortality or serious injury of marine mammals
III. **remote likelihood of/no known** incidental mortality or serious injury of marine mammals.

The classification of a fishery on the LOF determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan (TRP) requirements.

The black sea bass pot sector is considered a Category II fishery by the NMFS because of its potential to occasionally interact with marine mammals. The Atlantic mixed species trap/pot fishery has had interactions with threatened and endangered species including fin and humpback whales (December 29, 2014; 79 FR 77919). Some pot gear in other areas are Category I fisheries under the LOF, because they frequently cause incidental mortalities or serious injuries of marine mammals. Category I fisheries have been documented to cause serious injury and death to North Atlantic right whales (Johnson et al. 2005, Knowlton et al. 2012). Other trap pot fisheries are classified as Category III fisheries because there is a remote likelihood of or no known incidental mortality or serious injury of marine mammals. Entanglements incidental to commercial fishing are the primary threat to right whales,; however, less is known about the source of entanglement. In a study of 31 right whale entanglements, Johnson et al. (2005) found 14 cases where gear type could be identified; pot gear represented 71% of these cases (8 lobster pots, 1 crab pot, 1 unknown pot). In a recent compilation of data from 2007-2011, there were 17 entangled whales and none of these were attributed to a specific fishery (Waring et al. 2014). Waring et al. (2014) indicated information from an entanglement event often does not include the detail necessary to assign the entanglements to a particular fishery or location, and scarring studies suggest the vast majority of entanglements are not observed. Consequently, while black sea bass gear has not been definitively identified in entanglements, it also cannot be ruled out as gear that has resulted in serious injuries or deaths to right whales. Knowlton et al. (in press) examined line characteristics of fishing gear removed from live and dead entangled whales from the U.S. East Coast and Canada from 1994-2010. Of 132 ropes from 70 cases, they found 26% of ropes were in the range of 0.312 in (~5/16 in) to 0.654 in (11/16 in) diameter and made out of polypropylene (Knowlton et al, in press). Levesque (2009) interviewed 42 black sea bass pot fishermen from major fishing ports in the area Georgia through North Carolina. Fishermen reporting using 1/4 in, 5/16 in, or 3/8 in diameter buoy lines and most used polypropolene line (Levesque 2009).

Knowlton et al (in press) suggest that if buoy line breaking strength was 1,700 pounds or less, the number of life-threatening entanglements to large whales would be reduced substantially. However, this is not the case for smaller whales. Eight minke whales (relatively small body sizes to other large whale species) were included in the study and all had died presumably because they could not break free from the entangling gear (Knowlton et al, in press). The breaking strength of rope removed from minke whales ranged from 650 lbs to 3,780 lbs. Very young right whale calves are smaller and weaker than minke whales so line breaking strength would need to be less than 600 lbs to potentially allow right whale calves to break free of the gear (Knowlton et al, in press; S. Krause, 2014 ALWTRT Meeting).

NMFS tested the breaking strength of number 8 and number 10 Osprey lines, based on information indicating that Florida black sea bass pot fishermen were using primarily number 8 and number 10 Osprey line (T. Burgess, pers. comm. 2015). The testing concluded the maximum breaking strengths were 1,475 pounds and 2,218 pounds, respectively.

Buoy line diameter used off North Carolina was significantly larger than line used off South Carolina or Georgia (Levesque, 2009). The majority of fishermen in the North Carolina fishery report using 5/16 in diameter line (T. Burgess, pers. comm. 2015).

Compared to **Alternative 1 (No Action)**, **Alternative 2** is likely to maintain (**Sub-alternative 2a)** or slightly reduce (**Sub-alternative 2b)** the overall breaking strength of line used in the commercial black sea bass pot sector throughout the Council's jurisdiction. Reduced line breaking strength can be less life threatening to large whales than lines with higher breaking strength if line breaking strength is below the threshold at which whales can safely break free from the lines. Knowlton et al (in press) suggest that if buoy line breaking strength was 1,700 pounds or less, the number of life-threatening entanglements to adult large whales may be reduced substantially. **Sub-Alternative 2a** (maximum line strength of 2,200 pounds) would likely maintain the breaking strength of lines currently being used and would have limited, if any, benefits for listed whale species. **Sub-Alternative 2b** (maximum line strength of 1,200 pounds) would likely result in fewer life-threatening entanglements for humpback whales and juvenile and adult right whales. The breaking strength in both **Sub-Alternative 2a** and Sub-**Alternative 2b** is greater than what minke whales are able to escape from. Given that very young right whale calves are smaller and weaker than minke whales, the breaking strength of both sub-alternatives is also likely greater than what young calves could shed. Consequently, **Sub**-**Alternative 2b** would not be expected to provide any less risk from entanglement to very young right whale calves than **Sub-alternative 2a**.

The biological impacts from **Alternative 3** on ESA-listed whales is unclear, but are likely beneficial. Weak links break apart when enough opposing pressure is applied to the either side of the link. On trap/pot gear, weak links are installed where the surface buoy attaches to the buoy (vertical) line. When the weak link breaks, it releases the buoy from the vertical buoy line and attached pot. A benefit of releasing the buoy is that the remaining entangling line will then be free to slide through baleen or over/around flippers and be shed by a free swimming whale. Weak link provisions are likely to reduce entanglement risk relative to lines without weak links because the buoys can break away allowing the remaining gear to be potentially shed by the whale. A breaking strength of 400 lbs may be low enough to be broken by very young right whale calves. However, since adequate opposing pressure must be applied to the weak link to break the link, it is unclear how effective this measure will be on a case by case basis.

Preferred Alternative 4 provides a mechanism to identify the black sea bass pot sector if a line entangles a whale. There are no direct biological benefits from **Preferred Alternative 4**, however, any information gained from entangled whales on fishery type, entanglement location, and entanglement date is important to assess the impacts of a fishery and better understand and possibly work towards reducing future entanglements. However, not all gear remains on the individual after an interaction occurs. Furthermore, many entangled right whales are never seen nor is gear recovered. For line markings to be effective, the gear must be recovered, and the recovered gear must retain the marks. Line markings do improve the chances of identifying recovered gear, particularly as the number and size of marks increases. This alternative provides a mechanism to identify the black sea bass pot sector if an interaction occurs and if the gear remains entangled on the whale. This gear marking would be in addition to the gear marking required in the Large Whale Take Reduction Plan (http://www.greateratlantic.fisheries.noaa.gov/protected/whaletrp/docs/2015-12869.pdf).

None of these alternatives would reduce the potential of interaction between a black sea bass pot and ESA-listed whales. The alternatives could reduce the potential of serious injury or mortality (**Alternatives 2** and **3**) and potentially identify or eliminate the black sea bass pot sector as a gear with an entanglement (**Preferred Alternative 4**) if the fishery were to begin operating during Nov 1-April 30

4.2.2 Economic Effects

Alternative 2, Sub-Alternative 2a would require minimum line breaking strength of 2,200 pounds for North Carolina, which the ALWTRP already requires for South Carolina, Georgia, and Florida (**Alternative 1 – No Action**). A typical black sea bass pot buoy line is 100 to 130 feet in length (Jack Cox, pers. comm.) Assuming all 17 North Carolina fishermen with black sea bass pot endorsements have 35 pots and need to replace all the buoy lines, at 125 feet per pot, the cost to buy four bundles of line would be $716 (4 bundles x $179/bundle = $716, with each bundle having 1,000' of line and with 32 traps x 125 feet = 4,000' buoy line would be needed). The total expected maximum cost associated with **Alternative 2, Sub-Alternative 2a** is $12,172 (17 x $716). It is not known how many black sea bass pot fishermen currently use buoy line with a breaking strength less than 1,200 pounds as proscribed by **Sub-Alternative 2b**. The worst case scenario is that all 32 endorsement holders would have to buy new buoy line at $149 per 1,000 foot bundle, or $596, assuming fishermen would attach 125 feet of buoy line to each pot (32 traps x 125' = 4,000' buoy line). The total expected maximum cost associated with **Sub-Alternative 2b** is $19,072.

Alternative 3 would require a step-down from 600 to 400-pound in weak link strength. All 32 endorsement holders in all four states could be required to buy new weak links as the current required links have a 600-pound breaking strength. The cost for new weak links for each fisherman is estimated to be $65 (35 traps x $1.85 per weak-link). The total cost for **Alternative 3** for all endorsement holders would therefore be expected to be $2,080 (32 x $65) if specifically-made weak links are added to each pot. Some fishermen choose to set up their gear using hog rings to act as the weak link. To reduce to a 400-pound weak link, the fishermen would simply need to remove the number of hog rings necessary to reduce the breaking strength down to a 400-pound maximum. A potential side effect of this step-down in weak-link strength could be an increased probability of the links breaking and resulting in gear loss.

While it is unknown what the rate of lost gear might be should the Council choose any alternative/sub-alternative of **Action 2** as preferred alternatives/sub-alternatives, the cost to replace lost gear can be estimated. Two active black sea bass pot fishermen estimated their replacement costs for an entire pot assembly (Jack Cox pers. comm., May 7, 2015; Tom Burgess, pers. comm., May 10, 2015). The following are the estimated costs for replacement:

Trap: $38.50 - 50
Buoys: $4 - 20
Iron weights: $5 - 7
Line: $10 - 40
Weak links: $0 - $1.85 ($0 assumes the fisherman will remove hog rings)
Floy tags: $1.50 – 1.85
Shipping cost for equipment: $10
One hour of labor to assemble a single pot: $23.

Based on these estimates, the range of cost to replace a single lost black sea bass pot runs from approximately $92 to $154.

Preferred Alternative 4 would require fishermen to mark three 12 inch bands on each buoy line. If using paint, it is assumed that one quart of marine buoy paint would be sufficient to paint the bands on 35 traps. The cost for a quart of marine buoy paint is $47.35. The total maximum cost associated with **Preferred Alternative 4** if all endorsement holders marked their lines with paint is $1,515 (32 x $47.35). Some fishermen have reported that they mark their lines by weaving in surveyor's tape. Checking various sources online (www.amazon.com, www.uline.com/BL_6423/Flagging-Tape, and www.tigersupplies.com) show that rolls of 300' of surveyor's tape costs $3 - $11 per roll. This analysis assumes that three 12 inch strips per trap would come out to 105 feet (12 inches per strip x 3 strips per line x 35 pots) to initially equip each pot line. Therefore, if an endorsement holder decided to use surveyor's tape to mark lines, one roll would be sufficient. If all endorsement holders used surveyor's tape, the total cost would be between $96 (32 x $3) and $352 (32 x $11).

4.2.3 Social Effects

In general, the social effects of additional gear specifications would be associated with the economic effects and burden on black sea bass fishermen, and with broad social benefits that could occur with improved protection for right whales. **Sections 3.3.3** and **3.3.4** provide detailed information about the social environment for the black sea bass portion of the snapper grouper fishery. Additionally, considering engagement and reliance on commercial fishing for each community (**Figure 3.3.3.4**) and social vulnerability (**Figure 3.3.4.1**), the communities of Wanchese (North Carolina) and Sneads Ferry (North Carolina) are those that would be expected to experience positive and negative effects of changes for the black sea bass pot fishermen.

As discussed in **Section 4.2.2**, there could be some economic costs for fishermen if gear specifications require purchase of additional line and marking supplies. This could affect business cost decisions, which may have some negative effects on crew and associated shoreside support. Under **Alternative 1 (No Action)**, these effects would not be expected because the black sea bass pot fishermen are already required to have the ALWTRP gear specifications. Changing the specified breaking strength under **Alternative 2** - **Preferred Alternative 4** would likely increase business costs for some black sea bass pot fishermen by requiring new gear to meet the requirements. The time periods specified in **Sub-Alternative 2a** and **Sub-Alternative 2b** would likely have similar effects on black sea bass pot fishermen, because if the breaking strength or gear marking is required in only one part of the year (**Sub-alternative 2a**) would likely be as much of a burden in terms of requiring new or additional gear purchases as a year-round requirement (**Sub-alternative 2b**). Changing the specified breaking strength under **Sub-alternative 2a** would have the same effects on fishermen and communities in Florida, South Carolina, and Georgia as under **Alternative 1 (No Action).** However, **Sub-alternative 2a** would be expected to have some impact on black sea bass pot fishermen working in North Carolina because different gear would be required. **Sub-alternative 2b** would be expected to affect all black sea bass pot fishermen by increasing gear costs. The gear marking requirement in **Preferred Alternative 4** may be beneficial to the black sea bass pot fishermen by allowing NMFS to better identify gear associated with entanglements, which could help decipher entanglements with gear from other fisheries from black sea bass pot gear.

As noted in **Section 3.3.3**, marine mammal protection has broad social effects as well, as conservation of endangered species can produce societal benefits by protecting species for aesthetic, economic, scientific, and historical value to the U.S. and citizens. The social benefits would be tied to any benefits for right whale protection, as discussed in **Section 4.2.1**. If the biological benefits and contribution to right whale protection are higher, the broad social benefits associated with protected species conservation would be higher. However, because of limited information on actual risk of interaction is unknown, so that any associated social benefits would also be unknown. With all other regulations and management measures in place for the black sea bass pot sector that contribute to minimizing potential interactions through Council actions and ALWTRP requirements (see **Section 1.6**), the return on investment of additional gear specifications under **Alternative 2 - Preferred Alternative 4** could be low, particularly for a relatively small fishery such as the black sea bass pot sector Overall, any social benefits that would be expected to result from improved right whale protection will only be realized when biological benefits to the right whales can be measured and demonstrated.

4.2.4 Administrative Effects

Under **Alternative 1 (No Action)**, commercial black sea bass fishermen are required to abide by the pot configuration restrictions, pot escape mechanism requirements, and pot construction and escape mechanism requirements contained in 50 CFR § 622.189. As such, the alternative would retain the current level of administrative effects. There are logistical and economical costs of monitoring gear requirements. **Alternatives 2** and **3** would change the current requirements and could increase administrative costs, in the short-term, as law enforcement personnel adapt to the changes. **Preferred Alternative 4** would require unique line markings for those using black sea bass pots; this alternative may decrease adverse administrative effects compared to **Alternative 1 (No Action)** as it would be easier for law enforcement personnel to identify black sea bass pots.

Chapter 5. Council Rationale

5.1 Action 1

5.1.1 Snapper Grouper Advisory Panel (AP) Comments and Recommendations

Action 1 Alternatives[1]
(preferred alternative in bold)

1. No action. Closure would remain.
2. Closure of the currently designated North Atlantic right whale critical habitat area Nov 15 – April 15.
3. Closure from Nov 1 – April 30 between Ponce Inlet, FL and Cape Hatteras, NC based on extrapolated model outputs.
4. Closure from Nov 1 – April 30 in depths 25 m or shallower from Daytona Beach to Savannah and 30 m or shallower from Savannah to C. Hatteras.
5. Closure from Nov 1 – April 30 between Daytona Beach & C. Hatteras based on NGO comments.
6. Closure from Nov 1 – April 30 between Sebastian, FL & C. Hatteras, NC based on NGO comments.
7. Closure of the currently designated North Atlantic right whale critical habitat area & north to C. Hatteras in depths 25 m or shallower.
   7a. Nov 1 – Dec 15 & Mar 15 – Apr 30.
   7b. Off NC/SC Nov 1 – Dec 15/Mar 15 – April 30 and off FL/GA Nov 15 – April 15.
   7c. Off NC/SC Feb 15 – Apr 30. Off FL/GA Nov 15 – Apr 15.
8. Off FL/GA same as Alt 5. Off SC/NC < 25 m.
   8a. Closure Nov 1 – Apr 15.
   8b. FL/GA closure Nov 15 – Apr 1 SC/NC closure Nov 1 – Dec 15 and Feb 15 – Apr 30.
9. Off FL/GA same as Alt 5. Off SC/NC < 20 m.
   9a. Closure Nov 1 – Apr 15.
   9b. FL/GA closure Nov 15 – Apr 15. SC/NC closure Nov 1 – Dec 15 and Feb 15 – Apr 30.
10. Off FL/GA same as Alt 5 with closure Nov 15 – Apr 15. Off SC/NC Nov 1 – Dec 15 < 20 m. Off SC/NC Feb 15 1 – Apr 30 < 25 m.
11. **Nov 1 – 30 and Apr 1 - 30 off FL/GA same as Alt 5, off SC/NC same as Alt 8. Dec 1 – Mar 31, off FL/GA closure < 25 m, off SC/NC closure < 30 m.**
12. Nov 1 – Apr 30, midpoints between proposed closure Alts 4 and 8.

[1]See Chapter 2 for a more detailed description of the alternatives.

<u>From their November 2013 meeting</u>

South Atlantic Fishery Management Council (Council) staff reviewed alternatives to address the proposed annual closure of black sea bass pots from November 1 to April 30. Regulatory Amendment 19 to the Snapper Grouper FMP implemented this regulation as well as an increase to the black sea bass annual catch limit (ACL.) The AP discussed the feasibility of the November-April black sea bass pot prohibition only applying within designated right whale critical habitat. Some of the AP members from North Carolina indicated that migratory whales are frequently encountered in water 30-60 feet deep off the North Carolina coast. Migrating whales are distributed from the Gulf of Maine south in spring and fall and congregate on calving grounds. The number of black sea bass pots the whales encounter in the South Atlantic is minuscule relative to the number of pots in the Gulf of Maine.

The AP approved the following motion:

MOTION: RECOMMEND ALTERNATIVE 4 AS PREFERRED

Alternative 4. Prohibit retention, possession, and fishing for black sea bass using black sea bass pot gear, annually, from November 1 to April 30, in designated right whale critical habitat in the South Atlantic region.

From their April 2014 meeting

The AP recommended that the closure on the use of pots be limited to designated right whale critical habitat in the South Atlantic region. The AP made no further recommendations on the amendment but reiterated that vertical lines in the northeast lobster fishery pose a much more severe threat to whales than black sea bass pots and questioned why there are no restrictions in place for the northeast lobster fishery.

From their October 2014 meeting

No analyses were available for AP comment.
The following are highlights from the discussion:

- Concerns that the Council has not been given credit thus far for measures that have been implemented, e.g., endorsement program for pots, restriction on number of pots and soak time, etc.
- There have been no documented interactions between black sea bass pots and right whales.
- Amendment 18A drastically reduced effort effectively creating a day-boat fishery. Common sense indicates that there is very little risk to whales, especially since there has not been a single interaction between a whale and black sea bass pot even when the number of pots in the water was much larger and with longer soak times.
- While effort could potentially shift based on the area that is closed, it is very unlikely.
- Price of black sea bass is higher in winter. North Carolina wants their winter fishery back.

The AP approved the following motions:
MOTION: RECOMMEND ALTERNATIVE 2 AS PREFERRED
Alternative 2. Remove the annual November 1 through April 30 prohibition on the retention, possession, and fishing for black sea bass using black sea bass pot gear.

MOTION: RECOMMEND THAT THE COUNCIL CONSIDER A SEPARATE ACL FOR THE COMMERCIAL HOOK AND LINE SECTOR FOR BLACK SEA BASS IF THE CURRENT CLOSURE ON BLACK SEA BASS POTS IS REMOVED.

From their April 2015 meeting

The Snapper Grouper AP made the following motions regarding Regulatory Amendment 16:

MOTION: THE SG AP SUPPORTS THE COUNCIL'S CHOSEN PREFERRED ALTERNATIVE 9/SUB-ALTERNATIVE 9A.
APPROVED BY AP

5.1.2 Law Enforcement Advisory Panel (LEAP) Comments and Recommendations

From their March 2014 meeting

The LEAP received a general overview of the alternatives proposed under Regulatory Amendment 16 during their March 3, 2014, meeting. The LEAP did not express concerns or provide recommendations. One LEAP member,; however, stated that the annual closure of black sea bass pots is negatively impacting North Carolina fishermen who hold endorsements to fish for black sea bass using pot gear.

From their March 2015 meeting

The LEAP received a general overview of the alternatives proposed under Regulatory Amendment 16 and made the following recommendations:

- Keep number of waypoints to a minimum
- Effective enforcement is dependent on few waypoints and straight lines. The more waypoints there are, the more opportunity for error and it may also complicate prosecution.

5.1.3 Scientific and Statistical Committee Comments (SSC) and Recommendations

From their October 2014 meeting

The SSC met in October 2014 and discussed Snapper Grouper Regulatory Amendment 16. **The following is directly quoted from the report:**

The SSC reviewed the analysis of Regulatory Amendment 16 alternatives conducted by SERO staff. The most relevant comments, concerns, and discussion points brought up during the SSC meeting included:

- *The SSC expressed concern about the lack of detail in uncertainty characterizations in the analysis. Several sensitivity runs were conducted to evaluate major uncertainties. However, the Committee expressed concern with the ability to discern differences between management alternatives given the information provided. The Committee advised that further exploration and reporting of within-model uncertainties would improve insight into the variability associated with model parameters and help to distinguish between the different alternatives considered. The SSC recognizes that conducting a more complete, in-depth uncertainty characterization would provide a more robust picture of the proposed management alternatives given the amount of uncertainty in model outputs. At the very least it would be useful to explore uncertainty in a subset of runs and give a better picture of how well this analysis can distinguish between alternatives.*
- *Dr. Nick Farmer explained that rerunning the original model using bootstrapping or MCMC technique is not feasible given the current timeline for the amendment. However, the SSC recommended clearly defining this particular deficiency in the analysis such that the Council understands that the ranking of considered alternatives might not hold true if a full uncertainty analysis was undertaken.*

Overall, the SSC felt the presentation was informative. The approach of ranking the alternatives on a relative scale was supported. Inferring that the analysis evaluates and quantifies risk to whale encounters was not supported. With some refinement, directed at providing information on error associated with estimated scalar values for the alternatives, the analysis could allow the Council to distinguish between the different alternatives.

The SSC cautioned that assuming model output of co-occurrence between black sea bass pot effort and whale sightings is a proxy for whale interaction or entanglement overstates model and data capabilities. The Committee recommended presenting the scalar as a dimensionless value to avoid potential misunderstandings and misuse of the term 'risk'.

In terms of next steps regarding this issue the SSC provided the following recommendations:

1. *Convene an SSC ad hoc sub-Committee to advise Dr. Nick Farmer (SERO) on uncertainty analyses to more reliably distinguish between alternatives.*
2. *The SSC recommends an analysis of relative sea bass gear-whale sighting encounter scalar values (relative to alternative 2) that consider historic as well as current levels of effort.*
3. *The SSC also requested that a staff member from NMFS Protected Resources Division attend the next SSC meeting to address Committee questions and clarify how these types of analyses are used to create a Biological Opinion and guide management.*

<u>From their April 2015 meeting</u>
The SSC reviewed and discussed the revised analyses of RA16 alternatives provided by Dr. Nick Farmer. Regarding the three action items listed above the SSC provides the following recommendations:

- *The revised analyses addressed concerns raised by the SSC during the Oct 2014 meeting.*
- *The SSC agrees that this analysis should be considered BSIA.*
- *The SSC agrees that the analysis only characterizes the co-occurrence of whales and black sea bass pots as relative risk, not actual risk or percent risk of entanglement.*

The Socio-economic Panel (SEP) of the SSC met prior to the full SSC meeting. The SEP made the following recommendations based on specific questions asked regarding the two actions in the amendment:

Action 1
Specific Questions:

1. Two time frames were used to calculate price per pound by month (ref. Figure 4.1.2.1). Would it be beneficial to include other time frames?

   No. The SEP felt that no additional price analysis with other time frames is necessary. Additional analysis might add some variation but it would not be enough to change recommendations.

2. Table 4.1.1.1 uses information from an analysis by the Southeast Regional Office (SERO) that projects expected closure dates under various scenarios. Where there is a range of

closure dates, it is due to estimated closure dates based on differences between three different scenarios that were used to calculate trap placement for each month. The analysis used for the economic effects only used one of the three modeled scenarios for where pots would be placed. Is there value in repeating the analyses for the other two pot placement scenarios?

No. Additional analysis using other pot placement scenarios is not necessary because the SEP felt that there would probably be not much variation.

3. Are there additional social or economic analyses that the SEP recommends be completed for this action?

   The SEP recommends that additional economic analysis be considered.

   a. *For the price analysis, the SEP recommends using regression analysis to model the effects of regulatory measures in addition to temporal patterns. This may allow a more refined simulation of future regulatory measures, especially if price variation by market grade (fish size) can be incorporated.*
   b. *To consider efficiency, the SEP recommends predicting a change in the number of trips and change in predicted landings at the pot level and or trip level, especially seasonally. A more sophisticated analysis would model the trip-level decision process that also considers substitute target species but this could involve substantial effort.*
   c. *To incorporate changes in fishing costs, the SEP recommends considering a potential change in trip costs (e.g., due to a change in predicted landings) and vessels needing to travel further distances (e.g., by calculating the change in distance and a standard estimate of additional fuel costs required).*
   d. *Consider addressing the risk associated with expected returns, including localized depletion issues on other sectors of this fishery (e.g., recreational and commercial hook and line) and potential user conflicts with the recreational sector since the pot fishery has switched to the summer and early fall seasons, which is the time when recreational effort is generally at its highest level.*

Note: Regarding a. above, regression analysis was completed. A discussion of market grade is now included in the analysis,; however, market grade was only available from the North Carolina trip ticket program and could not be included in the overall black sea bass Southeast logbook landings and therefore market grade could not be included in the regression analysis. Sufficient data do not exist to complete recommended analyses b. and c. above. A qualitative discussion of the potential impacts of localized depletion and potential user conflicts is discussed in Section 4.1.3.

4. What additional recommendations does the SEP have for **Action 1**?

*The SEP had no additional recommendations for **Action 1**.*

5. Does this analysis represent BSIA?

Yes. The SEP feels that this is the BSAI, but are interested in sensitivity analysis resulting from investigating variation in seasonal prices, prices by fish size and additional ways to capture changes in trip efficiency. Additional sensitivity analysis is not likely to fundamentally change *the results of the economic analysis. But, additional sensitivity analysis would provide more confidence in the results.*

Note: Additional sensitivity analyses in the form of ANOVA and simple linear regression analyses are now included in the economic effects analysis for **Action 1** (Section 4.1.2).

Action 2

Specific Questions:

1.The Council has request that the SEP look at how **Action 2** is structured. Does the SEP have recommendations regarding this action?

No. The SEP has no recommendation on how Action 2 is structured.

2.Are there additional social or economic analyses that the SEP recommends be completed for this action?

Yes. The SEP recommends that the analysis includes estimates for any potential loss in yield (and associated costs) from the potential gear changes that would result from this action (i.e., loss in CPUE or loss in traps, revenue and/or costs, respectively). Ideally, the gear would be tested for a reduction in breaking strength and diameter with trap weight to minimize potential costs or losses to the fishermen. In addition, the data sources for the costs used should be referenced (we understand that point estimates are sufficient since fishermen will likely use the least expensive alternative, but including those sites would be helpful).

3.What additional recommendations does the SEP have for **Action 2**?

To the extent possible consider the opportunity costs of re-rigging the gear, especially if there is a specified time period, and input from fishermen on how this would affect them.

4.Does this analysis represent BSIA?

No. The SEP feels that this will be the BASI after the addition of information on the potential cost of lost traps due to the gear requirements.

Note: information on the potential cost of lost traps due to modified gear requirements has been included in the economic effects discussion for **Action 2** (Section 4.2.2).

5.1.4 Public Comments and Recommendations

Public comments for Snapper Grouper Regulatory Amendment 16 were taken in August of 2015. In person public hearings were held at three locations: Little River, SC on August 11, 2015; Jacksonville, NC on August 12, 2015; and Ormond Beach, FL on August 17, 2015. Written public comments were accepted by U.S. mail, facsimile, or email until August 21, 2015.

A total of 11 comments were received. There were seven comments given at the public hearings and four comments were submitted by email.

All of the commenters who appeared in person urged the Council to make provisions to allow black sea bass pot gear in some format from November through April each year. Commenters acknowledged keeping pot gear away from whales was a good idea, not just for the whales, but for fishermen, too.

Highlights of public hearing comments:

- Reasonable allowable fishing areas differ by region
- Florida-based black sea bass pot fishermen could fish beyond 20 meters depth and be away from whales and still catch black sea bass in pots November through April.
- North Carolina-based black sea bass pot fishermen have very few days they can fish from January through April because the weather is too rough. The further out they have to go to fish, the less likely they will be able to make a trip.
- There was no absolute consensus from North Carolina pot users on the depth they need to be able to fish. All agreed that 20 meters depth was doable, but there was less consensus among public hearing attendees regarding other depths. There was no support for a 30-nautical mile from shore closure (**Alternative 5**) off the Carolinas. Weather during that time of year and the fact that the fish tend to school closer to shore in winter makes fishing at that depth impracticable.
- Pot fishermen want to catch black sea bass November through April because the fish are of higher quality and easier to catch in pots during that time of the year.
- Public hearing attendees tended not to endorse specific alternatives for **Action 1**. They endorsed specific depth closures by area.

Four written comments were received (including one from a person who also spoke at one of the public hearings). Below is a summary of those written comments.

- Recommendation to use VHF radio to warn fishermen and other boaters when endangered mammals such as North Atlantic right whales (NARW) are seen.
- The potential hazard to NARWs has been greatly reduced since the requirement of pot endorsements was introduced. Participation in the fishery was capped at 32 participants with no more than 35 traps. Most of the fishermen are using fewer than 35 traps now.
- The Southeastern Fisheries Association, East Coast Fisheries Section, for **Action 1** endorsed **Alternative 9, Sub-Alternative 9a** citing the fact this alternative/sub-alternative provides continued protection for NARWs and allows fishermen to use pots.
- A joint written comment from The Humane Society of the U.S., Whale and Dolphin Conservation, Center for Biological Diversity, Defenders of Wildlife, Mason Weinrich, and Carolyn Good stated their position for retaining the current closure, **Action 1, Alternative 1 (No Action)**. Their objections included what they see as problems with the document development, changing purpose and need for the actions, the imperative to protect NARWs in their only known calving grounds, the need to do whatever is possible and necessary to protect NARWs, shifting economic effects from other gears to pot gear, and size of the economic gain by shifting landings to the pot sector. Should the Council choose an alternative other than **Action 1 (No Action)**, the letter writers urged the SAFMC to choose from among the other alternatives that would have the least risk of an interaction between NARWs and pot gear, namely, **Alternatives 4**, **6**, **11**, or **12**.

Additional public comment outreach was conducted to solicit input from each of black sea bass pot endorsement holders in August and September 2015. The outcome of those interviews is located in **Appendix S**.

5.1.5 South Atlantic Council Choice for Preferred Alternative

The South Atlantic Council chose **Preferred Alternative 11** as its preferred alternative. The South Atlantic Council determined that **Alternative 1 (No Action)** would not be the best alternative because the status quo unfairly prohibits all black sea bass pot fishing from November 1 through April 30 even in areas where NARW are not present. The South Atlantic Council determined the preferred alternative is the best management strategy based on **Preferred Alternative 11** prohibits black sea bass pot fishing from areas where 96% to 97% of the known sightings of NARW occurred from November 1 through April 30 and allows black sea bass pot fishing outside the closed area.

The South Atlantic Council concluded **Preferred Alternative 11** best meets the purpose and need, the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

5.2 Action 2

5.2.1 Snapper Grouper Advisory Panel Comments and Recommendations

Action 2 Alternatives[1]
(preferred alternative in bold)

5. No action. Status quo gear marking requirements.
6. Modify buoy line strength Nov 1 – Apr 30
   2a. less than or equal to 2,200 lbs in federal waters of the South Atlantic.
   2b. less than or equal to 1,200 lbs in federal waters of the South Atlantic.
7. Modify weak links to no more than 400 lbs Nov 1 – Apr 30.
8. **Add a purple 12" color mark adjacent to ALWTRP required line markings from Nov 1 – Apr 30.**

From their April 2015 meeting
The Snapper Grouper AP made the following motions regarding Regulatory Amendment 16:

MOTION: SG AP RECOMMENDS COUNCIL REQUIRE BLACK SEA BASS POT GEAR MARKING BE A SEPARATE COLOR FROM ANY OTHER VERTICAL LINE FISHERY IN THE REGION YEAR AROUND.
APPROVED BY AP

MOTION: SG AP RECOMMENDS RESEARCH BE DONE TO DETERMINE PROPER VERTICAL LINE AND WEAK LINK STRENGTH FOR THE BLACK SEA BASS POT FISHERY IN THE SOUTH ATLANTIC IN ORDER TO MAKE FUTURE RECOMMENDATIONS.
APPROVED BY AP

MOTION: RECOMMEND THE COUNCIL RESEARCH DIFFERENT MESH SIZES FOR BLACK SEA BASS POTS.
APPROVED BY AP

The AP's suggested a mesh size modification for black sea bass pots to 2 inches or 2 3/8 inches to minimize or eliminate discards if the minimum size for commercially harvested black sea bass were to increase from 11 inches to 12. Inches.

5.2.2 Law Enforcement Advisory Panel Comments and Recommendations

From their March 2015 meeting
The LEAP received a general overview of the alternatives proposed under Regulatory Amendment 16 and made the following recommendations:

- The LEAP defers to the ALWTRP for recommendations on Action 2.

5.2.3 Scientific and Statistical Committee Comments and Recommendations

From their April 2015 meeting
The SSC reviewed and discussed the revised analyses of RA16 alternatives provided by Dr.

Nick Farmer. Regarding the three action items listed above the SSC provides the following recommendations:

- *The revised analyses addressed concerns raised by the SSC during the Oct 2014 meeting.*
- *The SSC agrees that this analysis should be considered BSIA.*
- *The SSC agrees that the analysis only characterizes the co-occurrence of whales and black sea bass pots as relative risk, not actual risk or percent risk of entanglement.*

The Socio-economic Panel (SEP) of the SSC met prior to the full SSC meeting. The SEP made the following recommendations based on specific questions asked regarding the two actions in the amendment:

Action 2

Specific Questions:

1.The Council has request that the SEP look at how **Action 2** is structured. Does the SEP have recommendations regarding this action?

No. The SEP has no recommendation on how Action 2 is structured.

5.Are there additional social or economic analyses that the SEP recommends be completed for this action?

Yes. The SEP recommends that the analysis includes estimates for any potential loss in yield (and associated costs) from the potential gear changes that would result from this action (i.e., loss in CPUE or loss in traps, revenue and/or costs, respectively). Ideally, the gear would be tested for a reduction in breaking strength and diameter with trap weight to minimize potential costs or losses to the fishermen. In addition, the data sources for the costs used should be referenced (we understand that point estimates are sufficient since fishermen will likely use the least expensive alternative, but including those sites would be helpful).

6.What additional recommendations does the SEP have for **Action 2**?

To the extent possible consider the opportunity costs of re-rigging the gear, especially if there is a specified time period, and input from fishermen on how this would affect them.

7.Does this analysis represent BSIA?

No. The SEP feels that this will be the BASI after the addition of information on the potential cost of lost traps due to the gear requirements.

Note: information on the potential cost of lost traps due to modified gear requirements has been included in the economic effects discussion for **Action 2** (Section 4.2.2).

5.2.4 Public Comments and Recommendations

Public comments for Snapper Grouper Regulatory Amendment 16 were taken in August of 2015. In person public hearings were held at three locations: Little River, SC on August 11, 2015; Jacksonville, NC on August 12, 2015; and Ormond Beach, FL on August 17, 2015. Written public comments were accepted by U.S. mail, facsimile, or email until August 21, 2015.

A total of 11 comments were received. There were seven comments given at the public hearings and four comments were submitted by email.

All of the commenters who appeared in person urged the Council to make provisions to allow black sea bass pot gear in some format from November through April each year. Commenters acknowledged keeping pot gear away from whales was a good idea, not just for the whales, but for fishermen, too.

Highlights of public hearing comments relevant to **Action 2**:

- Fishermen are willing to modify their gear and fishing behavior as necessary so they can fish during the currently closed season and at reasonable depths.

Four written comments were received (including one from a person who also spoke at one of the public hearings). Below is a summary of those written comments.

- The potential hazard to NARWs has been greatly reduced since the requirement of pot endorsements was introduced. Participation in the fishery was capped at 32 participants with no more than 35 traps. Most of the fishermen are using fewer than 35 traps now.
- The Southeastern Fisheries Association, East Coast Fisheries Section, for **Action 2** supported the Council's choices of **Preferred Alternative 2**, **Sub-Alternative 2a**, **Preferred Alternative 3**, and **Preferred Alternative 4**.

Additional public comment outreach was conducted to solicit input from each of black sea bass pot endorsement holders in August and September 2015. The outcome of those interviews is located in **Appendix S**.

5.2.5 South Atlantic Council Choice for Preferred Alternative

The South Atlantic Council chose **Preferred Alternative 4** as its preferred alternative. The South Atlantic Council determined that **Alternative 1 (No Action)** would not be the best alternative because the status quo would not be able to identify black sea bass pot gear if it was found entangled on a NARW. The South Atlantic Council determined that **Alternatives 2** and **3** would not be good management strategies because black sea bass pots would be required to fish further offshore from November 1 through April 30 when the weather is likely to be rougher than at other times of the year. Since **Action 1, Preferred Alternative 11** requires fishing further offshore than 96% - 97% of all known NARW sightings, there was little need to require weaker weak links or weaker buoy line strength. Additionally, fishing further offshore as required by **Action 1, Preferred Alternative 11** would necessitate the use of gear with stronger weak links and buoy line strength to help prevent lost gear. The South Atlantic Council determined the preferred alternative is the best management strategy based on **Preferred Alternative 4** would be able to identify black sea bass pot gear if it was found entangled on a NARW.

The South Atlantic Council concluded **Preferred Alternative 4** best meets the purpose and need, the objectives of the Snapper Grouper FMP, as amended, while complying with the requirements of the Magnuson-Stevens Act and other applicable law.

Chapter 6. Cumulative Effects

This Cumulative Effects Analysis (CEA) for the biophysical environment will follow a modified version of the 11 steps. Cumulative effects for the socio-economic environment will be analyzed separately.

6.1 Biological

A. Identify the significant cumulative effects issues associated with the proposed action and define the assessment goals.

CEQ cumulative effects guidance states that this step is done through three activities. The three activities and the location in the document are as follows:

1. The direct and indirect effects of the proposed actions **(Chapter 4)**;

II. Which resources, ecosystems, and human communities are affected **(Chapter 3)**; and

III. Which effects are important from a cumulative effects perspective **(information revealed in this CEA)**.

2. Establish the geographic scope of the analysis.

The immediate impact area would be the federal 200-mile limit of the Atlantic off the coasts of North Carolina, South Carolina, Georgia, and east Florida to Key West, which is also the South Atlantic Fishery Management Council's (South Atlantic Council) area of jurisdiction. In light of the available information, the extent of the boundaries would depend upon the degree of fish immigration/emigration and larval transport, whichever has the greatest geographical range. Therefore, the proper geographical boundary to consider effects on the biophysical environment is larger than the entire South Atlantic exclusive economic zone (EEZ). The ranges of affected species are described in **Section 3.2**. The most measurable and substantial effects would be limited to the South Atlantic region.

A. Establish the timeframe for the analysis.

The timeframe for the analysis of cumulative effects is 1983 through the present. Fishery managers implemented the first significant regulations pertaining to black sea bass in 1983 through the Snapper Grouper FMP (SAFMC 1983). The regulations included a 8 inch size limit for black sea bass.

Identify the other actions affecting the resources, ecosystems, and human communities of concern (the cumulative effects to the human communities are discussed in Chapter 4).

Listed are other past, present, and reasonably foreseeable actions occurring in the South Atlantic region. These actions, when added to the proposed management measures, may result in cumulative effects on the biophysical environment.

A. Fishery-related actions affecting the snapper grouper species addressed in this amendment

A. Past

The reader is referred to **Appendix B** for past regulatory activity all species in the Snapper Grouper FMP. Past regulatory activity for the relevant snapper grouper species in this amendment is listed below.

Regulatory Amendment 9 to the Snapper Grouper FMP (SAFMC 2011a) reduced the black sea bass recreational bag limit from 15 fish per person per day to 5 fish per person per day. The final rule published in the *Federal Register* on June 15, 2011.

The Comprehensive ACL Amendment (SAFMC 2011c) includes ACLs and Ams for federally managed species not undergoing overfishing in four FMPs (Snapper Grouper, Dolphin Wahoo, Golden Crab, and *Sargassum*). Actions contained within the Comprehensive ACL Amendment include: (1) Removal of species from the snapper grouper fishery management unit; (2) designation of ecosystem component species; (3) allocations; (4) management measures to limit recreational and commercial sectors to their ACLs; (5) Ams; and (6) any necessary modifications to the range of regulations. The South Atlantic Council approved the Comprehensive ACL Amendment in September 2011. The final rule published in the *Federal Register* on March 16, 2012, and became effective on April 16, 2012.

Amendment 18A to the Snapper Grouper FMP (SAFMC 2012a) contained measures to limit participation and effort for black sea bass. Amendment 18A established an endorsement program than enables snapper grouper fishermen with a certain catch history to harvest black sea bass with pots. In addition, Amendment 18A included measures to reduce bycatch in the black sea bass pot sector, modified the rebuilding strategy, and other necessary changes to management of black sea bass as a result of a 2011 stock assessment. The South Atlantic Council approved Amendment 18A in December 2011. The amendment was partially approved and the final rule published in the *Federal Register* on June 1, 2012, and became effective on July 1, 2012.

Regulatory Amendment 19 adjusted the black sea bass harvest limits based on the results of a 2013 update assessment. Because the increase to the ABC/ACL was substantial, there was concern that this could extend fishing with pots into the calving season for right whales and create a risk of entanglement for large migratory whales during the fall months. To minimize this risk, the amendment also proposed a closure to black sea bass pot gear from November 1 to

April 30. The Council approved the amendment for submission to the Secretary at a special Council meeting held via webinar in May 2013. The final rule published on September 23, 2013. The ACL increase for black sea bass in the South Atlantic was effective September 23, 2013. The annual prohibition on the use of black sea bass pots from November 1 through April 30 became effective October 23, 2013.

Through Regulatory Amendment 14, the Council modified the fishing year for greater amberjack; revised the minimum size limit measurement for gray triggerfish; increased the minimum size limit for hogfish; modified the commercial and recreational fishing year for black sea bass; adjusted the commercial fishing season for vermilion snapper; modified the aggregate grouper bag limit; and revised the AMs for gag and vermilion snapper. The Council approved the amendment for public hearings at their June 2013 meeting and approved the amendment at the September 2013 meeting. The National Marine Fisheries Service (NMFS) implemented the regulations on December 8, 2014.

B. Present

NMFS has proposed to expand the designated critical habitat for endangered North Atlantic right whales in the northwestern Atlantic Ocean, including areas that will support calving and nursing. The rule would expand the critical habitat to roughly 29,945 square nautical miles, and include northeast feeding areas in the Gulf of Maine/Georges Bank region and calving grounds from southern North Carolina to northern Florida.

In addition to snapper grouper fishery management issues being addressed in this amendment, other snapper grouper amendments have been developed concurrently and are in the process of approval and implementation.

The Joint Dealer Reporting Amendment is intended to improve the timeliness and accuracy of fisheries data reported by permitted dealers. The amendment creates one dealer permit for all federally-permitted dealers in the southeast region. Requiring dealers to report landings data weekly will help to improve in-season quota monitoring efforts, which will increase the likelihood that AMs could be more effectively implemented prior to ACLs being exceeded. The notice of availability of the amendment and the proposed rule published on December 19, 2013, and January 2, 2014, respectively. The proposed rule published in the *Federal Register* on January 2, 2014, the final rule published on April 9, 2014, and became effective on August 7, 2014.

The South Atlantic Headboat Reporting Amendment requires that all federally-permitted headboats on the South Atlantic report their landings information electronically, and on a weekly basis in order to improve the timeliness and accuracy of harvest data. The proposed rule published in the *Federal Register* on September 27, 2013. The final rule published on December 27, 2013, and regulations became effective on January 27, 2014.

At their September 2012 meeting, the Council directed staff to develop Amendment 27 to the Snapper Grouper FMP to address issues related to blue runner, and extension of management into the Gulf of Mexico for Nassau grouper. The proposed rule published in the *Federal*

Register on September 27, 2013. The final rule published on December 27, 2013, and regulations became effective on January 27, 2014.

C. Reasonably Foreseeable Future

The Joint Commercial Logbook Reporting Amendment would require electronic reporting of landings information by federally-permitted commercial vessels, which would increase the timeliness and accuracy of landings data.

The Joint Charter Boat Reporting Amendment would require charter vessels to regularly report their landings information electronically. Including charter boats in the recreational harvest reporting system would further improve the agency's ability to monitor recreational catch rates in-season.

At their June 2013 meeting, the Council requested development of Regulatory Amendment 16 to the Snapper Grouper FMP to adjust management measures for black sea bass by removing the November through April prohibition on the use of black sea bass pots in Regulatory Amendment 19 (SAFMC 2013f). An options paper was reviewed by the Council in September 2013. The Council held scoping meetings in January 2014. **Appendix N** describes the results of the scoping process.

The Council is considering the implementation of Spawning Special Management Zones. The timeline is for the Council to take final action at the March 2016 meeting.

At their June 2013 meeting, the Council began development of Amendment 29 to the Snapper Grouper FMP, which would consider adjustments to the ABCs for data poor snapper grouper species, and management measures for gray triggerfish. Public hearings took place in January 2014, and the regulations were implemented July 1, 2015.

At their December 2013 meeting, the Council began development of Regulatory Amendment 21 to the Snapper Grouper FMP, which would consider redefining the minimum stock size threshold for species, including blueline tilefish, with small natural mortality rates. The Council also began development of Amendment 32 to the Snapper Grouper FMP, which would include actions to end overfishing of blueline tilefish and rebuild the stock.

Once stock assessments are completed for mutton snapper and snowy grouper, the Council will begin development of an amendment to update the ACLs.

II. Non-Council and other non-fishery related actions, including natural events affecting snapper grouper species in this amendment.

A. Past
B. Present
C. Reasonably foreseeable future

In terms of natural disturbances, it is difficult to determine the effect of non-Council and non-fishery related actions on stocks of snapper grouper species. Annual variability in natural conditions such as water temperature, currents, food availability, predator abundance, etc. can affect the abundance of young fish, which survive the egg and larval stages each year to become juveniles (i.e., recruitment). This natural variability in year class strength is difficult to predict, as it is a function of many interactive and synergistic factors that cannot all be measured (Rothschild 1986). Furthermore, natural factors such as storms, red tide, cold-water upwelling, etc. can affect the survival of juvenile and adult fishes; however, it is very difficult to quantify the magnitude of mortality these factors may have on a stock. Alteration of preferred habitats for snapper grouper species could affect survival of fish at any stage in their life cycles. However, estimates of the abundance of fish, which utilize any number of preferred habitats, as well as, determining the impact habitat alteration may have on snapper grouper species, is problematic.

Climate change can impact marine ecosystems through ocean warming by increased thermal stratification, reduced upwelling, sea level rise, increases in wave height and frequency, loss of sea ice, and increased risk of diseases in marine biota. Decreases in surface ocean pH due to absorption of anthropogenic CO_2 emissions may impact a wide range of organisms and ecosystems, particularly organism that absorb calcium from surface waters, such as corals and crustaceans (IPCC 2007, and references therein).

The BP/Deepwater Horizon oil spill event, which occurred in the Gulf of Mexico on April 20, 2010, did not impact fisheries operating the South Atlantic. Oil from the spill site has not been detected in the South Atlantic region, and is not likely to pose a threat to the species addressed in this amendment.

5. Characterize the resources, ecosystems, and human communities identified in scoping in terms of their response to change and capacity to withstand stress.

In terms of the biophysical environment, the resources/ecosystems identified in earlier steps of the CEA are the fish populations, right whales, and other protected resources directly or indirectly affected by the regulations. This step should identify the trends, existing conditions, and the ability to withstand stresses of the environmental components. Information on species most affected by this amendment are provided in **Section 3.2** of this document.

6. Characterize the stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds.

This step is important in outlining the current and probable stress factors on the affected species, ecosystems, and human communities identified in the previous steps. The goal is to determine whether these species are approaching conditions where additional stresses could have an important cumulative effect beyond any current plan, regulatory, or sustainability threshold (CEQ 1997). Sustainability thresholds can be identified for some resources, which are levels of impact beyond which the resources cannot be sustained in a stable state. Other thresholds are established through numerical standards, qualitative standards, or management goals. The CEA should address whether thresholds could be exceeded because of the contribution of the proposed action to other cumulative activities affecting resources.

The threats to large endangered whales and the relation to regulatory thresholds, within the ESA and MMPA, can be found in **Sections 3.2** and **4.1** and **Appendix M** of this document.

Fish populations

This document updates thresholds already specified for black sea bass to ensure future overfishing does not occur, and to ensure these stocks can be maintained at sustainable levels. With current AMs in place for both species it is unlikely that these thresholds would be exceeded. If the harvest limits are exceeded, management measures are in place to either restrict further fishing or correct for the overage in the following fishing season.

Climate change

Global climate changes could have significant effects on South Atlantic fisheries. However, the extent of these effects is not known at this time. Possible impacts include temperature changes in coastal and marine ecosystems that can influence organism metabolism and alter ecological processes such as productivity and species interactions; changes in precipitation patterns and a rise in sea level which could change the water balance of coastal ecosystems; altering patterns of wind and water circulation in the ocean environment; and influencing the productivity of critical coastal ecosystems such as wetlands, estuaries, and coral reefs (IPCC 2007; Kennedy et al. 2002).

It is unclear how climate change would affect snapper grouper species in the South Atlantic. Climate change can affect factors such as migration, range, larval and juvenile survival, prey availability, and susceptibility to predators. In addition, the distribution of native and exotic species may change with increased water temperature, as may the prevalence of disease in keystone animals such as corals and the occurrence and intensity of toxic algae blooms. Climate change may significantly impact snapper grouper species in the future, but the level of impacts cannot be quantified at this time, nor is the time frame known in which these impacts will occur. In the near term, it is unlikely that the management measures contained in Regulatory Amendment 16 would compound or exacerbate the ongoing effects of climate change on snapper grouper species.

Protected resources

The threats to large endangered whales and the relation to regulatory thresholds, withing the ESA and MMPA, can be found in **Sections 3.2** and **4.1** and **Appendix M** of this document.

7. Define a baseline condition for the resources, ecosystems, and human communities.

The purpose of defining a baseline condition for the resource and ecosystems in the area of the proposed action is to establish a point of reference for evaluating the extent and significance of expected cumulative effects. The SEDAR assessments show trends in biomass, fishing mortality, fish weight, and fish length going back to the earliest periods of data collection. For some species such as snowy grouper, assessments reflect initial periods when the stock was above B_{MSY} and fishing mortality was fairly low. However, some species were heavily exploited or possibly overfished when data were first collected. As a result, the assessment must make an assumption of the biomass at the start of the assessment period thus modeling the baseline reference points for the species. The baseline condition for the resources, ecosystems, and human communities can be found in **Chapter 3.**

8. Identify the important cause-and-effect relationships between human activities and resources, ecosystems, and human communities.

The cause and effect relationship of fishing and regulatory actions for black sea bass is shown in **Table 6.1**. The analysis that evaluates the potential cause-and-effect relationships between the various alternatives and right whale risk can be found in **Appendix N**.

Table 6.1. The cause and effect relationship of fishing and regulatory actions within the time period of the Cumulative Effects Analysis (CEA).

Time period/dates	Cause	Observed and/or Expected Effects
January 1992	Prohibited gear: fish traps south of Cape Canaveral, FL; entanglement nets; longline gear inside of 50 fathoms; powerheads and bangsticks in designated SMZs off SC. Size/Bag limits: 10" TL vermilion snapper (recreational only); 12" TL vermilion snapper (commercial only); 10 vermilion snapper/person/day; aggregate grouper bag limit of 5/person/day; and 20" TL gag, red, black, scamp, yellowfin, and yellowmouth grouper size limit (Snapper Grouper Amendment 4; SAFMC 1991).	Reduce mortality of snapper grouper species.
February 24, 1999	Snapper Grouper Amendment 6; SAFMC 1993.	All S-G without a bag limit: aggregate recreational bag limit 20 fish/person/day, excluding tomtate and blue runners. Vessels with longline gear aboard may only possess snowy, warsaw, yellowedge, and misty grouper, and golden, blueline and sand tilefish.
Effective October 23, 2006	Stock assessments indicate **black sea bass**, vermilion snapper, red porgy, and snowy grouper are undergoing overfishing. Snapper grouper FMP Amendment 13C (SAFMC 2006)	Management measures implemented to end overfishing of these species.
Effective March 20, 2008	Stock assessments indicate snowy grouper, black sea bass, and red porgy	Establish rebuilding plans and SFA parameters for snowy grouper, **black**

Time period/dates	Cause	Observed and/or Expected Effects
	are overfished. Snapper grouper FMP Amendment 15A (SAFMC 2008a).	**sea bass**, and red porgy.
Effective Date July 29, 2009	Stock assessment indicates some species are experiencing overfishing and is approaching an overfished condition. Snapper grouper FMP Amendment 16 (SAFMC 2009a).	Protect spawning aggregations and snapper grouper in spawning condition by increasing the length of the spawning season closure, decrease discard mortality by requiring the use of dehooking tools, reduce overall harvest of gag and vermilion snapper to end overfishing.
Effective Date July 15, 2011	Additional management measures are considered to help ensure overfishing of black sea bass, vermilion snapper, and gag does not occur. Desired to have management measures slow the rate of capture to prevent derby fisheries. Regulatory Amendment 9 (SAFMC 2011a)	Harvest management measures for **black sea bass**; commercial trip limits for gag, vermilion snapper, and greater amberjack
Effective Date July 1, 2012	Need to slow rate of harvest in black sea bass pot sector to ease derby conditions. Amendment 18A (SAFMC 2012a).	Established an endorsement program for **black sea bass** commercial sector; established a trip limit; specified requirements for deployment and retrieval of pots; made improvements to data reporting for commercial and for-hire sectors
Effective Date January 7, 2013	Clarification of action in Amendment 18A for black sea bass pot endorsement transferability was needed. Amendment 18A Transferability Amendment.	Reconsidered action to allow for transfer of **black sea bass** pot endorsements that was disapproved in Amendment 18A.
Effective Date July 17, 2013	The recreational data collection system has changed from MRFSS to MRIP. ACLs and allocations in place utilize MRFSS data. Regulatory Amendment 13. (SAFMC 2013b).	Adjust ACLs and allocations for unassessed snapper grouper species with MRIP recreational estimates
Effective Date September 23, 2013	New stock assessment for black sea bass indicates the stock is rebuilt and catch levels can be increased. Regulatory Amendment 19 (SAFMC 2013f).	Increase recreational and commercial ACLs for **black sea bass**. Black sea bass pots prohibited from November 1 through April 30 (effective October 23, 2013).
Target 2014	Regulatory Amendment 14	Change the fishing years for greater amberjack and **black sea bass**, change in AMs for vermilion snapper and black sea bass, and modify the gag trip limit.

9. Determine the magnitude and significance of cumulative effects.

Regulatory Amendment 16 alone would not result in significant cumulative impacts on snapper grouper fishery. When combined with the impacts of past, present, and future actions affecting the snapper grouper fishery, specifically black sea bass, minor cumulative adverse impacts are likely to accrue, such as a shift to fishing with pot gear. Actions in Regulatory Amendment 16 that address the black sea bass segment of the snapper grouper fishery, together or separately, are not expected to result in significant cumulative adverse biological effects. All of the proposed, or recently implemented management actions affecting black sea bass within the snapper grouper fishery, are intended to improve management of the snapper grouper resource, while minimizing, to the maximum extent practicable adverse social and economic impacts. The actions in Regulatory Amendment 16 are expected to reduce the adverse socioeconomic impacts resulting from the annual November 1 through April 30 prohibition on the use of black sea bass pot gear and increase the flexibility of black sea bass pot endorsement holders to fish with this gear while continuing to protect ESA-listed whales in the South Atlantic region and reduce the adverse effects on whales if entangled and help identify black sea bass pot lines used in the South Atlantic.

The actions are not likely to result in direct, indirect, or cumulative adverse effects to unique areas, such as significant scientific cultural, or historical resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas as the proposed action is not expected to substantially increase fishing effort or the spatial and/or temporal distribution of current fishing effort within the South Atlantic region. The USS Monitor, Gray’s Reef, and Florida Keys National Marine Sanctuaries are within the boundaries of the South Atlantic EEZ. The proposed actions are not likely to cause loss or destruction of the resources found within the national marine sanctuaries.

10. Modify or add alternatives to avoid, minimize, or mitigate significant cumulative effects.

The cumulative adverse effects on the biophysical environment are expected to be negligible. Most of the alternatives in Action 1 were developed as avoidance and minimization strategies to mitigate potential entanglement effects of fishing sea bass pots during winter months. Mitigation is not necessary for the successful implementation of the proposed actions in this amendment.

11. Monitor the cumulative effects of the selected alternatives and adopt management.

The effects of the proposed actions are, and will continue to be, monitored through collection of data by the National Marine Fisheries Service (NMFS), states, stock assessments and stock assessment updates, life history studies, and other scientific observations.

No specific observer program is in place for the 32 permits in the black sea bass pot fishery; however. In the programs described below, any gear recovered from an animal is analyzed to try and determine which fishery caused the entanglement. Because of the difficulty of identifying a specific fishery from the entangling gear, very few entanglements are identified beyond the gear type (i.e., a trap/pot or gillnet gear entanglement, without indicating a specific fishery).

NMFS authorizes organizations and volunteers in the Marine Mammal Stranding Program to respond to marine mammal strandings throughout the United States. Stranding network participants are trained to respond to, and collect samples from live and dead marine mammals that strand along southeastern United State beaches. As part of the network, the SEFSC coordinates stranding events, monitors stranding rates, monitors human-caused mortalities, and maintains a stranding database for the region, among other things. The Atlantic Large Whale Disentanglement Network responds to reports of entangled whales and attempts to remove entangling gear when possible. The network includes numerous governmental and non-governmental agencies, fishermen, and other trained individuals from Canada to Florida. Additionally, the MMPA and the Marine Mammal Authorization Program require that all commercial fishermen report all incidental injuries and mortalities of marine mammals that have occurred as a result of commercial fishing operations. Those reports must be sent to NMFS within 48 hours of the end of a fishing trip in which the serious injury or mortality occurred, or, for non-vessel fisheries, within 48 hours of the occurrence.

6.2 Socioeconomic

The actions in this amendment will modify the prohibition for harvest of black sea bass with pots in the winter months, and implement additional gear specifications for pots. The overall cumulative social and economic effects will be associated with increased fishing opportunities for pot endorsement holders, potential effects on hook and line fishermen, restrictions already in place due to existing regulations, and broad social benefits of whale protection.

Because of regulatory and economic changes that have affected the snapper grouper fishery, any action that restricts economic opportunity may have detrimental social and/or economic effects. The commercial sector of the snapper grouper fishery has seen significant changes in regulatory actions with limited entry, annual catch limits and associated accountability measures, and other restrictive measures.

Specifically, the black sea bass pot sector has experienced several recent regulatory changes in addition to existing requirements that have limited access to the black sea bass resource. The proposed action to modify the closure to allow fishing in areas that will not increase risk of interaction with right whales is expected to benefit the black sea bass pot fishermen to a large extent.

Furthermore, almost all fishermen or businesses with snapper grouper commercial permits also hold at least one (and usually multiple) additional commercial or for-hire permit to maintain the opportunity to participate in other fisheries. Even within the snapper grouper fishery, effort can shift from one species to another due to environmental, economic, or regulatory changes. Overall, changes in management of one species in the snapper grouper fishery can impact effort and harvest of another species (in the snapper grouper fishery or in another fishery) because of multi-fishery participation that is characteristic in the South Atlantic region.

The cumulative social and economic effects of past, present, and future amendments may be described as limiting fishing opportunities in the short-term, with some exceptions of actions that alleviate some negative social and economic impacts. The intent of these amendments is to improve prospects for sustained participation in the respective fisheries over time and the proposed actions in this amendment are expected to result in some important long-term benefits to the commercial and for-hire fishing fleets, fishing communities and associated businesses, and private recreational anglers. The proposed changes in this amendment that could affect access to several important species in the South Atlantic region may contribute to changes in the snapper grouper fishery within the context of the current economic and regulatory environment at the local and regional level.

Chapter 7. List of Preparers

Table 7.1.1. List of Regulatory Amendment 16 preparers

Name	Organization	Title
Andy Herndon	NMFS/PR	Protected Resources Biologist
Chip Collier	SAFMC	Fishery Biologist
Brian Cheuvront	SAFMC	Economist
Heather Blough	NMFS/SER	Acting Regional NEPA Coordinator
Gregg Waugh	SAFMC	Deputy Executive Director
Jack McGovern	NMFS/SF	Fishery Biologist
Jessica Powell	NMFS/PR	Protected Resources Biologist
Kari MacLauchlin	SAFMC	Fishery Social Scientist
Mike Errigo	SAFMC	Data Analyst
Mike Jepson	NMFS/SF	Fishery Social Scientist
Nick Farmer	NMFS/SF	Fishery Biologist
Rick DeVictor	NMFS/SF	Fishery Biologist
Tony Lamberte	NMFS/SF	Economist

NMFS = National Marine Fisheries Service, SAFMC = South Atlantic Fishery Management Council, SF = Sustainable Fisheries Division, PR = Protected Resources Division, SERO = Southeast Regional Office, HC = Habitat Conservation Division, GC = General Counsel, Eco=Economics

Table 7.1.2. List of Regulatory Amendment 16 interdisciplinary plan team members.

Name	Organization	Title
Andy Herndon	NMFS/PR	Protected Resources Biologist
Chip Collier	SAFMC	Fishery Biologist
Brian Cheuvront	SAFMC	Economist
David Dale	NMFS/HC	EFH Specialist
Heather Blough	NMFS/SER	Special Assistant to the RA
Gregg Waugh	SAFMC	Deputy Executive Director
Jack McGovern	NMFS/SF	Fishery Biologist
Jessica Powell	NMFS/PR	Protected Resources Biologist
Kari MacLauchlin	SAFMC	Fishery Social Scientist
Lance Garrison	NMFS/SEFSC	Research Biologist
Scott Crosson	NMFS/SEFSC	Economist
Mike Errigo	SAFMC	Fishery Biologist
Mike Jepson	NMFS/SF	Fishery Social Scientist
Monica Smit-Brunello	NMFS SERO/GC	Attorney
Myra Brouwer	SAFMC	Fishery Biologist
Nick Farmer	NMFS/SF	Fishery Biologist
Jeff Radonski	NOAA/OLE	Special Agent
Rick DeVictor	NMFS/SF	Fishery Biologist
Roger Pugliese	SAFMC	Sr. Fishery Biologist
Scott Sandorf	NMFS/SF	Technical Writer & Editor
Stephen Holiman	NMFS/SF	Supervisory Industry Economist
Tony Lamberte	NMFS/SF	Economist

NMFS = National Marine Fisheries Service, SAFMC = South Atlantic Fishery Management Council, SF = Sustainable Fisheries Division, PR = Protected Resources Division, SERO = Southeast Regional Office, HC = Habitat Conservation Division, GC = General Counsel, Eco=Economics

Chapter 8. List of Agencies, Organizations, and Persons to Whom Copies of the Statement are Sent

Responsible Agency

Regulatory Amendment 16:
South Atlantic Fishery Management Council
4055 Faber Place Drive, Suite 201
Charleston, South Carolina 29405
(843) 571-4366 (TEL)
Toll Free: 866-SAFMC-10
(843) 769-4520 (FAX)
safmc@safmc.net

Environmental Impact Statement:
NMFS, Southeast Region
263 13th Avenue South
St. Petersburg, Florida 33701
(727) 824-5301 (TEL)
(727) 824-5320 (FAX)

List of Agencies, Organizations, and Persons Consulted

Environmental Protection Agency
North Carolina Coastal Zone Management Program
South Carolina Coastal Zone Management Program
Georgia Coastal Zone Management Program
Florida Coastal Zone Management Program
Florida Fish and Wildlife Conservation Commission
Georgia Department of Natural Resources
South Carolina Department of Natural Resources
North Carolina Division of Marine Fisheries
Atlantic States Marine Fisheries Commission
National Marine Fisheries Service
- Washington Office
- Office of Ecology and Conservation
- Southeast Fisheries Science Center

Chapter 9. References

Akaike, H. 1974. A new look at the statistical model identification. IEEE Transactions on Automatic Control, 19(6):716–723.

Barco, S.G., W.A. McLellan, J. Allen, R. Asmutis, R. Mallon-Day, E. Meagher, D.A. Pabst, J. Robbins, R. Seton, R.M. Swingle, M.T. Weinrich, and P. Clapham. 2002.Population identity of humpback whales in the waters of the U.S. mid-Atlantic states, *J. Cetacean Res. Manage*. 4:135-141.

Barlow, J., and P.J. Clapham. 1997. A new birth-interval approach to demographic parameters of humpback whales, *Ecology*, 78:535-546.

Baumgartner, M.F. and B.R. Mate 2005. Summer and fall habitat of North Atlantic right whales (Eubalaena glacialis) inferred from satellite telemetry. Can. J. Fish. Aq. Sci. 62: 527-543.

Best, P.B., J.L. Bannister, R.L. Brownell, Jr., and G.P. Donovan, (ed.). 2001.Report of the workshop on status and trends of western North Atlantic right whales. *J. Cetacean Res. Manage.* (Special Issue) 2:61-87.

Brown, M.W. and M.K. Marx. 2000. Surveillance, monitoring and management of North Atlantic right whales, Eubalaena glacialis, in Cape Cod Bay, Massachusetts: January to Mid-May, 2000. Division of Marine Fisheries, Commonwealth of Massachusetts. final report.

Carter, D. and C. Liese. 2012. The Economic Value of Catching and Keeping or Releasing Saltwater Sport Fish in the Southeast USA. North American Journal of Fisheries Management, 32:613-625.

Carter, D. pers. comm., 2009. Response to the 7/10/09 Data Request for Amendment 17A to the Snapper Grouper Fishery Management Plans of the South Atlantic.

Cassoff, R.M., K.M. Moore. W.A. McLellan, S.G. Barco, D.S. Rotstein, and M.J. Moore. 2011. Lethal entanglement in baleen whales. Dis Aquat Org 96: 175−185.

Caswell, H., M. Fujiwara, and S. Brault. 1999. Declining survival probability threatens the North Atlantic right whale. *Proceedings of the National Academy of Science USA* 96: 3308-3313.

CEQ (Council on Environmental Quality). 1997. Considering Cumulative Effects Under the National Environmental Policy Act. U.S. Council on Environmental Quality, Washington, DC. 64 pp.

CeTAP. 1982. A characterization of marine mammals and turtles in the mid- and north Atlantic areas of the U.S. outer continental shelf. Cetacean and Turtle Assessment Program, University of Rhode Island. Final Report #AA551-CT8-48 to the Bureau of Land Management, Washington, DC, 538 pp.

Clapham, P.J. 1992. Age at attainment of sexual maturity in humpback whales, *Megaptera novaeangliae*, *Can. J. Zool.*, 70:1470-1472.

Clapham, P.J. 2002. Humpback Whales (*Megaptera novaeangliae*). Pp 589-592. In: W.F. Perrin, B. Würsig, and J.G.M Thewissen (eds) Encyclopedia of Marine Mammals. Academic Press, San Diego, San Francisco, New York, Boston, London, Sydney, Tokyo. 1414 pp.

Clapham, P.J., L.S. Baraff, C.A. Carlson, M.A. Christian, D.K. Mattila, C.A. Mayo, M.A. Murphy, and S. Pittman. 1993. Seasonal occurrence and annual return of humpback whales in the southern Gulf of Maine, *Can. J. Zool.* 71:440-443.

Clapham, P.J., J. Barlow, T. Cole, D. Mattila, R. Pace, D. Palka, J. Robbins, and R. Seton. 2003. Stock definition, abundance, and demographic parameters of humpback whales from the Gulf of Maine, *J. Cetacean Res. Manage*., 5:13-22.

Clapham, P.J., S. Brault, H. Caswell, M. Fujiwara, S. Kraus, R. Pace, and P. Wade. 2002. Report of the working group on survival estimation for North Atlantic right whales.

Clapham, P.J., and R.L. Brownell, Jr. 1996. Potential for interspecific competition in baleen whales. Report to International Whaling Commision 46:361-367.

Clapham, P.J. and C.A. Mayo. 1987. Reproduction and recruitment of individually identified Humpback whales, *Megaptera novaeangliae,* observed in Massachusetts Bay, 1979-1985, *Can. J. Zool*. 65(12):2853-2863.

Clapham, P.J. and C.A. Mayo. 1990. Reproduction of humpback whales *(Megaptera novaeangliae)* observed in the Gulf of Maine, *Rep. Int. Whal. Commn.* Special Issue 12:171-175,

Clapham, P.J., S.B. Young, and R.L. Brownell. 1999. Baleen whales: Conservation issues and the status of the most endangered populations, *Marine Mammal Rev.* 29(1):35-60.

Colburn, L.L. and M. Jepson. 2012. Social Indicators of Gentrification Pressure in Fishing Communities: A Context for Social Impact Assessment. Coastal Management 40(3): 289-300.

Cole, T.V.N., D. Hartley and R.L. Merrick. 2005. Methodologies of the NOAA National Marine Fisheries Service aerial survey program for right whales (Eubalaena glacialis) in the Northeast U.S., 1998-2006. Northeast Fish. Sci. Cent. Ref. Doc. 05-08.

Dumas, C.F., J.C. Whitehead, C.E. Landry, and J.H. Herstine. 2009. Economic Impacts and Recreation Value of the North Carolina For-Hire Fishing Fleet. North Carolina Sea Grant FRG Grant Report 07-FEG-05.

Durbin, E., G. Teegarden, R. Campbell, A. Cembella, M.F. Baumgartner, and B.R. Mate. 2002. North Atlantic right whales, *Eubalaena glacialis,* exposed to paralytic shellfish poisoning (PSP) toxins via a zooplankton vector, *Calanus finmarchicus*. *Harmful Algae* 1:243-251.
Federal Register. 2014. List of Fisheries for 2015. Federal Register 50 CFR Part 229 (29 December 2014): 77919-77941.

Frasier, T.R., B.A. McLeod, R.M. Gillett, M.W. Brown and B.N. White. 2007. Right Whales Past and Present as Revealed by Their Genes. Pp 200-231. *In*: S.D. Kraus and R.M. Rolland (eds) *The Urban Whale*. Harvard University Press, Cambridge, Massachusetts, London, England. vii-xv + 543pp.

Fujiwara, M. and H. Caswell. 2001. Demography of the endangered North Atlantic right whale, *Nature* 414:537-541.

Garrison, L.P. 2007. The Big Picture: Modeling Right Whales in Space and Time. In: The Urban Whale, Krauss, S.K. and Rolland, R. (eds.). Harvard University Press. Pgs 460-488.

Geraci, J.R. 1989.Clinical investigation of the 1987-88 mass mortality of bottlenose dolphins along the U.S. central and south Atlantic coast, Final Report to the National Marine Fisheries Service, U.S. Navy, Office of Naval Research, and Marine Mammal Commission, Washington, D.C.

Glass A.H., T.V.N Cole, and M. Garron. 2009. Mortality and serious injury determinations for baleen whale stocks along the United States eastern seaboard and adjacent Canadian Maritimes, 2003-2007 (2nd Edition). U.S. Dep. of Commerce, Northeast Fisheries Science Center. Ref Doc. 09-04; 19 p.

Gowan, T.A. and J.G. Ortega-Ortiz. 2014. Wintering habitat model for the North Atlantic right whales (*Eubalaena glacialis)* in Southeastern United States. PLoS ONE: 9(4): e95126.

Greene, C.H., and A.J. Pershing. 2003. The flip-side of the North Atlantic Oscillation and modal shifts in slope water circulation patterns. *Limnology and Oceanography* 48: 319-322.

Good, C. 2008. Spatial ecology of the North Atlantic right whale (*Eubalaena glacialis*). Ph.D. Dissertation, Duke University.

Haab, T.C., R. Hicks, K. Schnier, and J.C. Whitehead. 2009. Angler Heterogeneity and the Species-Specific Demand for Recreational Fishing in the Southeastern United States. Draft Final Report Submitted for MARFIN Grant #NA06NMF4330055.

Hain, J.H.W., G.R. Carter, S.D. Kraus, C.A. Mayo, and H.E. Winn. 1982.Feeding behavior of the humpback whale, *Megaptera novaeangliae,* in the western North Atlantic, Fish Bull., U.S. Fish. Wildl. Serv., 80:259-268.

Hamilton, P.K., M.K. Marx, and S.D. Kraus. 1998. Scarification analysis of North Atlantic right whales *(Eubalaena glacialis)* as a method of assessing human impacts. Final report to the Northeast Fisheries Science Center, NMFS, Contract No. 4EANF-6-0004.

Henry, A.G., T.V.N. Cole, M. Garron, L. Hall, W. Ledwell and A. Reid. 2012. Mortality and serious injury determinations for baleen whale stocks along the Gulf of Mexico, United States East Coast and Atlantic Canadian Provinces, 2006-2010, NEFSC Reference Document 12-11.

Holland, S., A. Fedler and J.W. Milon. 1999. The operations and economics of the charter and head boat fleets of the eastern Gulf of Mexico and South Atlantic coasts. Technical Report for U.S. Department of Commerce: National Marine Fisheries Service. St. Petersburg, Florida.

Holland, S., C. Oh, S.L. Larkin, and A.W. Hodges. 2012. The Operations and Economics of the For-Hire Fishing Fleets of the South Atlantic States and the Atlantic Coast of Florida. Final report prepared for the National Marine Fisheries Service, Marine Fisheries Initiative (MARFIN) Program Grant Number NA09NMF4330151.

IBM SPSS. 2011. IBM SPSS Statistics version 20, Release 20.0.0.

International Whaling Commission. 2001. Report of the Workshop on the Comprehensive Assessment of Right Whales: A worldwide comparison. J. Cetacean Res. Manage. (special issue) 2:1-60.

IPCC. 2007. Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

Jackson A., R. Inger, A.C. Parnell, S. Bearhop. 2011. Comparing isotopic niche widths among and within communities: SIBER – Stable Isotope Bayesian Ellipses in R. *J Anim Ecol* 80: 595–602.

Jackson, K. A., J. L. Jakush, T. D. Pitchford, and J. G. Ortega-Ortiz. 2012a. Aerial Surveys for Ship Strike Mitigation and Other Field Observations of North Atlantic Right Whales (*Eubalaena glacialis*) off the East Coast of Florida December 2011-March 2012 Southern Early Warning System. Final Report to NOAA Fisheries Service.

Jackson, K. A., J. L. Jakush, and J. G. Ortega-Ortiz. 2012b. Aerial Surveys for Ship Strike Mitigation and Other Field Observations of North Atlantic Right Whales (*Eubalaena glacialis*) off the East Coast of Florida and Georgia December 2011-March 2012 Central Early Warning System. Final Report to NOAA Fisheries Service.

Jacob, S., P. Weeks, B. Blount, and M. Jepson. 2012. Development and Evaluation of Social Indicators of Vulnerability and Resiliency for Fishing Communities in the Gulf of Mexico. Marine Policy 26(10): 16-22.

Johnson, A.J., G.S. Salvador, J.F. Kenney, J. Robbins, S.D. Kraus, S.C. Landry, and P.J. Clapham. (2005). Fishing gear involved in entanglements of right and humpback whales, *Marine Mammal Science* 21(4):635-645.

Katona, S.K., J.A. 1990. Beard, Population Size, Migrations, and Feeding Aggregations of the Humpback Whale *(Megaptera novaeangliae)* in the Western North Atlantic Ocean, *Reports of the International Whaling Commission,* Special Issue 12:295-306.

Keller, C.A., L.I. Ward-Geiger, W.B. Brooks, C.K. Slay, C.R. Taylor, and B.J. Zoodsma. 2006. North Atlantic right whale distribution in relation to sea-surface temperature in the southeastern United States calving grounds. *Marine Mammal Science* 22 (2): 426-445.

Keller, C.A., L. Garrison, R. Baumstark, L.I. Ward-Geiger, E. Hines. 2012. Application of a habitat model to define calving habitat of the North Atlantic right whale in the southeastern United States. Endangered Species Research 18: 73–87.

Kenney, R.D. 2002.North Atlantic, North Pacific, and Southern hemisphere right whales, pp. 806-813 in: W.F. Perrin, B. Wursig, and J.G.M. Thewissen (eds.), *Encyclopedia of Marine Mammals*. Academic Press, CA.

Knowlton, A.R., L. A. Cooper, P. K. Hamilton, M. K. Marx, H. M. Pettis, and S. D. Kraus. 2008. Analysis of scarring on North Atlantic right whales (*Eubalaena glacialis*): Monitoring rate of entanglement interaction 1980 – 2004. Final report to the Northeast Fisheries Science Center, NMFS, Contract No. EA133F-03-SE-0323. New England Aquarium: 25pp.

Knowlton, A.R, PK Hamilton, MK Marx, HM Pettis, and SD Kraus. 2011. Final report on 2007/2008 right whale entanglement scar coding efforts. Final Report to National Marine Fisheries Service. New England Aquarium, Boston, MA.

Knowlton, A.R., P.K. Hamilton, M.K. Marx, H.M. Pettis, and S.D. Kraus. 2012. Monitoring North Atlantic right whale *Eubalaena glacialis* entanglement rates: a 30 year retrospective. *Marine Ecology Progress Series* 466: 293-302. 2012.

Knowlton, A.R. and S.D. Kraus. 2001. Mortality and serious injury of northern right whales *(Eubalaena glacialis)* in the western North Atlantic Ocean. *J. Cetacean Res. Manage.*

Knowlton, A.R., M.K. Marx, H.M. Pettis, P.K. Hamilton and S.D. Kraus. (2005). Analysis of scarring on North Atlantic right whales (*Eubalaena glacialis*): monitoring rates of entanglement interaction 1980-2002. National Marine Fisheries Service. Contract#43EANF030107. Final Report.

Knowlton, A., Ring, J., and Russell, B. 2002. Right whale sightings and survey effort in the mid-atlantic region: migratory corridor, time frame, and proximity to port entrances. A report submitted to the NMFS Ship Strike Working Group. Available from www. nero.noaa.gov/shipstrike/ssr/midatanticreportrFINAL.pdf

Kraus, S.D., M.J. Crone, and A.R. Knowlton. (1988). The North Atlantic right whale, in: W.E. Chandler (ed.), *The Audubon Wildlife Report 1988/1989*. Academic Press, N.Y.

Kraus, S.D., P.K. Hamilton, R.D. Kenney, A.R. Knowlton, and C.K. Slay. (2001). Reproductive parameters of the North Atlantic right whale. *J. Cetacean Res. Manage*. (Special Issue) 2:231-236.

Kraus, S.D., R.M. Pace III, and T.R. Frasier. 2007. High investment, low return: the strange case of reproduction in *Eubalaena glacialis*. *in* Kraus, S.D. and R. M. Rolland, Eds. The Urban Whale: North Atlantic Right Whales at the Crossroads. Harvard University Press. Cambridge, Massachusetts p172-199.

Learmonth J.A., C.D. MacLeod, M.B. Santos, G.J. Pierce, H.Q.P. Crick and R.A. Robinson. 2006. Potential effects of climate change on marine mammals. *Oceanography and Marine Biology: an Annual Review* 44, 431–464.

Lewis, C.N., K.A. Brown, L.A. Edwards, G. Cooper, and H.S. Findlay. 2013. Sensitivity to ocean acidification parallels natural pCO2 gradients experienced by Arctic copepods under winter sea ice. PNAS, 110.

Liese, C., D.W. Carter, and R. Curtis. 2009. Surveying the For-hire Sector: Economic Heterogeneity in the Southeast U.S. Charter Boat Industry. Submitted to the Proceedings of the 5th World Recreational Fishing Conference.

MacIntyre, I. G. and J. D. Milliman. 1970. Physiographic features on the outer shelf and upper slope, Atlantic Continental Margin, southeastern United States. Geological Society of America Bulletin 81:2577-2598.

MacLeod, C.D. 2009. Global climate change, range changes and potential implications for the conservation of marine cetaceans: a review and synthesis. *End. Spec. Res*. 7: 125–136.

Malik, S., M.W. Brown, S.D. Kraus, and B.N. White. 1997. Analysis of DNA diversity within and between North and South Atlantic right whales, *Mar. Mammal Sci.* 16:545-558, 2000.
Mate, B.M., S.L. Nieukirk, and S.D. Kraus, Satellite-monitored movements of the North Atlantic right whale, *J. Wildl. Manage.*, 61:1393-1405.

McGovern, J.C., M. R. Collins, O. Pashuk, and H.S. Meister. 2002. Changes in the life history of black sea bass, *Centropristis striata*, from the southeastern United States during 1978-1998. North American Journal of Fisheries Management Vol. 22, No. 4, pp. 1151–1163.

McLellan, W.A., E. Meagher, L. Torres, G. Lovewell, C. Harper, K. Irish, B. Pike and A.D. Pabst. 2004. Winter right whale sightings from aerial surveys of the coastal waters of the US mid-Atlantic. 15th Biennial Conference on the Biology of Marine Mammals.

Miller, C.A., D. Reeb, P.B. Best, A.R. Knowlton, M.W. Brown and M.J. Moore. 2011. Blubber thickness in right whales *Eubalaena glacialis* and *Eubalaena australis* related with reproduction, life history status and prey abundance. *Marine Ecology Progress Series* 438: 267-283.

Miller, G. C. and W. J. Richards. 1979. Reef fish habitat, faunal assemblages and factors determining distributions in the South Atlantic Bight. Proceedings of the Gulf and Caribbean Fisheries Institute 32:114-130.

Mitchell, E. 1975. Preliminary report on Nova Scotia fishery for sei whales (*Balaenoptera borealis*). Report to International Whaling Commission 25:218-225.

Moore, M.J, A.R. Knowlton, S.D. Kraus, W.A. McLellan, R.K. Bonde. 2004. Morphomentry, gross morphology and available histopathology in North Atlantic right whale (*Eubalaena glacialis*) mortalities (1970-2002). *J. Cetacean Res. Manage.* 6(3):199-214.

Newton J.G., O.H. Pilkey, and J.O. Blanton. 1971. An Oceanographic Atlas of the Carolina and continental margin. North Carolina Dept. of Conservation and Development. 57 p.

NMFS (National Marine Fisheries Service). 1991. Final recovery plan for the humpback whale (*Megaptera novaeangliae)*, Office of Protected Resources.

NMFS (National Marine Fisheries Service). 2005. A Message from the NOAA Assistant Administrator for Fisheries, NMFS's Report on the Status of the U.S. Fisheries for 2004, Available at: http://www.mafmc.org/midatlantic/
StatusReport2004.pdf.

NMFS (National Marine Fisheries Service). 2006. Review of the Status of the Right Whales in the North Atlantic and North Pacific Oceans. National Marine Fisheries Service, Silver Spring, Md.

NMFS (National Marine Fisheries Service). 2015. Evaluation of black sea bass trap gear closure alternatives in South Atlantic Snapper-Grouper Regulatory Amendment 16.

NMFS (National Marine Fisheries Service) SERO PRD. 2015. Unpublished data.

NOAA SEFSC SSRG. 2009. Economic Value of Catch and Keep in the Southeastern U.S.: Evidence from a Choice Experiment.

NOAA. 2014a. Atlantic Large Whale Take Reduction Plan. Southeast Trap/Pot Fisheries Requirements and Management Areas.

NOAA. 2014b. Atlantic Large Whale Take Reduction Plan. Mid-Atlantic Trap/Pot Fisheries Requirements and Management Areas.

Pabst, D., C. Taylor, M. Zani, A. Glass, A. Knowlton, C. Khan, R. McAlarney, and W. McLellan. 2009. North Atlantic right whale (*Eubalaena glacialis*) sightings in the US mid-Atlantic and southeast Atlantic Bight (Virginia through South Carolina) from 2001-2008. 18th Biennial Conference on the Biology of Marine Mammals, Quebec City, Canada.

P J Palsboll, J Allen, M Berube, P J Clapham*, T P Feddersen, P S Hammond, R R Hudson, H Jorgensen, S Katona, A Larsen-Holm, F Larsen, J Lien, D K Mattila*, N Oien, J Sigurjonsson, R Sears, T Smith, R Sponer, P Stevick. 1997. Genetic tagging of humpback whales Nature 388: 767-769.

Parker, R.O., D.R. Colby, and T.D. Willis. 1 1983. Estimated amount of reef habitat on a portion of the U.S. South Atlantic and Gulf of Mexico Continental Shelf. Bulletin of Marine Science 33: 935-940.

Payne, P.M., J.R. Nicholas, L. O'Brien, and K.D. Powers. 1986., The Distribution of the Humpback Whale, *Megaptera novaeangliae*, on Georges Bank and in the Gulf of Maine in Relation to Densities of the Sand Eel, *Ammodytes americanus*, *Fish. Bull., U.S.* 84:271-277.

Payne, P.M., D.N. Wiley, S.B. Young, S. Pittman, P.J. Clapham, and J.W. Jossi. 1990. Recent fluctuations in the abundance of baleen whales in the southern Gulf of Maine, *Fish. Bull*. 88 (4):687-696.

Perruso, L. and Waters, J. 2005. Trip-level cost function estimation for the South Atlantic snapper-grouper commercial fishery. Working Paper Series SEFSC-SSRG-09. Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33133.

Perry, S.L., D.P. DeMaster, and G.K. Silber. 1999. The great whales: and status of six species listed as endangered under the U.S. Endangered Species Act of 1973, *Mar. Fish. Rev.* Special Edition. 61(1):59-74.

Reeves, R.R., A.J. Read, L. Lowry, S. Katona, and D.J. Boness. 2007. Report of the North Atlantic Right Whale Program Review, 13–17 March 2006, Woods Hole, MA. Marine Mammal Commission, Bethesda, MD

Robbins, J. 2009. Scar-based inference into the Gulf of Maine humpback whale entanglement: 2003-2006. Report to National Marine Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA. NOAA Contract #EA133F04SE0998.

Robbins, J. and D. Mattila. 1999. Monitoring entanglement scars on the caudal peduncle of Gulf of Maine humpback whales. Report to the National Marine Fisheries Service. Order No. 40EANF80028.

Rolland, R.M., P.K. Hamilton, M.K Marx, H.M. Pettis, C.M. Angell, and M.J. Moore. 2007. External perspectives on right whale health. *in* Kraus, S.D. and R. M. Rolland, Eds. The Urban Whale: North Atlantic Right Whales at the Crossroads. Harvard University Press. Cambridge, Massachusetts p. 273-309.

Rothschild, B.J. 1986. Dynamics of Marine Fish Populations. Harvard University Press. Cambridge, Massachusetts. 277pp.

SAFMC (South Atlantic Fishery Management Council). 1983. Fishery Management Plan, Regulatory Impact Review and Final Environmental Impact Statement for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Circle, Suite 306, Charleston, South Carolina, 29407-4699.

SAFMC (South Atlantic Fishery Management Council). 1988. Regulatory Amendment 2 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699.
SAFMC (South Atlantic Fishery Management Council). 1991. Amendment Number 4, Regulatory Impact Review, Initial Regulatory Flexibility Analysis and Environmental Assessment for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 200 pp.

SAFMC (South Atlantic Fishery Management Council). 1993. Amendment Number 6, Regulatory Impact Review, Initial Regulatory Flexibility Analysis and Environmental Assessment for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 155 pp.

SAFMC (South Atlantic Fishery Management Council). 1998. Amendment 9, Final Supplemental Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 246 pp.

SAFMC (South Atlantic Fishery Management Council). 2006. Amendment 13C to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, Regulatory Flexibility Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2007. Final Amendment 14, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2008a. Amendment 15A, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405. 325 pp.

SAFMC (South Atlantic Fishery Management Council). 2008b. Amendment 15B, Final

Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405. 325 pp.

SAFMC (South Atlantic Fishery Management Council). 2009a. Amendment Number 16, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2009b. Fishery Ecosystem Plan for the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2010a. Amendment 17A, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2010b. Amendment 17B, Final Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011a. Regulatory Amendment 9 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011b. Regulatory Amendment 11 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011c. Comprehensive Annual Catch Limit (ACL) Amendment. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2011d. Amendment 24 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2012a. Amendment 18A to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic

Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2012b. Amendment 18B to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013a. Regulatory Amendment 13 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013b. Regulatory Amendment 18 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013c. Regulatory Amendment 19 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, Regulatory Flexibility Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2014. Regulatory Amendment 14 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, Regulatory Flexibility Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

Schaeff, C.M., S.D. Kraus, M.W. Brown, J.S. Perkins, R. Payne, and B.N. White. 1997. Comparison of genetic variability of North and South Atlantic right whales *(Eubalaena)* using DNA fingerprinting, *Can. J. Zool.* 75:1073-1080.

SEDAR 25. 2011. Stock Assessment Report. South Atlantic Black Sea Bass. Available from the SEDAR website: www.sefsc.noaa.gov/sedar/.

SEDAR 25 Update. 2013. Stock Assessment Report. South Atlantic Black Sea Bass. Available from the SEDAR website: www.sefsc.noaa.gov/sedar/.

Sedberry, G.R. 1988. Food and feeding of black sea bass, *Centropristis striata*, in live bottom habitats in the South Atlantic Bight. J. Elisha Mitchell Sci. Soc. 104(2):35-50.

SERO-LAPP-2014-09. Evaluation of black sea bass trap gear closure alternatives in South Atlantic Snapper-Grouper Regulatory Amendment 16.

SERO-LAPP-2012-04. South Atlantic Black Sea Bass Annual Catch Limit Closure Projection – 2012/13 Fishing Year Southeast Regional Office. NOAA Fisheries Service. Southeast Regional Office. St. Petersburg, Florida. May 14, 2012.

Stevick, P., N. Oien and D.K. Mattila. 1998. Migration of a humpback whale between Norway and the West Indies. *Mar. Mammal Sci.* 14:162-166.

Stevick, P.T., J. Allen, P.J. Clapham, N. Friday, S.K. Katona, F. Larsen, J. Lien, D.K. Mattila, P.J. Palsbøll, R. Sears, J. Sigurjónsson, T.D. Smith, G. Vikingsson, J. Øien, and P.S. Hammond. 2001.Trends in abundance of North Atlantic humpback whales, 1979-1993, Paper SC/53/NAH2 presented to the International Whaling Commission Scientific Committee.

Stevick, P.T., J. Allen, P.J. Clapham, S.K. Katona, F. Larsen, J. Lien, D.K. Mattila, P.J. Palsboll, R. Sears, J. Sigurjonsson, T.D. Smith, G. Vikingsson, N. Oien, P.S. Hammond. 2006. Population spatial structuring on the feeding grounds in North Atlantic humpback whales (*Megaptera novaeangliae*). Journal of Zoology. 270(2006) 244-255.

Sutton, S.G., R.B. Ditton, J.R. Stoll, and J.W. Milon. 1999. A cross-sectional study and longitudinal perspective on the social and economic characteristics of the charter and party boat fishing industry of Alabama, Mississippi, Louisiana, and Texas. Report prepared for the National Marine Fisheries Service.

Swingle, W.M., S.G. Barco, T.D. Pitchford, W.A. McLellan, and D.A. Pabst. 1993. Appearance of juvenile humpback whales feeding in the nearshore waters of Virginia, *Mar. Mamm. Sci.* 9:309-315.

Taylor, J., M. Zani, A. Knowlton, B Wikgren, P. Hamilton, S. Kraus. 2010. Aerial surveys to reduce ship/whale collisions in the calving ground of the North Atlantic right whale (*Eubalaena glacialis*). NMFS, Fernandina Beach, Florida.

van der Hoop, J. M., A. S. M. Vanderlaan, and C. T. Taggart. 2012. Absolute probability of lethal vessel strikes to North Atlantic right whales in Roseway Basin, Scotian Shelf. Ecological Applications 22:2021–2033.

van der Hoop, J. M., M. J. Moore, S. G. Barco, T. V. Cole, P. Y. Daoust, A. G. Henry, D. F. McAlpine, W. A. McLellan, T. Wimmer and A. R. Solow. 2013. Assessment of management to mitigate anthropogenic effects on large whales. Conservation Biology 27:121-133.

Vaughan, D.S., M.R. Collins, and D.J. Schmidt. 1995. Population characteristics of the U.S. South Atlantic black sea bass *Centropristis striata*. Bulletin of Marine Science 56:250-267.

Wade, P.R., and R.P. Angliss. 1997. Guidelines for assessing marine mammal stocks: Report of the GAMMS Workshop, April 3-5, 1996, Seattle, Washington. NOAA Technical Memorandum NMFS-OPR-12. U.S. Dept. of Commerce, Washington, DC.

Waring, G.T., E. Josephson, C.P. Fairfield, and K. Maze-Foley (eds.). 2006. U.S. Atlantic and Gulf of Mexico marine mammal stock assessments – 2005, NOAA Technical Memorandum

NOAA-NE-194, 2006.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel (eds). 2009. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments-2009. NOAA Tech Memo NMFS NE 213; 528p.

Waring GT, Josephson E, Maze-Foley K, Rosel, PE, editors. 2012. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments -- 2011. NOAA Tech Memo NMFS NE 221.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, (eds). 2013. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments, Volume 1 – 2012. U.S. Department of Commerce, Woods Hole, MA. NOAA Technical Memorandum, 419 pp. http://www.nmfs.noaa.gov/pr/sars/pdf/ao2012.pdf

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, (eds). 2014. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2013. U.S. Department of Commerce, Woods Hole, MA. NOAA Technical Memorandum, 475p.

Weinrich, M.T., M.R. Schilling, and C.R. Belt. 1992. Evidence of acquisition of a novel feeding behaviour: lobtail feeding in humpback whales, *Megaptera novaeangliae, Anim. Behav.*, 44:1059-1072.

Weisbrod, A.V., D. Shea, M.J. Moore, and J.J. Stegeman. 2000.Organochlorine exposure and bioaccumulation in the endangered Northwest Atlantic right whale *(Eubalaena glacialis)* population, *Environmental Toxicology and Chemistry,* 19(3):654-666.

Wenner, C.A., W.A. Roumillat, and C.W. Waltz. 1986. Contributions to the life history of black sea bass, *Centropristis striata*, off the Southeastern United States. Fishery Bulletin 84: 723-741.

Wiley, D.N., R.A. Asmutis, T.D. Pitchford, and D.P. Gannon. 1995. Stranding and mortality of humpback whales, *Megaptera novaeangliae*, in the Mid-Atlantic and southeast United States, 1985-1992, *Fish. Bull.,* U.S. 93:196-205.

Wynne, K. and M. Schwartz. 1999.Guide to marine mammals and turtles of the U.S. Atlantic and Gulf of Mexico, Rhode Island Sea Grant, Narragansett.

Zheng, Y. Zhang, T. Romano, and T. O'Hara. 2008. Hexavalent chromium is cytotoxic and genotoxic to the North Atlantic right whale (Eubalaena glacialis) lung and testes fibroblasts. *Mutat Res* 650: 30-38.

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APPENDIX N: EVALUATION OF BLACK SEA BASS POT GEAR CLOSURE ALTERNATIVES IN SOUTH ATLANTIC SNAPPER-GROUPER REGULATORY AMENDMENT 16

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SUMMARY

Since 2012, the South Atlantic Fishery Management Council (SAFMC) has made several changes to the management of black sea bass (*Centropristis striata*) in federal waters, including a pot gear endorsement program, pot gear limits, over a twofold increase to the annual catch limit (ACL), trip limits, and a change in the fishing season from June-May to Jan-Dec. Through Regulatory Amendment 16 to the Snapper-Grouper Fishery Management Plan (Reg-16), the SAFMC is considering opening the commercial black sea bass pot season when federally-protected whales occur in the mid-Atlantic and Southeast regions (i.e., Nov 1-Apr 30). The western North Atlantic right whale (*Eubalaena glacialis*) is one of the most endangered large whales in the world, with as few as 455 individuals remaining. As entanglement in fixed fishing gear, such as pot gear, is a leading cause of human-induced right whale mortality, the SAFMC has proposed a variety of spatiotemporal closure alternatives that may potentially mitigate this risk. This analysis simulated the potential landings of black sea bass pot endorsement holders during a winter season under each of the proposed alternatives. Factoring in landings by other gears, the date the ACL would be met under each scenario was predicted. The analysis also considered the seasonal distribution of black sea bass pot gear and North Atlantic right whales to compare the relative risk of right whale entanglements under each of the proposed spatial closure alternatives. Because pot gear hasn't been fished during the Nov-Apr time period since a two-week opening in Dec 2010, uncertainty in possible pot gear winter catch rates under current regulations was addressed using four proxies for winter catch rates. Similarly, uncertainty in the location of winter fishing effort under current regulations was addressed using three different proxies for winter fishing effort. Monthly whale distributions off FL-SC were modeled following Gowan and Ortega-Ortiz (2014) under mean, warmer-than-average, and colder-than-average conditions. Due to limited sightings effort off NC, whale distributions off NC were modeled using all months combined following a similar regression approach as Gowan and Ortega-Ortiz (2014); annual and monthly NC models were developed by fitting the final model to mean Nov-Apr environmental conditions and mean monthly conditions, respectively. Within model uncertainty was addressed using the upper and lower confidence bounds of the model predicted fits. The entanglement risk to right whales from pot gear was modeled as the co-occurrence of black sea bass effort and right whale relative abundance on a relative scale from 0 (no pot gear opening) to 100 (complete opening to pot gear). Although a broad range of sensitivity runs were considered, the relative differences between alternatives were consistent. Most Reg-16 proposed alternatives are anticipated to result in-season quota closures to prevent the ACL from being exceeded. Of the proposed alternatives, Alternatives 1, 7b, 8b, 9b, 6, 4, 5, and 7c would result in the longest fishing seasons (listed in order). Alternatives 1, 6, and 4 would result in the lowest relative entanglement risk for right whales. Alternatives 7c, 7b, 2, 9b, and 7a would result in the highest relative entanglement risk.

INTRODUCTION

The South Atlantic Fishery Management Council (SAFMC) manages black sea bass (*Centropristis striata*) in federal waters from the Florida Keys to Cape Hatteras, North Carolina. The current allocation is 57% recreational and 43% commercial. For the past several years, the fishing year for black sea bass ran from June 1-May 31. In the past several years, recreational and commercial black sea bass fishing has been subject to quota closures shortening the fishing year (e.g., recreational: 12 Feb 2011, 17 Oct 2011; commercial: 15 May 2009, 20 Dec 2009, 7 Oct 2010, 15 July 2011, and 8 Oct 2012). In 2012, the SAFMC implemented Snapper-Grouper Amendment 18A, which established a black sea bass pot endorsement program where a commercial vessel with an Unlimited Snapper-Grouper Permit may harvest black sea bass using pot gear only if the vessel also has a black sea bass pot endorsement (SAFMC 2012). Amendment 18A also implemented a limit of 35 black sea bass pot tags issued to each of the 32 black sea bass pot gear endorsement holders each permit year, a 1,000 pound (lb) gutted weight (gw) trip limit, an increase in the commercial minimum size limit from 10 inches to 11 inches total length, and a requirement that pots be returned to shore at the end of each trip. In 2013, the SAFMC implemented Regulatory Amendment 19 (Reg-19), which increased the black sea bass commercial annual catch limit (ACL) from 309,000 lb gw to 661,034 lb gw (in 2015) based on the results of the latest stock assessment (SAFMC 2013). In 2014, the SAFMC implemented Regulatory Amendment 14 (Reg-14), which changed the commercial fishing season for black sea bass to Jan 1-Dec 31 (starting in 2015), implemented a 300-lb gw hook-and-line trip limit for Jan-Apr, and a 1,000-lb gw hook-and-line trip limit for May 1-Dec 31. See Appendix A for a visual on management history.

Due to the substantial increase in the ACL via Reg-19, there was potential that the commercial black sea bass pot season would remain open when federally-protected whales occur in the mid-Atlantic and Southeast regions (i.e., Nov 1-Apr 30) for the first time since Dec 2010 (Figure A2). Entanglement in fixed fishing gear, such as pot gear, is a leading cause of human-induced western North Atlantic right whale (*Eubalaena glacialis*) mortality (Knowlton *et al.* 2012, Waring *et al.* 2014). To minimize the probability of entanglement of ESA-listed whales in black sea bass pot gear, Reg-19 implemented an annual prohibition on the use of black sea bass pots from Nov 1-Apr 30 in conjunction with the ACL increase.

The SAFMC, through Regulatory Amendment 16 (Reg-16), is currently considering shortening the black sea bass pot closure season and/or spatially designating the closure boundaries (SAFMC 2014). The purpose of Reg-16 is to reconsider the annual November 1 through April 30 prohibition on the use of black sea bass pot gear. The need for the amendment is to minimize socioeconomic impacts to black sea bass pot endorsement holders while considering the need to protect ESA-listed whales in the South Atlantic region. This analysis considers the potential landings of black sea bass as well as the risk to right whales that might occur under the alternatives of Reg-16 (Appendix B). This analysis does not address any reductions in entanglement risk that might result from Reg-16 Action 2, which proposes to modify buoy line/weak link gear requirements and buoy line rope marking for black sea bass pots required by the Atlantic Large Whale Take Reduction Plan (ALWTRP).

Black Sea Bass

Prior to the inception of the Southeast Data Assessment and Review (SEDAR) process, the SAFMC-managed stock of black sea bass was assessed using tuned virtual population analysis models. Using data through 1990, Vaughan et al. (1995) concluded that overfishing was occurring during the 1980s. Subsequently, with data through 1995, Vaughan et al. (1996) estimated that the rate of overfishing had increased during the 1990s. South Atlantic black sea bass was first assessed through the SEDAR process in 2002 (SEDAR-02). SEDAR (2002) applied a statistical catch-age formulation as the primary model. It estimated that the rate of overfishing had increased through the 1990s and that the stock was overfished. The SEDAR-02 assessment was updated in 2005 with data through 2003 (SEDAR Update Process #1). The update assessment estimated that the rate of overfishing continued to increase into the 2000s and that the stock remained overfished. The SEDAR 25 Update (2013) concluded that black sea bass were no longer overfished and that overfishing was not occurring. The stock was very close to B_{MSY} (B_{2012}/B_{MSY}=0.96) and the SSB in 2012 was just above SSB_{MSY} (SSB_{2012}/SSB_{MSY}=1.032). SSB in 2012 was estimated to be above SSB_{MSY}, indicating that the stock was rebuilt. Spawning stock biomass decreased significantly from the beginning of the assessment period, dropping below SSB_{MSY} in 1989, until finally stabilizing and remaining at a low level from 1994-2007. The SSB increased consistently since 2008, crossing SSB_{MSY} in the terminal year of the assessment. SEDAR-25 Update (2013) estimated current fishing mortality (F) was well below F_{MSY} ($F_{Current}/F_{MSY}$=0.659). The trend in F showed a rapid increase from the late-1970s until 1988, when it surpassed F_{MSY} by a significant amount. F remained above F_{MSY}, with large inter-annual variability, until it dropped below F_{MSY} in 2011. The rebuilding of the black sea bass stock allowed the SAFMC to increase the ACL over twofold via Reg-19.

North Atlantic Right Whale

The western North Atlantic right whale is one of the most endangered large whales in the world (Clapham et. al. 1999). The species' known range extends from calving grounds in coastal waters of the southeastern United States to feeding grounds in New England waters and the Canadian Bay of Fundy, Scotian Shelf, and Gulf of St. Lawrence (Waring *et al.* 2014). The western North Atlantic right whale population size was estimated to be at least 455 individuals in 2010 (447 cataloged whales plus 8 not cataloged calves at the time the data were received) based on a census of individual whales identified using photo-identification techniques (Waring *et al.* 2014). The species is listed as "Endangered" under the Endangered Species Act, "Depleted" under the Marine Mammal Protection Act, and under CITES Appendix I throughout its range. As such, North Atlantic right whales are afforded many legal protections.

Right whales may be found from Florida to North Carolina from November 1 through April 30 (NMFS 2008). The coastal waters of the southeastern United States are a wintering ground and the sole known calving area for the North Atlantic right whale. Sighting records of right whales spotted in the core calving area off Georgia and Florida consist of mostly mother-calf pairs and juveniles but also some adult males and females without calves (Jackson *et al.* 2012a). Most calves are likely born early in the calving season. As many as 243 right whales have been documented in the southeastern U.S. during one calving season (P. Hamilton, personal communication, April 11, 2014). Studies indicate that right whale concentrations are highest in the core calving area from November 15 through April 15 (NMFS 2008). Residency patterns for non-calving right whales are typically less than one month (A. Krzystan, June 2014 SEIT meeting) indicating a steady stream of right whales travel between habitats in the northeastern and southeastern U.S. during fall, winter, and spring. Thus, movements within and between habitats are extensive, with telemetry data and aerial observations suggesting the area off the mid-Atlantic states is an important migratory corridor (Brown and Marx 2000, Mate *et al.* 1997, Baumgartner and Mate 2005). Furthermore, systematic surveys conducted off the coast of North Carolina during the winters of 2001 and 2002 sighted eight calves, suggesting the calving grounds may extend as far north as Cape Fear (McLellan *et al.* 2004). Four of the calves were not sighted by surveys conducted farther south. One of the cows photographed was new to researchers, having effectively eluded identification over the period of its maturation (McLellan *et al.* 2004).

The small population size and low annual reproductive rate of North Atlantic right whales suggest that human sources of mortality may have a greater effect relative to population growth rates than for other whales (Waring *et al.* 2014). The principal factors believed to be retarding growth and recovery of the population are ship strikes and entanglement with fishing gear (Waring *et al.* 2014). Young whales, ages 0-4 years, are especially vulnerable (Kraus 1990), and an analysis of the population age structure suggests that it contains a smaller proportion of juvenile whales than expected (Hamilton et al. 1998; Best et al. 2001), which may reflect lowered recruitment and/or high juvenile mortality. Fishery entanglement is the largest known source of human-caused mortality and serious injury to right whales (Waring *et al.* 2014), and juveniles and calves entangle at a higher rate than adults (Knowlton *et al.* 2012). A recent study found that approximately 83% of all right whales have been entangled at least once, and 60% of those animals had been entangled multiple times (Knowlton *et al.* 2012). The authors further clarify that this is a minimum estimate (Knowlton *et al.* 2012).

The number of human caused serious injury and deaths caused by fishery entanglements alone far exceed the MMPA potential biological removal (PBR). The MMPA defines PBR as the maximum number of animals, not including natural mortalities, which may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (16 U.S.C. 1362). For the Western Atlantic stock of the North Atlantic right whale, PBR is 0.9 (Waring *et al.* 2014). Based on data from 2007-2011, the minimum rate of annual human-caused mortality and serious injury to right whales averaged 4.05 per year; 3.25 per year were attributed to incidental fishery entanglement and 0.8 per year were attributed to vessel strike. These numbers represent the lower bound of estimated human caused mortality (Waring *et al.* 2014). Thus, the current rate of fishery entanglements averages 3.25 animals per year and is 3.6 times over PBR. Therefore, any serious injury or mortality for this stock is significant (Waring *et al.* 2014). NMFS is working to reduce serious injury and mortality through the ship speed limit rule and through the ALWTRP. Section 118 of the MMPA mandates that the ALWTRP reduce mortality and serious injury of right whales to below PBR.

Entanglements incidental to commercial fishing are the primary threat to right whales, however less is known about the source of entanglement. In a study of 31 right whale entanglements, Johnson et al. (2005) found 14 cases where gear type could be identified; pot gear represented 71% of these cases (8 lobster pots, 1 crab pot, 1 unknown pot). In a recent compilation of data from 2007-2014, there were 17 entangled whales and none of these were attributed to a specific fishery (Waring *et al.* 2014). As evidenced by these compilations, information from an entanglement event often does not include the detail necessary to assign the entanglements to a particular fishery or location, and scarring studies suggest the vast majority of entanglements are not observed (Waring *et al.* 2014). Consequently, while black sea bass gear has not been definitively identified in the few cases when gear was identified to fishery, it also cannot be ruled out as gear that has resulted in serious injuries or deaths to right whales.

Evaluation of Reg-16 Alternatives

The analysis simulates the potential landings of black sea bass pot endorsement holders during a winter season under each of the proposed alternatives. Factoring in landings by other gears, the date the ACL would be met under each scenario is predicted. The analysis also considers the seasonal distribution of black sea bass pot gear and North Atlantic right whales to compare the relative risk of right whale entanglements under each of the proposed spatial closure alternatives.

METHODS

Data Sources

Through the Southeast Fisheries Science Center (SEFSC) Logbook program (SEFSC Logbook, accessed 22 July 2014), federally-permitted commercial fishermen self-report landings on a trip level, providing species-specific landings (lb), primary gear used, and primary area fished. Primary depth of capture has also been reported from 2004 onward. A single area and depth of fishing is reported in the commercial logbooks for each species per trip, although fish may be encountered in many areas and depths during multiple sets. The SEFSC Commercial ACL dataset contains aggregated dealer records of monthly catch by gear and species, and includes landings from vessels with and without federal permits through 2013. The Atlantic Coastal Cooperative Statistics Program (ACCSP) assimilates dealer trip tickets into a database of monthly catch by gear and by species, including landings from vessels with and without federal permits (ACCSP Trip Ticket data, accessed by SEFSC 12 Sept 2014).

Landings using gear other than pot gear were summarized by fishing year and fishing month from 2002-2013 using the SEFSC ACL dataset and 2013-2014 from the ACCSP Trip Ticket data. Landings using pot gear were summarized by fishing year and fishing month from 1998-2014 for federally-permitted pot gear endorsement holders using SEFSC Logbook data. The 1,000 lb gw trip limit and 35-pot limit implemented by Amendment 18A were simulated in the time series. Any trip catching more than 1,000 lb gw was scaled down to 1,000 lb gw. Landings for trips using greater than 35 pots were scaled down based on the average catch-per-pot multiplied by 35 pots. Trip and pot limits were not simulated for the 2012/13 or 2013/14 fishing years, as these regulations were already in place for that period. No additional simulations were performed to estimate additional trips that may have occurred in the past if pot and trip limit restrictions had been in place.

Spatial Distribution of Landings and Effort

Season and water depth are important drivers of the spatial distribution of landings and effort and are therefore important to consider when comparing the alternatives in Reg-16. Seasonal trends in catch rates per pot haul and depth of fishing were compared across fishing seasons. Using a Geographic Information System (GIS; ESRI ArcGIS 10.1), landings for 2013/14 (the most recent season), 2008/09 (the most recent Nov-Apr winter season), and 2006/07-2008/09 (the average of the last three winter seasons) were evaluated to compare spatial distribution of catch.

The impacts of the spatial closures in Reg-16 were evaluated by first assigning pot landings to area-depth grids. Landings were assumed to be homogenous within an area-depth grid. Logbook pot gear landings were then eliminated from the time series proportional to the amount of area covered by the proposed closure alternative during the closed season and the remaining landings were compared to Alternative 1, which assumed landings in 2015 would proceed at the same pace as 2013/14.

Three scenarios were tested: (A) based on the spatial distribution of pot gear endorsement holder landings under simulated Amendment 18A regulations for the Nov-May period of the 2008/09 season, (B) based on the spatial distribution of pot gear endorsement holder landings during the June-Oct period of the 2013/14 season, and (C) based on the spatial distribution of pot gear endorsement holder landings under simulated Amendment 18A regulations for the Nov-May period averaged across the 2006/07, 2007/08, and 2008/09 seasons. By comparing spatial closure impacts to the baselines of a 100% closure and a 100% opening for each scenario, and expressing these comparisons as a percentage, the analysis controls for changes in the magnitude of black sea bass landings through time. Scenario A assumes no change in the spatial distribution of pot gear fishing pressure would have taken place between the 2008/09 and projected 2015 season. Scenario B assumes no change in the spatial distribution of pot gear fishing pressure would take place between the June-Oct period of the recent 2013/14 season and the Nov-May period of the projected 2015 season. Scenario C assumes no change in the spatial distribution of pot gear fishing pressure between the projected 2015 season and the mean distribution of fishing pressure during the past three winter seasons (e.g., 2006/07 to 2008/09). As such, Scenarios A and C address winter/summer differences in spatial fishing pressure, and Scenario B addresses regional differences in fishing pressure that have emerged over the past 5 years where the black sea bass commercial pot gear fishery has been partially or completely closed during the Nov-May time period. Spatial distributions of pot gear prior to 2006 were not considered due to changes in the fishery and a lack of consistently reported depth of fishing in logbooks.

Catch Rate Projections

Projected landings were expressed as daily catch rates uniformly distributed within each fishing month. ACCSP Trip Ticket landings using gears other than pot gear ("other gear") for June-May from the 2013/14 fishing year were used in projections because a substantial increase in "other gear" landings was observed following implementation of Amendment 18A, which restricted utilization of pot gear to federally-permitted endorsement holders only. Pot gear in ACCSP data was defined only as gear code 139 ("Pots and Traps, Fish"). Reg-14 will implement a 300-lb gw trip limit for Jan-Apr and a 1,000-lb gw trip limit for May-Dec for hook and line gears. The impacts of these trip limits were simulated by examining ACCSP Trip Ticket records from 2013/14 and setting any landings for hook and line gears exceeding the trip limit for a given month equivalent to the trip limit.

Under all scenarios, catch rates for pot gear for June-Oct were assumed equivalent to pot gear catch rates observed during the 2013/14 season. Since the months under consideration in the alternatives in Reg-16 have not been open to pot gear fishing for several years, four projection scenarios were developed to express the potential pot gear catch rates during Nov-May. Computations were performed using catch-per-pot rather than catch-per-pot-haul because the number of hauls prior to the 2013/14 season had some misreporting issues due to confusion on how to complete the commercial logbook forms (SEFSC, pers. comm.). Thus, catch rates reported below are cumulative and may reflect multiple hauls. Under Scenario 1, catch rates for pot gear from Nov-May were set equivalent to catch rates for the 2008/09 season (the last fully open winter season), computed as catch-per-pot for pot endorsement holders under a 35-pot limit and 1000-lb gw trip limit, multiplied by the number of pots that were used during 2008/09 under a simulated 35-pot limit. Under Scenario 2, catch rates for pot gear from Nov-May were computed assuming Nov-May effort would be equivalent to the number of pots that were used during 2008/09 under a simulated 35-pot limit, and catch-per-pot would be equivalent to 2013/14 observed Oct catch-per-pot scaled by the observed ratios of Oct 2008/09 catch-per-pot to Nov-May 2008/09 catch-per-pot. For example, October 2013 catch-per-pot was 26.94 lbs gw/pot, and October 2008/09 catch-per-pot haul was 15.00 lbs gw/pot, 52.78% of the maximum catch-per-pot observed in the 2008/09 season (January 2009's 28.42 lbs gw per pot). The ratio-scaled January pot landings would be 103,871 lbs gw (100%/52.78% × 26.94 lbs gw/pot × 2,035 pots used in January 2009 under a simulated 35-pot limit per vessel-trip). Under Scenario 3, Nov-May catch rates were assumed equal to observed Oct 2013/14 catch rates. Under Scenario 4, Nov-May catch rates were assumed equal to mean Nov-May catch rates from the past three winter seasons (e.g., 2006/07-2008/09).

Right Whale Spatial Distribution Model

Season and habitat characteristics are important drivers of right whale occurrence and are important to consider under all Reg-16 alternatives to ensure adequate protection for endangered right whales. Gowan and Ortega-Ortiz (2014) developed a temporally dynamic habitat model to predict wintering right whale distribution between Florida and South Carolina using a generalized additive model framework and aerial survey data (see Appendix D for link to free online manuscript). The model summarized whale sightings from surveys in the southeastern United States (SEUS Survey: 2003/04-2012/13), survey effort corrected for probability of whale detection, and environmental data at a semimonthly resolution. A generalized additive model (GAM) was used to relate the number of right whale sightings to predictor variables. Because the response variable, number of sighted whales, was overdispersed and zero-inflated due to the large number of sampling units (96%) with no sightings, Gowan and Ortega-Ortiz (2014) used a hurdle model. A quasibinomial distribution (to deal with excessive number of zeros) with a logit link was used to model presence-absence from all data, and a gamma distribution with a log link was used to model the number of whales from sampling units with whale sightings. Predicted relative abundance was calculated by multiplying the probability of occurrence, derived from the first model, by the expected number of whales, derived from the second model. Model selection was accomplished with a forward stepwise selection procedure, using the following evaluation criteria: model GCV scores, percentage of deviance explained, and analysis of deviance tests. Five-fold cross-validation was used to evaluate each candidate model's predictive ability, and was repeated five times, with mean average squared prediction error (ASPE) used to assist in model selection. Final specification of the selected best model used to estimate smoothing functions and create prediction maps was based on the complete dataset.

Under the best model specification, sea surface temperature (SST), water depth, and survey year were significant predictors of right whale relative abundance. Additionally, distance to shore, distance to the 22°C SST isotherm, and an interaction between time of year and latitude (to account for the latitudinal migration of whales) were also selected. Predictions from the model revealed that the location of preferred habitat differs within and between years in correspondence with variation in environmental conditions. Although cow-calf pairs were rarely sighted in the company of other whales, there was minimal evidence that the preferred habitat of cow-calf pairs was different than that of whale groups without calves at the scale of this study. The results of this updated habitat model were averaged by month, across all years, to represent right whale distribution, expressed as an encounter rate (i.e., expected number of whales sighted in each grid cell, given observed SST, annual sighting rate, and uniform survey effort). To bookend the spatial distribution of right whales under different environmental conditions, sensitivity runs were conducted for model-predicted spatial distributions under a warmer-than-average winter (i.e., 2011/12) and a colder-than-average winter (i.e., 2009/10).

An additional model was developed by T. Gowan (FWC/FWRI) for North Carolina using survey data collected by the University of North Carolina, Wilmington (UNCW Survey: 10/2005-4/2006, 12/2006-4/2007, 2/2008-4/2008). Survey effort data was obtained from OBIS-Seamap, and was expressed as the cumulative number of surveys per cell, across all survey months and years. The number of sightings was calculated as the cumulative number of right whales per cell, across all months and years. Distance to shore, depth, SST, and slope were calculated as in Gowan and Ortega-Ortiz (2014). Due to limited data, no temporal framework was introduced into the model; cumulative sightings and effort data were used with long-term winter SST. A generalized additive model (GAM) with a quasibinomial distribution (to handle excessive zeroes) with a logit link was used to model presence-absence of right whale sightings, with log(Surveys) used as an offset term. Predictor variables considered were log(Depth), log(Slope), distance to shore, and average SST. The basis dimension parameter was set to 3 and the gamma term was set to 1.4 to avoid overfitting. Following Gowan and Ortega-Ortiz (2014), model selection was accomplished with a forward stepwise selection procedure, using the following evaluation criteria: model generalized cross validation (GCV) scores, percentage of deviance explained, analysis of deviance tests, and average squared prediction error from a five-fold cross-validation. Predicted values from the North Carolina model did not have the same scale or interpretation as the predictions from the Florida-South Carolina model (Gowan and Ortega-Ortiz 2014), and were not directly comparable due to differences in survey design, resolution/quantification of survey effort, temporal components in the model, model framework (probability of presence vs. relative abundance), whale behavior (e.g. sighting availability bias in migratory corridor vs. calving grounds), etc. See Appendix C for further details on the North Carolina right whale sightings model.

Relative Risk of Right Whale Entanglement in Pot Gear Vertical Lines

The relative risk to right whales from pot gear was modeled by overlaying black sea bass effort and right whale relative abundance. Black sea bass pot gear effort was expressed as monthly totals of soak time across all vessels, assigned to commercial logbook area and binned into 5 m depth intervals. Because right whale entanglement rates in pot gear are unknown but greater than 0% and any vertical line in the water column has been determined to pose an entanglement risk (Johnson *et al.* 2005), this analysis assumes that the overlay of pot gear soak time and right whale distribution is a proxy for entanglement risk to right whales. Right whale encounter rates were modeled using the FL-SC and NC right whale spatial distribution models discussed above.

Three black sea bass effort distribution scenarios were considered; Scenario A was based on the winter of the 2008/09 fishing year, Scenario B was based on the summer of the 2013/14 fishing year, and Scenario C was based on the mean distribution during the winters of the 2006/07-2008/09 fishing years. Various reporting issues (discussed below) and substantial changes in fishing practices since the implementation of the 35-pot limit, the pot gear endorsement, and the requirement to bring pots in at the end of the trip made effort data (i.e., soak times and number of hauls) for black sea bass pot gear less reliable for previous seasons. Reliable effort data was obtained for the 2013/14 fishing year after a targeted reconciliation process (SEFSC, pers. comm.). Because pot fishing was prohibited in the winter of the 2013/14 fishing year, the spatial distribution of fishing effort for the 2013/14 scenario was treated as the total effort within area-depth bins across months with complete data that were open to pot fishing (i.e., June-Oct 2013).

The 2008/09 fishing year was the most recent period when pot fishing took place during Nov-Apr, but effort data for this fishing year (‘Scenario A’) and prior years (‘Scenario C’) was not considered reliably reported for pot gear due to misunderstandings among fishermen regarding how to report hauls and soak times (SEFSC, pers. comm.). To handle this concern, the spatial distribution of pots from winter fishing seasons was utilized in Scenarios A and C, but pot soak-times were assigned to area-depth bins for these Scenarios using reconciled 2013/14 soak time data to approximate future soak times during Nov-Apr. For example, under Scenario A, effort data were back-filled for the 2008/09 fishing year by multiplying 2013/14 mean soak time per pot by the number of pots reported in 2008/09 for each area-depth grid. The number of pots used on a given trip in 2008/09 was retrospectively capped at 35 to reflect current regulations. Mean pot soak times were assigned by linkage under the following hierarchy: vessel+area+depth, vessel, owner, area+depth, area, region. This approach assumed that the soak-times of a given vessel in a given area-depth grid from summer 2013/14 would not differ substantially in a winter season. If a vessel fished in a given area-depth grid in 2008/09 but not in 2013/14, then the mean soak-time across all trips for that vessel in 2013/14 was multiplied by the number of pots reported in the given area-depth grid in 2008/09. If that vessel did not fish in 2013/14, but the owner of that vessel did fish, the owner's mean soak-time across all trips was used. If there were no matches for the vessel or the owner between the 2013/14 and 2008/09 fishing years, then the mean soak-time across all vessels in that area-depth grid in 2013/14 was used as the multiplier, and so forth. The monthly spatial distribution of recomputed soak-times for the 2008/09 fishing year was summed by area-depth grid for Nov-Apr.

The three effort distribution scenarios were entered into a GIS geodatabase. Effort was assigned to area-depth grids using a generalized 5 m bathymetric bin polygon layer developed using the NGDC Coastal Relief Model sliced by the South Atlantic commercial logbook grid layer. The FL-SC and NC right whale encounter rate models were also input into the geodatabase. In the area where the FL-SC model predictions and the NC model predictions overlapped, the NC model predictions were removed in favor of the more statistically robust FL-SC model. All models were projected as Albers Equal Area Conic. The areas of all polygon cells were computed. The right whale encounter models (i.e. predicted sightings/habitat models) were clipped to the commercial area-depth grids, and the areas within each right whale encounter sub-grid were computed. Right whale encounter rate was summarized as a weighted mean within area-depth grids, with the weights based upon the areas of the right whale encounter sub-grids. For each area-depth grid, the weighted mean of right whale encounters was then multiplied by the total commercial pot gear effort within the area-depth grid. The products of mean encounter rates and commercial effort were summed across all depth-grids and used as the baseline for the analysis of the impacts of the spatial closure alternatives on potential right whale interactions with pot gear vertical lines. This baseline assumes a complete opening of SAFMC waters to pot gears; the maximum possible daily exposure of right whales to entanglement risk until a quota closure is reached. Thus, the comparison of Alternatives would range from 0% (Alternative 1: EEZ closed Nov-Apr) to 100% (no closed area) relative right whale risk. To evaluate the impacts of different spatial closure alternatives, the area-depth grid layer was clipped to each spatial closure alternative, and the products of mean encounter rate and commercial effort were summed across remaining depth-grids and compared to the baseline to determine the relative potential encounter risk remaining. As many area-depth grids were only partially contained by spatial closure alternatives, weighted mean encounter rates and effort were recomputed for each alternative. Effort was multiplied by the ratio of the percent of area remaining to the total area of the area-depth grid.

Cumulative Effects

To evaluate the cumulative effects of spatial closure alternatives upon landings and relative right whale entanglement risk, daily catch rates were forward-projected in Microsoft Excel for a future Jan-Dec fishing season. This analysis was performed for spatial distribution scenarios A-C and catch rate scenarios 1-4 for all eight Reg-16 alternatives. Additionally, two sensitivity runs were performed for a warm and cold winter distribution of right whales. Cumulative relative right whale risk was tracked under each scenario-alternative combination from Jan 1-Apr 30 and Nov 1-Dec 31, or the season closure date (whichever came sooner). Total catch relative to the ACL, closure date and total days open, and cumulative relative right whale risk were all output from the model. Total landings and season length were compared to Alternative 1 (status quo). Because the entanglement rate for North Atlantic right whales is unknown, risk was expressed as relative risk units (RRU). Daily relative right whale risk units were scaled from 0 RRU (Alternative 1: EEZ closed Nov-Apr) to 100 RRU (no closed area). Under all scenarios, daily relative right whale risk is eliminated when a quota closure is imposed to avoid an ACL overage, because the fishery would be closed to all gears. Daily relative right whale risk might exceed 100 RRU under scenarios where the proposed closed area slows catch rates enough for the fishery to stay open later than it would with no closed area to pot gear but fails to sufficiently mitigate right whale risk during the additional days open. Risk levels were categorized to facilitate distinction between alternatives (Low <25 RRU, Moderate 26-50, High 51-75, Very High >75). Right whale risk for the FL-SC and NC models was handled separately due to differences in model construction. A sensitivity run incorporating a dynamic monthly model of whale distributions off NC was performed (Appendix E). To evaluate whether the differences between alternatives were significant, within-model uncertainty was evaluated using modeled 95% confidence limits (Appendix F).

Impacts on other Large Whales

Other species of large whales protected under the Marine Mammal Protection Act are periodically observed by the SEUS Survey and UNCW Survey, including humpback whales (*Megaptera novaeangliae*) and fin whales (*Balaenoptera physalus*). Sightings of these large whales were plotted relative to proposed closed areas to determine if proposed closed areas might provide potential reductions in entanglement risk for large whales other than right whales.

RESULTS

Spatial Distribution of Landings and Effort

From 2004/05-2008/09, pot gear effort during months completely open to pot gear fishing averaged 2126 ± 1410 pots/month (mean ± SD), with an average of 3038 ± 1219 pots/month from Nov-Apr. Since the implementation of Amendment 18A, the 32 pot gear endorsement holders have averaged 2122 ± 653 pots/month (range 1503-3148 pots/month) during months completely open to pot gear fishing. In the 2013/14 season, number of pots per trip averaged 24.9 ± 9.7, with 52.3 ± 36.4 hauls per trip. Trips averaged 1.4 ± 0.6 days. Soaktimes averaged 4.4 ± 4.0 hours per trap (range 0.33-28.0 hours). Total soaktime per trip averaged 245.8 ± 337.6 hours (range 5.3-5040.0 hours).

Commercial black sea bass pot endorsement holders tended to fish between 15-40 m depth (Figure 1). Analyses of seasonal fishing trends indicated little overall trend in reported depth of fishing using pot gear for black sea bass for Florida and North Carolina, but an inshore movement of the fishery during winter months was apparent for South Carolina (Figure 2). A comparison of Nov-May pot gear endorsement holder landings from the 2008/09 season (Scenario A) to June-Oct pot gear endorsement holder landings from the 2013/14 (Scenario B) showed higher proportional landings off SC under Scenario A, and higher proportional landings off NC and FL under Scenario B (Figure 3). Landings and effort in the 2008/09 winter months covered a narrower geographic range than the 2013/14 summer season (Figure 3). In the 2008/09 winter months, fishing activity shifted from nearshore NC (Nov-Dec: Figures 3A-B) to South Carolina (Dec-Feb: Figures 3B-D) and then farther offshore of both NC and SC (Feb-Apr: Figures 3D-F). This spatial shifting was not observed in Scenario B due to the static treatment of the summer 2013/14 landings and effort data (Figure 3G). The spatial extent of landings and effort under Scenario C (Figures 3H-M) was similar to Scenario A; however, landings and effort averaged across the three winters were more diffuse with fewer obvious 'hot-spots.'

Catch Rate Projections

Between 2006/07 and 2013/14, black sea bass catch-per-trip for endorsement holders was within 50 pounds of the 1000-lb gw trip limit on average 24% of trips, with a peak of 56% in 2011/12 and a minimum of 10% in the most recent 2013/14 season. Catch-per-pot haul in the commercial black sea bass fishery was historically higher during the winter months, but this trend shifted towards the summer months as derby conditions emerged (Figure 4). Daily catch rates for projection Scenarios 1-4 are presented in Table 1. Winter catch rates were highest under Scenario 2 and lowest under Scenario 3. Scenarios 1, 2, and 4 showed a dome-shaped catch rate with peaks in Dec-Feb (Figure 5). The abundance of black sea bass vulnerable to pot gears has nearly doubled since the 2008/09 season (Figure 6).

Right Whale Spatial Distribution Model

Wintering habitat models were developed to predict right whale distribution for FL-SC (Gowan and Ortega-Ortiz 2014) and NC (Gowan, unpublished data) over time. The FL-SC model predicts a seasonal trend in right whale distribution (Figure 7). In December and March (Figures 7A and 7D), the model predicts right whales to be distributed farther north than in January and February (Figures 7B and 7C). The data informing the NC model were not sufficiently robust to construct monthly models of right whale abundance; however, the model predicted right whales might be sighted across a relatively broad area, with the highest encounter rates relatively close to the NC shoreline and off Pamlico Sound. As illustrated in Appendix D, under the 'warm' winter scenario, the distribution compressed closer to shore, in the relatively shallow, cooler waters west of the Gulf Stream; under the 'cold' winter scenario, the distribution was more concentrated farther south (Gowan and Ortega-Ortiz 2014).

Relative Risk of Right Whale Entanglement in Pot Gear Vertical Lines

Figure 8 shows effort-weighted relative right whale risk of interactions with pot gear vertical lines under gear distribution Scenarios A (pot gear distribution based on observed 2008/09 winter deployments) and B (pot gear distribution based on observed 2013/14 summer deployments). Because the NC right whale distribution model and the pot distribution in Scenario B are not time-dynamic, modeled risk of NC for Scenario B did not vary by month. For Scenario B, from Nov-Apr, right whale weighted entanglement risk was highest between 5-30 m between Wilmington and Jacksonville (Figures 8A-F).

In November (Figure 8A), weighted entanglement risk for right whales in FL-SC was highest off Murrell's Inlet, South Carolina and Daytona Beach, Florida under Scenario A; risk off NC was highest between 5-30 m from Jacksonville to Wilmington, North Carolina. Under Scenario B, weighted entanglement risk in FL-SC was highest off Charleston, South Carolina, followed by Murrell's Inlet, South Carolina, and Daytona Beach, Florida; off NC, risk was slightly higher offshore of Jacksonville than in Scenario A (Figure 8A). In December, under both Scenarios, weighted risk was highest off Charleston, South Carolina; followed by Murrell's Inlet, South Carolina, and Daytona Beach, Florida (Figure 8B). In December, off North Carolina, under both Scenarios, weighted risk was highest from Wilmington to Jacksonville in waters <30 m. From January-February, under both Scenarios, weighted risk was highest off Charleston, South Carolina and Daytona Beach, Florida; followed by Murrell's Inlet, South Carolina (Figures 8C-D). In January-February off North Carolina, Scenario A shows much more broadly distributed relative risk than Scenario B (Figures 8C-D). From March-April, under Scenario A, weighted risk was highest off Murrell's Inlet, South Carolina and, in April, Daytona Beach, Florida (Figure 8E-F). Under Scenario B, weighted risk was highest off Charleston, South Carolina; followed by Murrell's Inlet, South Carolina, and Daytona Beach, Florida. In March-April, Scenario A predicts much more broadly distributed relative risk off North Carolina than Scenario B (Figure 8E-F). In general, black sea bass fishing pressure and associated right whale entanglement risk off Florida to South Carolina are more broadly distributed under Scenario B, and more broadly distributed off North Carolina under Scenario A. Because pot distribution under Scenario C was similar to that under Scenario A, it was not depicted in Figure 8.

Cumulative Effects

Different catch rate and closure scenarios resulted in different projected closure dates for the commercial black sea bass fishery to avoid an ACL overage (Figure 9). Table 2 and Figure 10 show the interplay of projected black sea bass fishing season lengths and cumulative relative risk of right whales to entanglement in vertical lines associated with black sea bass pot gear. Under all alternatives except Alternative 1 (status quo) and a few scenarios for Alternatives 7b, 8b, 9b, and 10, a quota closure was anticipated to avoid a quota overage. A quota closure would reduce relative right whale risk by reducing the number of days pot gear is in the water.

Under warmer than average conditions, the predicted right whale distribution was located closer to shore and most depth-based spatial closure alternatives are more effective in reducing relative risk of entanglement (Table 2B). Some permutations suggested Alternative 7B could be less effective even than opening the entire EEZ to pot gear fishing Nov-Apr under warmer than average conditions because it would allow two additional months of fishing during right whale season. Under colder than average conditions, the predicted right whale distribution was farther south and more broadly distributed offshore, making most depth-based closure Alternatives less effective than under average conditions (Table 2C). A sensitivity run using monthly SST data to generate monthly predictions of right whale abundance off NC found minimal differences compared to the time-averaged model approach presented in Table 2 (see Appendix E).

Table 3 shows relative risk of right whale entanglement ranked by alternative, ranging from Alternative 1 (most protective) to Alternative 2 (least protective). Figure 11 shows the clustering of sensitivity run output by alternatives for relative right whale risk and fishing season length. Alternatives 4 and 6 provide the least additional right whale risk of any pot gear opening under consideration (Table 3), while also providing the longest fishing seasons (Figure 11). Alternatives 2, 7a, and 7b provide similarly high relative right whale risk and shorter seasons than the other alternatives (Figure 11). Within-model uncertainty was relatively low, and the separation between the most protective and least protective alternatives was significant (see Appendix F).

Under Alternative 1, no quota closure was projected. Alternative 1 was projected to catch 97% of the ACL while maintaining the six-month seasonal closure to pot gear fishing and providing no increased risk of vertical line entanglement for right whales. Under Alternative 2, a quota closure date was projected for 4 Aug-2 Oct. Alternative 2 increases relative right whale risk by 100 RRU over status quo. Under Alternative 3, a quota closure date was projected for 4 Oct-5 Dec. Alternative 3 results in a low to moderate increase in relative right whale risk off NC (+10-26 RRU) and a low to high increase in relative right whale risk off FL-SC (+16-52 RRU). Under Alternative 4, a quota closure date was projected for 7-30 Dec. Alternative 4 results in a low increase in relative right whale risk off NC (+2-8 RRU) and a low increase in relative right whale risk off FL-SC (+0-3 RRU). Under Alternative 5, a quota closure date was projected for 1-24 Dec. Alternative 5 results in a low increase in relative right whale risk off NC (+1-2 RRU) and a low to high increase in relative right whale risk off FL-SC (+11-58 RRU). Under Alternative 6, a quota closure date was projected for 7-29 Dec. Alternative 6 results in a low increase in relative right whale risk off NC (+2-8 RRU) and no additional right whale risk off FL-SC (0 RRU). Under Alternative 7a, a quota closure was projected for 18 Aug-12 Oct. Alternative 7a results in a high increase in relative right whale risk off NC (+69-74 RRU) and very high increase in relative right whale risk off FL-SC (+77-96 RRU). Under Alternative 7b, the ACL was projected to be met between 17-30 Dec. Alternative 7b results in a very high increase in relative right whale risk off NC (+77-89 RRU) and a high to very high increase in relative right whale risk off FL-SC (+70-106

RRU). Under Alternative 8a, a quota closure was projected for 17 Oct-11 Dec. Alternative 8a results in a low to moderate increase in relative right whale risk off NC (+13-36 RRU) and a low to high increase in relative right whale risk off FL-SC (+13-64 RRU). Under Alternative 8b, the ACL was projected to be met late in the fishing season (18 Dec or later). Alternative 8b results in a high increase in relative risk off NC (+51-68 RRU) and a high to very high increase in relative risk off FL-SC (+61-89 RRU). Under Alternative 9a, a quota closure was projected for 15 Sept-9 Nov. Alternative 9a results in a moderate increase in relative right whale risk off NC (+26-51 RRU) and moderate to high increase in relative right whale risk off FL-SC (+30-72 RRU). Under Alternative 9b, the ACL was projected to be met as early as 14 Dec. Alternative 9b results in a high to very high increase in relative right whale risk off NC (+61-87 RRU) and high to very high increase in relative right whale risk off FL-SC (+67-94 RRU). Alternative 10 falls between Alternatives 8b and 9b, with a projected closure date as early as 16 Dec, a moderate to high increase in relative right whale risk off NC (+55-75 RRU) and high to very high increase in relative right whale risk off FL-SC (+62-89 RRU).

Impacts on other Large Whales

Maps of aerial survey observations confirmed the presence of humpback whales and fin whales within several of the proposed Reg-16 closure areas (Figure 12). From 2005-2014, a total of 135 humpback whale sightings were recorded by the two surveys, of which six were confirmed dead. A total of 21 fin whales were also recorded. Number of observations was highest in areas of highest survey effort. Some of these sightings may represent multiple sightings of the same individual.

DISCUSSION

During the 2013/14 season, SEFSC in-season quota monitoring projected 99.6% of the ACL was caught with no pot gear fishing during the Nov-Apr period. Analyses of Reg-16 alternatives indicated that nearly all scenarios would result in the ACL being achieved. These analyses are based heavily upon data from the recent 2013/14 season because the black sea bass commercial fishery is in a dynamic state. Trends in catch per pot haul (see Figure 4) reveal a full-season fishery with peak catches in winter during the first part of the past decade that shifted to a derby fishery in the past 5 years, characterized by high summer catch rates and early quota closures. The 2008/09 season was the last season with no quota closure during right whale season (Nov 1-Apr 30). Despite effort restrictions implemented under Amendment 18A and the substantial increase in ACL implemented by Reg-19, the commercial fishery caught over 99% of their ACL during the 2013/14 season. Even with the hook-and-line gear trip limits imposed by Reg-14, they are projected to catch 97% of their ACL under Alternative 1 for the 2014/15 season. The derby condition may have relaxed somewhat, as landings in 2012/13 and 2013/14 were more evenly distributed through the fishing season; however, it is too early to definitively state that the derby conditions have ended. Furthermore, the implementation of Reg-14 will shift the season start date from June 1 to Jan 1, guaranteeing at least some pot gear fishing during the Nov 1-Apr 30 right whale season with the implementation of any alternative under Reg-16, excluding the no action alternative. The pot endorsement requirement implemented by Amendment 18A substantially reduced participation in the pot gear fishery, which historically has shown higher daily catch rates than other gears. Because participation is limited and the ACL has been substantially increased, the incentives for derby fishing have diminished, and may be further diminished by communication between fishermen. The reduction in pot gear fishery participation has been partially offset by increases in the number of participants using other gears. During the 2013/14 season, 68% of the commercial harvest originated from gears other than pots, as compared to an average of 28% from 2004-2013.

Given the substantial changes in the fishery in the last two fishing seasons and the lack of fishing (due to quota closures) in the Nov-Apr time period of greatest concern for federally-protected large whale species, it is challenging to predict the impacts of the various Alternatives under consideration by Reg-16. To encompass the range of realistic possibilities, four scenarios were evaluated for catch rate, and three scenarios were evaluated for the spatial distribution of fishing. Projected closure dates for each alternative across scenarios varied by as much as 59 days; however, the relative differences between alternatives were consistent across scenarios. Catch rate projection Scenario 1 does not account for the rebuilding of the black sea bass stock, because it is based on 2008/09 catch rates, but it does feature winter catch rates on par with those observed in summer months during the 2013/14 season. Scenario 2 does not account for a potential decline in catch rate during winter months due to high pressure during summer months, which would likely result in localized depletion. The catch rates predicted by Scenario 2 have been observed in a single month in previous seasons, but never in multiple consecutive months as predicted. The sum of anticipated pot catches across the season in Scenario 2 exceeds the highest observed catches for every month by 5%; however, the abundance of black sea bass available to the pot gear fishery is projected to be substantially higher than observed since pre-1998 (Figure 6), and the reconfiguration of the commercial season to Jan-Dec by Reg-14 increases the likelihood of high Jan-Apr catch rates and reduces concerns about the impacts of localized depletion on projected catch rates in the first few months of the season. In summary, Scenario 2 may capture this increasing abundance trend, or it may overestimate catch rates that could be achieved in future seasons. Scenario 3 maintains a constant Oct 2013/14 catch rate through Nov-May; as such, it does not account for any temporal dynamics of catch rate which might be caused by fish movement or adverse weather conditions reducing the number of potential trips that could be taken. Scenario 4 accounts for potential impacts of the economic crash and high fuel prices in 2008/09 by averaging catch rates across the last three open winter seasons (2006/07-2008/09).

Of the spatial closure scenarios evaluated, Scenarios A and C do not account for recent shifts in the core distribution of fishing pressure. The stock may have shifted in regional abundance to localized recruitment pulses or localized depletion, and some pot gear endorsement holders may have moved or dropped out of the fishery since past winter seasons. Similarly, Scenario B does not account for inshore/offshore dynamics for winter months, because it is based on 2013/14 data from June-Oct. Off South Carolina, there are some indications of an inshore shift in fishing pressure during the winter months; however, from a statistical standpoint, this shift was insignificant based on the reported depth of fishing. If there is a shift in fishing depths during winter months, this would not be captured by Scenario B. Accurately predicting the impacts of spatial closures is further challenged because area and depth of fishing are reported at the trip level. Multiple sets may be made during a single trip; therefore, there may be depths and areas fished that are not accurately represented in the logbook. This is less of a concern with commercial black sea bass pot gear than for many other fisheries due to the relatively low trip limit constraining the number of sets that might be made during a single trip. The model assumes landings during May-Oct will proceed equivalent to 2013/14 observations. Reduced catch rates prior to Nov would result in longer winter seasons for all scenario-alternative combinations with projected quota closures, leading to increased cumulative relative right whale risk.

Removing the closed area for pot gear would provide the fastest path towards achieving the ACL, as it removes all spatiotemporal restrictions on the use of pot gear to harvest black sea bass. Reg-16 Alternative 2 has minimal spatial overlap with black sea bass pot fishing effort, and results in nearly identical outcomes to removing the closed area entirely with regards to landings achieved. The spatial overlap of black sea bass fishing effort with the proposed closed areas in Alternatives 4 and 6 is robust to the assumed distribution of fishing pressure. By contrast, the spatial overlap of black sea bass fishing effort with the proposed closed areas in Alternatives 3, 5, 7a, 8a, and 9a is more dependent upon assumptions about the spatial distribution of fishing pressure.

The Alternatives proposed in Reg-16 differ in their abilities to maintain protections (i.e. prevent or minimize an increase in relative risk of entanglement) for ESA-listed whales in the South Atlantic Region. All alternatives, excluding Alternative 1 (the No Action Alternative), result in an increase in relative risk of entanglement to right whales. Alternative 1 best maintains protections for ESA-listed whales in the South Atlantic region because it maintains the seasonal closure to pot gear fishing, resulting in no increased risk of vertical line entanglement for large whales from black sea bass pot gear. Conversely, removing the closed area entirely would fail to maintain protections for ESA-listed whale species because it would eliminate the seasonal closure to pot gear fishing implemented to protect endangered large whales from entanglement in black sea bass pot gear, exposing right whales to the maximum possible daily vertical line entanglement risk (i.e., 100% on the relative scale described in the Methods).

Alternatives 2, 7b, 7c, 9b, and 8b maintain little to no protection for ESA-listed whales in the South Atlantic Region. Alternative 2 greatly increases the relative risk of entanglement to right whales off North Carolina and between Florida and South Carolina. Alternative 2 represents the current North Atlantic right whale critical habitat designated for North Atlantic right whales in 1994. This area was originally based on 303 sightings from 1950-1989. However, North Atlantic right whale critical habitat is currently undergoing a revision based on more current data. Proposed changes were published 17 Feb 2015 at 80 FR 9313. The very high relative risk associated with Alternative 2 is because predicted right whale presence is high outside of the spatial boundaries of the Alternative 2 management area (i.e., the area proposed in Alternative 2 is insufficient to protect right whales from an increase in relative risk of entanglement). Alternatives 7b, 7c, 8b, and 9b greatly increase the relative risk of right whale entanglement over the status quo for temporal (does not account for year-round presence of right whales off

North and South Carolina) and spatial reasons (does not account for spatial use of right whales off Florida). Alternative 7a, 8a, and 9a are slightly more protective because they prohibit pot gear fishing for more of the right whale season across a broader geographic range.

Alternative 3 would result in a low to moderate increase in relative risk to right whales from potential entanglement off North Carolina and a moderate to high increase in relative risk between Florida and South Carolina. This increase in relative risk is likely because the area proposed in Alternative 3 is based on habitat features preferred by pregnant female right whales and mother/calf pairs only (Good 2008, Keller et al. 2012), and does not consider juveniles, non-reproducing adults, or account for the north/south migratory behavior of right whales (i.e. whales may occur outside of predicted areas due to behavioral reasons). Juvenile right whales are a particularly important demographic segment to consider since they are most prone to entanglement (Knowlton et al. 2012).

Of all the alternatives in Reg-16, Alternatives 4 and 6 result in the least increase in relative risk to right whales, followed by Alternative 5. Alternative 4 is based on 2005/06-2012/13 right whale Early Warning System (EWS) and South Carolina/Georgia aerial survey data and 2001/02, 2005/06, and 2006/07 surveys by the University of North Carolina-Wilmington (Garrison 2014). This is a more expansive and recent database than that used by Keller et al. (2012) and particularly is more robust off the state of South Carolina. Alternative 4 includes all right whale demographic segments (i.e., mother/calf pairs, pregnant females, non-reproducing females, adult males, and juveniles). The area in this alternative captures 97% and 96% of right whale sightings in the NC/SC region and the FL/GA region, respectively.

Alternative 5 results in a low increase in relative risk off North Carolina but a greater increase in relative risk from Florida to South Carolina. In particular, the increase in relative risk from Florida to South Carolina is the result of estimated commercial pot gear effort south and east of the proposed area from St. Augustine to Cape Canaveral, Florida. Alternative 5 is based on joint comments received from non-government organizations (dated January 3, 2014) in response to NMFS' December 4, 2013, *Federal Register* Notice of Intent to Prepare this Draft Environmental Impact Statement (DEIS) (78 FR 72868). The area, also included in a Center for Biological Diversity et al. petition in 2009 for right whale critical habitat, is off the coasts of Georgia and Florida and based on calving right whale habitat modeling work of Garrison (2007) and Keller et al. (2012). This area represents the 75th percentile of right whale sightings (91% of historical sightings included in their study) off Florida and Georgia (Garrison 2007, and Keller et al. 2012). This alternative provides less protection in the core calving area because the protected area likely does not extend far enough into South Florida waters to capture the full extent of right whale habitat usage.

Alternative 6 would result in a low increase in relative risk to whales off North Carolina and no additional entanglement risk to right whales off Florida to South Carolina. The Alternative 6 area extends substantially further offshore of Florida and Georgia than areas included in other alternatives. Consequently, similar to Alternative 1, Alternative 6 would result in no increase in relative risk to right whales off Florida and Georgia and, arguably, negligible increase in relative risk off South Carolina. Alternative 6 is also based on joint comments received from a number of environmental groups (dated January 3, 2014) in response to NMFS's December 4, 2013, *Federal Register* Notice of Intent (78 FR 72868). This area represents an existing management area, the Southeast Seasonal Gillnet Restricted Area, under the ALWTRP; and an additional area off North Carolina. The area off North Carolina is northward of the designated ALWTRP Southeast Restricted Area and includes waters shallower than 30 m. Overall, aside from Alternative 1, Alternative 6 results in the least amount of increase in relative risk to right whales from entanglement.

There is uncertainty in the predicted distribution of right whales, especially off North Carolina, where limited data with relatively few sightings were available. However, limited data should not be confused with limited right whale use of the area. Both the FL-SC and NC models implicitly assume that detectability of right whales (and therefore number of sightings) is equivalent across the spatial domain; however, it is widely accepted that detectability can vary. Richardson et al. (1995) found migrating bowhead whales (closely related to right whales) spent an especially low percentage of time at the surface and reasoned that the low percent of surface time explained low sightability of bowheads during aerial surveys of migrating whales. Likewise, the mid-Atlantic is used by right whales as a migratory corridor, among other uses, including calving grounds. Some of the more common behaviors off North and South Carolina may lead to right whale presence being underestimated by visual detection surveys. Additionally, the model was constructed based on right whale distribution on their primary wintering grounds not in their migratory corridor. Due to a lack of survey data, December distributions were used to represent November, and March model distributions were used to represent April. There may be differences between modeled distribution and actual distribution during these periods. Preliminary data demonstrate that the majority of right whales that frequent the calving area are present there for only a period of a few weeks (A. Krzystan, June 2014 SEIT meeting). As many as 243 right whales have been sighted in the Southeast U.S. wintering habitat in one winter. If most of these whales were present for a period of weeks and other whales are short-stopping off South and North Carolina, there is likely a steady, constant presence of right whales in the mid-Atlantic during the Nov-Apr period.

The modeled distribution used in this report averages across years with relatively low and high sighting frequency. It is unlikely this averaging would have a substantial impact upon the projected relative risk associated with each spatial closure alternative. Additionally, the modelling approach described in this report uses the overlay of black sea bass pot gear fishing effort (expressed in line-hours) and predicted right whale distribution to determine right whale relative risk of entanglement. This is a frequently used approach in whale risk assessment (Vanderlaan *et al.* 2009, Williams & O'Hara 2010, Murray & Orphanides 2013, Brown *et al.* 2015), because estimation of absolute risk is often impractical (Fonnesbeck *et al.* 2008, Redfern *et al.* 2013). This approach implicitly assumes that right whale entanglement rates do not vary by gender, size, space or time; however, certain behaviors or size classes of whales in certain locations at certain times might be more inherently vulnerable to entanglement than others (Knowlton *et al.* 2012). A sensitivity run using right whale distributions under warmer than average conditions showed most spatial closures would be more effective if the right whale distribution is compressed close to shore. Under colder than average conditions, most proposed closure alternatives become less effective, because the right whale population is located farther south and more broadly distributed offshore beyond the closure boundaries. Alternatives 4 and 6 both provided very little additional entanglement risk to right whales off Florida to South Carolina under all sensitivity runs. Insufficient data were available to explore the impacts of warmer or colder than average conditions on right whale distributions off North Carolina, and no assumptions were made regarding the redistribution of the black sea bass population or associated fishing effort under these different temperature regimes. Average temperature conditions are more appropriate for forecasting risk when future temperature conditions are unknown.

The modeling approach did not assume an inherent rate of right whale entanglement relative to vertical line hours. Instead, all comparisons were made relative to the cumulative right whale risk assuming no closed area within each spatial distribution and catch rate scenario. Because all comparisons were performed in a relative framework, potential differences in the magnitude of exposure to risk between scenarios are not possible, nor would they be appropriate given that each scenario operates independently. For example, it would not be appropriate to compare the total exposure to risk assuming a summer distribution of pot gear in Alternative 2 to the total exposure to risk assuming a winter distribution of pot gear in Alternative 4. Although we were constrained by available data to apply 2013/14 mean pot soak times to historical spatial distributions of pot gear, this scalar is washed out by the relative framework of comparison. Thus, if winter wind and sea state conditions are such that shorter soak times are used, shorter soak times would reduce the total magnitude of right whale risk for each alternative, but the impact on relative comparisons would be dampened and only have an impact when an Alternative allowed fishing longer into the winter season than having no closed area. In this instance, the projected relative risk under the closure alternative with more time fishing under shorter soak times would be less than projected in this report.

The analysis does not consider the potential for effort shifting into open areas during the Nov-Apr time period. Few of the areas that would remain open have been fished for black sea bass, and most of them have not been fished in the Nov-Apr time period for five years or more. As such, it is difficult to determine how much effort might shift to open areas, which open areas would receive new effort, whether fishing opportunities exist in areas outside the closure, and what catch rates might be in those areas. Although estimating the impacts of effort shifting is challenging, the directional impacts of any effort shifting are relatively easy to describe. If effort shifting into open areas occurs, the projections may underestimate the potential catch rates of black sea bass if deeper portions of the stock can be caught outside the closed areas. The fuel costs associated with reaching open areas farther offshore combined with the requirement to bring pot gear back to shore under a 1000-lb gw trip limit might serve as a financial disincentive for commercial pot fishers to shift effort into deeper water offshore. If effort shifting takes place, quota closures would take place sooner than projected in this report. Relative entanglement risk for right whales in open areas would increase if effort shifted into those areas, although for some closure alternatives the areas of highest risk would be closed and effort would shift into low risk areas. Additionally, some right whale risk might be offset by reductions in season length due to earlier ACL quota closures. This is likely to apply only to the Nov 1-Dec 31 period following implementation of Reg-14. Alternative 3 provides greater opportunities for effort shifting offshore of Daytona Beach and Charleston than Alternatives 4-6; as such, the relative risk under Alternative 3 may be higher than estimated in Table 2.

Aerial survey observations indicate humpback whales and fin whales are found within areas historically used by the black sea bass pot gear fishery. As such, they may also be at risk of entanglement and may be impacted by alternatives being considered by Reg-16. The federally-protected North Atlantic humpback whale is assumed to use the mid-Atlantic as a migratory pathway to and from their calving/mating grounds in the West Indies. Furthermore, biologists theorize that non-reproductive humpbacks may be establishing a winter feeding range in the mid-Atlantic since they are not participating in reproductive behavior in the Caribbean (Barco *et al.* 2002). As with right whales, a major known source of human-caused mortality and injury of humpback whales is commercial fishing gear entanglements. Sixty percent of closely investigated mid-Atlantic humpback whale mortalities showed signs of entanglement or vessel collision (Wiley *et al.* 1995). A scar-based study of Gulf of Maine humpback whales indicated that over half of the population had experienced a previous entanglement, and 8-25% received new injuries each year (Robbins and Mattila 2004). From 2006 through 2010, there were at least 29 serious injuries and mortalities attributed to entanglement for humpback whales (Waring et al. 2014). The impacts of Reg-16 alternatives for other large whales such as humpback whales and fin whales could not be quantified due to a lack of detailed mid-Atlantic distribution data.

In summary, the lack of recent winter fishing challenges predicting future fisher behavior, and the unknown dynamics of serial depletion make it challenging to predict future black sea bass catch rates, especially in the Nov-Apr time period. Our analyses provide a broad range of possible scenarios to highlight the uncertainty in predicted catch rates. Analyses indicated that proposed pot gear closed areas do not cover all reported historical pot gear fishing grounds and cover varying proportions of areas where right whales are predicted to be found. Increased fishing pressure early in the season similar to derby conditions observed in the past, pot gear effort shifting into deeper water outside a closed area, removing the hook and line gear trip limit, and allowing additional pot gear participation could all increase the probability of attaining the ACL sooner than projected.

REFERENCES

Barco, S.G., W.A. McLellan, J. Allen, R. Asmutis, R. Mallon-Day, E. Meagher, D.A. Pabst, J. Robbins, R. Seton, R.M. Swingle, M.T. Weinrich, and P. Clapham, Population identity of humpback whales in the waters of the U.S. mid-Atlantic states, J. Cetacean Res. Manage. 4:135-141, 2002.

Baumgartner, M.F. and B.R. Mate 2005. Summer and fall habitat of North Atlantic right whales (*Eubalaena glacialis*) inferred from satellite telemetry. Can. J. Fish. Aq. Sci. 62: 527–543.

Best, P.B., J.L. Bannister, R.L. Brownell, Jr. and G.P. Donovan, eds. 2001. Right whales: worldwide status. J. Cetacean Res. Manage. (Special Issue) 2: 309.

Brown, M.W. and M.K. Marx. 2000. Surveillance, monitoring and management of North Atlantic right whales, *Eubalaena glacialis*, in Cape Cod Bay, Massachusetts: January to Mid-May, 2000. Division of Marine Fisheries, Commonwealth of Massachusetts. Final Report.

Brown, S. L., D. Reid, and E. Rogan. 2015. Spatial and temporal assessment of potential risk to cetaceans from static fishing gears. Marine Policy, 51, 267-280.

Clapham, P.j., S.B. Young and R.L. Brownell Jr. 1999. Baleen whales: conservation issues and the satus of the most endangered populations. Mammal Rev. 29: 35-60.

Cole, T.V.N. and Henry, A.G. 2013. Serious injury determinations for baleen whale stocks along the Gulf of Mexico, United States East Coast and Atlantic Canadian Provinces, 2007-2011, NEFSC Reference Document 13–24. 20 pp

Fonnesbeck, C. J., Garrison, L. P., Ward-Geiger, L. I., & Baumstark, R. D. 2008. Bayesian hierarchichal model for evaluating the risk of vessel strikes on North Atlantic right whales in the SE United States. Endangered Species Research, 6: 87-94.

Garrison, L.P. 2007. The big picture: Modeling right whales in space and time. In: Kraus S.D., Rolland R.M. (eds). The Urban Whale. Cambridge, Massachusetts: Harvard University Press. pp 460–487.

Good C. 2008. Spatial ecology of the North Atlantic right whale (*Eubalaena glacialis*). PhD dissertation, Duke University, Durham, NC.

Gowan, T.A. and Ortega-Ortiz, J.G. 2014. Wintering habitat model for the North Atlantic right whale (*Eubalaena glacialis*) in the southeastern United States. PLoS ONE 9(4): e95126. doi:10.1371/journal.pone.0095126 http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0095126

Hamilton, P.K., A.R. Knowlton, M.K. Marx and S.D. Kraus 1998. Age structure and longevity in North Atlantic right whales *Eubalaena glacialis* and their relation to reproduction. Mar. Ecol. Prog. Ser. 171: 285-292.

Henry, A.G., T.V.N. Cole, M. Garron, L. Hall, W. Ledwell and A. Reid 2013. Mortality determinations for baleen whale stocks along the Gulf of Mexico, United States East Coast and Atlantic Canadian Provinces, 2007-2011, NEFSC Reference Document 13-18. 15 pp

Jackson, K. A., J. L. Jakush, T. D. Pitchford, and J. G. Ortega-Ortiz. 2012a. Aerial Surveys for Ship Strike Mitigation and Other Field Observations of North Atlantic Right Whales (Eubalaena glacialis) off the East Coast of Florida December 2011-March 2012 Southern Early Warning System. Final Report to NOAA Fisheries Service. Requisition Numbers NFFN53001000014 and NFFN53001100030.

Johnson, A., G. Salvador, J. Kenney, J. Robbins, S. Kraus, S. Landry, and P. Clapham. 2005. Fishing gear involved in entanglements of right and humpback whales. Marine Mammal Science, 21(4):635–645.

Keller, C. A., L. I. Ward-Geiger, W. B. Brooks, C. K. Slay, C. R. Taylor, B. J. Zoodsma. 2006. North Atlantic Right Whale Distribution in Relation to Sea-Surface Temperature in the Southeastern United States Calving Grounds. Marine Mammal Science 22(2):426-445.

Keller CA, Garrison L, Baumstark R, Ward-Geiger LI, Hines E. 2012. Application of a habitat model to define calving habitat of the North Atlantic right whale in the southeastern United States. Endangered Species Research 18: 72-87.

Kenney, R.D. 2002. North Atlantic, North Pacific and Southern Right Whales. pp. 806-813, In: W.F. Perrin, B. Würsig, and J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals. Academic Press, San Diego, CA.

Knowlton AR, Hamilton PK, Marx MK, Pettis HM, Kraus SD. 2012. Monitoring North Atlantic right whale *Eubalaena glacialis* entanglement rates: a 30 yr retrospective. Marine Ecology Progress Series, 466: 293-302.

Kraus, S.D. 1990. Rates and potential causes of mortality in North Atlantic right whales (*Eubalaena glacialis*). Mar. Mamm. Sci. 6: 278-291.

Mate, B.M., S.L. Nieukirk and S.D. Kraus 1997. Satellite-monitored movements of the northern right whale. J. Wildl. Manage. 61: 1393-1405.

McLellan, W.A., E. Meagher, L. Torres, G. Lovewell, C. Harper, K. Irish, B. Pike and A.D. Pabst 2004. Winter right whale sightings from aerial surveys of the coastal waters of the US mid-Atlantic. 15th Biennial Conference on the Biology of Marine Mammals.

Murray, K. T. and C.D. Orphanides. 2013. Estimating the risk of loggerhead turtle Caretta caretta bycatch in the US mid-Atlantic using fishery-independent and-dependent data. Marine Ecology Progress Series, 477, 259-270.

Neilson, J.L., Gabriele, C.M. and J.M. Straley. 2007. Humpback whale entanglement in fishing gear in northern southeastern Alaska, *in* Piatt, J.F., and Gende, S.M., eds., Proceedings of the Fourth Glacier Bay Science Symposium, October 26-28, 2004: U.S. Geological Survey Scientific Investigations Report 2007-5047, p. 204-207.

NMFS. 2008. Final Environmental Impact Statement to Implement Vessel Operational Measures to Reduce Ship Strikes to North Atlantic Right Whales. National Marine Fisheries Service, Silver Spring, Md.

NMFS. 2014. North Atlantic right whale (*Eubalaena glacialis*): Western Atlantic Stock. NMFS Stock Assessment Report: April 2014. Available online: http://www.nmfs.noaa.gov/pr/sars/2013/ao2013_rightwhale-west-atl.pdf

Perry, S.L., D.P. DeMaster, and G.K. Silber, The great whales: and status of six species listed as endangered under the U.S. Endangered Species Act of 1973, Mar. Fish. Rev. Special Edition. 61(1):59-74, 1999.

Redfern, J. V., McKenna, M. F., Moore, T. J., Calambokidis, J., Deangelis, M. L., Becker, E. A., et al. 2013. Assessing the risk of ships striking large whales in marine spatial planning. Conservation Biology, 27(2), 292-302.

Richardson, W. J., K. J. Finley, G. W. Miller, R. A. Davis, and W. R. Koski. 1995. Feeding, Social and Migration Behavior of Bowhead Whales, Balaena-Mysticetus, in Baffin-Bay Vs the Beaufort Sea - Regions with Different Amounts of Human Activity. Marine Mammal Science 11(1):1-45.

Robbins, J., and D. K. Mattila. 2004. Estimating humpback whale (*Megaptera novaeangliae*) entanglement rates on the basis of scar evidence. Final report to the US National Marine Fisheries Service (unpublished). Available from the Center for Coastal Studies, Box 1036, Provincetown, MA 02657. 22 pp

SAFMC: South Atlantic Fishery Management Council. 2012. Snapper-Grouper Amendment 18A. Charleston, SC. Available online: http://safmc.net/Library/pdf/SG_Amend18A013112.pdf.

SAFMC: South Atlantic Fishery Management Council. 2013. Snapper-Grouper Regulatory Amendment 19. Charleston, SC. Available online:

http://sero.nmfs.noaa.gov/sustainable_fisheries/s_atl/sg/bsb/documents/pdfs/sa_reg_am19_final_052213.pdf.

SAFMC: South Atlantic Fishery Management Council. 2014. Snapper-Grouper Regulatory Amendment 16. Charleston, SC. Available online: http://safmc.net/sites/default/files/meetings/pdf/Advisory%20Panels/SG-Nov%2013/Attach6_SGReg16_DD_forSGAP.pdf.

SEDAR: Southeast Data Assessment and Review. 2002. SEDAR-02 South Atlantic black sea bass stock assessment. SEDAR, Charleston, SC.

SEDAR: Southeast Data Assessment and Review. 2012. SEDAR-25 South Atlantic black sea bass stock assessment. SEDAR, Charleston, SC.

Silber, G. K. and S. Bettridge. 2012. An assessment of the final rule to implement vessel speed restrictions to reduce the threat of vessel collisions with North Atlantic right whales. NOAA Tech. Memo. NMFS-OPR-48. 114 p

Vanderlaan, A. S. M., J. J. Corbett, S. L. Green, J. A. Callahan, C. Wang, R. D. Kenney, C. T. Taggart, and J. Firestone. 2009. Probability and mitigation of vessel encounters with North Atlantic right whales. Endangered Species Research, 6:273–285.

Vaughan, DS, MR Collins, and DJ Schmidt. 1995. Population characteristics of the black sea bass *Centropristis striata* from the southeastern U.S. Bulletin of Marine Science 56:250−267.

Vaughan, DS. 1996. Population characteristics of the black sea bass Centropristis striata from the U.S. southern Atlantic coast. Report to South Atlantic Fishery Management Council, Charleston, SC, 59 p.

Waring, G.T., E. Josephson, K. Maze-Foley, and P.E. Rosel, (eds). 2014. U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments – 2013. U.S. Department of Commerce, Woods Hole, MA. NOAA Technical Memorandum, 475p. http://www.nmfs.noaa.gov/pr/sars/pdf/ao2013_tm228.pdf

Wiley, D.N., R.A. Asmutis, T.D. Pitchford, and D.P. Gannon. 1995. Stranding and mortality of humpback whales, *Megaptera novaeangliae*, in the Mid-Atlantic and southeast United States, 1985-1992. Fishery Bulletin 93(1): 196-205.

Williams, R., and P. O'Hara. 2010. Modelling ship strike risk to fin, humpback and killer whales in British Columbia, Canada. Journal of Cetacean Research and Management 11:1–8.

Table 1. Estimated daily catch rates (lb gw) for Scenario 1 (observed 2008/09), Scenario 2 (monthly ratio 2008/09 applied to 2013/14 Oct catch rate), Scenario 3 (constant Oct 2013/14 catch rate), and Scenario 4 (mean observed 2006/07-2008/09) by fishing month.

Month	Status Quo	Scenario 1	Scenario 2	Scenario 3	Scenario 4	"Other Gear"
Jan	0	1,866	3,351	1,214	2,013	875
Feb	0	1,669	2,998	1,214	1,633	1,535
Mar	0	1,051	1,888	1,214	1,196	628
Apr	0	384	690	1,214	1,229	903
May	0	315	566	1,214	1,214	1,028
June	2,013	2,013	2,013	2,013	1,146	2,007
July	1,633	1,633	1,633	1,633	2,092	1,547
Aug	1,196	1,196	1,196	1,196	1,791	1,027
Sept	1,229	1,229	1,229	1,229	2,046	842
Oct	1,214	1,214	1,214	1,214	1,108	733
Nov	0	1,266	2,274	1,214	548	193
Dec	0	1,384	2,485	1,214	207	2,381

Table 2. Projected commercial black sea bass closure dates, percent of ACL reached, and risk of right whale entanglement in pot gear vertical lines (in relative risk units) under proposed Alternatives in Regulatory Amendment 16.

MEAN	CONDITION	Alt1	No Closure				Alt2				Alt3				Alt4				Alt5				Alt6				Alt7a			
		SQ	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Scenario A	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	12/5	10/12	10/28	12/3	12/30	12/22	12/18	12/30	12/24	12/11	12/11	12/23	12/29	12/21	12/18	12/29	10/11	8/18	10/6	10/7
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	14	10	10	14	2	2	2	2	2	2	2	2	2	2	2	2	74	74	74	74
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	48	47	47	48	0	0	0	0	37	37	37	37	0	0	0	0	94	94	94	94
Scenario B	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	12/3	10/17	11/4	12/2	12/28	12/19	12/18	12/29	12/18	12/2	12/8	12/17	n/a	12/25	12/20	n/a	10/12	8/20	10/9	10/9
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	26	21	21	26	8	8	8	8	2	1	1	2	8	8	8	8	69	69	69	69
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	30	29	29	30	2	2	2	2	43	42	42	43	0	0	0	0	77	77	77	77
Scenario C	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	11/26	10/4	10/26	11/19	12/20	12/7	12/11	12/19	12/16	12/1	12/6	12/15	12/20	12/7	12/10	12/19	10/11	8/18	10/6	10/7
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	17	13	13	16	4	3	3	3	2	2	2	2	4	3	3	3	71	71	71	71
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	44	43	43	44	1	1	1	1	34	33	33	34	0	0	0	0	84	84	84	84

MEAN	CONDITION	Alt1	Alt7b				Alt7c				Alt8a				Alt8b				Alt9a				Alt9b				Alt10			
		SQ	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Scenario A	Closure Date	n/a	n/a	12/30	12/21	n/a	12/28	12/17	12/14	12/29	12/11	10/24	10/31	12/9	n/a	12/30	12/21	n/a	10/31	9/20	10/15	10/27	n/a	12/28	12/20	n/a	n/a	12/29	12/20	n/a
	%ACL	97%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	98%	100%	100%	100%	100%	99%	100%	100%	99%	99%	100%	100%	99%
	RW Risk (NC)	0	81	80	77	81	80	76	75	81	14	13	13	14	55	54	51	55	26	26	26	26	65	64	61	65	59	58	55	59
	RW Risk (FL-SC)	0	98	97	92	98	91	85	83	92	40	38	38	39	81	79	74	81	62	62	62	62	90	87	83	90	81	79	74	81
Scenario B	Closure Date	n/a	12/28	12/18	12/17	12/28	12/22	12/9	12/11	12/23	12/7	10/25	11/5	12/6	12/29	12/20	12/18	12/29	11/9	9/27	10/19	11/3	12/26	12/15	12/14	12/26	12/27	12/17	12/16	12/28
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	86	78	77	86	92	82	83	93	36	30	31	36	68	61	59	68	51	48	48	49	87	78	78	87	74	66	65	75
	RW Risk (FL-SC)	0	73	70	70	73	70	67	67	71	50	48	49	50	65	62	61	65	57	56	56	56	71	68	68	71	65	62	62	66
Scenario C	Closure Date	n/a	n/a	12/27	12/19	n/a	12/27	12/16	12/13	12/28	12/6	10/17	10/29	12/5	n/a	12/28	12/20	n/a	10/28	9/15	10/13	10/24	12/31	12/24	12/17	n/a	n/a	12/25	12/18	n/a
	%ACL	97%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%
	RW Risk (NC)	0	89	84	77	89	96	86	83	97	19	17	17	19	65	60	53	65	35	35	35	35	82	77	70	82	71	71	71	71
	RW Risk (FL-SC)	0	92	89	84	92	85	78	76	86	37	36	36	37	76	74	68	76	56	56	56	56	84	79	74	84	77	72	68	77

WARM CONDITION		Alt1	No Closure				Alt2				Alt3				Alt4				Alt5				Alt6				Alt7a			
		SQ	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Scenario A	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	12/5	10/12	10/28	12/3	12/30	12/22	12/18	12/30	12/24	12/11	12/11	12/23	12/29	12/21	12/18	12/29	10/11	8/18	10/6	10/7
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	14	10	10	14	2	2	2	2	2	2	2	2	2	2	2	2	74	74	74	74
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	33	32	32	33	0	0	0	0	13	12	12	13	0	0	0	0	96	96	96	96
Scenario B	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	12/3	10/17	11/4	12/2	12/28	12/19	12/18	12/29	12/18	12/2	12/8	12/17	n/a	12/25	12/20	n/a	10/12	8/20	10/9	10/9
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	26	21	21	26	8	8	8	8	2	1	1	2	8	8	8	8	69	69	69	69
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	17	16	16	17	1	1	1	1	15	15	15	15	0	0	0	0	82	82	82	82
Scenario C	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	11/26	10/4	10/26	11/19	12/20	12/7	12/11	12/19	12/16	12/1	12/6	12/15	12/20	12/7	12/10	12/19	10/11	8/18	10/6	10/7
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	17	13	13	16	4	3	3	3	2	2	2	2	4	3	3	3	71	71	71	71
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	31	30	30	31	0	0	0	0	11	11	11	11	0	0	0	0	91	91	91	91

WARM CONDITION		Alt1	Alt7b				Alt7c				Alt8a				Alt8b				Alt9a				Alt9b				Alt10			
		SQ	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Scenario A	Closure Date	n/a	n/a	12/30	12/21	n/a	12/28	12/17	12/14	12/29	12/11	10/24	10/31	12/9	n/a	12/30	12/21	n/a	10/31	9/20	10/15	10/27	n/a	12/28	12/20	n/a	n/a	12/29	12/20	n/a
	%ACL	97%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	98%	100%	100%	100%	100%	99%	100%	100%	99%	99%	100%	100%	99%
	RW Risk (NC)	0	81	80	77	81	80	76	75	81	14	13	13	14	55	54	51	55	26	26	26	26	65	64	61	65	59	58	55	59
	RW Risk (FL-SC)	0	106	105	99	106	96	89	87	97	14	13	13	14	84	83	77	84	46	46	46	46	90	88	82	90	84	82	77	84
Scenario B	Closure Date	n/a	12/28	12/18	12/17	12/28	12/22	12/9	12/11	12/23	12/7	10/25	11/5	12/6	12/29	12/20	12/18	12/29	11/9	9/27	10/19	11/3	12/26	12/15	12/14	12/26	12/27	12/17	12/16	12/28
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	86	78	77	86	92	82	83	93	36	30	31	36	68	61	59	68	51	48	48	49	87	78	78	87	74	66	65	75
	RW Risk (FL-SC)	0	84	80	80	84	82	77	78	83	22	21	21	22	68	64	63	68	31	30	30	30	72	67	67	72	68	64	64	69
Scenario C	Closure Date	n/a	n/a	12/27	12/19	n/a	12/27	12/16	12/13	12/28	12/6	10/17	10/29	12/5	n/a	12/28	12/20	n/a	10/28	9/15	10/13	10/24	12/31	12/24	12/17	n/a	n/a	12/25	12/18	n/a
	%ACL	97%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%
	RW Risk (NC)	0	89	84	77	89	96	86	83	97	19	17	17	19	65	60	53	65	35	35	35	35	82	77	70	82	71	71	71	71
	RW Risk (FL-SC)	0	103	99	92	103	99	91	88	100	14	13	13	14	89	86	79	89	41	41	41	41	93	87	82	94	89	84	78	89

COLD CONDITION		Alt1	No Closure				Alt2				Alt3				Alt4				Alt5				Alt6				Alt7a			
		SQ	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Scenario A	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	12/5	10/12	10/28	12/3	12/30	12/22	12/18	12/30	12/24	12/11	12/11	12/23	12/29	12/21	12/18	12/29	10/11	8/18	10/6	10/7
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	14	10	10	14	2	2	2	2	2	2	2	2	2	2	2	2	74	74	74	74
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	52	51	51	52	0	0	0	0	52	52	52	52	0	0	0	0	95	95	95	95
Scenario B	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	12/3	10/17	11/4	12/2	12/28	12/19	12/18	12/29	12/18	12/2	12/8	12/17	n/a	12/25	12/20	n/a	10/12	8/20	10/9	10/9
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	26	21	21	26	8	8	8	8	2	1	1	2	8	8	8	8	69	69	69	69
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	37	36	36	37	3	3	3	3	58	57	58	58	0	0	0	0	82	82	82	82
Scenario C	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	11/26	10/4	10/26	11/19	12/20	12/7	12/11	12/19	12/16	12/1	12/6	12/15	12/20	12/7	12/10	12/19	10/11	8/18	10/6	10/7
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	17	13	13	16	4	3	3	3	2	2	2	2	4	3	3	3	71	71	71	71
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	51	51	51	51	1	1	1	1	48	48	48	48	0	0	0	0	87	87	87	87

COLD CONDITION		Alt1	Alt7b				Alt7c				Alt8a				Alt8b				Alt9a				Alt9b				Alt10			
		SQ	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Scenario A	Closure Date	n/a	n/a	12/30	12/21	n/a	12/28	12/17	12/14	12/29	12/11	10/24	10/31	12/9	n/a	12/30	12/21	n/a	10/31	9/20	10/15	10/27	n/a	12/28	12/20	n/a	n/a	12/29	12/20	n/a
	%ACL	97%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	98%	100%	100%	100%	100%	99%	100%	100%	99%	99%	100%	100%	99%
	RW Risk (NC)	0	81	80	77	81	80	76	75	81	14	13	13	14	55	54	51	55	26	26	26	26	65	64	61	65	59	58	55	59
	RW Risk (FL-SC)	0	92	92	89	92	86	83	82	86	54	53	53	54	82	82	79	82	72	72	72	72	89	88	85	89	83	82	79	83
Scenario B	Closure Date	n/a	12/28	12/18	12/17	12/28	12/22	12/9	12/11	12/23	12/7	10/25	11/5	12/6	12/29	12/20	12/18	12/29	11/9	9/27	10/19	11/3	12/26	12/15	12/14	12/26	12/27	12/17	12/16	12/28
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	86	78	77	86	92	82	83	93	36	30	31	36	68	61	59	68	51	48	48	49	87	78	78	87	74	66	65	75
	RW Risk (FL-SC)	0	74	72	72	74	71	70	70	72	64	63	63	64	72	70	70	72	69	68	68	69	76	75	75	76	72	70	70	72
Scenario C	Closure Date	n/a	n/a	12/27	12/19	n/a	12/27	12/16	12/13	12/28	12/6	10/17	10/29	12/5	n/a	12/28	12/20	n/a	10/28	9/15	10/13	10/24	12/31	12/24	12/17	n/a	n/a	12/25	12/18	n/a
	%ACL	97%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%
	RW Risk (NC)	0	89	84	77	89	96	86	83	97	19	17	17	19	65	60	53	65	35	35	35	35	82	77	70	82	71	71	71	71
	RW Risk (FL-SC)	0	88	87	84	88	82	78	77	82	52	51	51	52	78	76	73	78	67	67	67	67	83	81	78	83	78	75	73	78

Sensitivity Runs: Mean, warm, and cold conditions whale distributions, catch rate projection scenarios 1-4 (i.e., observed 2008/09 winter catch rates, observed 2013/14 summer catch rates scaled to account for higher winter CPUE, observed 2013/14 summer catch rates, and mean observed 2006/07-2008/09 winter catch rates) and spatial fishing distribution scenarios A-C (i.e., based on Nov-Apr 2008/09 pot distribution with 2013/14 soak times, based on 2013/14 June-October pot distribution and soak times, based on mean Nov-Apr 2006/07-2008/09 pot distribution with 2013/14 soak times).

Table 3. Ranked projected risk of right whale entanglement in pot gear vertical lines (in relative risk units; RRU) under proposed Alternatives in Regulatory Amendment 16.

NARW Protection	Alternative
Most Protective	**Alternative 1:** no relative risk of entanglement (0 RRU)
	Alternative 6: low increase in relative risk off NC (+2-8 RRU); no additional risk off FL-SC (0 RRU).
	Alternative 4: low increase in relative risk off NC (+2-8 RRU); low increase in relative risk off FL-SC (+0-3 RRU).
	Alternative 5: low increase in relative risk off NC (+1-2 RRU); low to high increase in relative risk off FL-SC (+11-58 RRU).
	Alternative 3: low to moderate increase in relative risk off NC (+10-26 RRU); low to high increase in relative risk off FL-SC (+16-52 RRU).
	Alternative 8a: low to moderate increase in relative risk off NC (+13-36 RRU); low to high increase in relative risk off FL-SC (+13-64 RRU).
	Alternative 9a: moderate to high increase in relative risk off NC (+26-51 RRU); moderate to high increase in relative risk off FL-SC (+30-72 RRU).
	Alternative 7a: high increase in relative risk off NC (+69-74 RRU); very high increase in relative risk off FL-SC (+77-96 RRU).
	Alternative 8b: high increase in relative risk off NC (+51-68 RRU); high to very high increase in relative risk off FL-SC (+61-89 RRU).
	Alternative 10: high to very high increase in relative risk off NC (+55-75 RRU); high to very high increase in relative risk off FL-SC (+62-89 RRU).
	Alternative 9b: high to very high increase in relative risk off NC (+61-87 RRU); high to very high increase in relative risk off FL-SC (+67-94 RRU).
	Alternative 7c: high to very high increase in relative risk off NC (+75-97 RRU) and off FL-SC (+67-100 RRU).
	Alternative 7b: very high increase in relative risk off NC (+77-89 RRU); high to very high increase in relative risk off FL-SC (+70-106 RRU).
Least Protective	**Alternative 2:** very high increase in relative risk off NC (+100 RRU over status quo) and off FL-SC (+100 RRU).
Risk Classification	1-25 RRU = low, 26-50 RRU = moderate, 51-75 RRU= high, 76-100+ RRU = very high

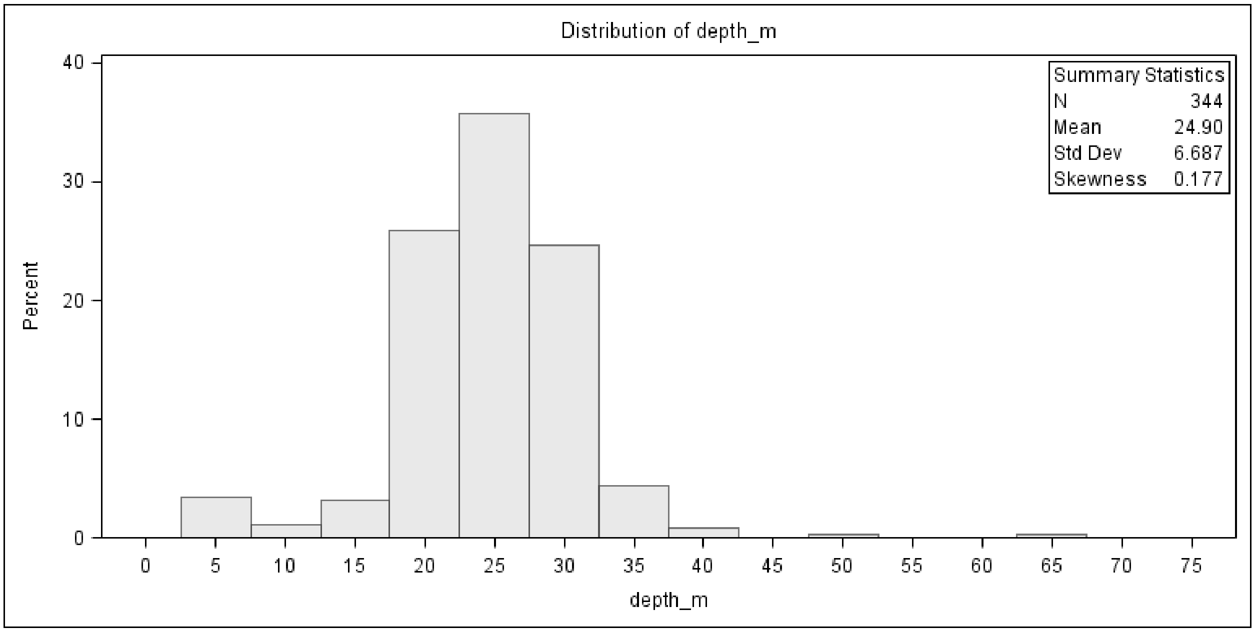


Figure 1. Histogram of reported depth of fishing (m) by commercial black sea bass pot gear endorsement holders for the 2012/13 and 2013/14 fishing seasons.

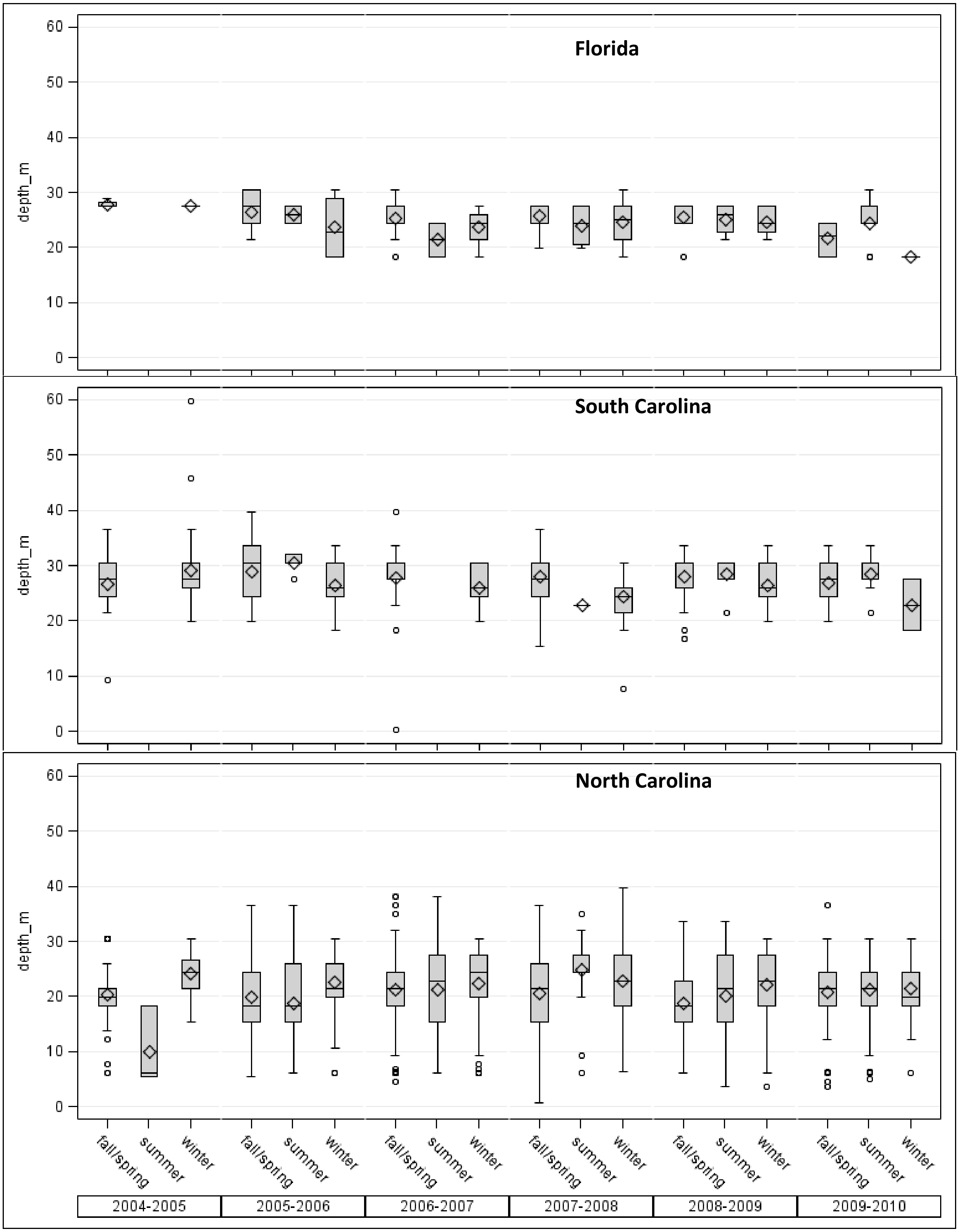


Figure 2. Boxplots of captain-reported depth of fishing (ft) for black sea bass pot gear endorsement holders, by state, fishing year, and season (summer: Jul-Aug, winter: Dec-Feb, fall/spring: Mar-Jun, Sept-Nov).

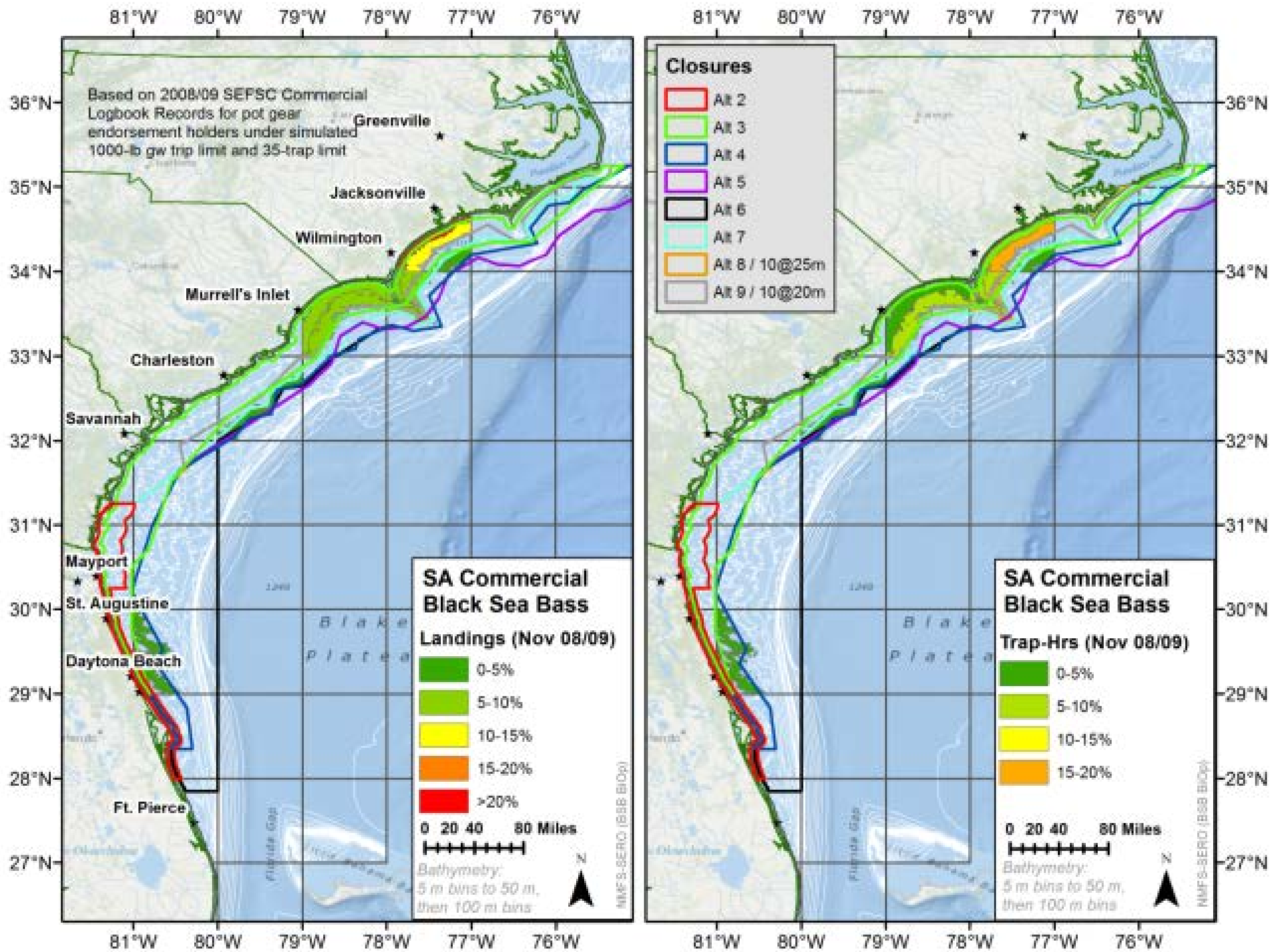


Figure 3: Scenario A (November). Spatial distribution of reported South Atlantic commercial black sea bass pot gear endorsement holder landings and effort under Amendment 18A regulations, by area and depth, for (A)-(F) most recent winter season (2008/09; by month) ['Scenario A'], (G) most recent season (2013/14) ['Scenario B'], and (H)-(M) mean of last three (2006/07-2008/09) winter seasons ['Scenario C']. Landings and effort are aggregated into 5-m wide by 1° tall bins and expressed as percentages of the total to maintain confidentiality. Bathymetry and shoreline courtesy ESRI Ocean Basemap.

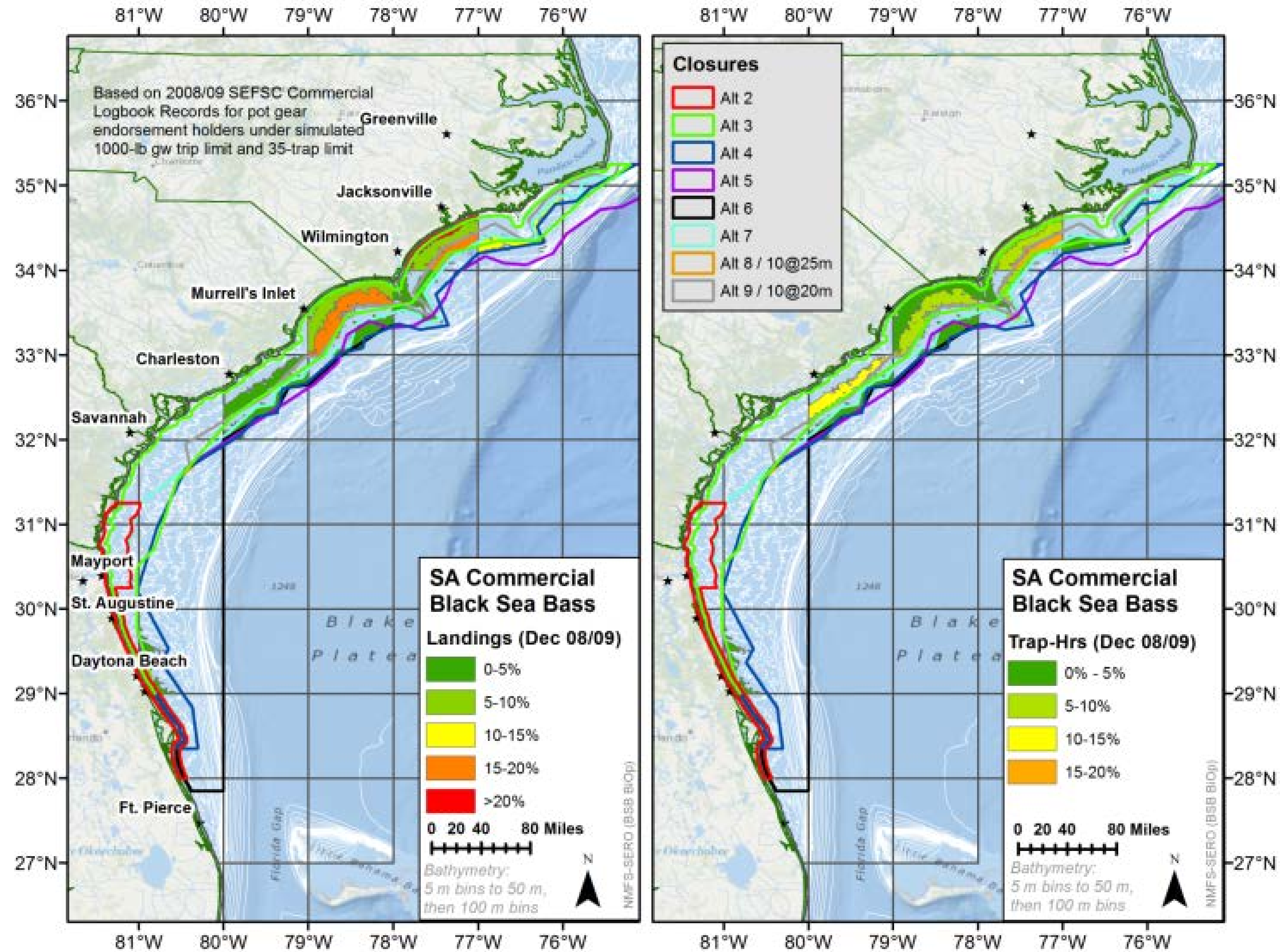


Figure 3B: Scenario A (December)

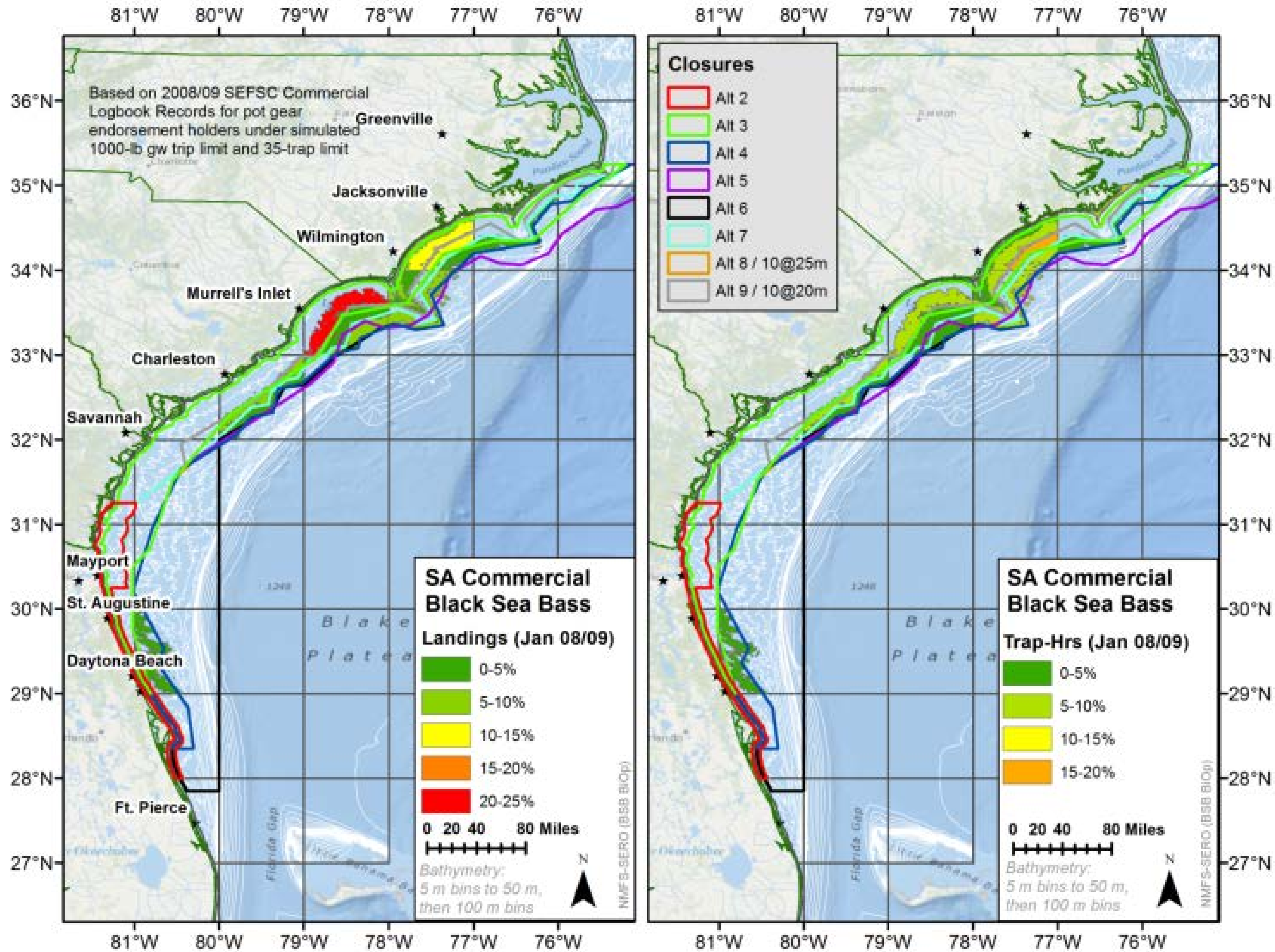


Figure 3C: Scenario A (January)

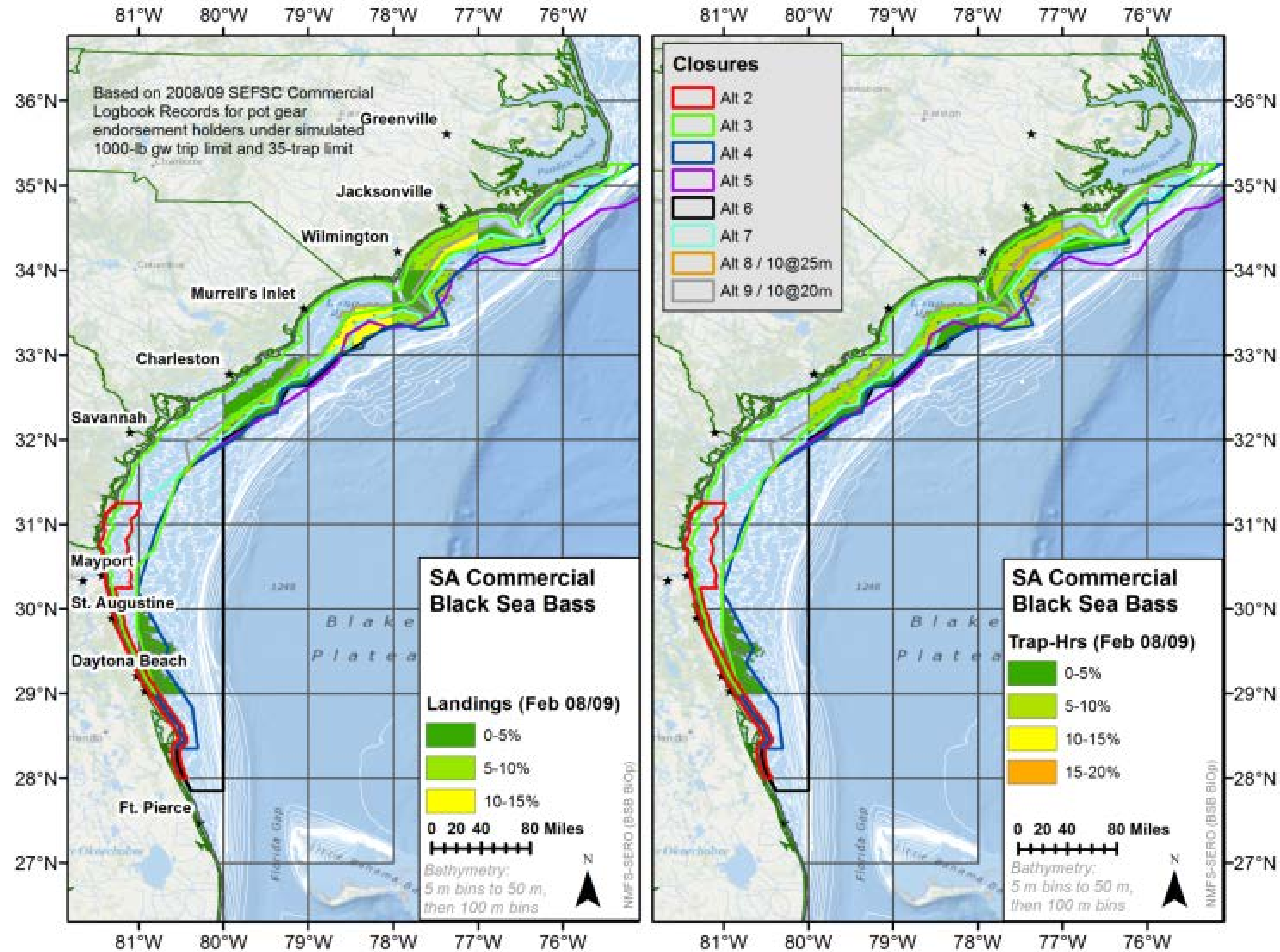


Figure 3D: Scenario A (February)

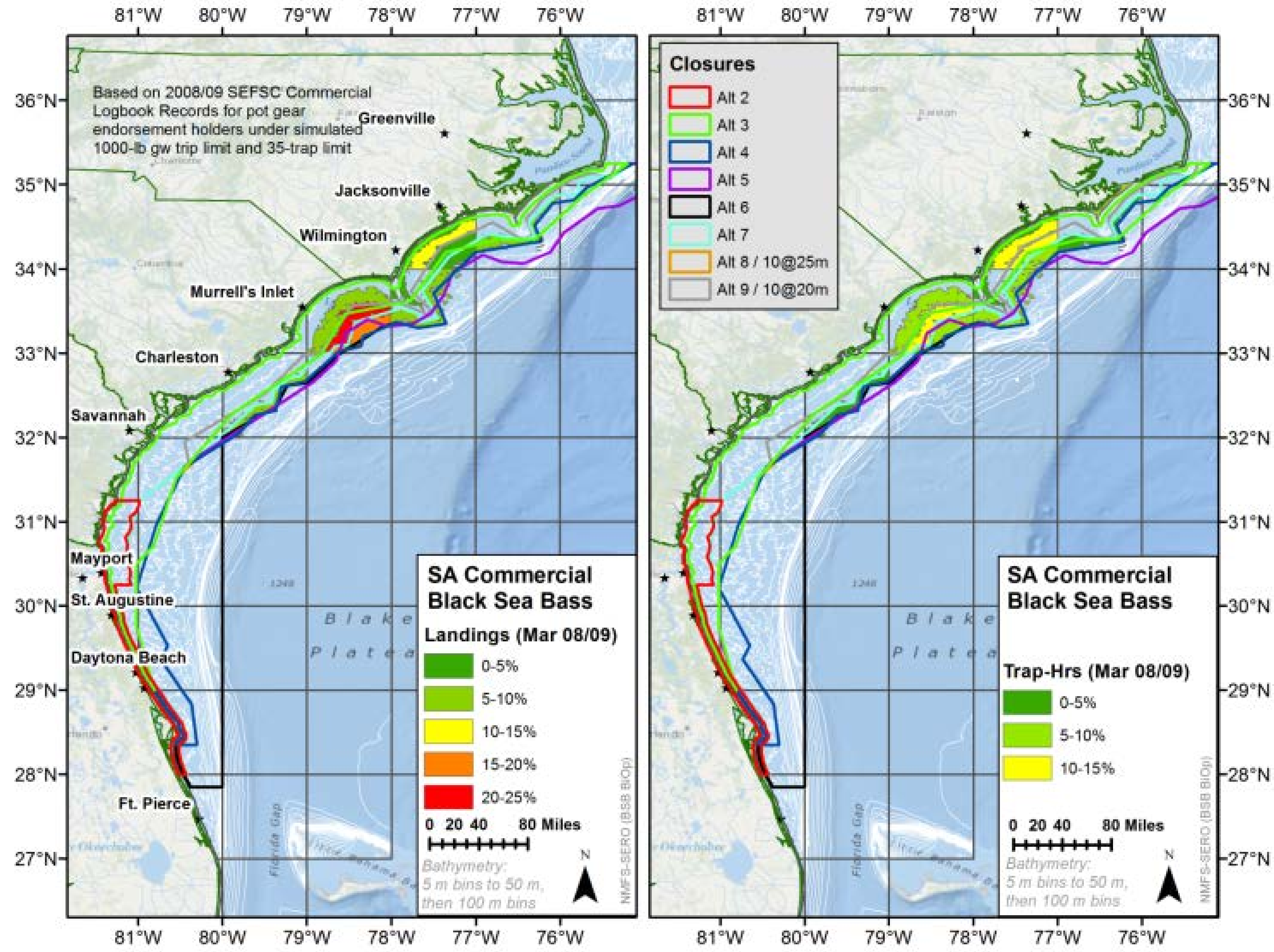


Figure 3E: Scenario A (March)

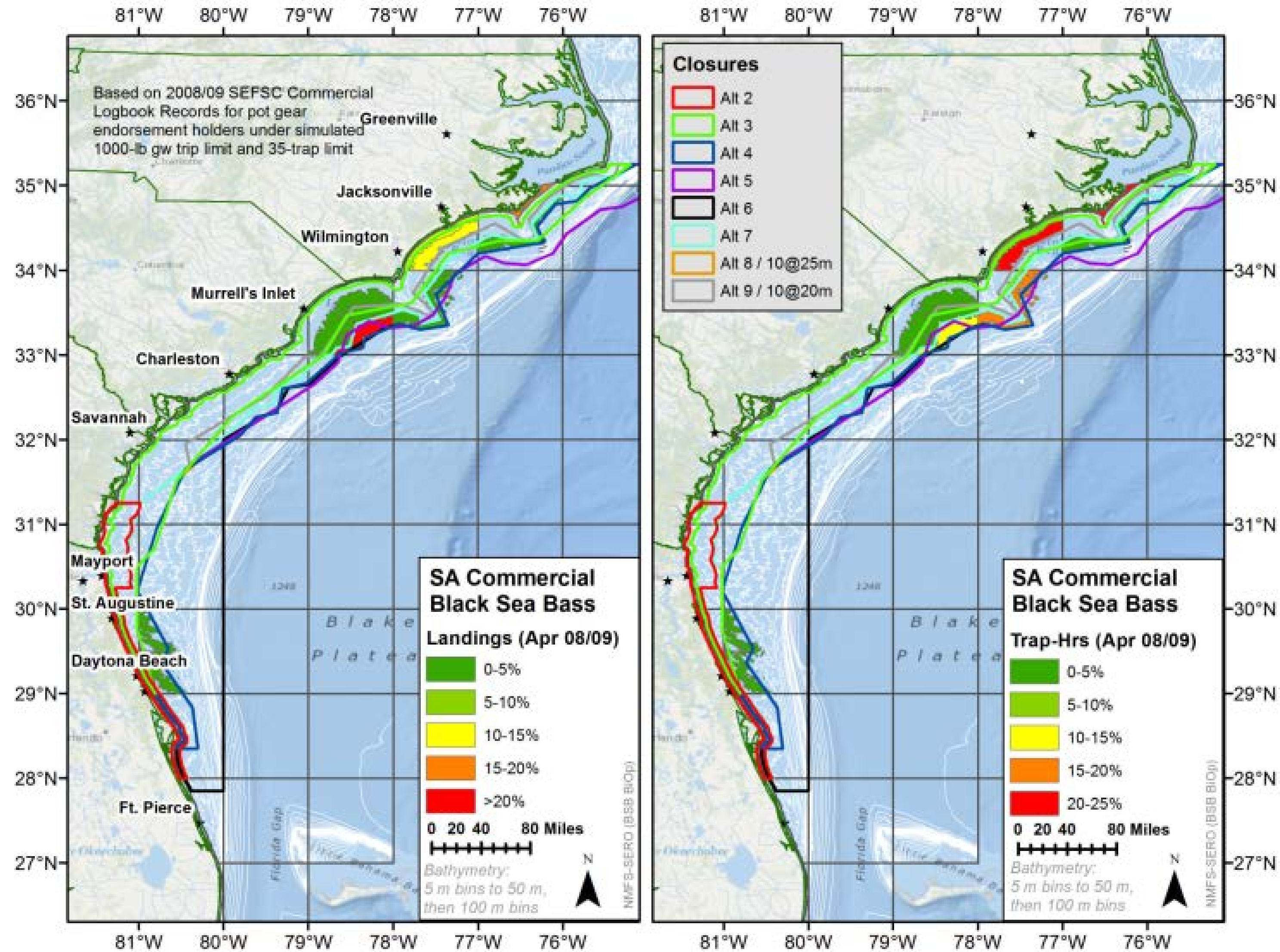


Figure 3F: Scenario A (April)

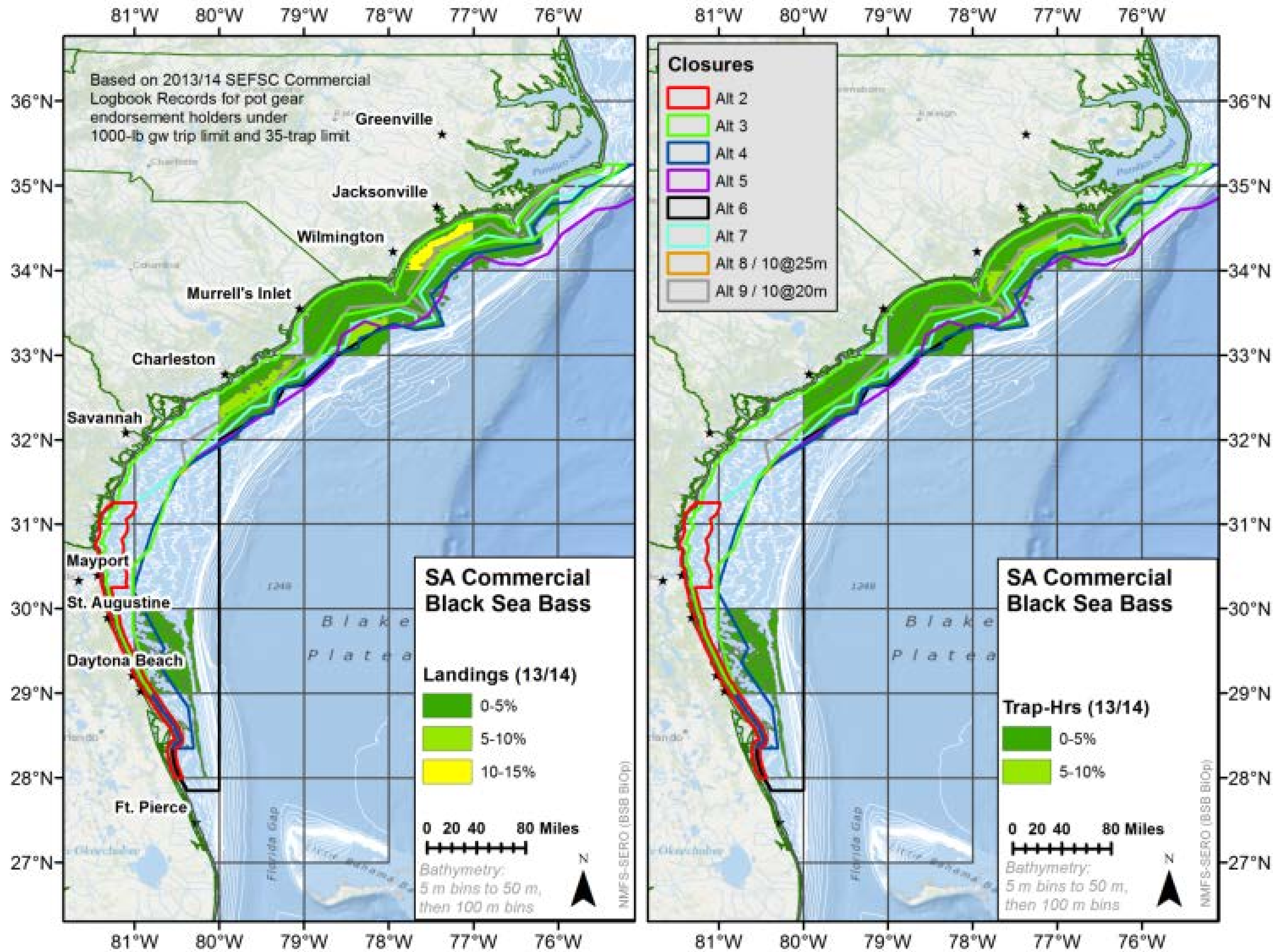


Figure 3G: Scenario B (Nov-Apr)

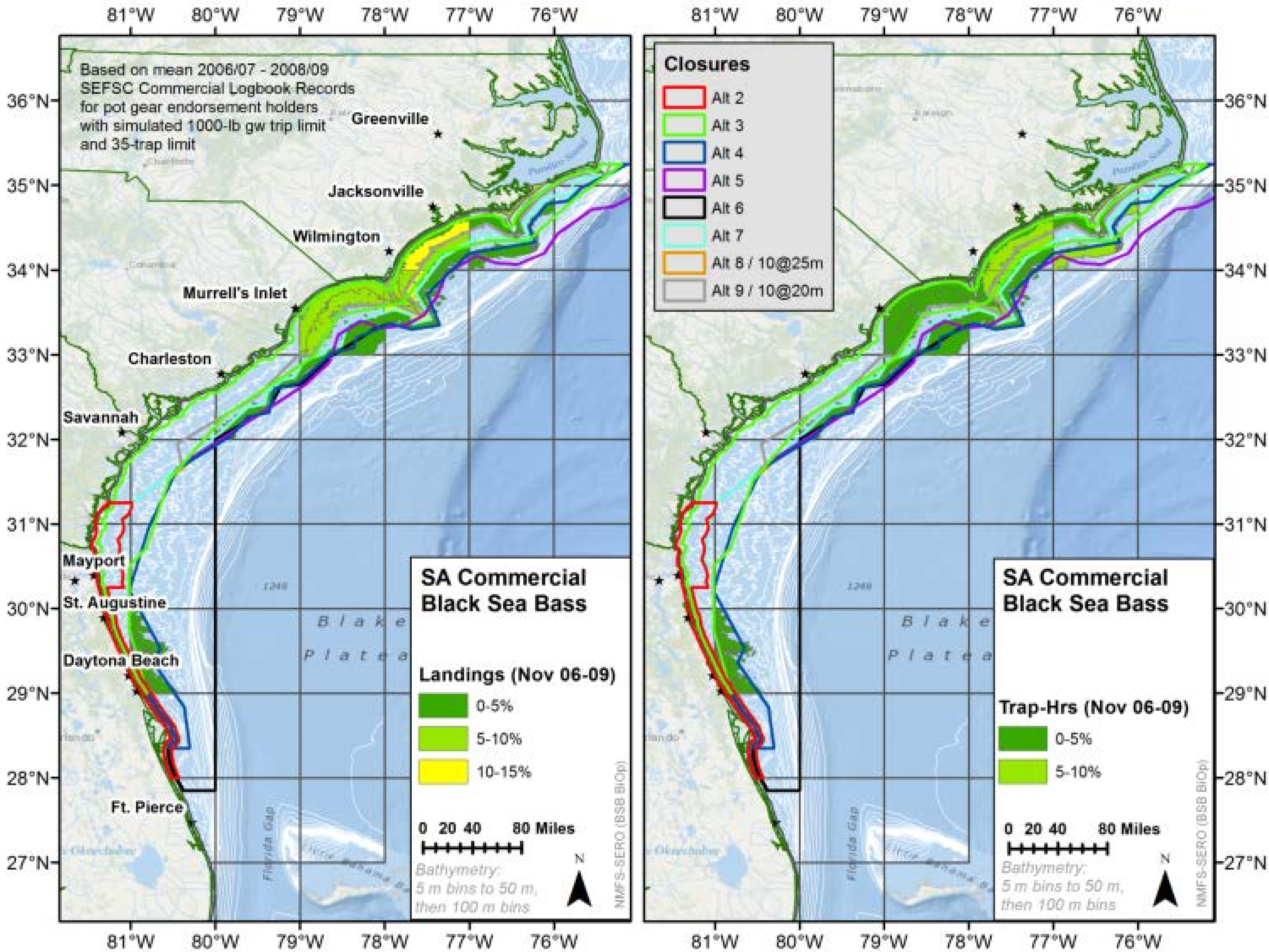


Figure 3H: Scenario C (November)

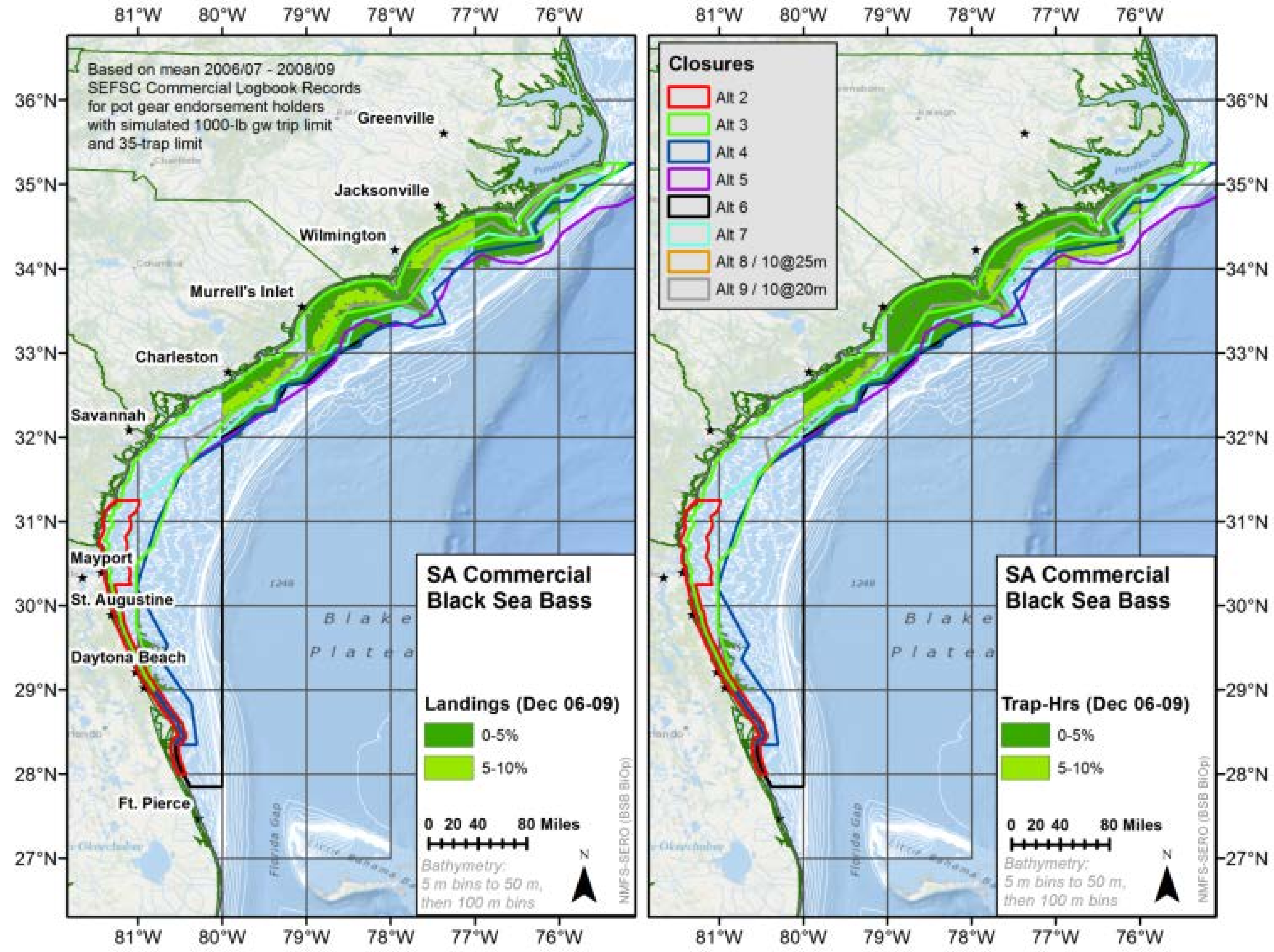


Figure 3I: Scenario C (December)

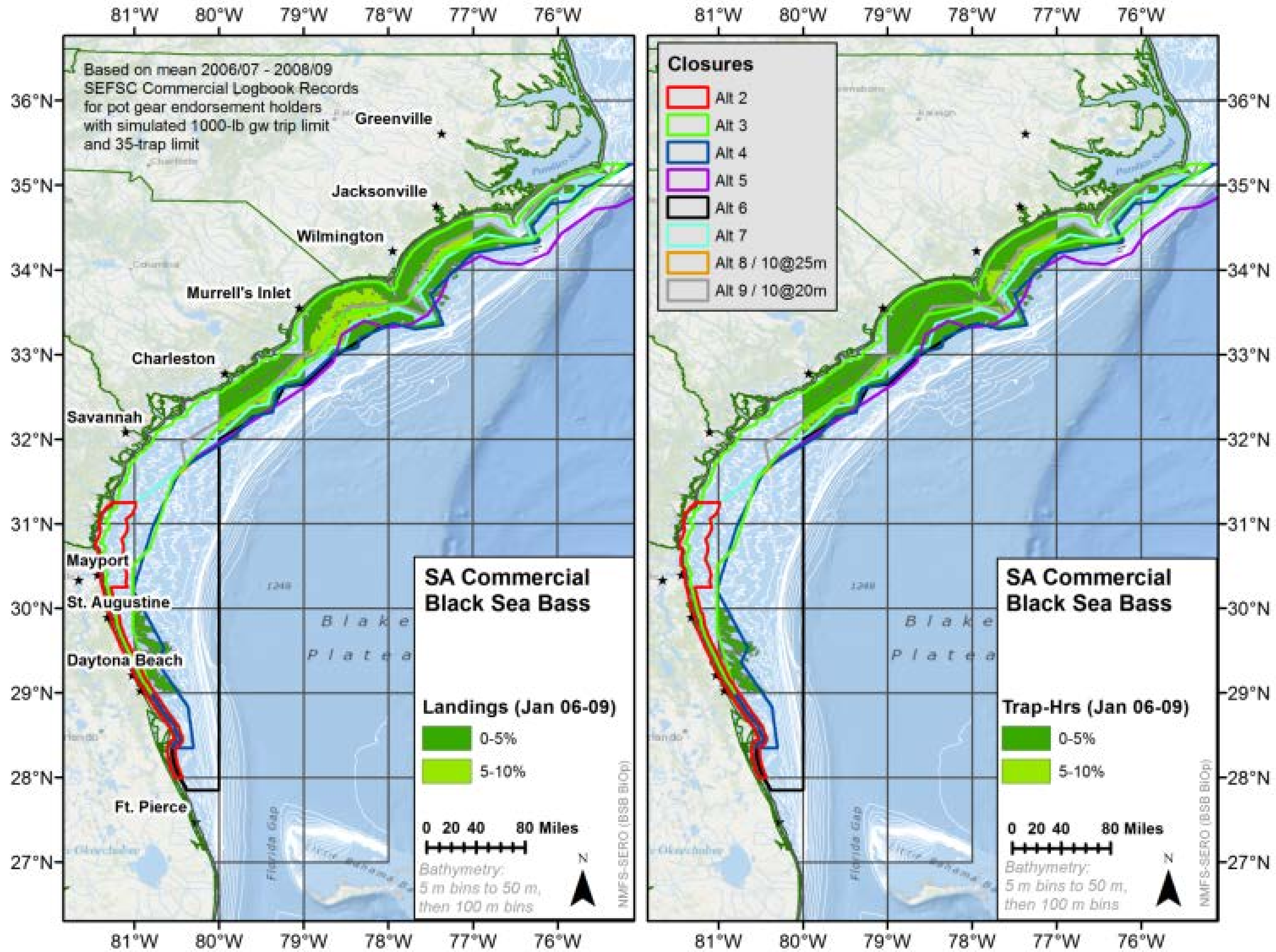


Figure 3J: Scenario C (January)

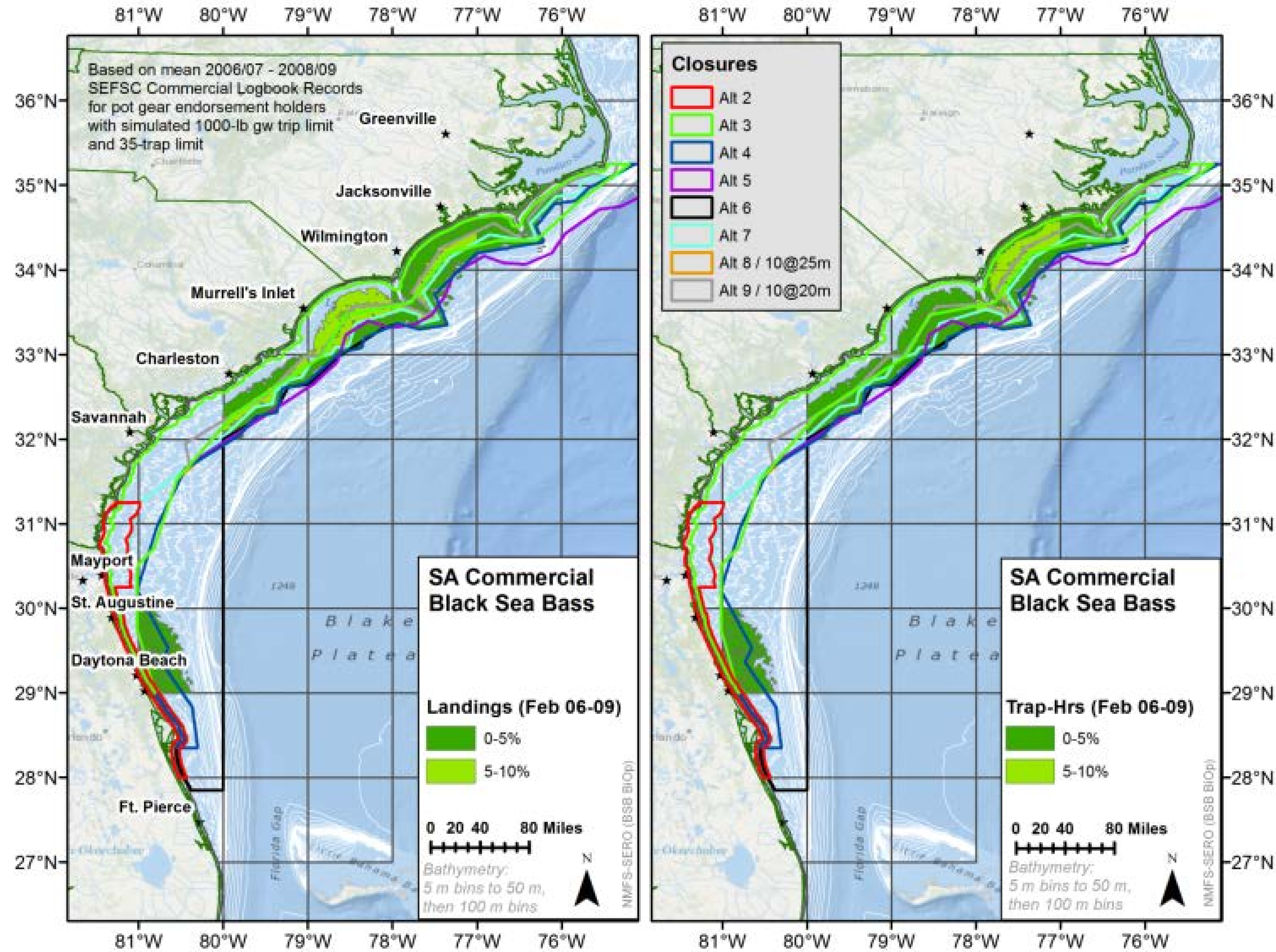


Figure 3K: Scenario C (February)

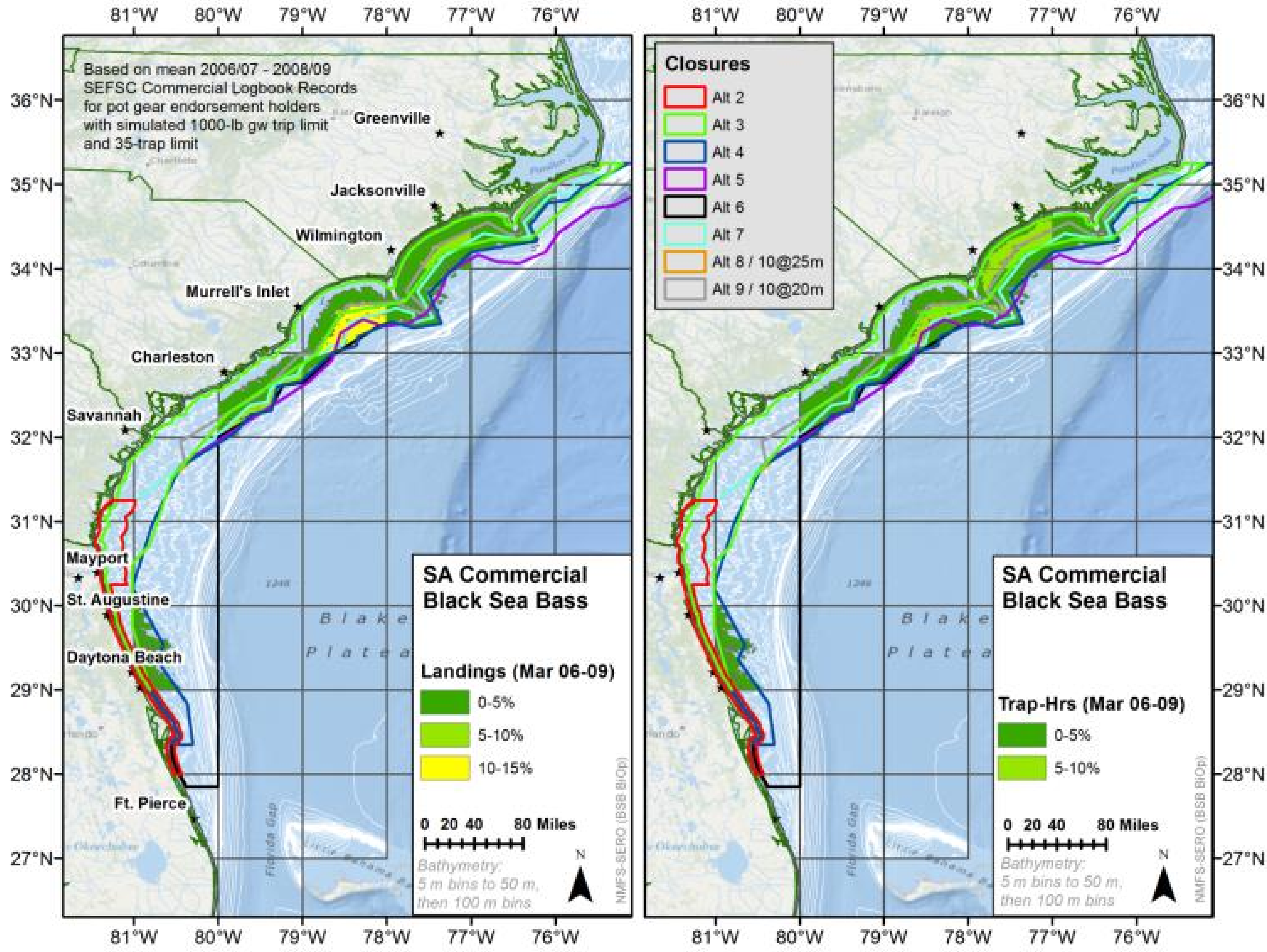


Figure 3L: Scenario C (March)

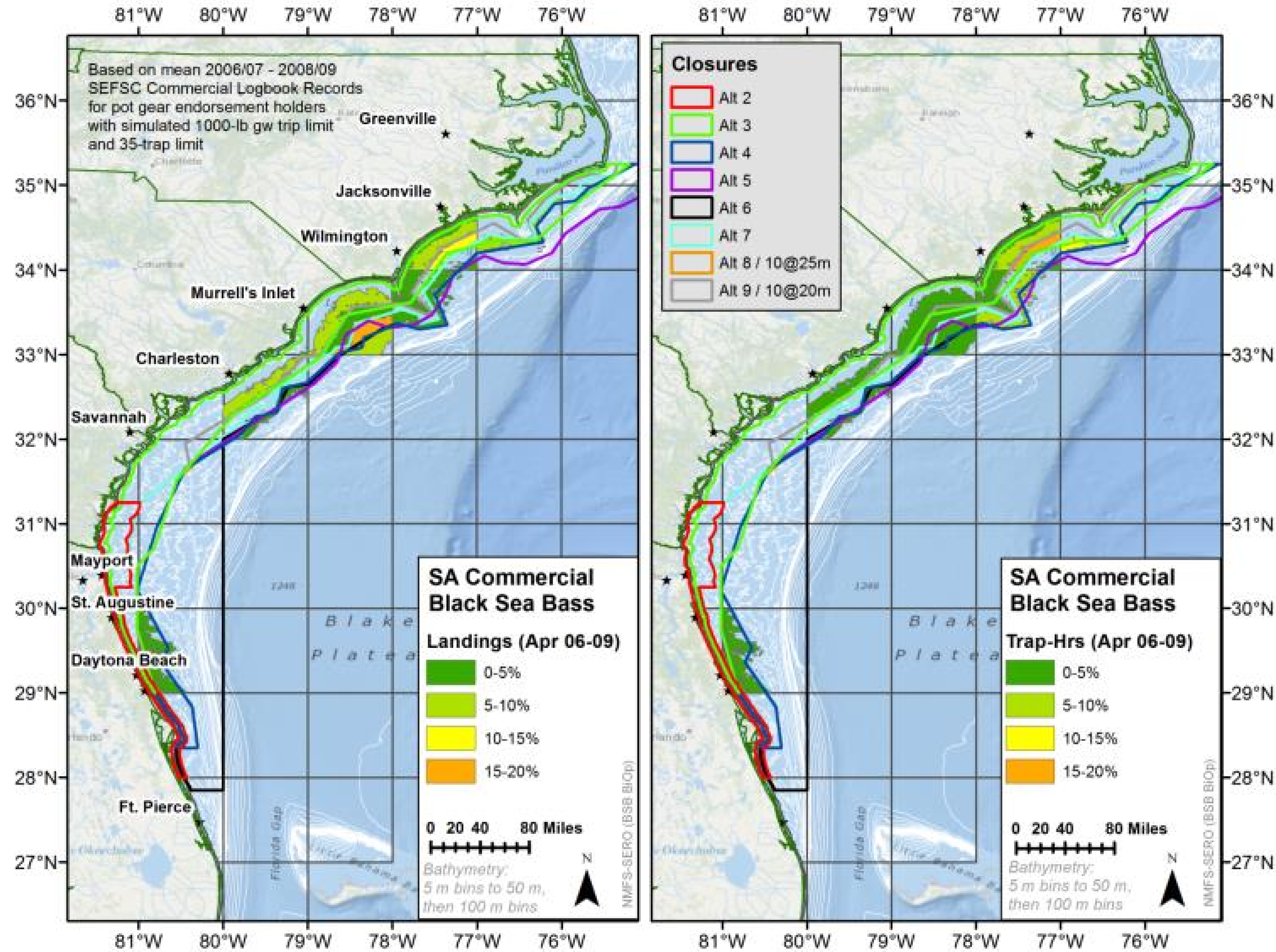


Figure 3M: Scenario C (Apr)

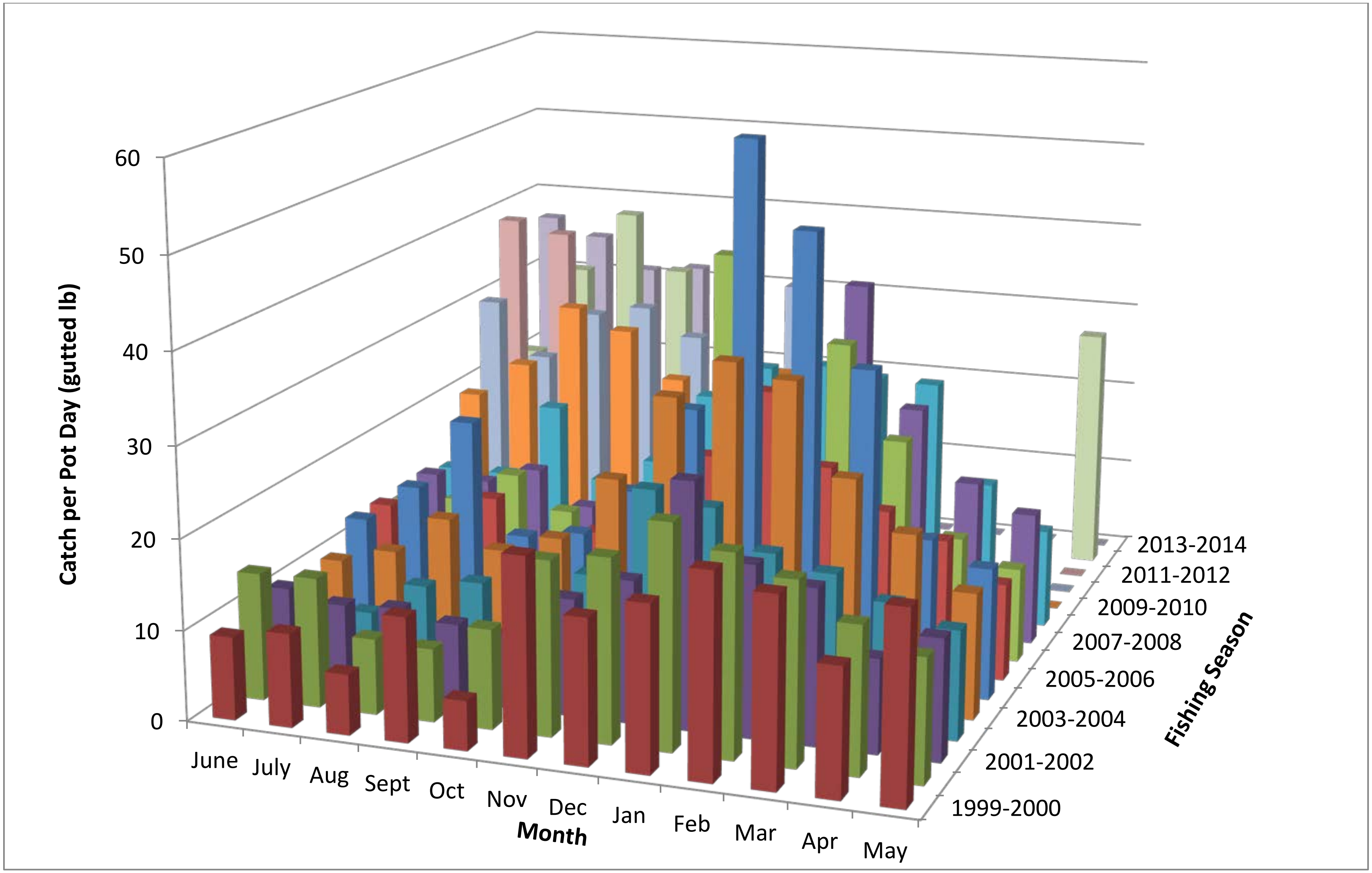


Figure 4. Catch-per-pot day by commercial black sea bass pot gear endorsement holders by fishing month and season, as reported to SEFSC Commercial Logbooks (accessed 20 Feb 2014). Note the shift from high winter catch rates to high summer catch rates as derby conditions emerged in the later years.

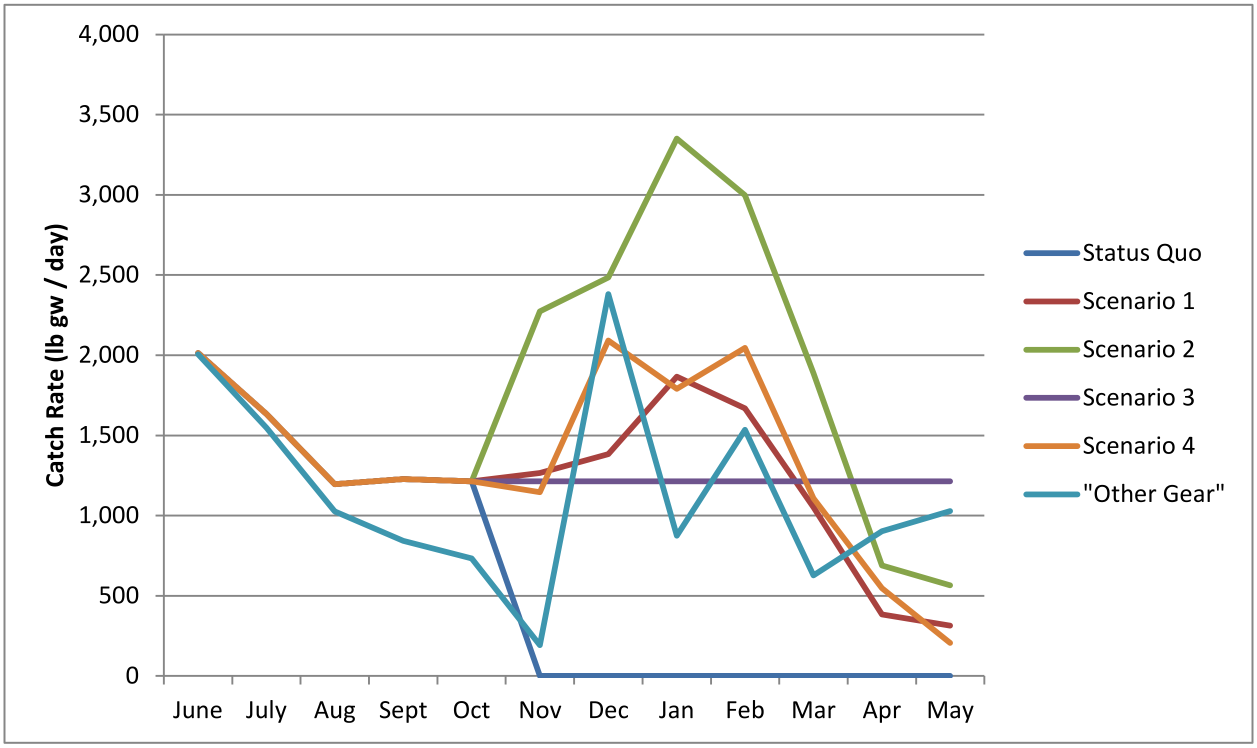


Figure 5. Black sea bass commercial pot endorsement holder projected catch rate, expressed as landings in gutted pounds per day of fishing, for three scenarios as well as status quo and other gear catch rate.

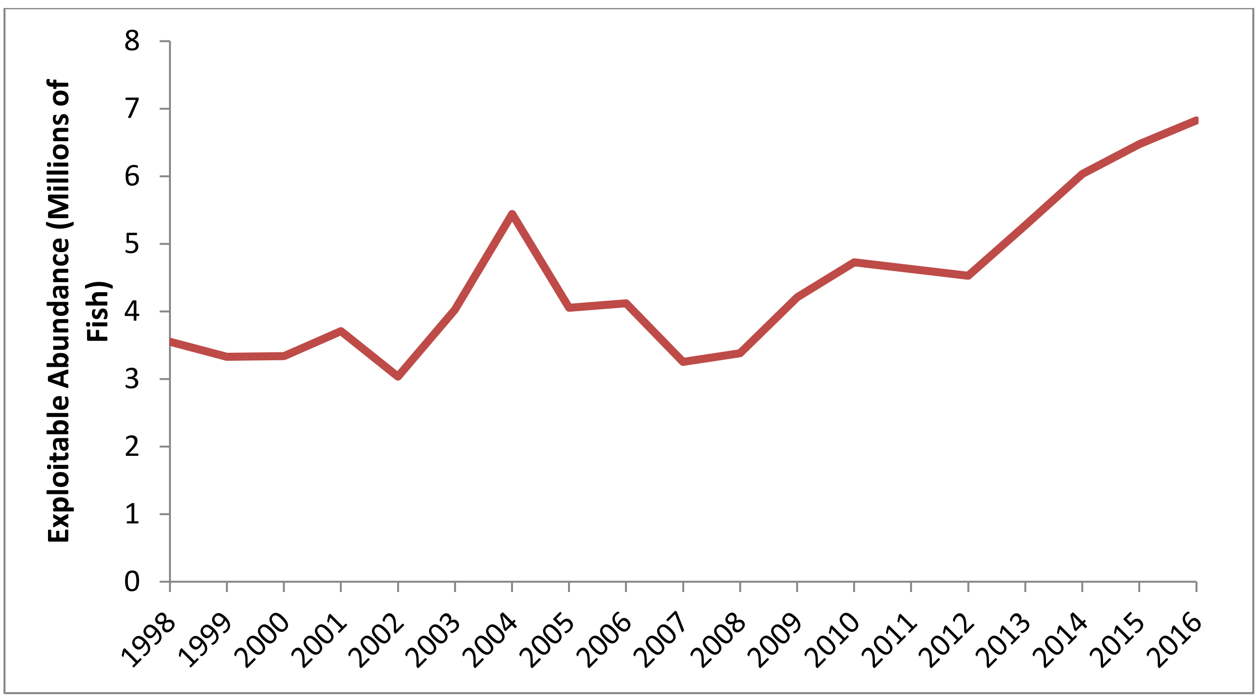


Figure 6. Abundance (in millions of fish) available to black sea bass commercial pot gear, from SEDAR-25 (2012) assessment.

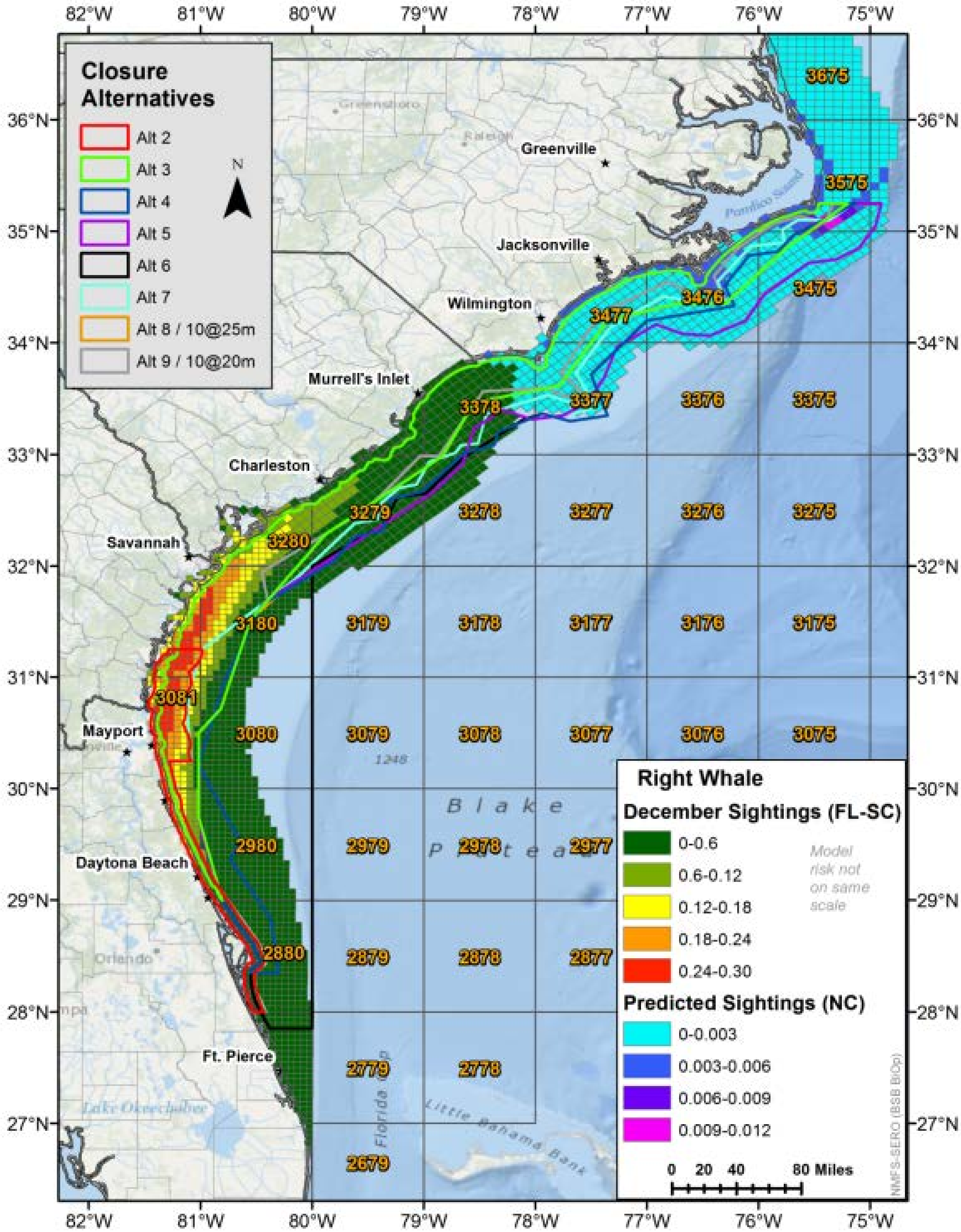


Figure 7A. December right whale predicted distribution based on modeled right whale habitat from right whale sightings from 2003/2004 through 2012/2013 (Gowan and Ortega-Ortiz 2014, Gowan pers. comm.). Note NC model is not time-dynamic due to limited sampling. Note December abundance was used as a proxy for November, which was not modeled due to limited sampling. National Marine Fisheries Service commercial logbook reporting grids are labeled in orange. Bathymetry and shoreline courtesy ESRI Ocean Basemap. NC and FL-SC predictions are not directly comparable in scale.

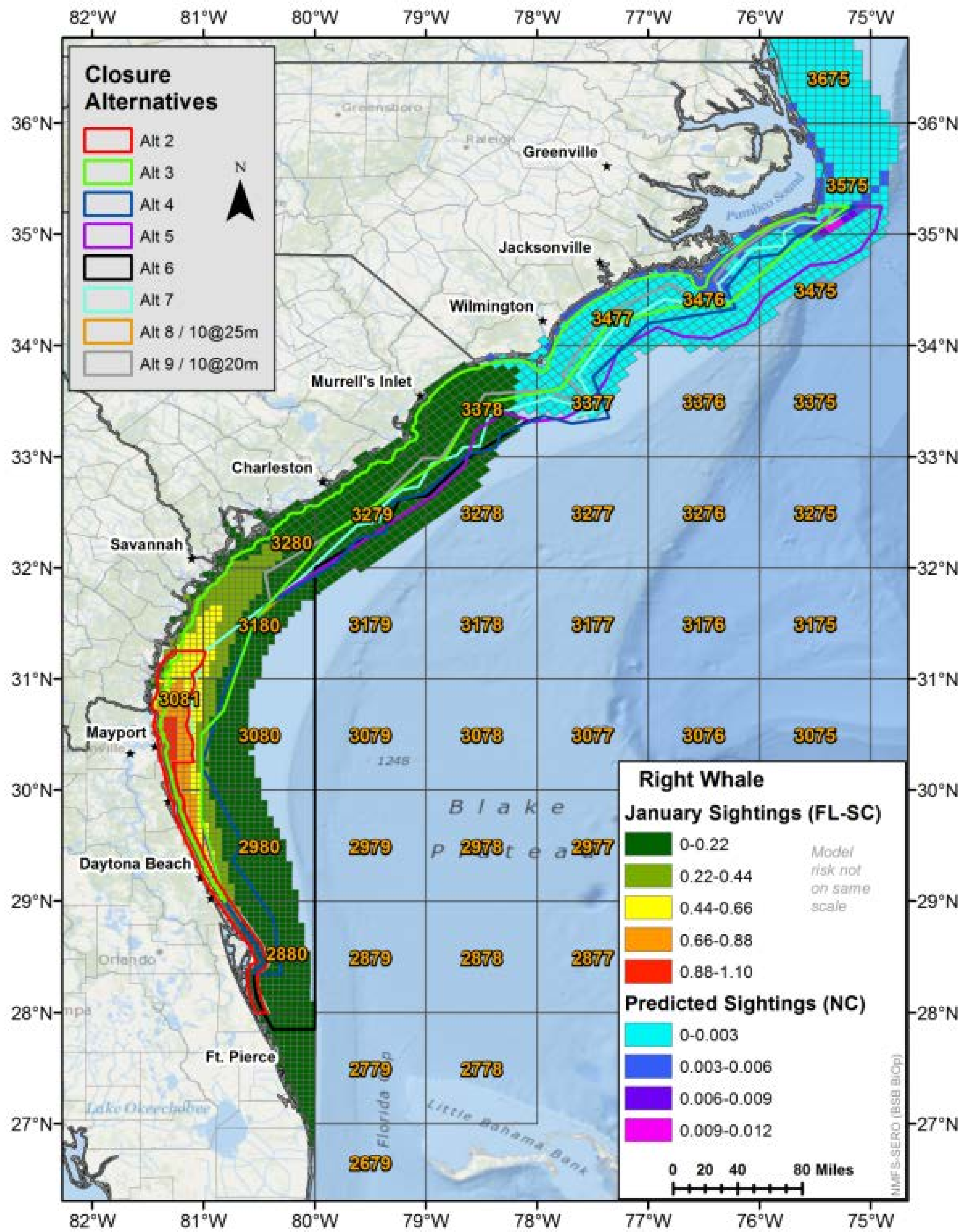


Figure 7B. January right whale predicted distribution based on modeled habitat from right whale sightings from 2003/2004 through 2012/2013. Note NC model is not time-dynamic due to limited sampling. National Marine Fisheries Service commercial logbook reporting grids are labeled in orange. Bathymetry and shoreline courtesy ESRI Ocean Basemap. NC and FL-SC predictions are not directly comparable in scale.

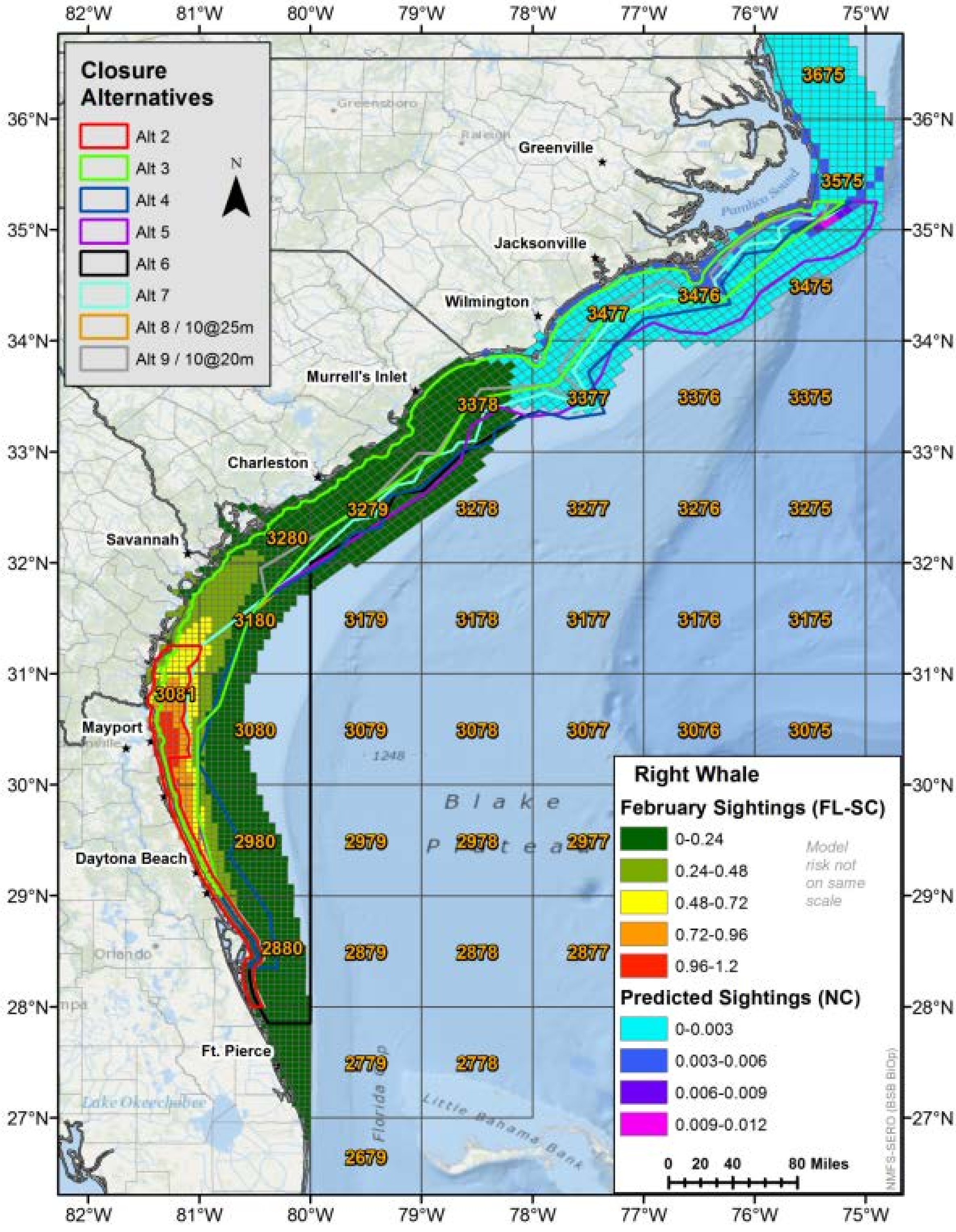


Figure 7C. February right whale predicted distribution based on modeled habitat from right whale sightings from 2003/2004 through 2012/2013. Note NC model is not time-dynamic due to limited sampling. National Marine Fisheries Service commercial logbook reporting grids are labeled in orange. Bathymetry and shoreline courtesy ESRI Ocean Basemap. NC and FL-SC predictions are not directly comparable in scale.

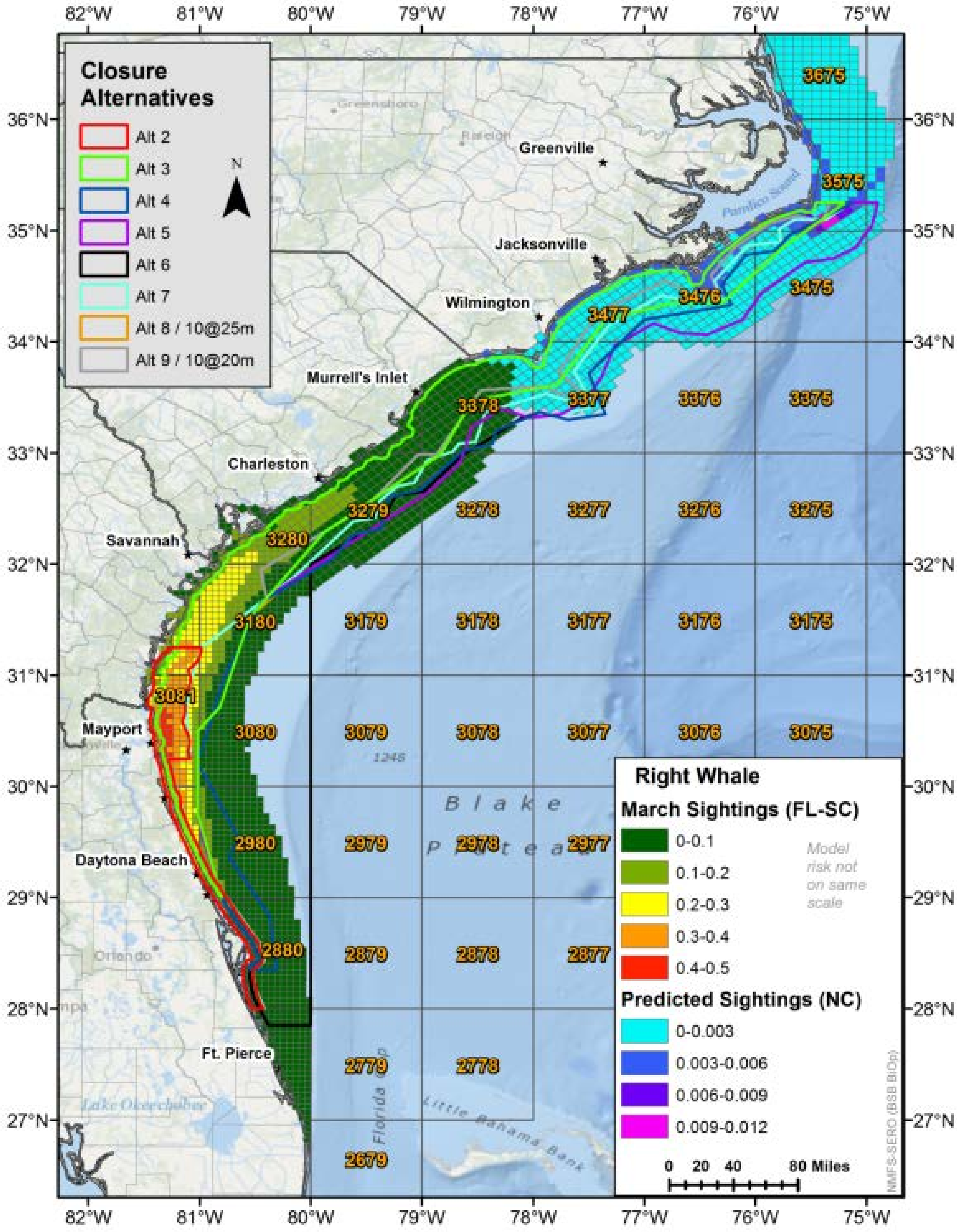


Figure 7D. March right whale predicted distribution based on modeled habitat from right whale sightings from 2003/2004 through 2012/2013. Note NC model is not time-dynamic due to limited sampling. Note March abundance was used as a proxy for April, which was not modeled due to limited sampling. National Marine Fisheries Service commercial logbook reporting grids are labeled in orange. Bathymetry and shoreline courtesy ESRI Ocean Basemap. NC and FL-SC predictions are not directly comparable in scale.

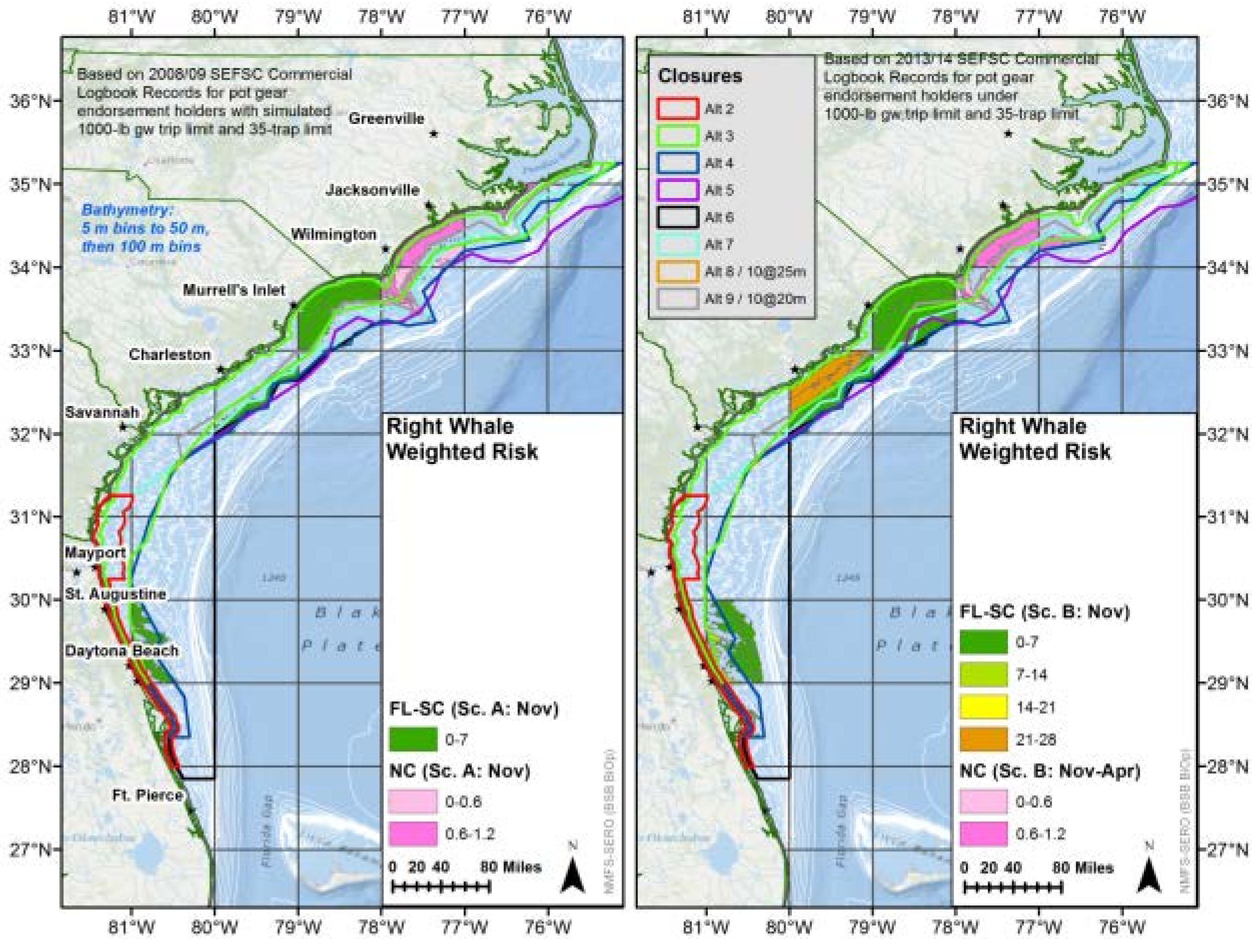


Figure 8A: November. Right whale predicted monthly relative risk based on right whale habitat models and estimated commercial pot gear effort by area-depth grid. Under Scenario A (left), spatial distribution of effort is based on observations from the 2008/09 winter fishing season. Under Scenario B (right), spatial distribution of pot effort is based on observations from the summer 2013/14 season. Note underlying NC right whale 'relative abundance' model is not time-dynamic due to limited sampling. Bathymetry and shoreline courtesy NOAA NGDC Coastal Relief Model and ESRI Ocean Basemap. Note weighted risk is a unitless, relative scalar. NC and FL-SC modeled risk are not directly comparable. Note Scenario C relative risk was similar to Scenario A and is not depicted.

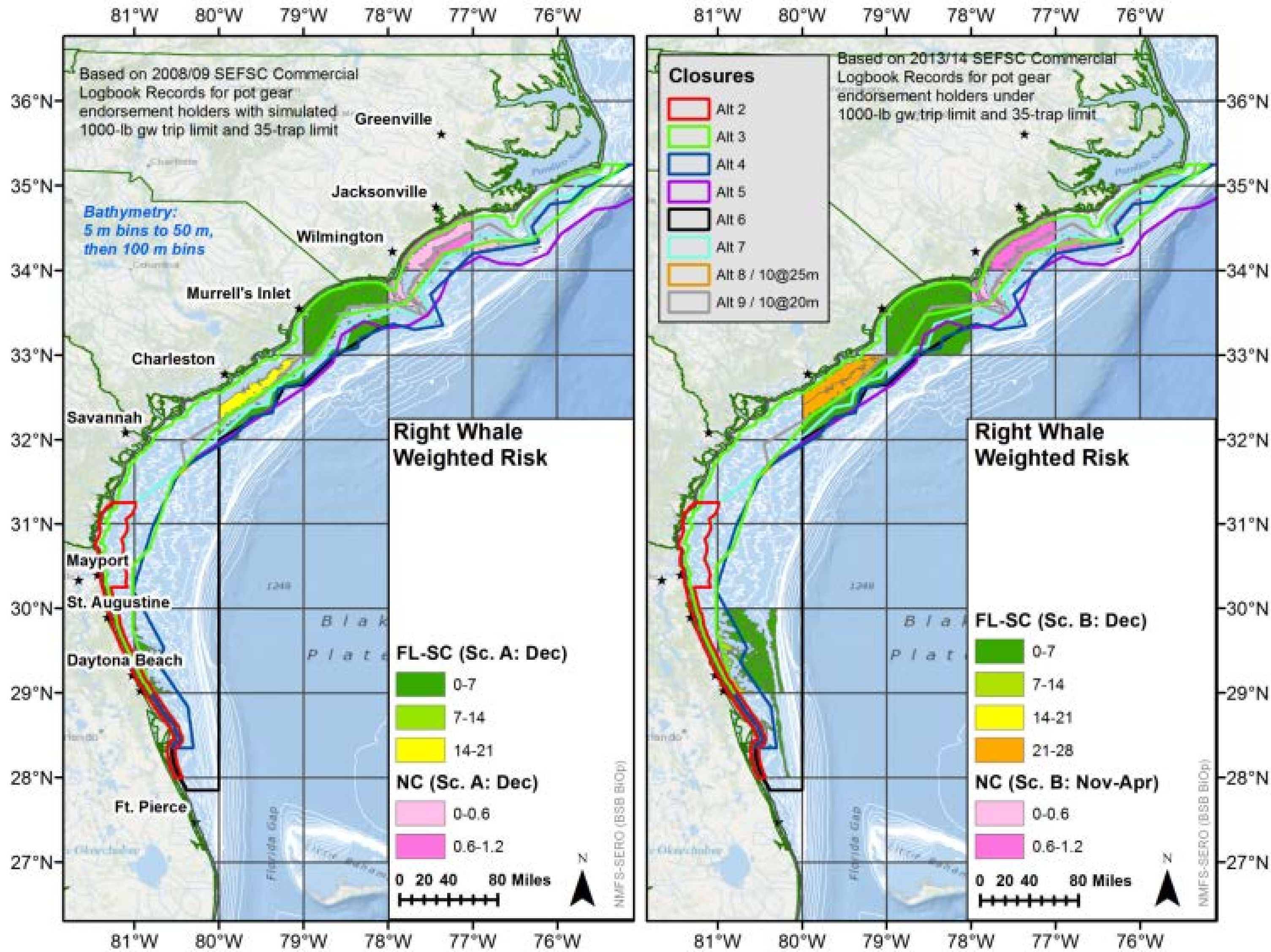


Figure 8B: December

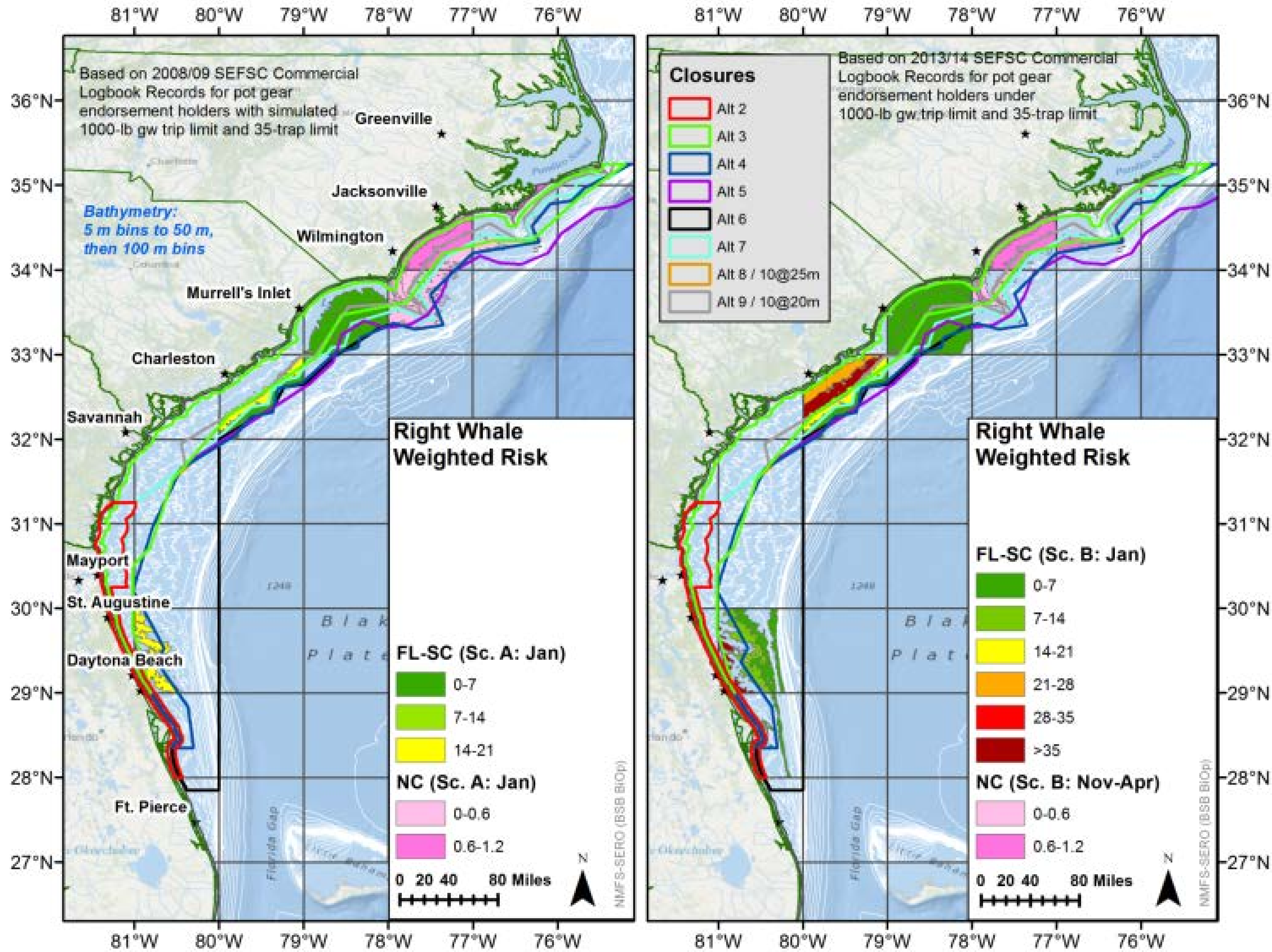


Figure 8C: January

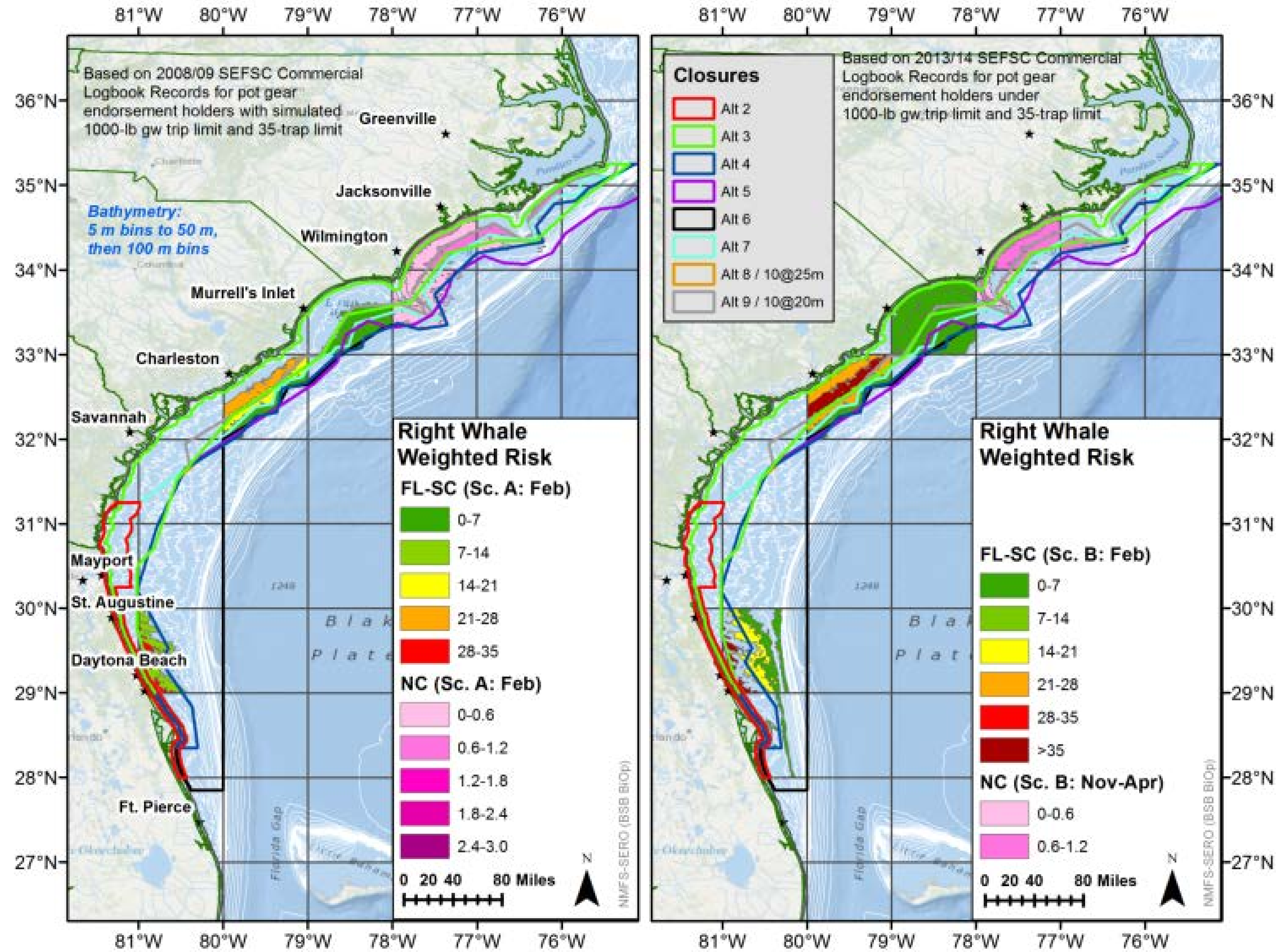


Figure 8D: February

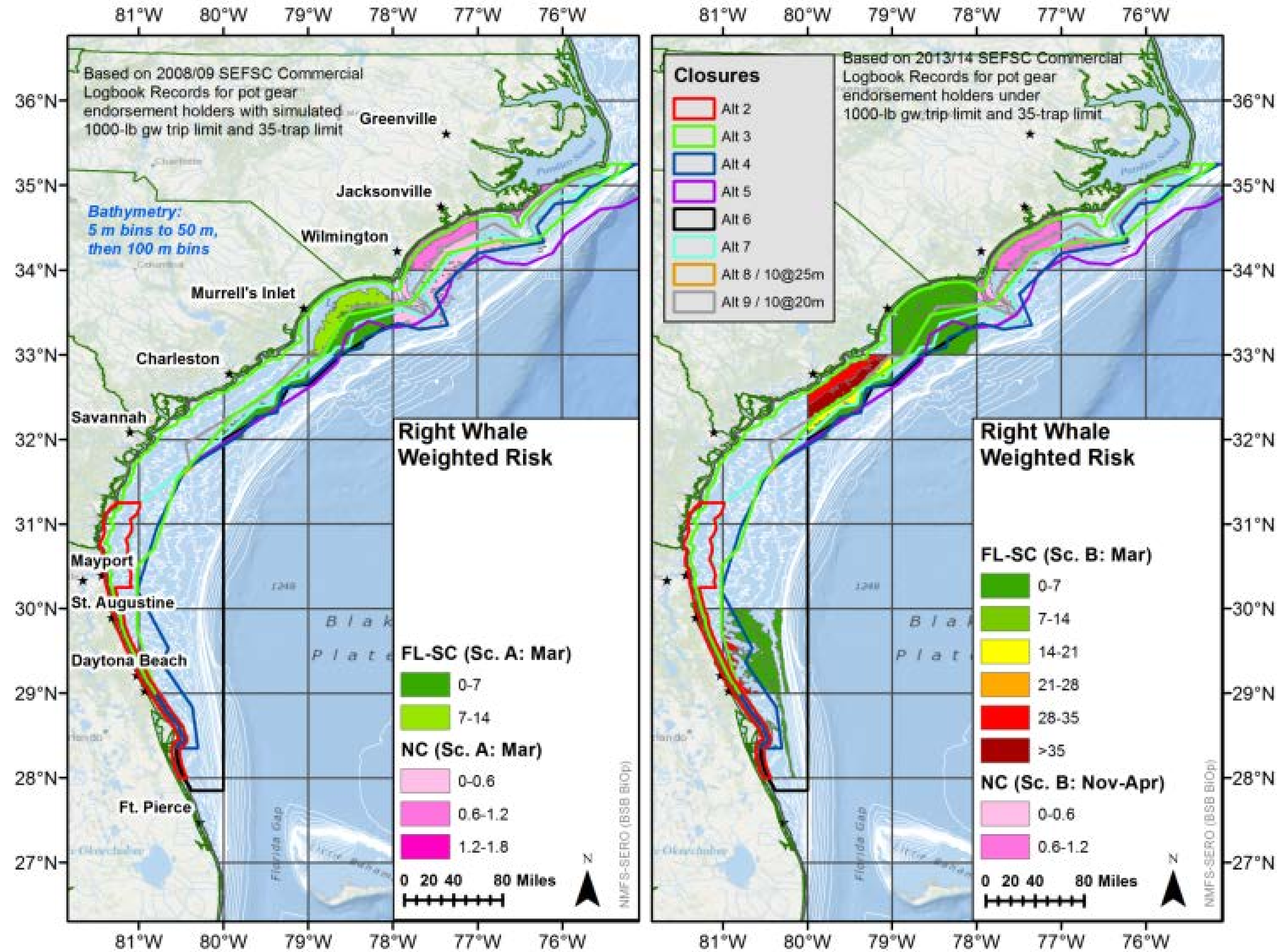


Figure 8E: March

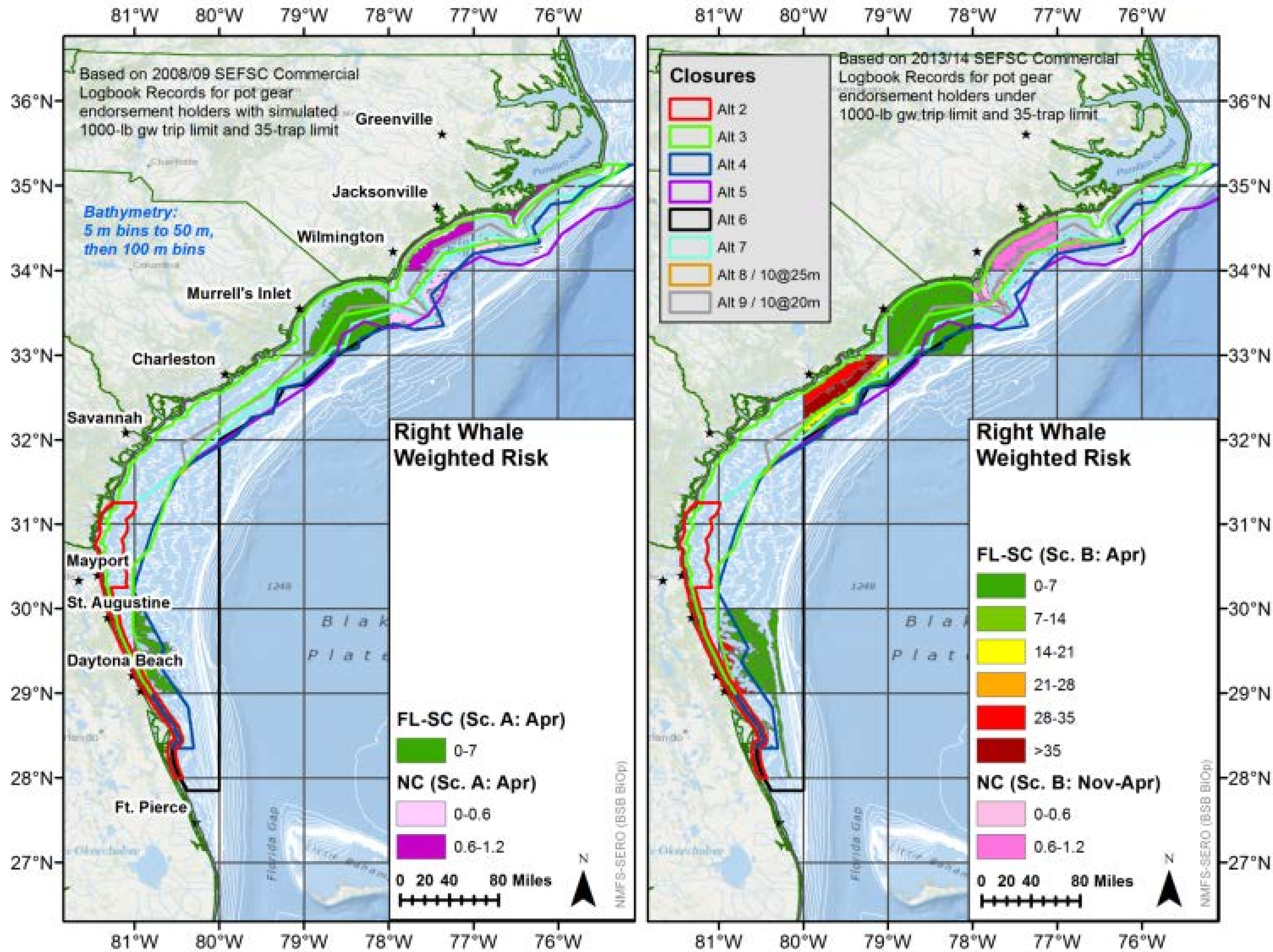


Figure 8F: April

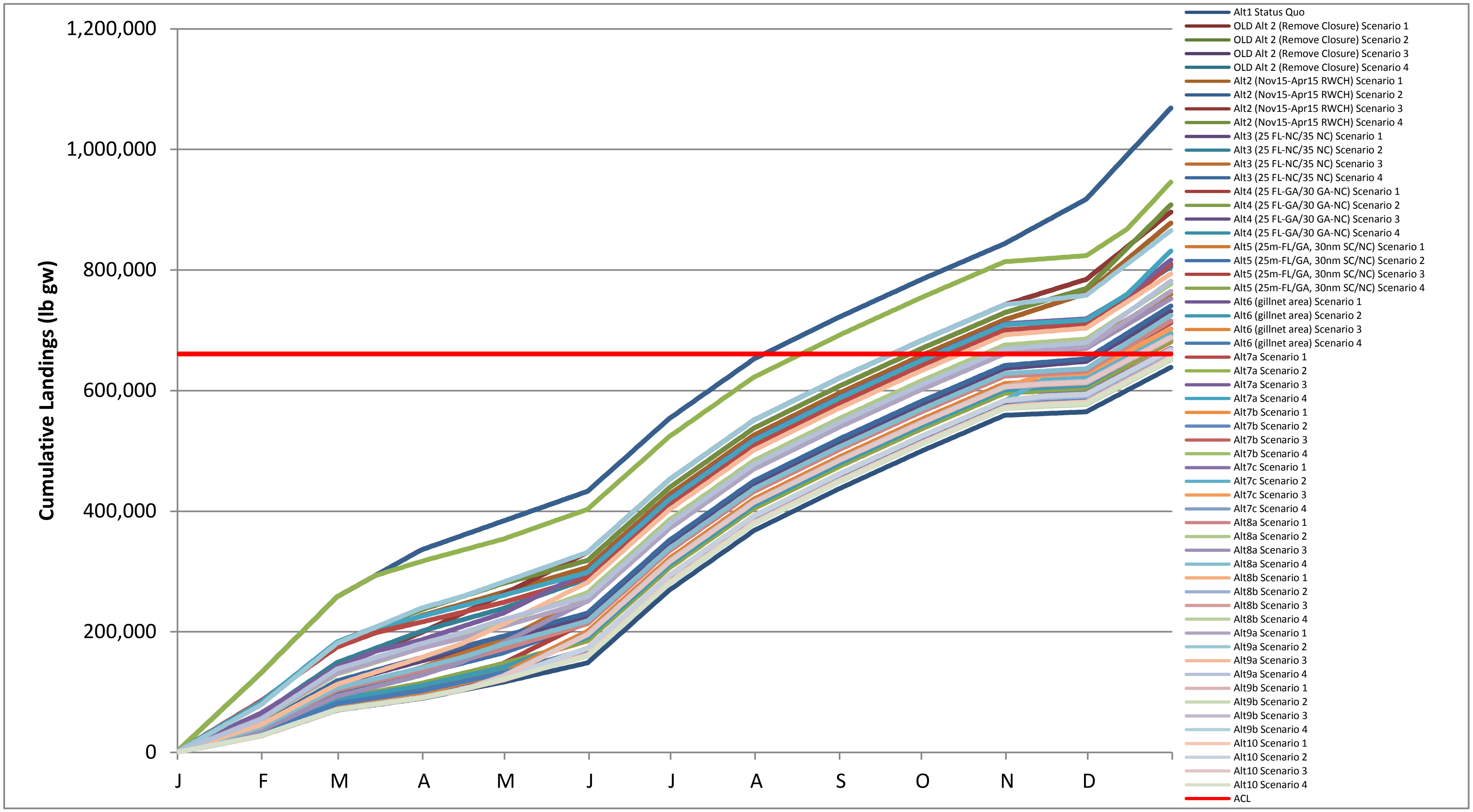
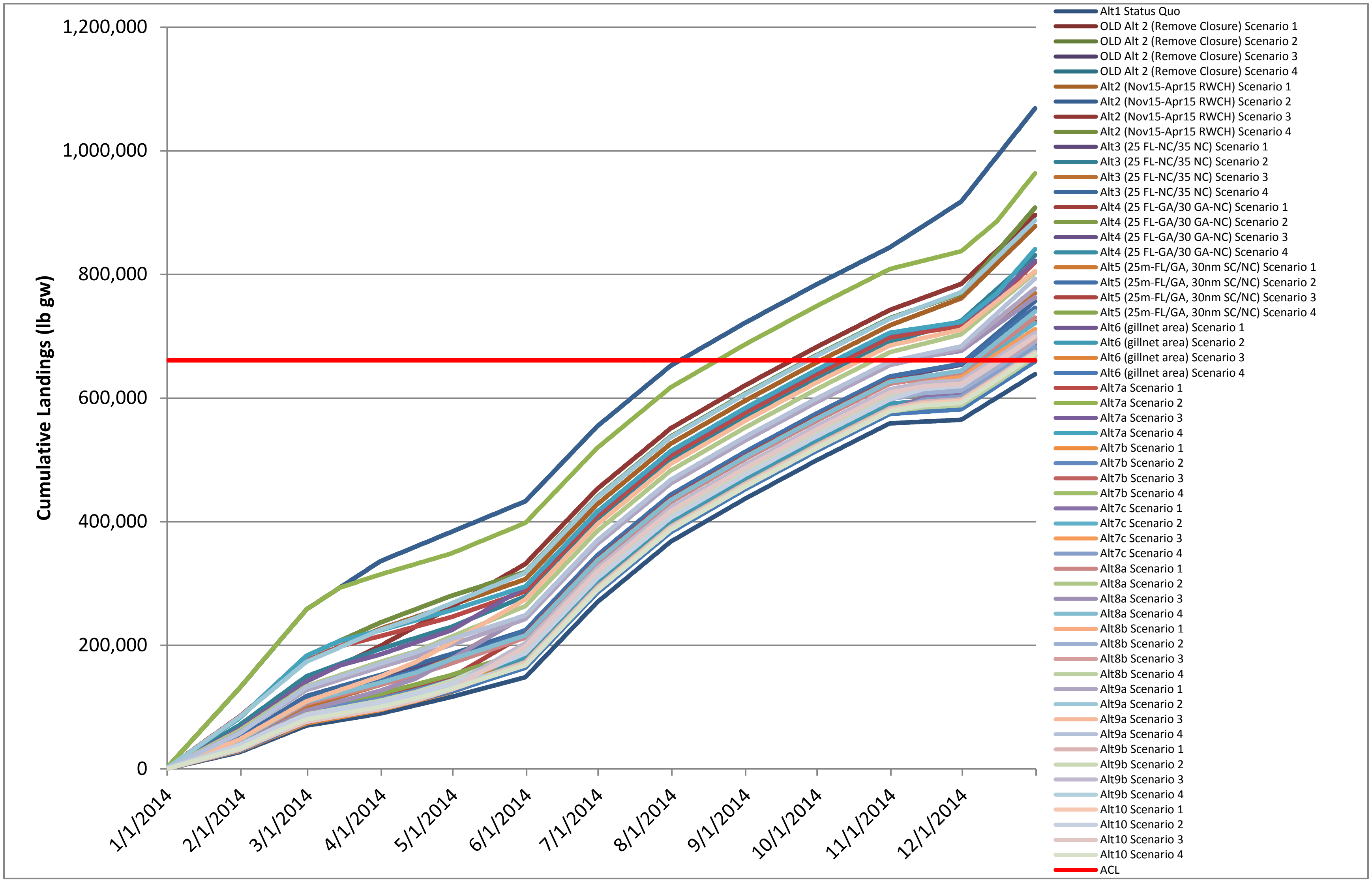


Figure 9. Cumulative landings forecasts for the commercial black sea bass fishery (all gears) under different Regulatory Amendment 16 spatial closure alternatives and different catch rate assumptions (Scenario 1: Observed 2008/09 Nov-Apr catch rates, Scenario 2: Observed 2013/14 catch rates scaled to account for historically higher Nov-Apr catch rates, Scenario 3: Observed 2013/14 catch rates, and Scenario 4: Observed mean 2006/07-2008/09 Nov-Apr catch rates), assuming A) winter 2008/09, B) summer 2013/14, and C) mean of winters 2006/07-2008/09 distribution of pot gear during any fishing in November-April. All figures assume right whale distribution under mean conditions.


Cumulative Landings (lb gw)
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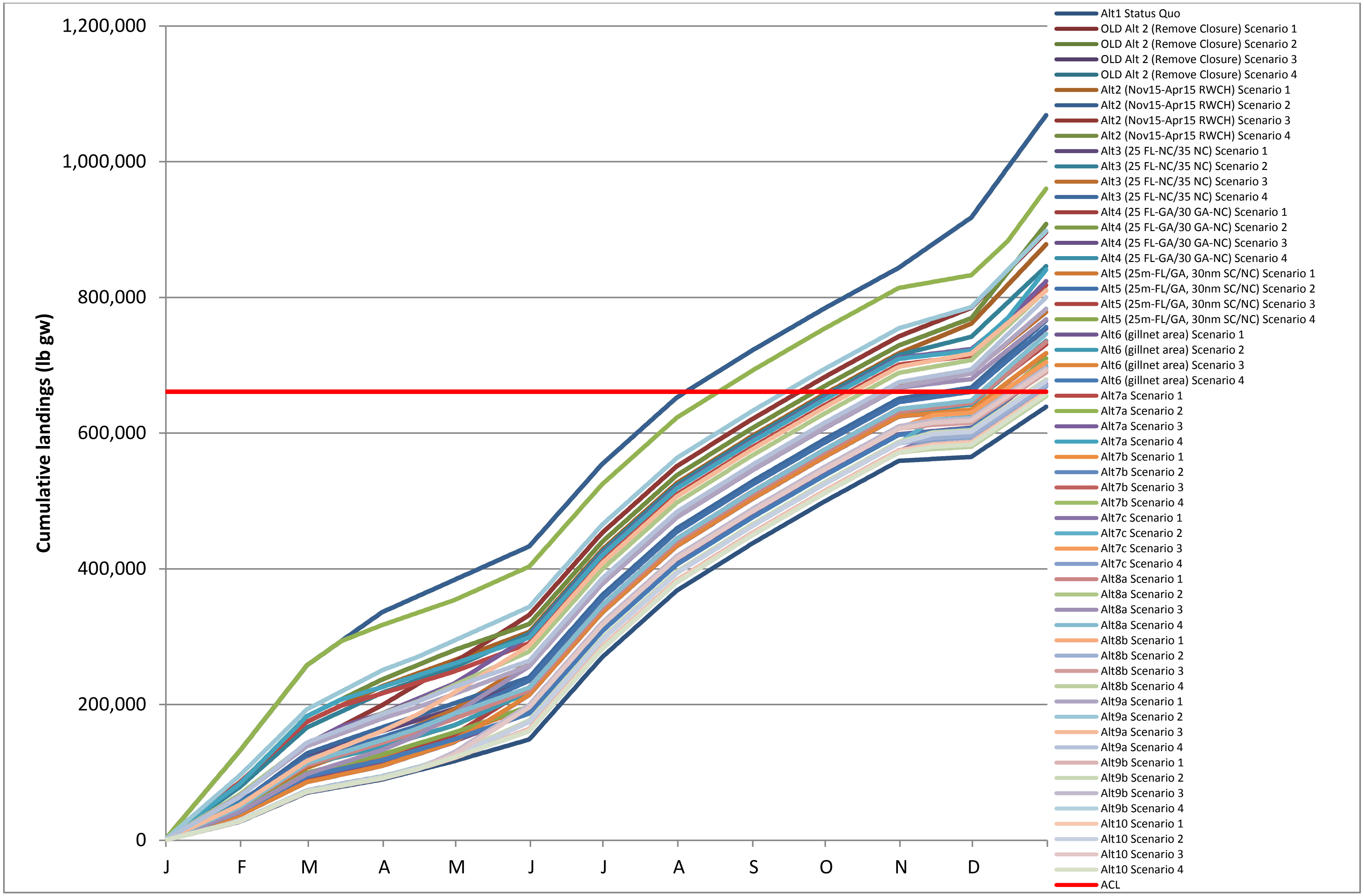
1,000,000
800,000
600,000
400,000
200,000
0
1/1/2014
2/1/2014
3/1/2014
4/1/2014
5/1/2014
6/1/2014
7/1/2014
8/1/2014
9/1/2014
10/1/2014
11/1/2014
12/1/2014
Alt1 Status Quo
OLD Alt 2 (Remove Closure) Scenario 1
OLD Alt 2 (Remove Closure) Scenario 2
OLD Alt 2 (Remove Closure) Scenario 3
OLD Alt 2 (Remove Closure) Scenario 4
Alt2 (Nov15-Apr15 RWCH) Scenario 1
Alt2 (Nov15-Apr15 RWCH) Scenario 2
Alt2 (Nov15-Apr15 RWCH) Scenario 3
Alt2 (Nov15-Apr15 RWCH) Scenario 4
Alt3 (25 FL-NC/35 NC) Scenario 1
Alt3 (25 FL-NC/35 NC) Scenario 2
Alt3 (25 FL-NC/35 NC) Scenario 3
Alt3 (25 FL-NC/35 NC) Scenario 4
Alt4 (25 FL-GA/30 GA-NC) Scenario 1
Alt4 (25 FL-GA/30 GA-NC) Scenario 2
Alt4 (25 FL-GA/30 GA-NC) Scenario 3
Alt4 (25 FL-GA/30 GA-NC) Scenario 4
Alt5 (25m-FL/GA, 30nm SC/NC) Scenario 1
Alt5 (25m-FL/GA, 30nm SC/NC) Scenario 2
Alt5 (25m-FL/GA, 30nm SC/NC) Scenario 3
Alt5 (25m-FL/GA, 30nm SC/NC) Scenario 4
Alt6 (gillnet area) Scenario 1
Alt6 (gillnet area) Scenario 2
Alt6 (gillnet area) Scenario 3
Alt6 (gillnet area) Scenario 4
Alt7a Scenario 1
Alt7a Scenario 2
Alt7a Scenario 3
Alt7a Scenario 4
Alt7b Scenario 1
Alt7b Scenario 2
Alt7b Scenario 3
Alt7b Scenario 4
Alt7c Scenario 1
Alt7c Scenario 2
Alt7c Scenario 3
Alt7c Scenario 4
Alt8a Scenario 1
Alt8a Scenario 2
Alt8a Scenario 3
Alt8a Scenario 4
Alt8b Scenario 1
Alt8b Scenario 2
Alt8b Scenario 3
Alt8b Scenario 4
Alt9a Scenario 1
Alt9a Scenario 2
Alt9a Scenario 3
Alt9a Scenario 4
Alt9b Scenario 1
Alt9b Scenario 2
Alt9b Scenario 3
Alt9b Scenario 4
Alt10 Scenario 1
Alt10 Scenario 2
Alt10 Scenario 3
Alt10 Scenario 4
ACL

Figure 9B.


Cumulative landings (lb gw)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
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J
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D
Alt1 Status Quo
OLD Alt 2 (Remove Closure) Scenario 1
OLD Alt 2 (Remove Closure) Scenario 2
OLD Alt 2 (Remove Closure) Scenario 3
OLD Alt 2 (Remove Closure) Scenario 4
Alt2 (Nov15-Apr15 RWCH) Scenario 1
Alt2 (Nov15-Apr15 RWCH) Scenario 2
Alt2 (Nov15-Apr15 RWCH) Scenario 3
Alt2 (Nov15-Apr15 RWCH) Scenario 4
Alt3 (25 FL-NC/35 NC) Scenario 1
Alt3 (25 FL-NC/35 NC) Scenario 2
Alt3 (25 FL-NC/35 NC) Scenario 3
Alt3 (25 FL-NC/35 NC) Scenario 4
Alt4 (25 FL-GA/30 GA-NC) Scenario 1
Alt4 (25 FL-GA/30 GA-NC) Scenario 2
Alt4 (25 FL-GA/30 GA-NC) Scenario 3
Alt4 (25 FL-GA/30 GA-NC) Scenario 4
Alt5 (25m-FL/GA, 30nm SC/NC) Scenario 1
Alt5 (25m-FL/GA, 30nm SC/NC) Scenario 2
Alt5 (25m-FL/GA, 30nm SC/NC) Scenario 3
Alt5 (25m-FL/GA, 30nm SC/NC) Scenario 4
Alt6 (gillnet area) Scenario 1
Alt6 (gillnet area) Scenario 2
Alt6 (gillnet area) Scenario 3
Alt6 (gillnet area) Scenario 4
Alt7a Scenario 1
Alt7a Scenario 2
Alt7a Scenario 3
Alt7a Scenario 4
Alt7b Scenario 1
Alt7b Scenario 2
Alt7b Scenario 3
Alt7b Scenario 4
Alt7c Scenario 1
Alt7c Scenario 2
Alt7c Scenario 3
Alt7c Scenario 4
Alt8a Scenario 1
Alt8a Scenario 2
Alt8a Scenario 3
Alt8a Scenario 4
Alt8b Scenario 1
Alt8b Scenario 2
Alt8b Scenario 3
Alt8b Scenario 4
Alt9a Scenario 1
Alt9a Scenario 2
Alt9a Scenario 3
Alt9a Scenario 4
Alt9b Scenario 1
Alt9b Scenario 2
Alt9b Scenario 3
Alt9b Scenario 4
Alt10 Scenario 1
Alt10 Scenario 2
Alt10 Scenario 3
Alt10 Scenario 4
ACL

Figure 9C.

Figure 10. South Atlantic commercial black sea bass projected closure dates (black dashes) and relative right whale risk of pot gear vertical line entanglement off North Carolina (blue bars) and Florida to South Carolina (green bars) under 2008/09 winter (Scenario A), 2013/14 summer (Scenario B), and mean 2006/07-2008/09 winter (Scenario C) spatial pot distributions for catch rate Scenarios 1-4.

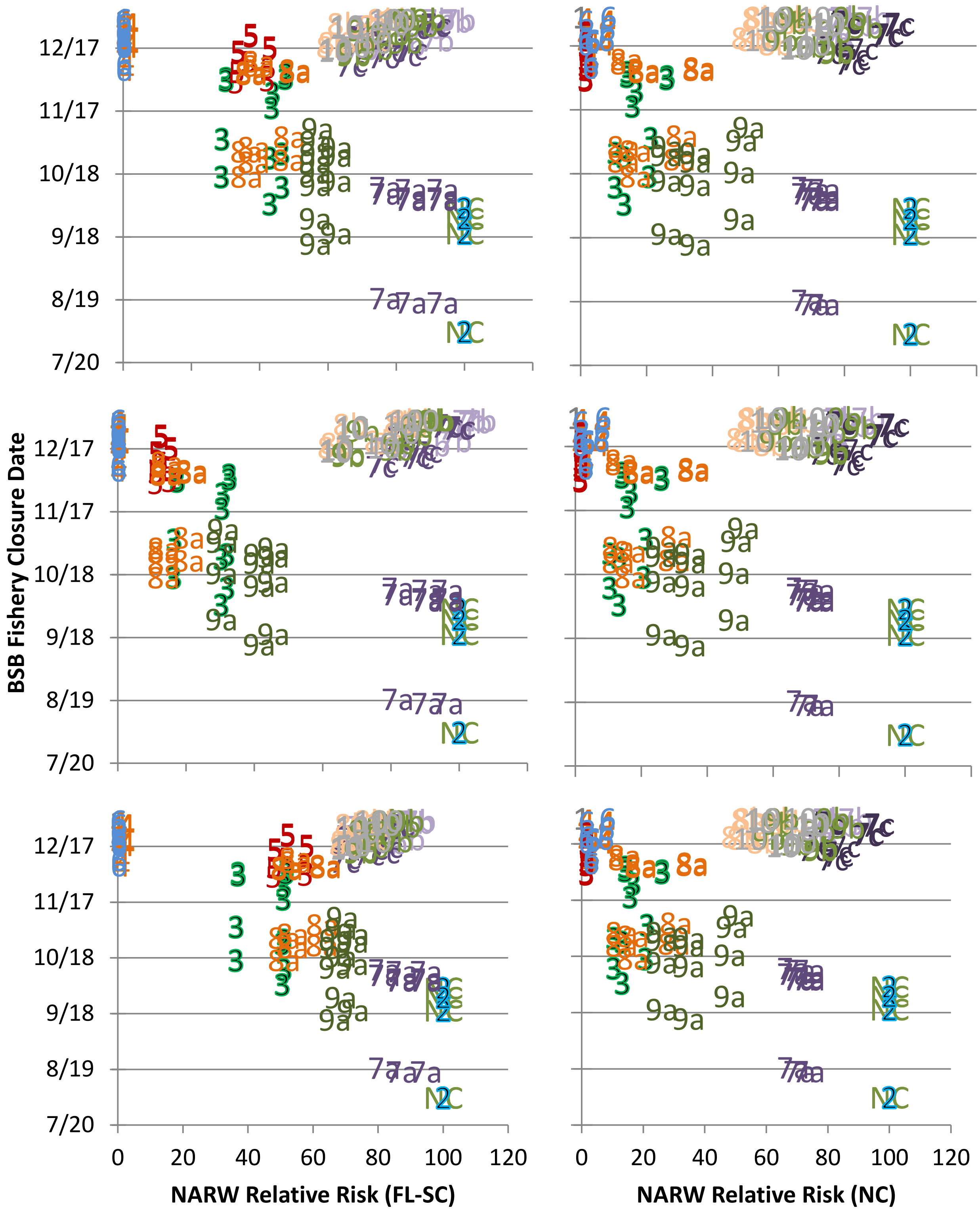


Figure 11. North Atlantic right whale (NARW) relative risk versus projected black sea bass (BSB) fishery closure date, by alternative (colored numbers), across catch rate and spatial pot gear distribution scenarios, for right whale distributions under mean (top), warm (middle), and cold conditions (bottom). Number/letter combinations included in the graphs correspond to alternatives in Reg-16.

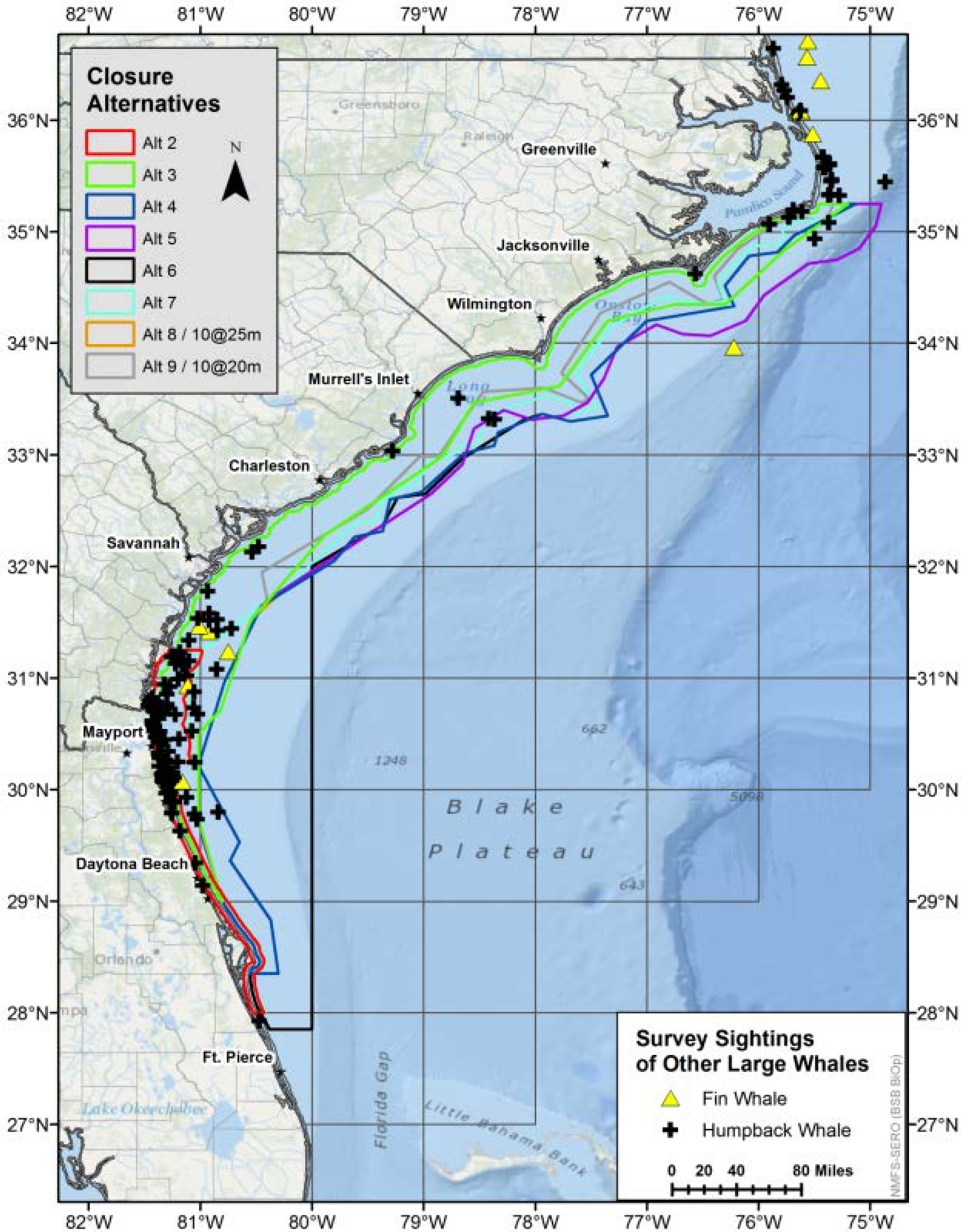


Figure 12. Aerial survey observations (2005-2014) of humpback whales and fin whales within the SAFMC jurisdiction relative to Reg-16 proposed closure alternatives.

APPENDIX A: MANAGEMENT HISTORY

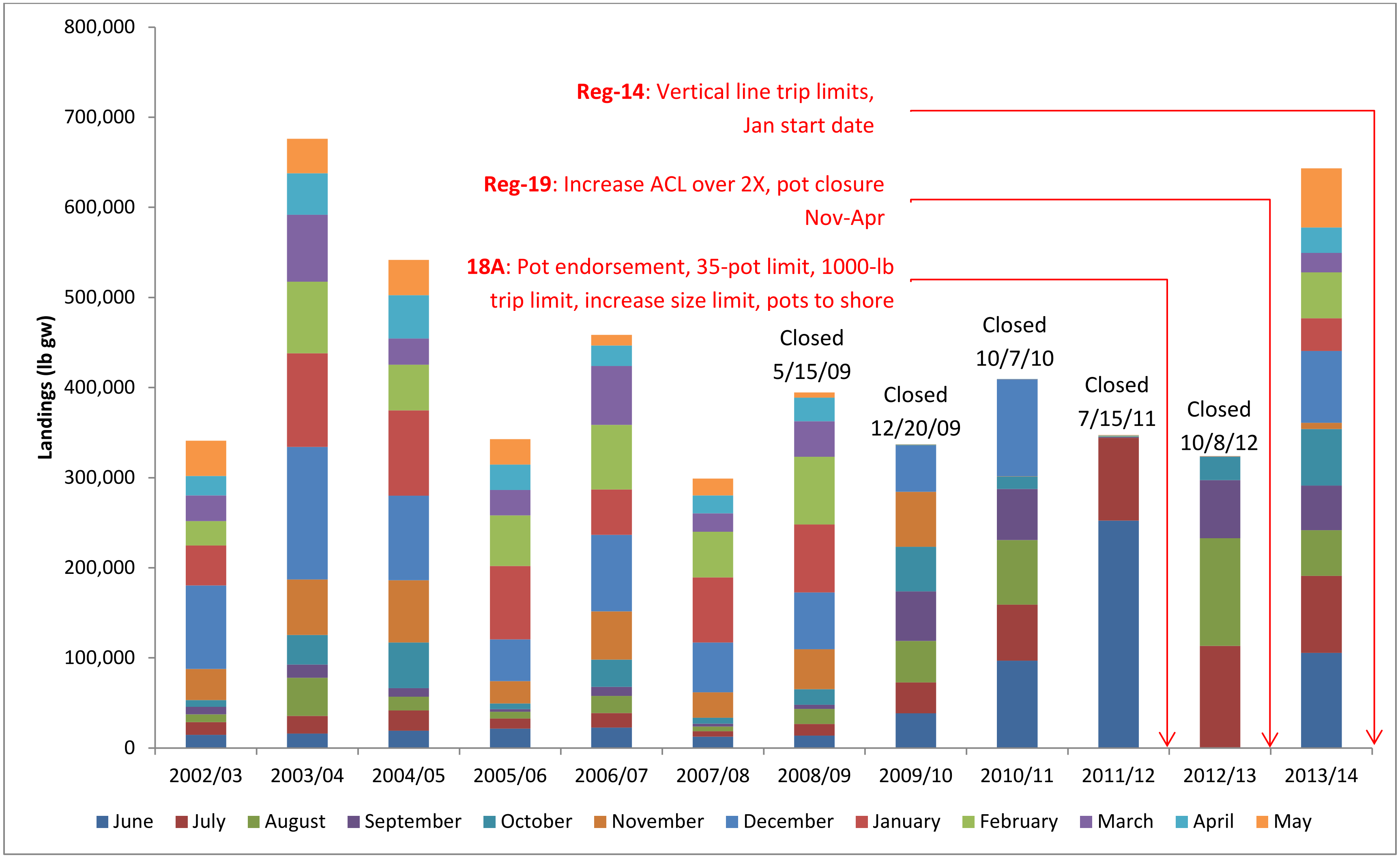


Figure A.1. Commercial black sea bass landings by fishing year and month, relative to management history. Sources: SEFSC Commercial ACL Data (July 2014) and SEFSC Trip Ticket Data (Sept 2014 – for the 2013/14 season).

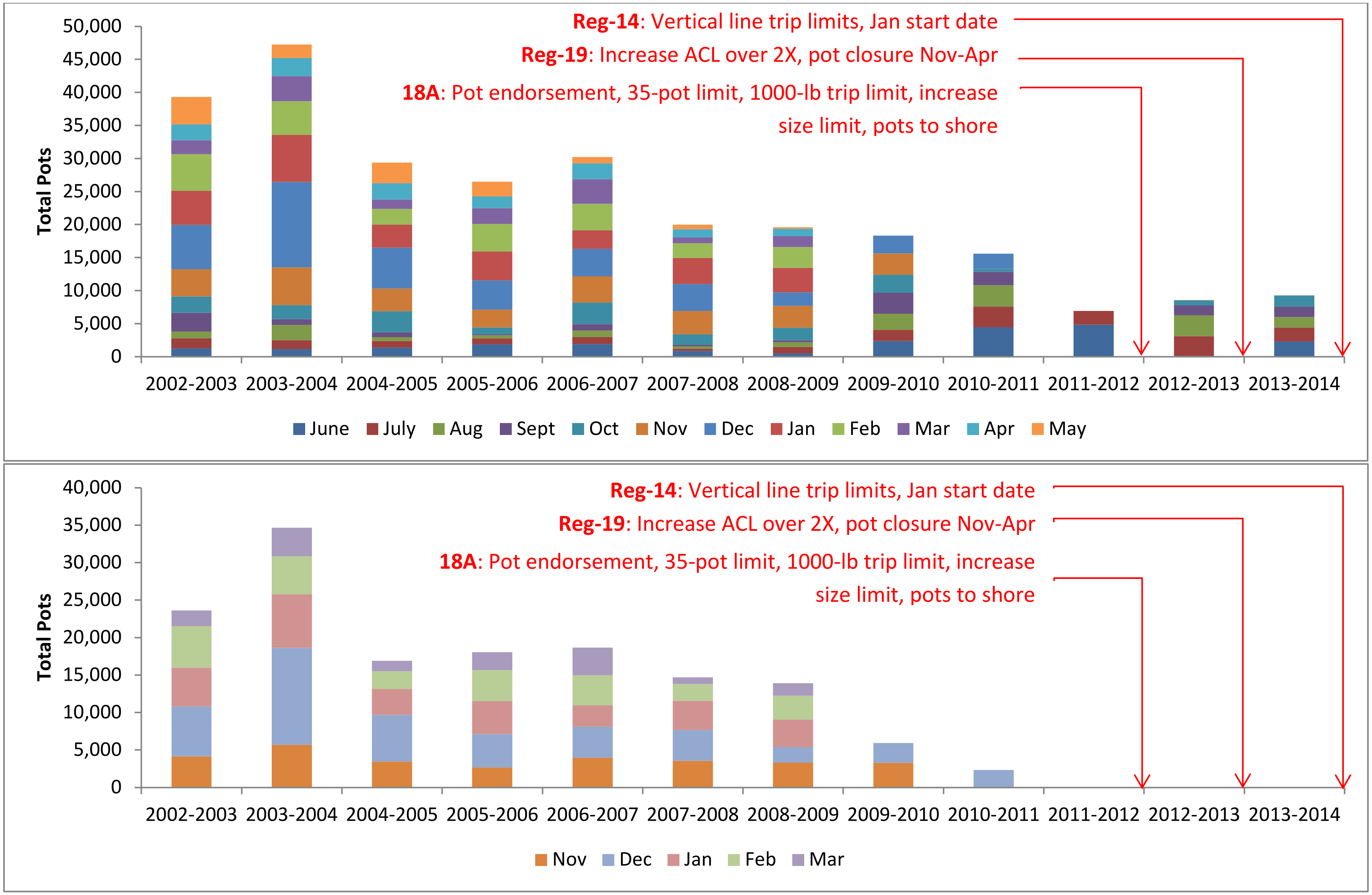


Figure A.2. Commercial black sea bass effort (number of pots) by fishing year and month, relative to management history for full season (top) and winter only (bottom). Sources: SEFSC Commercial Logbook Data (July 2014).

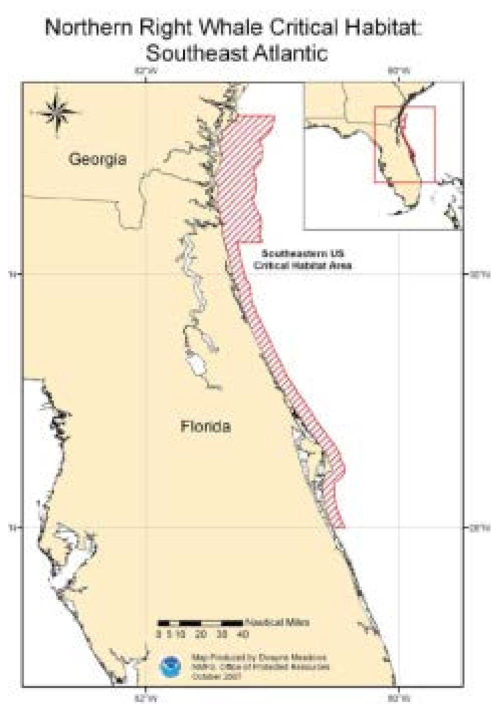
APPENDIX B: REG-16 CLOSURE ALTERNATIVES

Highlighting denotes areas where Council clarification is needed.

Alternative 1 (No Action). Retention, possession, and fishing for black sea bass is prohibited using black sea bass pot gear, annually, from November 1 through April 30.

Alternative 2. The black sea bass pot closure applies to the area currently designated as North Atlantic right whale critical habitat (Figure B2.1.1). North Atlantic right whale critical habitat encompasses waters between 31° 15'N, (approximately the mouth of the Altamaha River, Georgia) and 30° 15'N (approximately Jacksonville, Florida) from the shoreline out to 15 nautical miles offshore; and the waters between 30° 15'N and 28 °00'N, (approximately Sebastian Inlet, Florida) from the shoreline out to 5 nautical miles. The closure applies to the area annually from November 15 through April 15.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.



Note: This area represents North Atlantic right whale critical habitat in the South Atlantic region designated on June 3, 1994. The map below provides location of the critical habitat boundary. The critical habitat designation did not provide waypoints for the boundary. The boundary would not automatically change if the boundary for the right whale critical habitat were to change.

Figure B2.1.1. Area for the proposed black sea bass pot closure in Alternative 2.

The following is language describing the North Atlantic right whale critical habitat area from 50 CFR 226: "Southeastern United States: The area designated as critical habitat in these waters encompasses waters between 31 deg.15'N (approximately located at the mouth of the Altamaha River, GA) and 30 deg.15'N (approximately Jacksonville, FL) from the shoreline out to 15 nautical miles offshore; and the waters between 30 deg.15'N and 28 deg.00'N (approximately Sebastian Inlet, FL) from the shoreline out to 5 nautical miles." Note: North Atlantic right whale critical habitat is currently undergoing a revision based on more current data. Proposed changes are published at 80 FR 9313.

Alternative 3. The black sea bass pot closure applies to waters inshore of points 1-15 listed below (Table B2.1.1); approximately Ponce Inlet, Florida, to Cape Hatteras, North Carolina (Figure B2.1.2). The closure applies to the area annually from November 1 through April 30.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Note: This area likely represents North Atlantic right whale calving habitat. The area identified from Cape Fear, North Carolina, southward to 29°N (approximately Ponce Inlet, Florida) is based on model outputs (i.e., Garrison 2007, Keller et al. 2012, Good 2008). The area from Cape Fear, North Carolina, to Cape Hatteras, North Carolina, is an extrapolation of those model outputs and based on sea surface temperatures and bathymetry.

Table B2.1.1. Eastern boundary coordinates for proposed black sea bass pot closure in Alternative 3.

Point	N Latitude	W Longitude
1	35°15’ N	State/EEZ boundary
2	35°15'	75°12'
3	34°51'	75°45'
4	34°21'	76°18'
5	34°21'	76°45'
6	34°12'	77°21'
7	33°37'	77°47
8	33°28'	78°33
9	32°59'	78°50'
10	32°17'	79°53'
11	31°31'	80°33'
12	30°43'	80°49'
13	30°30'	81°01'
14	29°45'	81°01'
15	29°00'	State/EEZ boundary

Note that federal regulations would only include the waters of the South Atlantic EEZ. The states will be asked to comply by implementing complementary regulations in state waters.

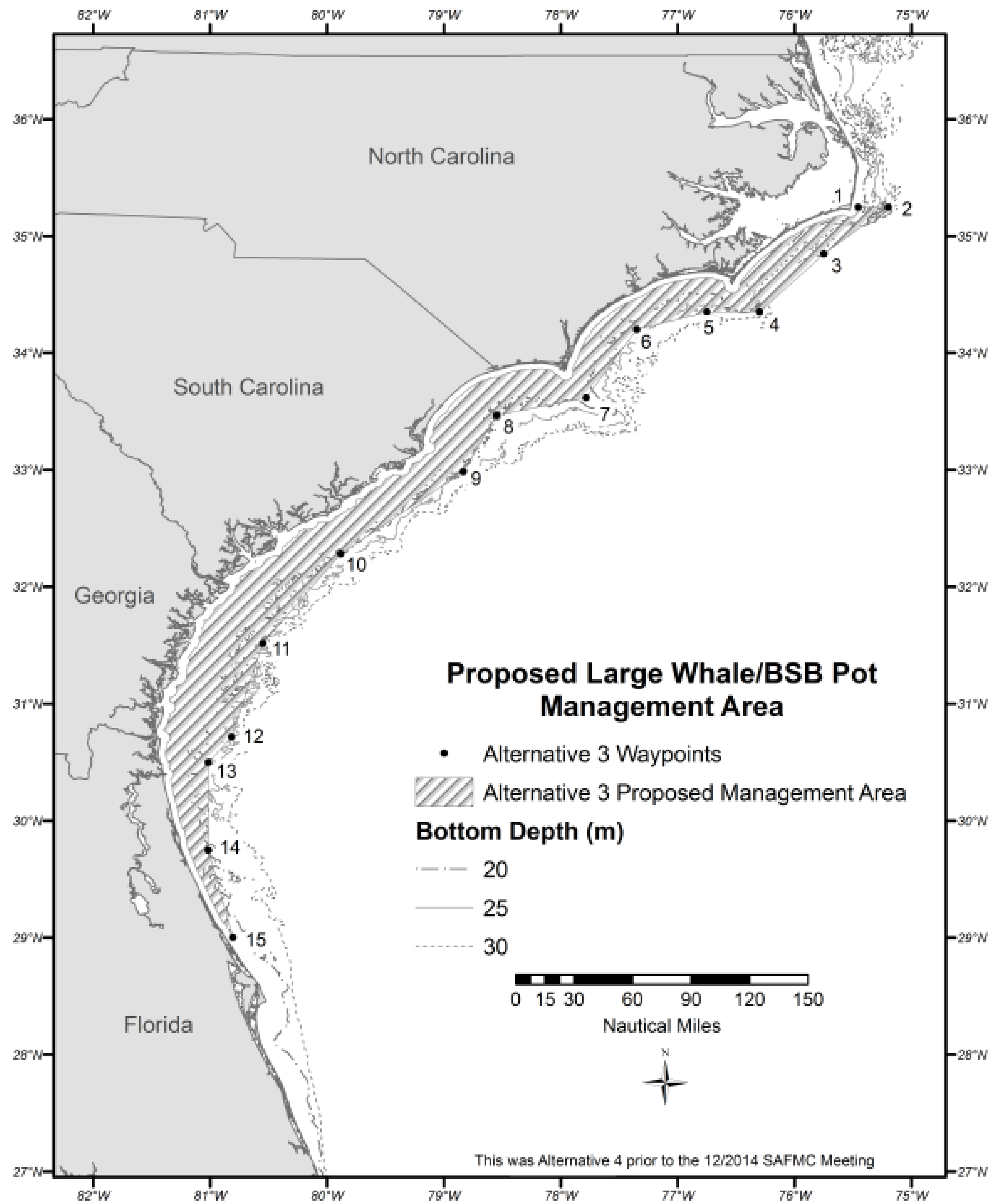


Figure B2.1.2. Area for the proposed black sea bass pot closure in Alternative 3.

Alternative 4. The black sea bass pot closure applies to waters inshore of points 1-28 listed below (Table B2.1.2), approximately Cape Canaveral, Florida, to Cape Hatteras, North Carolina (Figure B2.1.3). The closure applies to the area annually from November 1 through April 30.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Note: This area generally represents waters 25 m or shallower from 28° 21 N (approximately Cape Canaveral, Florida) to Savannah, Georgia; from the Georgia/South Carolina border to Cape Hatteras, North Carolina, the closure applies to waters under Council management that are 30 m or shallower. This bathymetric area is based on right whale sightings (all demographic segments) and sightings per unit of effort (proxy of density) by depth and captures 97% and 96% of right whale sightings off the North Carolina/South Carolina area, and Florida/Georgia area, respectively. The map below provides an approximate location of the proposed boundary.

Table B2.1.2. Eastern boundary coordinates for proposed black sea bass pot closure in Alternative 4.

Point	N Latitude	W Longitude
1	35° 15’	State/EEZ boundary
2	35° 15’	75° 08’
3	34° 58’	75° 41’
4	34° 49’	75° 50’
5	34° 47’	76° 05’
6	34° 31’	76° 18’
7	34° 20’	76° 13
8	34° 12’	77° 00’
9	33° 43’	77° 30’
10	33° 21’	77° 21’
11	33° 18’	77° 41’
12	33° 22’	77° 56’
13	33° 12’	78° 20’
14	33° 05’	78° 22’
15	33° 01’	78° 38’
16	32° 40’	79° 01’
17	32° 36’	79° 18’
18	32° 19’	79° 22’
19	32° 16’	79° 37’
20	32° 03’	79° 48’
21	31° 39’	80° 27’
22	30° 58’	80° 47’
23	30° 13’	81° 01’
24	29° 32’	80° 39’
25	29° 22’	80° 44’
26	28° 50’	80° 22’
27	28° 21’	80° 18’
28	28° 21’	State/EEZ boundary

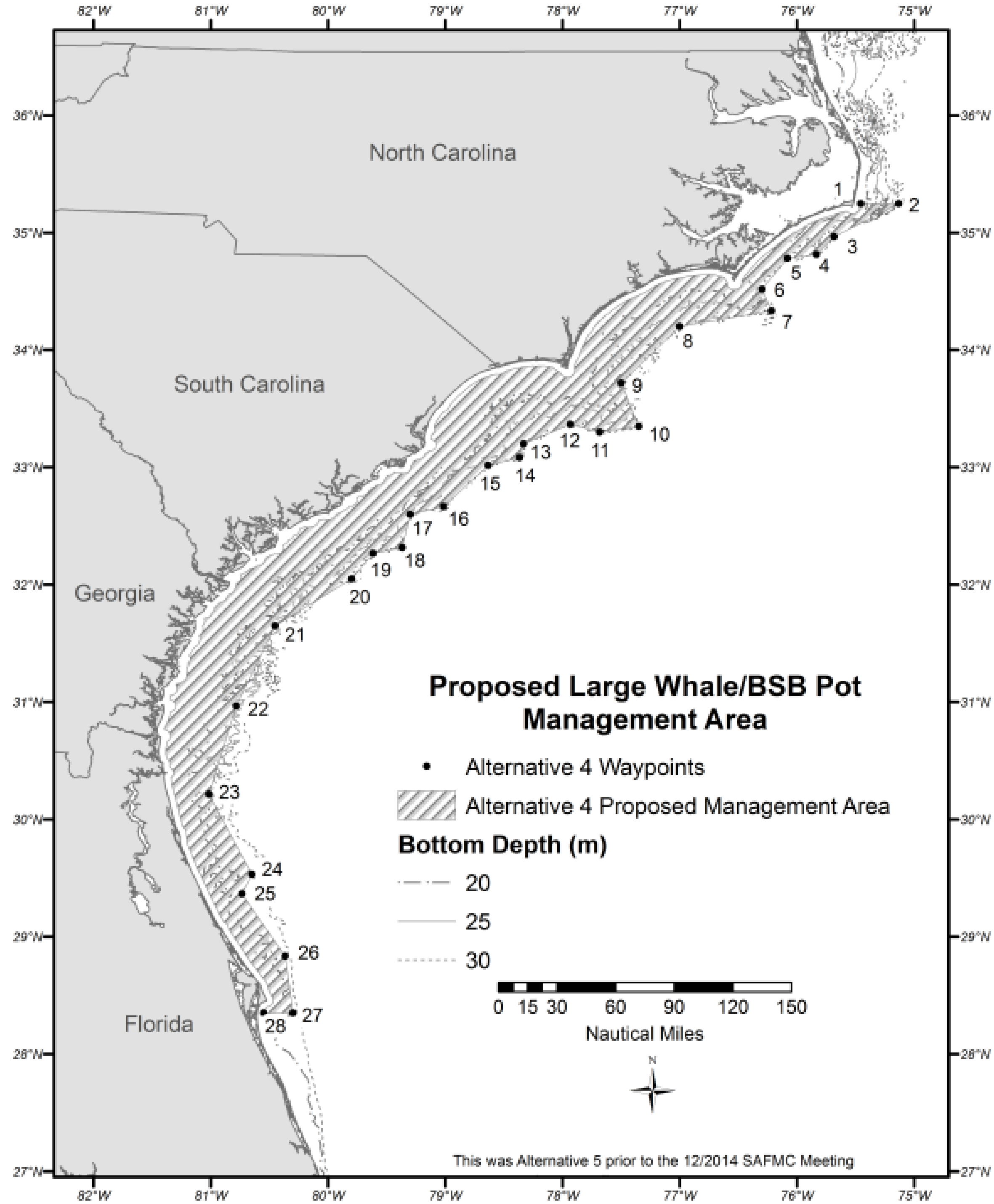


Figure B2.1.3. Area for the proposed black sea bass pot closure in Alternative 4.

Alternative 5. The black sea bass pot closure applies to waters inshore of points 1-28 listed below (Table B2.1.3); approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina (Figure B2.1.4). The closure applies to the area annually from November 1 through April 30.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Note: This area is based on joint comments received from non-government organizations (dated January 3, 2014) in response to NMFS' December 4, 2013, Federal Register Notice of Intent to Prepare this Draft Environmental Impact Statement (DEIS) (78 FR 72868). The non-government organizations proposed the area as a reasonable alternative for consideration. The area, also included in a Center for Biological Diversity et al. petition in 2009 for right whale critical habitat, is off the coasts of Georgia and Florida and based on calving right whale habitat modeling work of Garrison (2007) and Keller et al. (2012). This area represents the 75th percentile of sightings (91% of historical sightings included in their study) off Florida and Georgia (Garrison 2007 and Keller et al. 2012). Off the coasts of North Carolina and South Carolina, the closure extends from the coastline to 30 nautical miles offshore. The map below provides approximate location of proposed boundary.

Table B2.1.3. Eastern boundary coordinates for proposed black sea bass pot closure in Alternative 5.

Point	N Latitude	W Longitude
1	35°15'	State/EEZ Boundary
2	35°15'	74°54'
3	35°03'	74°57'
4	34°51'	75°06'
5	34°45'	75°18'
6	34°43'	75°33'
7	34°26'	75°57'
8	34°12'	76°07'
9	34°04'	76°26'
10	34°05'	76°41'
11	34°10'	76°55'
12	33°58'	77°16'
13	33°41'	77°23'
14	33°28'	77°32'
15	33°21'	77°45'
16	33°19'	78°02'
17	33°24'	78°17'
18	33°14'	78°33'
19	32°55'	78°39'
20	32°39'	78°56'
21	31°42'	80°24'
22	31°31'	80°33'
23	30°43'	80°49'
24	30°30'	81°01'
25	29°45'	81°01'
26	29°31'	80°58'
27	29°13'	80°52'
28	29°13'	State/EEZ boundary

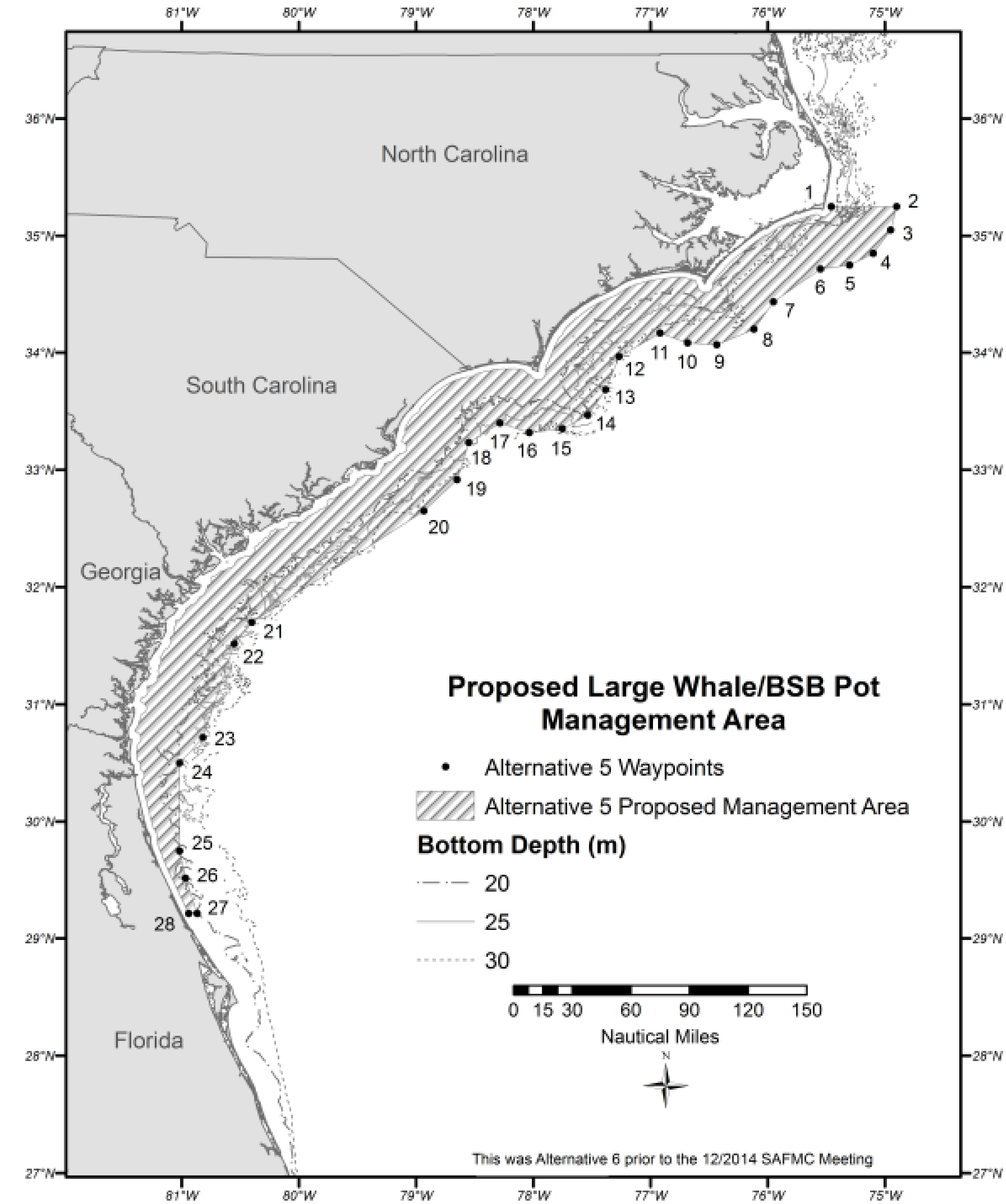


Figure B2.1.4. Area for the proposed black sea bass pot closure in Alternative 5.

Alternative 6. The black sea bass pot closure applies to waters inshore of points 1-20 listed below (Table 2.1.4), approximately Sebastian, Florida, to Cape Hatteras, North Carolina. The closure applies to the area annually from November 1 through April 30.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations within state waters.

Note: This area is also based on joint comments received from a number of environmental groups (dated January 3, 2014) in response to NMFS' December 4, 2013, Federal Register Notice of Intent to Prepare this DEIS (78 FR 72868). The environmental groups proposed the area as a reasonable alternative for consideration. This area represents an existing management area, the Southeast Seasonal Gillnet Restricted Area, under the ALWTRP; and an additional area off North Carolina. The area off North Carolina includes waters shallower than 30 meters and is northward of the designated ALWTRP Southeast Restricted Area.

Table B2.1.4. Eastern boundary coordinates for the proposed black sea bass pot closure in Alternative 6.

Point	N. Latitude	W Longitude
1	35º 15'	State/EEZ Boundary
2	35º 15'	75º 08'
3	34º 58'	75º 41'
4	34º 49'	75º 50'
5	34º 47'	76º 05'
6	34º 31'	76º 18'
7	34º 20'	76º 13'
8	34º 12'	77º 00'
9	33º 43'	77º 30'
10	33º 21'	77º 21'
11	33º 18'	77º 41'
12	33º 22'	77º 56'
13	33º 19'	78º 06'
14	32º 58'	78º 39'
15	32º 39'	78º 59'
16	32º 37'	79º 14'
17	32º 22'	79º 22'
18	32º 00'	80º 00'
19	27º 51'	80º 00'
20	27º 51'	State/EEZ Boundary

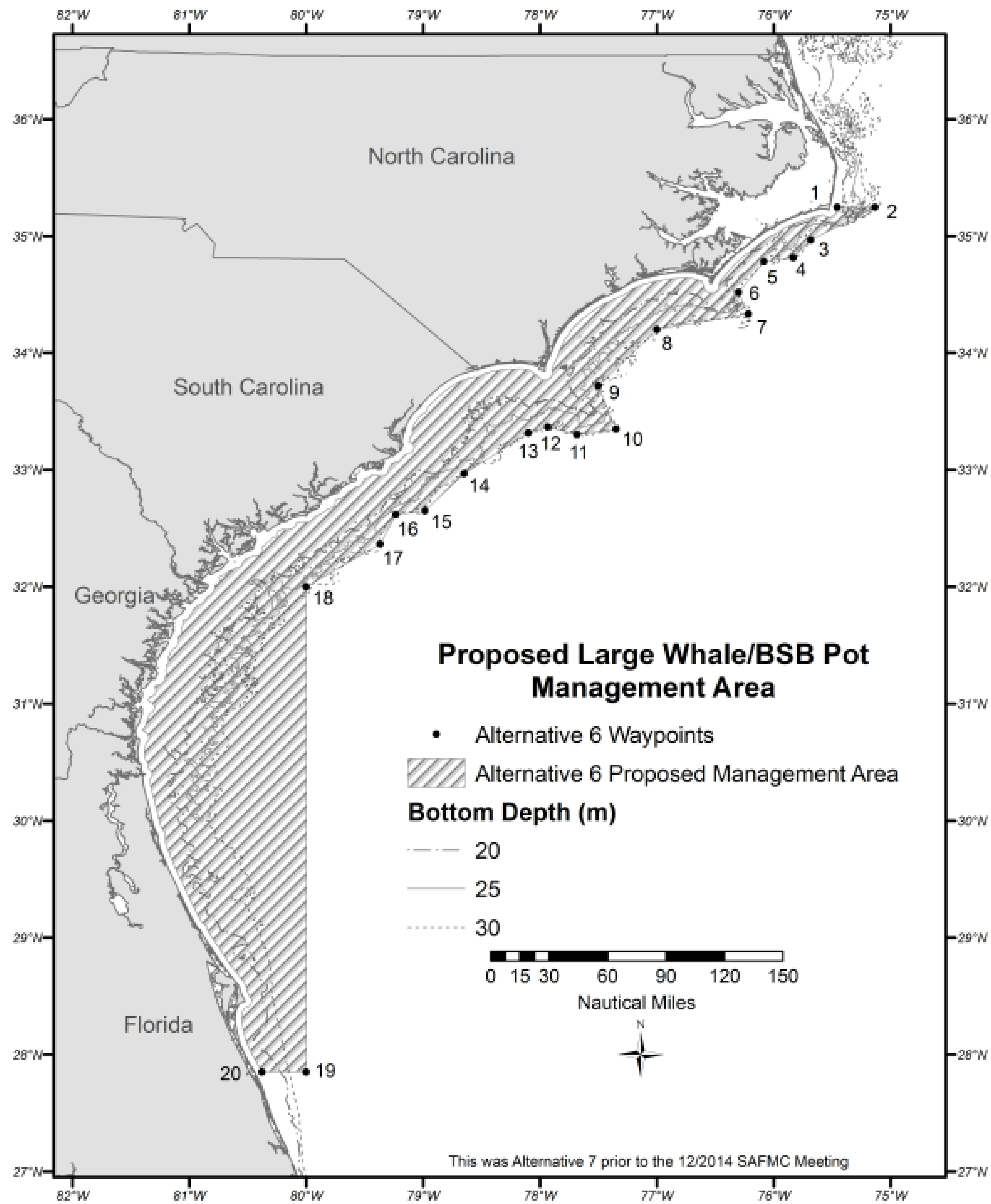


Figure B2.1.5. Area for the proposed black sea bass pot closure in Alternative 6.

Alternative 7. The black sea bass pot closure applies to the area currently designated as North Atlantic right whale critical habitat, in addition to waters inshore of points 1-29 listed below (Table B2.1.5), approximately North of the Altamaha River, Georgia, to Cape Hatteras, North Carolina (Figure B2.1.6).

> *Sub-alternative 7a.* The black sea bass pot closure applies to the area annually from November 1 through December 15 and March 15 through April 30.
>
> *Sub-alternative 7b.* For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and March 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.
>
> *Sub-alternative 7c.* For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations for the portion of the area within state waters.

Note: This area represents North Atlantic right whale critical habitat in the South Atlantic region designated on June 3, 1994. However, the closure dates are inconsistent with the critical habitat listing since right whales inhabit southeastern waters from 1 Nov-30 Apr. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 25 meters. The eastern boundary of the closure between these two areas was formed by drawing a straight line from the southeastern corner waypoint of the northern portion (NC/SC) to the northeastern corner waypoint of the southern section (FL/GA).

The following is language describing the North Atlantic right whale critical habitat area from 50 CFR 226:

Southeastern United States: The area designated as critical habitat in these waters encompasses waters between 31 deg.15'N (approximately located at the mouth of the Altamaha River, GA) and 30 deg.15'N (approximately Jacksonville, FL) from the shoreline out to 15 nautical miles offshore; and the waters between 30 deg.15'N and 28 deg.00'N (approximately Sebastian Inlet, FL) from the shoreline out to 5 nautical miles.

Table B2.1.5. Eastern boundary coordinates for proposed black sea bass pot closure Alternative 7.

Point	N. Latitude	W Longitude
1	35° 15'	State/EEZ boundary
2	35° 15'	75° 09'
3	35° 06'	75° 22'
4	35° 06'	75° 39'
5	35° 01'	75° 47'
6	34° 54'	75° 46'
7	34° 52'	76° 04'
8	34° 33'	76° 22'
9	34° 23'	76° 18'
10	34° 21'	76° 27'
11	34° 25'	76° 51'
12	34° 09'	77° 19'
13	33° 44'	77° 38'
14	33° 25'	77° 27'
15	33° 22'	77° 40'
16	33° 28'	77° 41'
17	33° 32'	77° 53'
18	33° 22'	78° 26'
19	33° 06'	78° 31'
20	33° 05'	78° 40'
21	33° 01'	78° 43'
22	32° 56'	78° 57'
23	32° 44'	79° 04'
24	32° 42'	79° 13'
25	32° 34'	79° 23'
26	32° 25'	79° 25'
27	32° 23'	79° 37'
28	31° 53'	80° 09'
29	31° 15'	80° 59'
30	30° 56'	81° 05'
31	30° 42'	81° 07'
32	30° 15'	81° 05'
33	30° 15'	81° 17'
34	29° 40'	81° 07'
35	29° 08'	80° 51'
36	28° 36'	80° 28'
37	28° 26'	80° 25'
38	28° 20'	80° 31'
39	28° 11'	80° 30'
40	28° 00'	80° 25'
41	28° 00'	State/EEZ Boundary

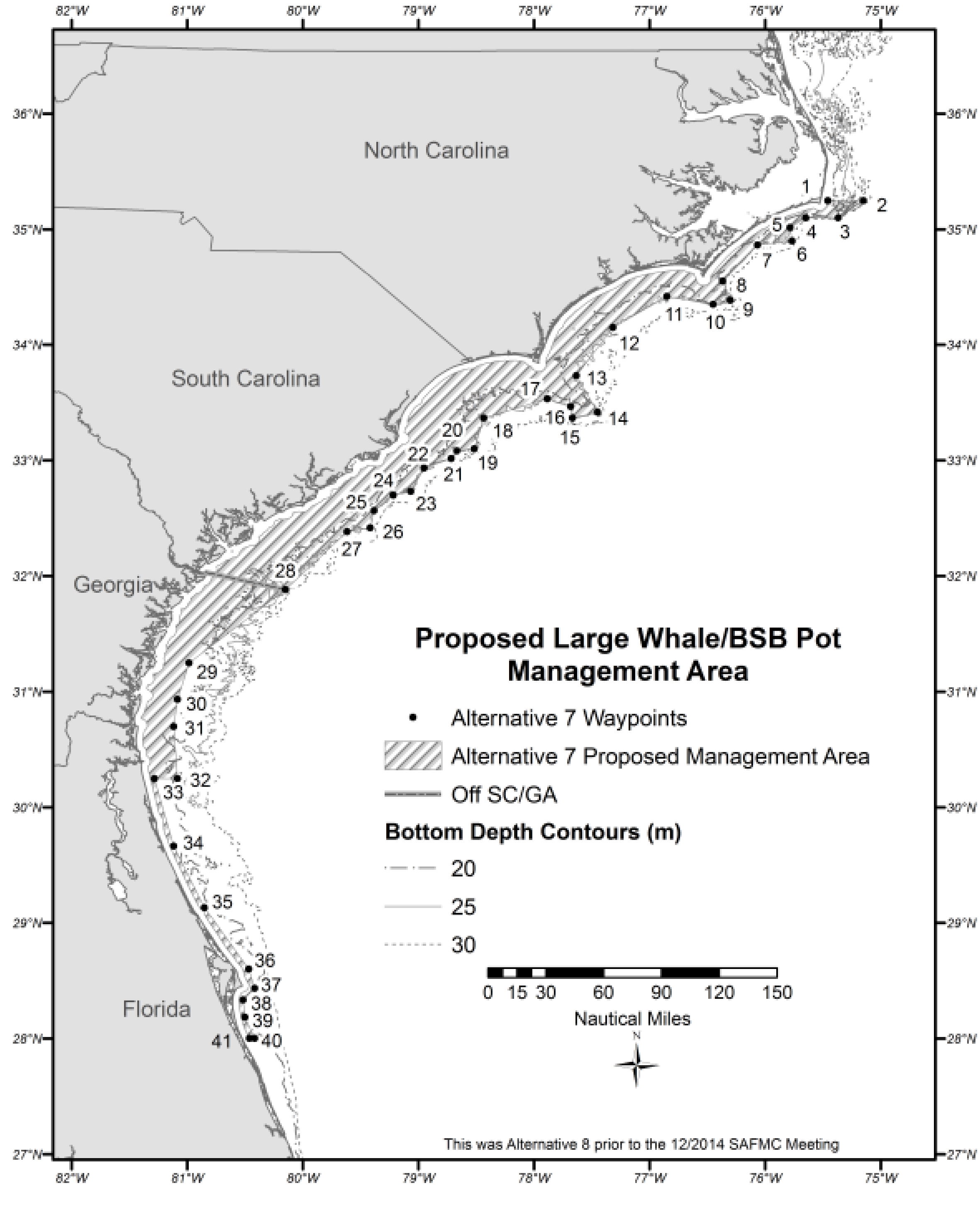


Figure B2.1.6. Area for the proposed black sea bass pot closure in Alternative 7.

Alternative 8. The black sea bass pot closure applies to waters inshore of points 1-35 listed below (Table B2.1.6), approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina (Figure B2.1.7).

> *Sub-alternative 8a.* The black sea bass pot closure applies to the area annually from November 1 through April 15.
>
> *Sub-alternative 8b.* For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations for the portion of the area within state waters.

Note: In Alternative 8, the boundaries off Florida and Georgia are identical to the boundaries in Alternative 5. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 25 meters.

Table B2.1.6. Eastern boundary coordinates for proposed black sea bass pot closure in Alternative 8.

Point	N. Latitude	W Longitude
1	35° 15'	State/EEZ Boundary
2	35° 15'	75° 09'
3	35° 06'	75° 22'
4	35° 06'	75° 39'
5	35° 01'	75° 47'
6	34° 54'	75° 46'
7	34° 52'	76° 04'
8	34° 33'	76° 22'
9	34° 23'	76° 18'
10	34° 21'	76° 27'
11	34° 25'	76° 51'
12	34° 09'	77° 19'
13	33° 44'	77° 38'
14	33° 25'	77° 27'
15	33° 22'	77° 40'
16	33° 28'	77° 41'
17	33° 32'	77° 53'
18	33° 22'	78° 26'
19	33° 06'	78° 31'
20	33° 05'	78° 40'
21	33° 01'	78° 43'
22	32° 56'	78° 57'
23	32° 44'	79° 04'
24	32° 42'	79° 13'
25	32° 34'	79° 23'
26	32° 25'	79° 25'
27	32° 23'	79° 37
28	31° 53'	80° 09'
29	31º 31'	80º 33'
30	30º 43'	80º 49'
31	30º 30'	81º 01'
32	29º 45'	81º 01'
33	29º 31'	80º 58'
34	29º 13'	80º 52'
35	29º 13'	State/EEZ Boundary

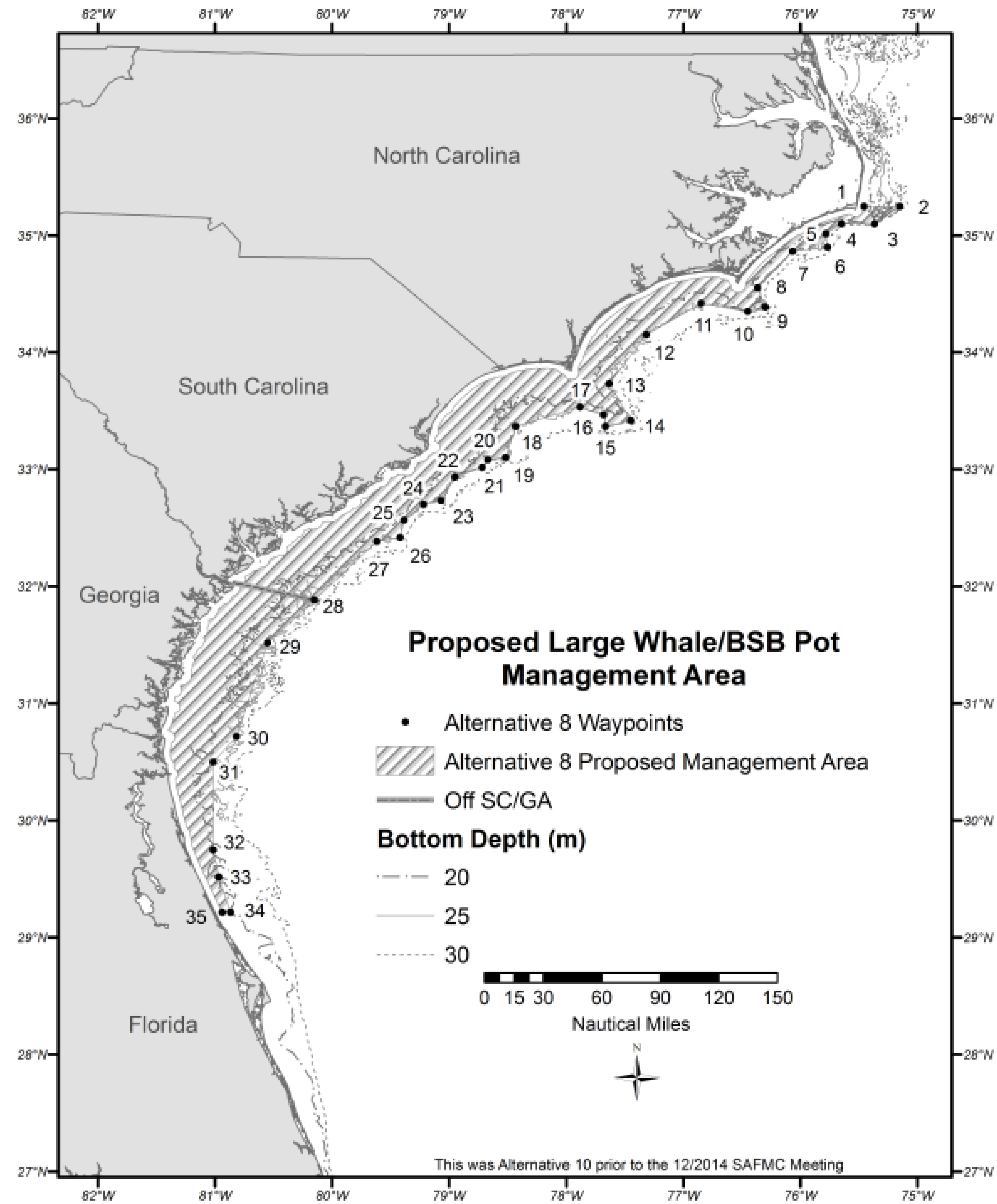


Figure B2.1.7. Area for the proposed black sea bass pot closure in Alternative 8.

Alternative 9 . The black sea bass pot closure applies to waters inshore of points 1-18 listed below (Table B2.1.7), approximately Daytona Beach, Florida, to Cape Hatteras, North Carolina (Figure B2.1.8).

> *Sub-alternative 9a.* The black sea bass pot closure applies to the area annually from November 1 through April 15.
>
> *Sub-alternative 9b.* For the area off North Carolina and South Carolina, the black sea bass pot closure applies annually from November 1 through December 15 and February 15 through April 30. For the area off Georgia and Florida, the black sea bass pot closure applies annually from November 15 through April 15.

Note: Federal regulations would only apply to that portion of the area within the South Atlantic EEZ. The states will be asked to implement compatible regulations for the portion of the area within state waters.

Note: In Alternative 9, the boundaries off Florida and Georgia are identical to the boundaries in Alternative 5. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 20 meters.

Table B2.1.7. Eastern boundary coordinates for the proposed black sea bass pot closure in Alternative 9.

Point	N. Latitude	W Longitude
1	35° 15’	State/EEZ Boundary
2	35° 15'	75° 20'
3	35° 05'	75° 24'
4	35° 08'	75° 38'
5	35° 04'	75° 52'
6	34° 51'	76° 11'
7	34° 36'	76° 24'
8	34° 24'	76° 19'
9	34° 21'	76° 27'
10	34° 33'	76° 48'
11	34° 16'	77° 25'
12	33° 44'	77° 46'
13	33° 30'	77° 31'
14	33° 28'	77° 35'
15	33° 36'	77° 55'
16	33° 34'	78° 28'
17	32° 59'	78° 52'
18	32° 59'	79° 02'
19	32° 31'	79° 30'
20	31° 57'	80° 27'
11	31° 42'	80° 24'
12	31º 31'	80º 33'
13	30º 43'	80º 49'
14	30º 30'	81º 01'
15	29º 45'	81º 01'
16	29º 31'	80º 58'
17	29º 13'	80º 52'
18	29º 13'	State/EEZ Boundary

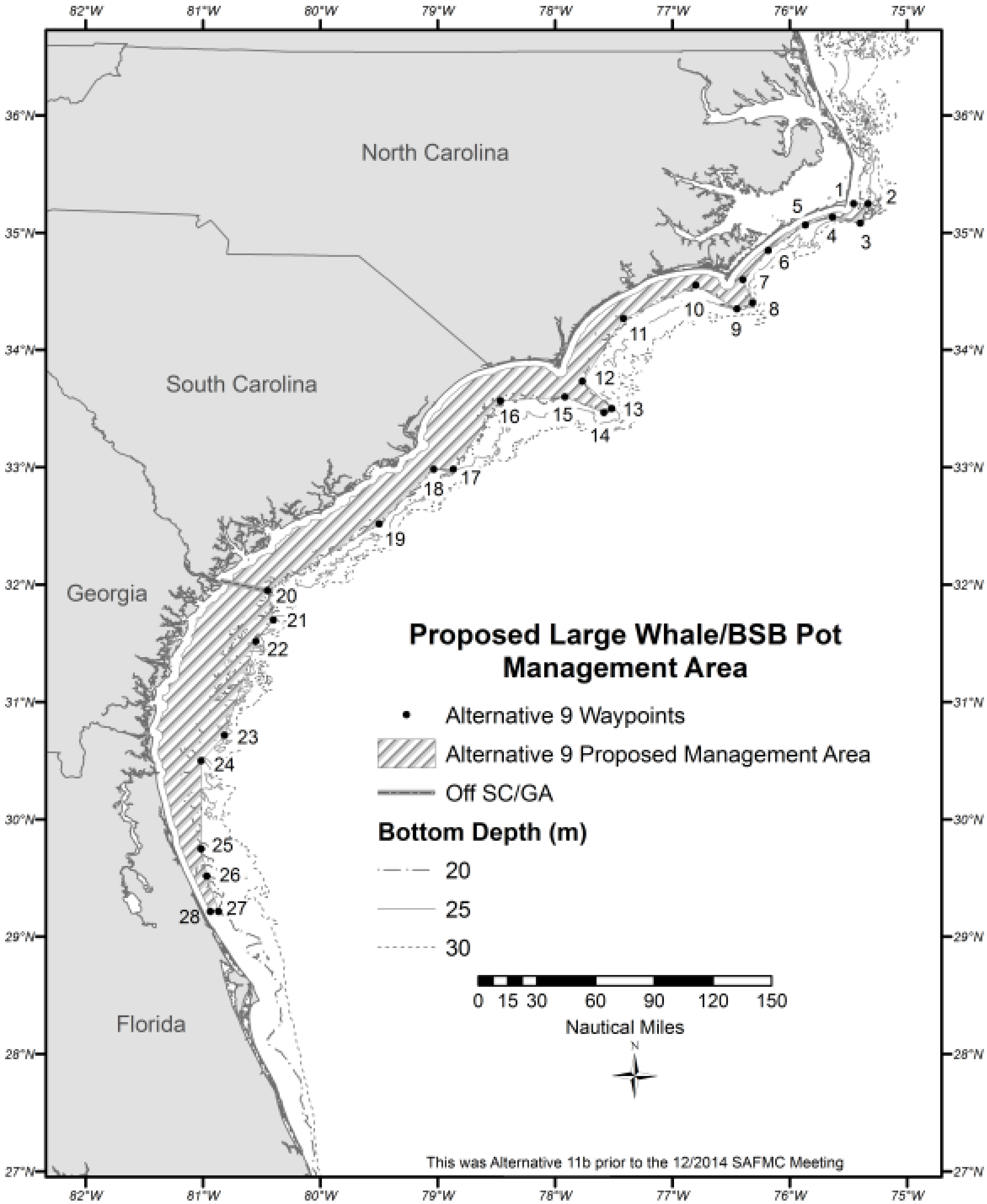


Figure B2.1.8. Area for the proposed black sea bass pot closure in Alternative 9.

Alternative 10. From November 1 through December 15, the black sea bass pot closure applies to waters inshore of points 1-20 listed below **(Table 2.1.8)**, approximately Georgia/South Carolina State Line, to Cape Hatteras, North Carolina **(Figure 2.1.9).**

From February 15 through April 30, the black sea bass pot closure applies to waters inshore of points 1-28 listed below **(Table 2.1.9)**, approximately Georgia/South Carolina State Line, to Cape Hatteras, North Carolina **(Figure 2.1.10).**

From December 16 through February 14, there would be no closure off of the Carolinas.

From November 15 through April 15, the black sea bass pot closure applies to waters inshore of points 20-28 listed below **(Table 2.1.8)**, approximately Georgia/South Carolina State Line, to approximately Daytona Beach, Florida **(Figure 2.1.9).**

Note: In Alternative 10, the boundaries off Florida and Georgia are identical to the boundaries in Alternative 5. Off North Carolina and South Carolina, the black sea bass pot closure applies in the exclusive economic zone in waters shallower than 20 meters from November 1 through x and 25 meters from x through April 30..

Table B2.1.8. Eastern boundary coordinates for the proposed black sea bass pot closure in Alternative 10 for November 1 through x.

Point	N. Latitude	W Longitude
1	35° 15′	State/EEZ Boundary
2	35° 15'	75° 20'
3	35° 05'	75° 24'
4	35° 08'	75° 38'
5	35° 04'	75° 52'
6	34° 51'	76° 11'
7	34° 36'	76° 24'
8	34° 24'	76° 19'
9	34° 21'	76° 27'
10	34° 33'	76° 48'
11	34° 16'	77° 25'
12	33° 44'	77° 46'
13	33° 30'	77° 31'
14	33° 28'	77° 35'
15	33° 36'	77° 55'
16	33° 34'	78° 28'
17	32° 59'	78° 52'
18	32° 59'	79° 02'
19	32° 31'	79° 30'
20	31° 57'	80° 27'
11	31° 42'	80° 24'
12	31º 31'	80º 33'
13	30º 43'	80º 49'
14	30º 30'	81º 01'
15	29º 45'	81º 01'
16	29º 31'	80º 58'
17	29º 13'	80º 52'
18	29º 13'	State/EEZ Boundary

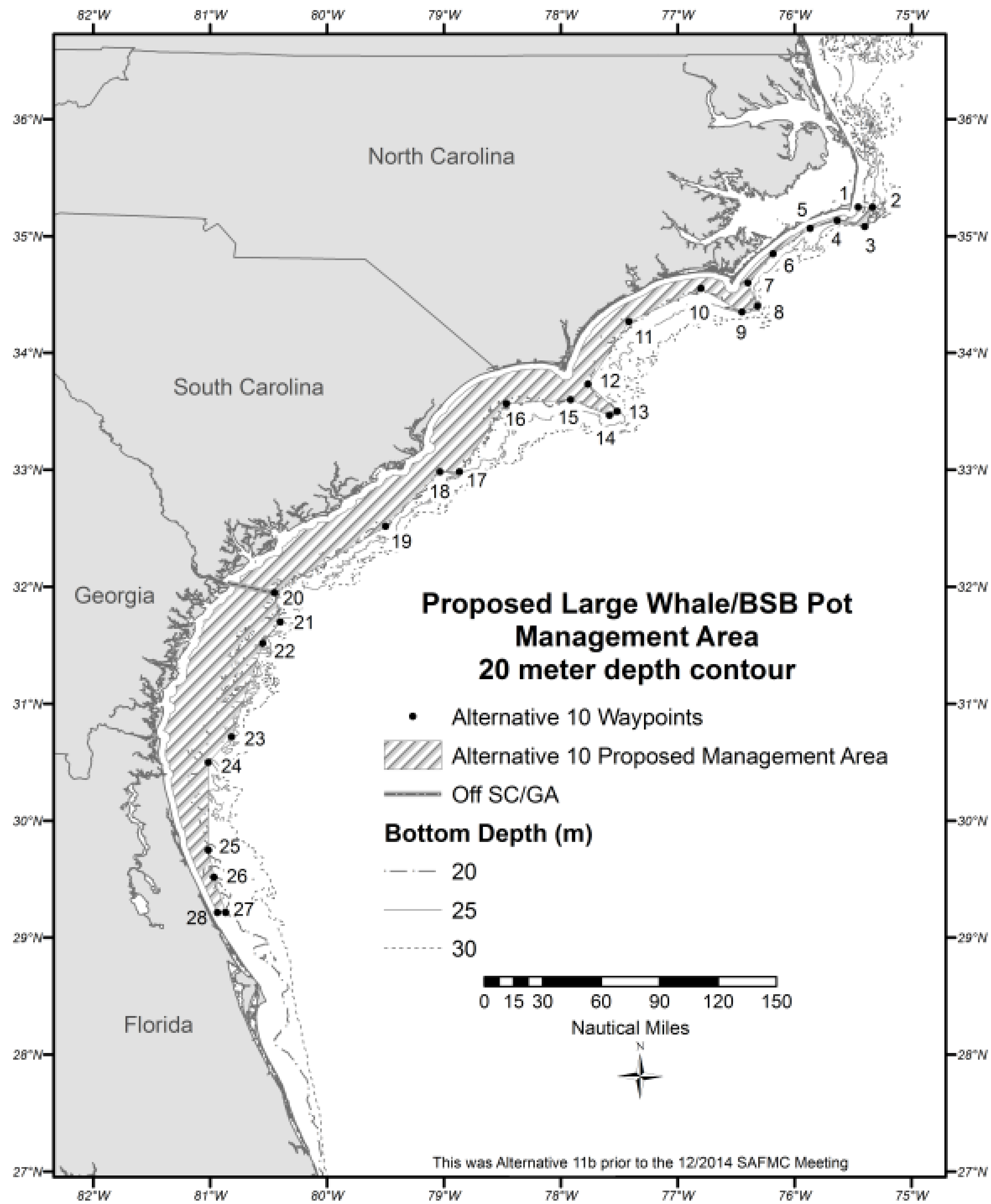


Figure B2.1.9. Area for the proposed black sea bass pot closure in Alternative 10 from November 1 through X.

Table B2.1.9. Eastern boundary coordinates for the proposed black sea bass pot closure in Alternative 10 for x through April 30.

Point	N. Latitude	W Longitude
1	35° 15'	State/EEZ Boundary
2	35° 15'	75° 09'
3	35° 06'	75° 22'
4	35° 06'	75° 39'
5	35° 01'	75° 47'
6	34° 54'	75° 46'
7	34° 52'	76° 04'
8	34° 33'	76° 22'
9	34° 23'	76° 18'
10	34° 21'	76° 27'
11	34° 25'	76° 51'
12	34° 09'	77° 19'
13	33° 44'	77° 38'
14	33° 25'	77° 27'
15	33° 22'	77° 40'
16	33° 28'	77° 41'
17	33° 32'	77° 53'
18	33° 22'	78° 26'
19	33° 06'	78° 31'
20	33° 05'	78° 40'
21	33° 01'	78° 43'
22	32° 56'	78° 57'
23	32° 44'	79° 04'
24	32° 42'	79° 13'
25	32° 34'	79° 23'
26	32° 25'	79° 25'
27	32° 23'	79° 37
28	31° 53'	80° 09'
29	31º 31'	80º 33'
30	30º 43'	80º 49'
31	30º 30'	81º 01'
32	29º 45'	81º 01'
33	29º 31'	80º 58'
34	29º 13'	80º 52'
35	29º 13'	State/EEZ Boundary

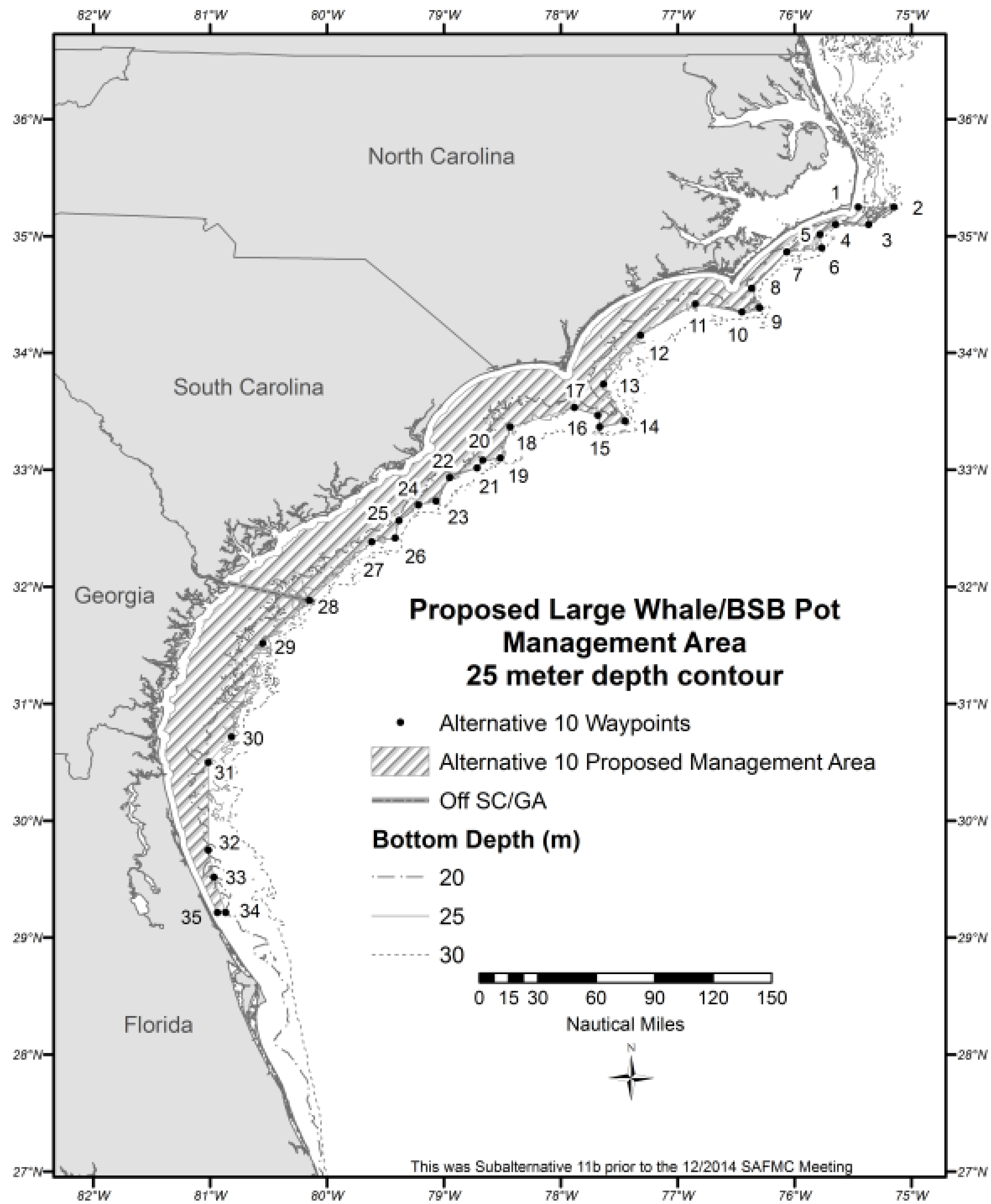


Figure B2.1.10. Area for proposed black sea bass pot closure in Alternative 10 from X through April 30.

APPENDIX C: NORTH CAROLINA RIGHT WHALE SIGHTINGS MODEL

Tim Gowan
FWC/FWRI
6/17/2014

Training data
Survey data from UNC Wilmington surveys (10/2005-4/2006, 12/2006-4/2007, and 2/2008-4/2008), obtained from OBIS-Seamap. Survey effort calculated as cumulative number of surveys (flights) per cell, across all survey months and years. Number of sightings calculated as cumulative number of right whales per cell, across all months and years.

Environmental data:
Distance to shore, depth, and slope calculated as in Gowan and Ortega-Ortiz 2014. SST summarized into semi-monthly averages (as in Gowan and Ortega-Ortiz 2014), then 'countSST' (number of semi-monthly periods with available data) and 'avgSST' calculated from 80 semi-monthly periods (Dec03-Mar13).

Started with 5642 sampling units/cells (22 cells with sightings, 24 groups, 48 whales). Removed cells with no surveys; where DistToShore=-999 (on land); where slope=0.00 (null); and where 'countSST' < 15 (623 cells remaining for analysis, 23 groups, 45 whales).

Model framework and selection
Note that there is no temporal component to this model – just used cumulative sightings and effort (across all months and years with survey data) and long-term winter SST – due to limited data.

Used a GAM with quasibinomial distribution (to deal with excessive number of zeros) with a logit link to model presence-absence of right whale sightings. log(Surveys) used as offset term in model; log(Depth), log(Slope), DistToShore, and avgSST considered as predictor variables; basis dimension parameter set to 3 and gamma term set to 1.4 to avoid overfitting.

Model selection was accomplished with a forward stepwise selection procedure, using the following evaluation criteria: model GCV scores (Table 1), percentage of deviance explained (Table 1), analysis of deviance tests (Table 2), and average squared prediction error from a five-fold cross-validation (Table 1) [all as in Gowan and Ortega-Ortiz 2014].

Table 1

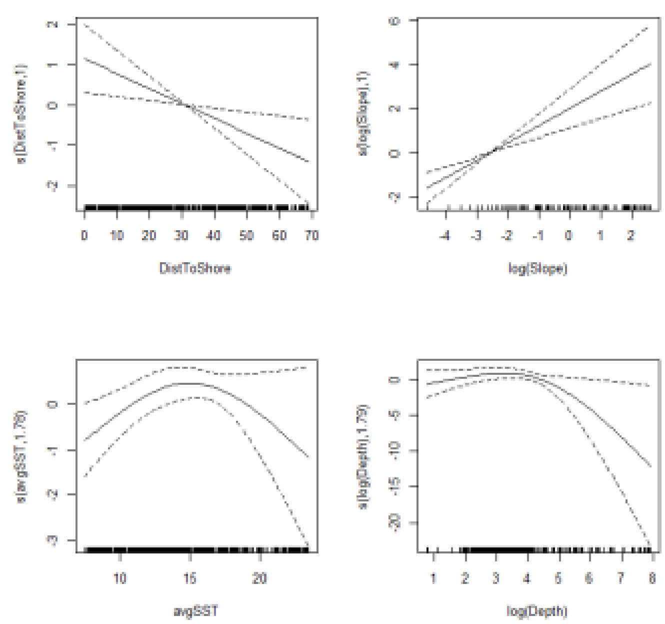
Step	Model	% Deviance	GCV	mean ASPE
1	**Null**	**0.0**	**0.3003**	0.03032
2	s(log(Depth))	1.84	0.2962	0.03031
2	**s(DistToShore)**	**3.74**	**0.2904**	0.03031
2	s(log(Slope))	3.61	0.2920	0.03029
2	s(avgSST)	2.93	0.2940	0.03031
3	s(DistToShore) + s(log(Depth))	4.38	0.2907	0.03030

3	**s(DistToShore) + s(log(Slope))**	**6.88**	**0.2844**	0.03028
3	s(DistToShore) + s(avgSST)	5.17	0.2885	0.03031
4	s(DistToShore) + s(log(Slope)) + s(log(Depth))	8.05	0.2817	0.03027
4	**s(DistToShore) + s(log(Slope)) + s(avgSST)**	**8.42**	**0.2812**	0.03028
5	**s(DistToShore) + s(log(Slope)) + s(avgSST) + s(log(Depth))**	**9.11**	**0.2800**	0.03027

Table 2

Model	Estimated df	Residual Deviance	Reduction in Deviance	*F*	*p*
null	1.00	186.3			
Step2	2.00	179.3	6.96	24.1	<0.001
Step3	4.67	173.5	5.86	7.8	<0.001
Step4	5.89	170.6	2.87	8.5	<0.01
Step5	6.57	169.3	1.28	6.8	<0.05

<u>Results</u>
Selected model, as formulated in R:
gam(Presence ~ s(DistToShore,k=3) + s(log(Slope),k=3) + s(avgSST,k=3) + s(log(Depth),k=3), family=quasibinomial(link='logit'), offset=log(Surveys), gamma=1.4)

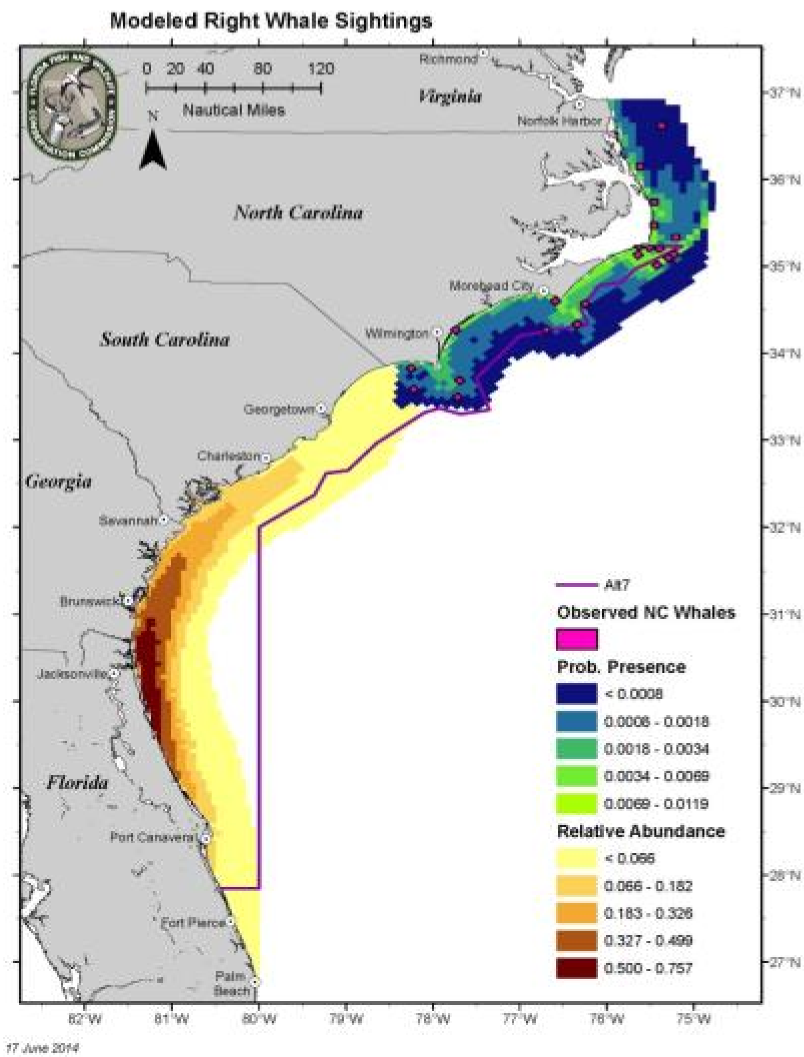


<u>Predictions</u>

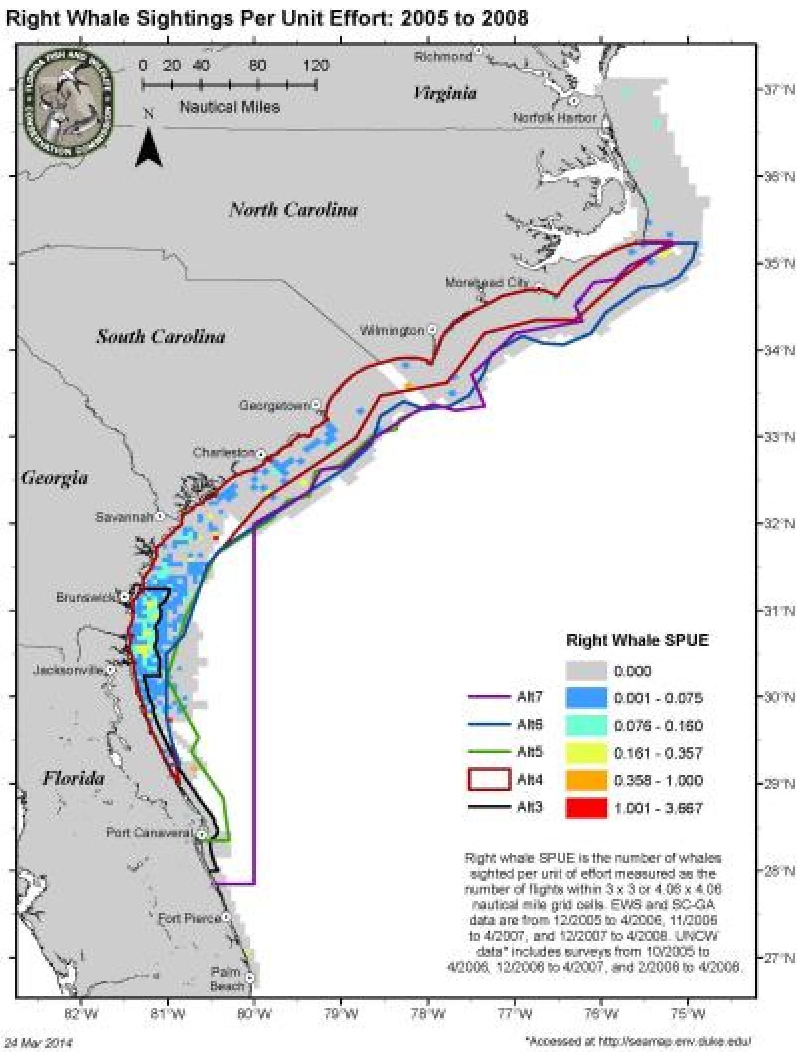
Only made predictions within the range of the training data [(0 < DistToShore <= 69) and (2 < Depth < 2742) and (33.38 <= Lat <= 36.89) and (-78.42 <= Long <= -74.79) and (0 < Slope <= 13.21) and (countSST >= 15)] – in 704 cells.

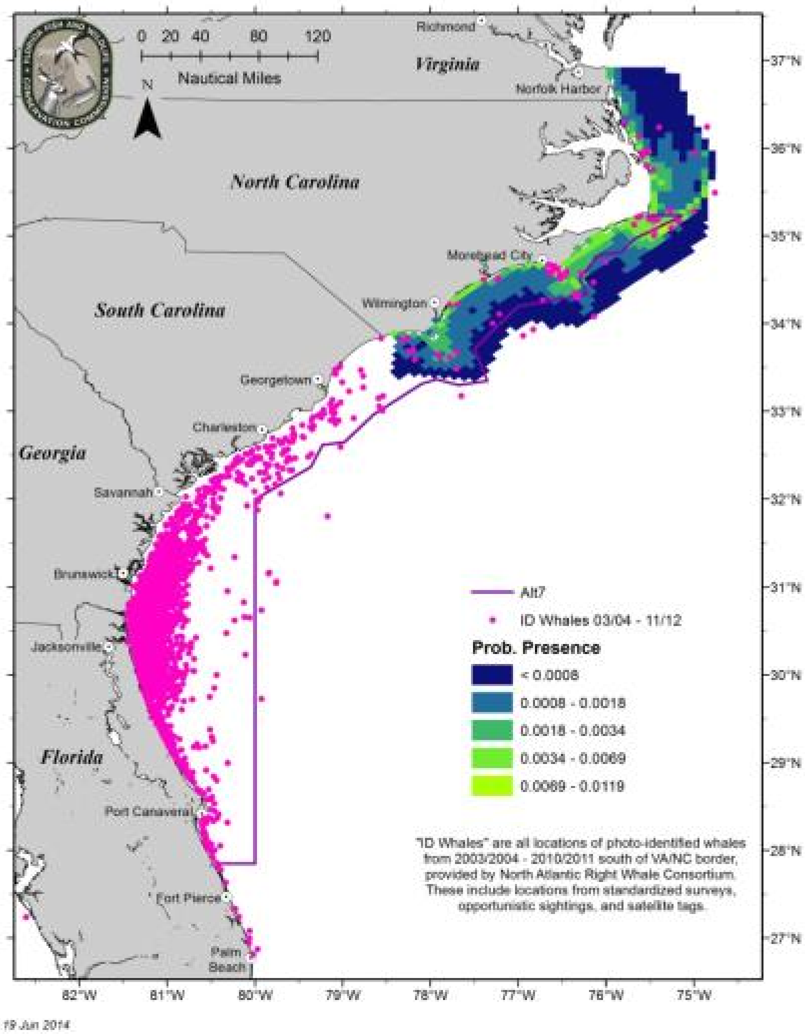
Survey data, environmental data, predicted probability of right whale presence ('pres'), and standard errors around predictions ('pres_se').

***Note: Predicted values from this NC model do not have the same scale or interpretation as the values from the SEUS model (Gowan and Ortega-Ortiz 2014) and are not directly comparable. Differences include survey design, resolution/quantification of survey effort, temporal components in the model, model framework (probability of presence vs. relative abundance), whale behavior (e.g. sighting availability bias in migratory corridor vs. calving grounds), etc.

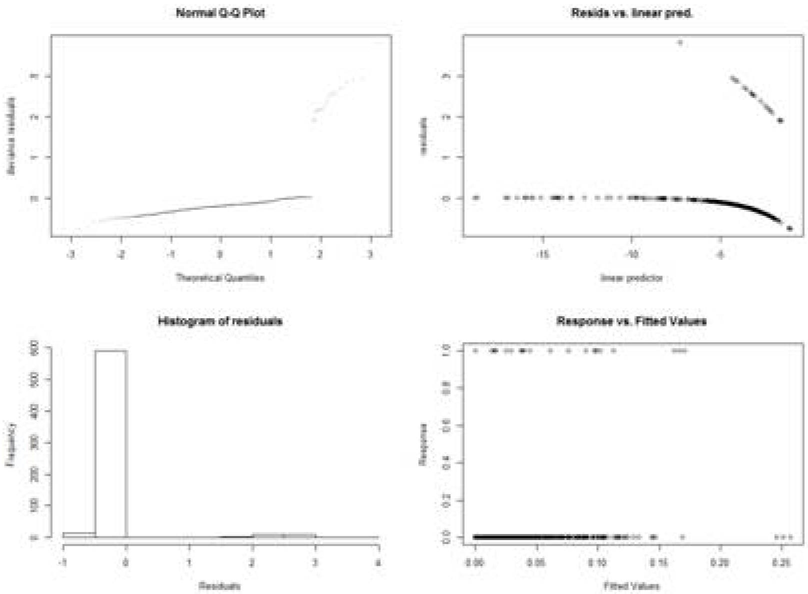


Comparing Predictions to Observations




0 20 40 80 120
Nautical Miles
N
Richmond
Virginia
Norfolk Harbor
North Carolina
Morehead City
Wilmington
South Carolina
Georgetown
Charleston
Georgia
Savannah
Brunswick
Jacksonville
Florida
Port Canaveral
Fort Pierce
Palm Beach
37°N
36°N
35°N
34°N
33°N
32°N
31°N
30°N
29°N
28°N
27°N
82°W
81°W
80°W
79°W
78°W
77°W
76°W
75°W
Alt7
ID Whales 03/04 - 11/12
Prob. Presence
< 0.0008
0.0008 - 0.0018
0.0018 - 0.0034
0.0034 - 0.0069
0.0069 - 0.0119
"ID Whales" are all locations of photo-identified whales from 2003/2004 - 2010/2011 south of VA/NC border, provided by North Atlantic Right Whale Consortium. These include locations from standardized surveys, opportunistic sightings, and satellite tags.
19 Jun 2014

Residual plots for zero-inflated model fits



APPENDIX D: Gowan and Ortega-Ortiz (2014)
{AVAILABLE FREE AT: http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0095126}

Warm/Cold Winter Right Whale Distribution

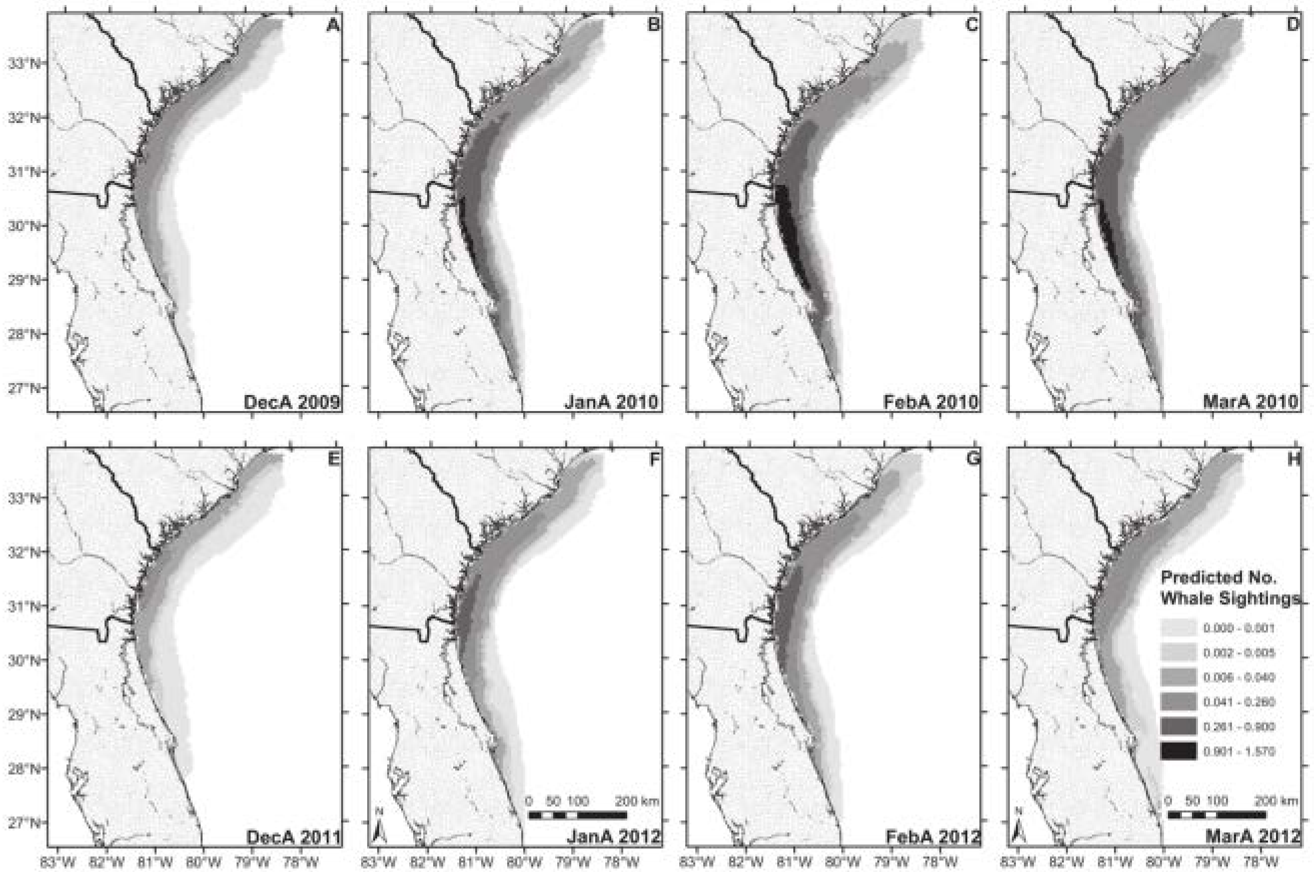


FIGURE 5: Predicted right whale relative abundance.
Values represent predicted number of sighted right whales per grid cell (assuming uniform survey effort) during the 2009/2010 calving season (a relatively cold season with high sighting rates) for December 1–15 (A), January 1–15 (B), February 1–15 (C), and March 1–15 (D); and during the 2011/2012 calving season (a relatively warm season with low sighting rates) for December 1–15 (E), January 1–15 (F), February 1–15 (G), and March 1–15 (H).
doi:10.1371/journal.pone.0095126.g005

APPENDIX E: Sensitivity Run – Monthly North Carolina Whale Distribution Model

Introduction
Insufficient right whale sightings data off North Carolina were available to directly fit a model comparable to the Gowan & Ortiz-Ortega (2014) model for FL-SC. As described in Appendix C, Dr. Gowan fit the NC model using the same modeling approach as described in Gowan & Ortega-Ortiz (2014), but aggregated right whale sightings data across all months (Dec-Mar) to obtain sufficient sample size for a statistically robust approach.

The SAFMC SSC requested additional analysis of monthly trends off NC, if possible. Dr. Gowan determined the data could support this approach if driven by whale responses to the most dynamic environmental factor (SST) rather than by the monthly sightings data. The model described in Appendix C was used to generate monthly predictions by using monthly means for SST rather than a long term Dec-Mar average of SST as in the original analysis. Thus, monthly differences in predictions are based solely on predicted whale responses to monthly differences in SST and not on modeled whale abundance/migration.

Methods
Training data
Survey data from UNC Wilmington surveys (10/2005-4/2006, 12/2006-4/2007, and 2/2008-4/2008), obtained from OBIS-Seamap. Survey effort calculated as cumulative number of surveys (flights) per cell, across all survey months and years. Number of sightings calculated as cumulative number of right whales per cell, across all months and years.

Environmental data:
Distance to shore, depth, and slope calculated as in Gowan and Ortega-Ortiz 2014. SST summarized into semi-monthly averages (as in Gowan and Ortega-Ortiz 2014), then 'countSST' (number of semi-monthly periods with available data) and 'avgSST' calculated from 80 semi-monthly periods (Dec03-Mar13).

Started with 5642 sampling units/cells (22 cells with sightings, 24 groups, 48 whales). Removed cells with no surveys; where DistToShore=-999 (on land); where slope=0.00 (null); and where 'countSST' < 15 (623 cells remaining for analysis, 23 groups, 45 whales).

Model framework and selection
Note that there is no temporal component to this model – just used cumulative sightings and effort (across all months and years with survey data) and long-term winter SST – due to limited data.

Used a GAM with quasibinomial distribution (to deal with excessive number of zeros) with a logit link to model presence-absence of right whale sightings. log(Surveys) used as offset term in model; log(Depth), log(Slope), DistToShore, and avgSST considered as predictor variables; basis dimension parameter set to 3 and gamma term set to 1.4 to avoid overfitting.

Model selection was accomplished with a forward stepwise selection procedure, using the following evaluation criteria: model GCV scores (Table E1), percentage of deviance explained (Table E1), analysis of deviance tests (TableE2), and average squared prediction error from a five-fold cross-validation (Table E1) [all as in Gowan and Ortega-Ortiz 2014].

Table E1

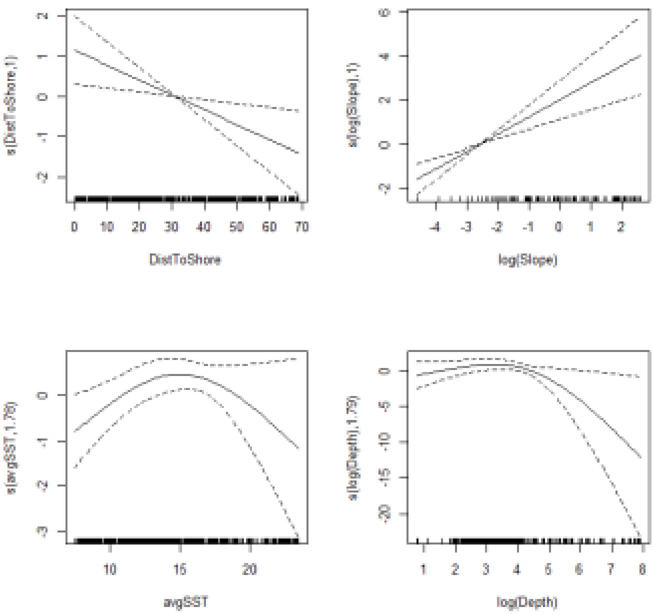
Step	Model	% Deviance	GCV	mean ASPE
1	**Null**	**0.0**	**0.3003**	0.03032
2	s(log(Depth))	1.84	0.2962	0.03031
2	**s(DistToShore)**	**3.74**	**0.2904**	0.03031
2	s(log(Slope))	3.61	0.2920	0.03029
2	s(avgSST)	2.93	0.2940	0.03031
3	s(DistToShore) + s(log(Depth))	4.38	0.2907	0.03030
3	**s(DistToShore) + s(log(Slope))**	**6.88**	**0.2844**	0.03028
3	s(DistToShore) + s(avgSST)	5.17	0.2885	0.03031
4	s(DistToShore) + s(log(Slope)) + s(log(Depth))	8.05	0.2817	0.03027
4	**s(DistToShore) + s(log(Slope)) + s(avgSST)**	**8.42**	**0.2812**	0.03028
5	**s(DistToShore) + s(log(Slope)) + s(avgSST) + s(log(Depth))**	**9.11**	**0.2800**	0.03027

Table E2

Model	Estimated df	Residual Deviance	Reduction in Deviance	*F*	*p*
null	1.00	186.3			
Step2	2.00	179.3	6.96	24.1	<0.001
Step3	4.67	173.5	5.86	7.8	<0.001
Step4	5.89	170.6	2.87	8.5	<0.01
Step5	6.57	169.3	1.28	6.8	<0.05

Final Model

Selected model, as formulated in R:
gam(Presence ~ s(DistToShore,k=3) + s(log(Slope),k=3) + s(avgSST,k=3) + s(log(Depth),k=3), family=quasibinomial(link='logit'), offset=log(Surveys), gamma=1.4)



Results

Predictions were made within the range of the training data [(0 < DistToShore <= 69) and (2 < Depth < 2742) and (33.38 <= Lat <= 36.89) and (-78.42 <= Long <= -74.79) and (0 < Slope <= 13.21) and (countSST >= 15)] – in 704 cells. Long-term mean monthly SST was calculated from 10 years of data (December 2003 – March 2013) and used to generate monthly predictions.

Summary Outputs from Sensitivity Run:

The Reg-16 analysis was re-run using the monthly NC right whale distribution model data for Dec-Mar, with Dec used as a proxy for Nov and Mar used as a proxy for Apr. Projected closure dates and relative right whale entanglement risk were summarized by spatial scenario, catch rate scenario, and Reg-16 proposed alternative (Table E3, Figure E1). The incorporation of monthly data for NC right whale distribution had very little impact on the projected effects of Reg-16 alternatives with regards to relative right whale risk (Table E4). Impacts ranged from 0-5 relative risk units. The greatest impact was observed for Alternatives 7c, which showed slightly reduced risk under this sensitivity run. By contrast, Alternatives 8b and 9b showed slightly increased risk. It is important to note that this model is based on predicted right whale responses to mean monthly sea surface temperature. Due to data limitations, the model was unable to account for temporally unique right whale behavioral dynamics.

Note: Predicted values from this NC model do not have the same scale or interpretation as the values from the SEUS model (Gowan and Ortega-Ortiz 2014) and are not directly comparable. Differences include survey design, resolution/quantification of survey effort, temporal components in the model, model framework (probability of presence vs. relative abundance), whale behavior (e.g. sighting availability bias in migratory corridor vs. calving grounds), etc.

Table E3. Monthly NC Model sensitivity run projected commercial black sea bass closure dates, percent of ACL reached, and risk of right whale entanglement in pot gear vertical lines (in relative risk units) under proposed Alternatives in Regulatory Amendment 16.

MEAN CONDITIONS		Alt1	No Closure				Alt2				Alt3				Alt4				Alt5				Alt6				Alt7a			
		SQ	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Scenario A	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	12/5	10/12	10/28	12/3	12/30	12/22	12/18	12/30	12/24	12/11	12/11	12/23	12/29	12/21	12/18	12/29	10/11	8/18	10/6	10/7
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	15	11	11	15	2	2	2	2	2	2	2	2	2	2	2	2	71	71	71	71
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	48	47	47	48	0	0	0	0	37	37	37	37	0	0	0	0	94	94	94	94
Scenario B	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	12/3	10/17	11/4	12/2	12/28	12/19	12/18	12/29	12/18	12/2	12/8	12/17	n/a	12/25	12/20	n/a	10/12	8/20	10/9	10/9
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	27	21	22	26	8	8	8	8	2	1	2	2	8	8	8	8	66	66	66	66
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	30	29	29	30	2	2	2	2	43	42	42	43	0	0	0	0	77	77	77	77
Scenario C	Closure Date	n/a	10/2	8/4	9/20	9/27	10/2	8/4	9/20	9/27	11/26	10/4	10/26	11/19	12/20	12/7	12/11	12/19	12/16	12/1	12/6	12/15	12/20	12/7	12/10	12/19	10/11	8/18	10/6	10/7
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	100	100	100	100	100	100	100	100	17	14	14	16	3	3	3	3	2	2	2	2	3	3	3	3	68	68	68	68
	RW Risk (FL-SC)	0	100	100	100	100	100	100	100	100	44	43	43	44	1	1	1	1	34	33	33	34	0	0	0	0	84	84	84	84

MEAN CONDITIONS		Alt1	Alt7b				Alt7c				Alt8a				Alt8b				Alt9a				Alt9b				Alt10			
		SQ	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4	S1	S2	S3	S4
Scenario A	Closure Date	n/a	n/a	12/30	12/21	n/a	12/28	12/17	12/14	12/29	12/11	10/24	10/31	12/9	n/a	12/30	12/21	n/a	10/31	9/20	10/15	10/27	n/a	12/28	12/20	n/a	n/a	12/29	12/20	n/a
	%ACL	97%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	98%	100%	100%	100%	100%	99%	100%	100%	99%	99%	100%	100%	99%
	RW Risk (NC)	0	79	78	74	79	84	79	78	85	15	14	14	15	54	53	49	54	27	27	27	27	64	63	59	64	58	57	53	58
	RW Risk (FL-SC)	0	98	97	92	98	91	85	83	92	40	38	38	39	81	79	74	81	62	62	62	62	90	87	83	90	81	79	74	81
Scenario B	Closure Date	n/a	12/28	12/18	12/17	12/28	12/22	12/9	12/11	12/23	12/7	10/25	11/5	12/6	12/29	12/20	12/18	12/29	11/9	9/27	10/19	11/3	12/26	12/15	12/14	12/26	12/27	12/17	12/16	12/28
	%ACL	97%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	RW Risk (NC)	0	84	75	74	84	94	82	84	95	37	31	32	37	67	58	57	67	52	50	50	50	85	76	75	85	73	64	63	74
	RW Risk (FL-SC)	0	73	70	70	73	70	67	67	71	50	48	49	50	65	62	61	65	57	56	56	56	71	68	68	71	65	62	62	66
Scenario C	Closure Date	n/a	n/a	12/27	12/19	n/a	12/27	12/16	12/13	12/28	12/6	10/17	10/29	12/5	n/a	12/28	12/20	n/a	10/28	9/15	10/13	10/24	12/31	12/24	12/17	n/a	n/a	12/25	12/18	n/a
	%ACL	97%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	99%	100%	100%	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	99%
	RW Risk (NC)	0	88	82	74	88	101	90	87	102	20	18	18	20	64	59	51	64	36	36	36	36	82	77	68	82	71	71	71	71
	RW Risk (FL-SC)	0	92	89	84	92	85	78	76	86	37	36	36	37	76	74	68	76	56	56	56	56	84	79	74	84	77	72	68	77

Sensitivity Runs: Mean conditions whale distribution, catch rate projection scenarios 1-4 (i.e., observed 2008/09 winter catch rates, observed 2013/14 summer catch rates scaled to account for higher winter CPUE, observed 2013/14 summer catch rates, and mean observed 2006/07-2008/09 winter catch rates) and spatial fishing distribution scenarios A-C (i.e., based on Nov-Apr 2008/09 pot distribution with 2013/14 soak times, based on 2013/14 June-October pot distribution and soak times, based on mean Nov-Apr 2006/07-2008/09 pot distribution with 2013/14 soak times).

Table E4. Differences in North Atlantic right whale relative risk units between annual (see Table 2A) and monthly NC model (see Table E3).

Catch Rate	Trap Distribution	1	NC	2	3	4	5	6	7a	7b	7c	8a	8b	9a	9b	10
1	A	0	0	0	0	0	0	0	3	2	-4	-1	1	-1	1	1
	B	0	0	0	0	0	0	0	2	2	-2	-1	2	-1	1	2
	C	0	0	0	0	0	0	0	3	1	-5	-1	0	-1	0	0
2	A	0	0	0	-1	0	0	0	3	2	-3	-1	1	-1	1	1
	B	0	0	0	-1	0	0	0	2	3	-1	-2	2	-1	2	2
	C	0	0	0	-1	0	0	0	3	2	-4	-1	1	-1	0	0
3	A	0	0	0	-1	0	0	0	3	3	-3	-1	2	-1	2	2
	B	0	0	0	-1	0	0	0	2	3	-1	-1	2	-1	2	2
	C	0	0	0	-1	0	0	0	3	3	-4	-1	2	-1	1	0
4	A	0	0	0	0	0	0	0	3	2	-4	-1	1	-1	1	1
	B	0	0	0	0	0	0	0	2	2	-2	-1	2	-1	1	2
	C	0	0	0	0	0	0	0	3	1	-6	-1	0	-1	0	0

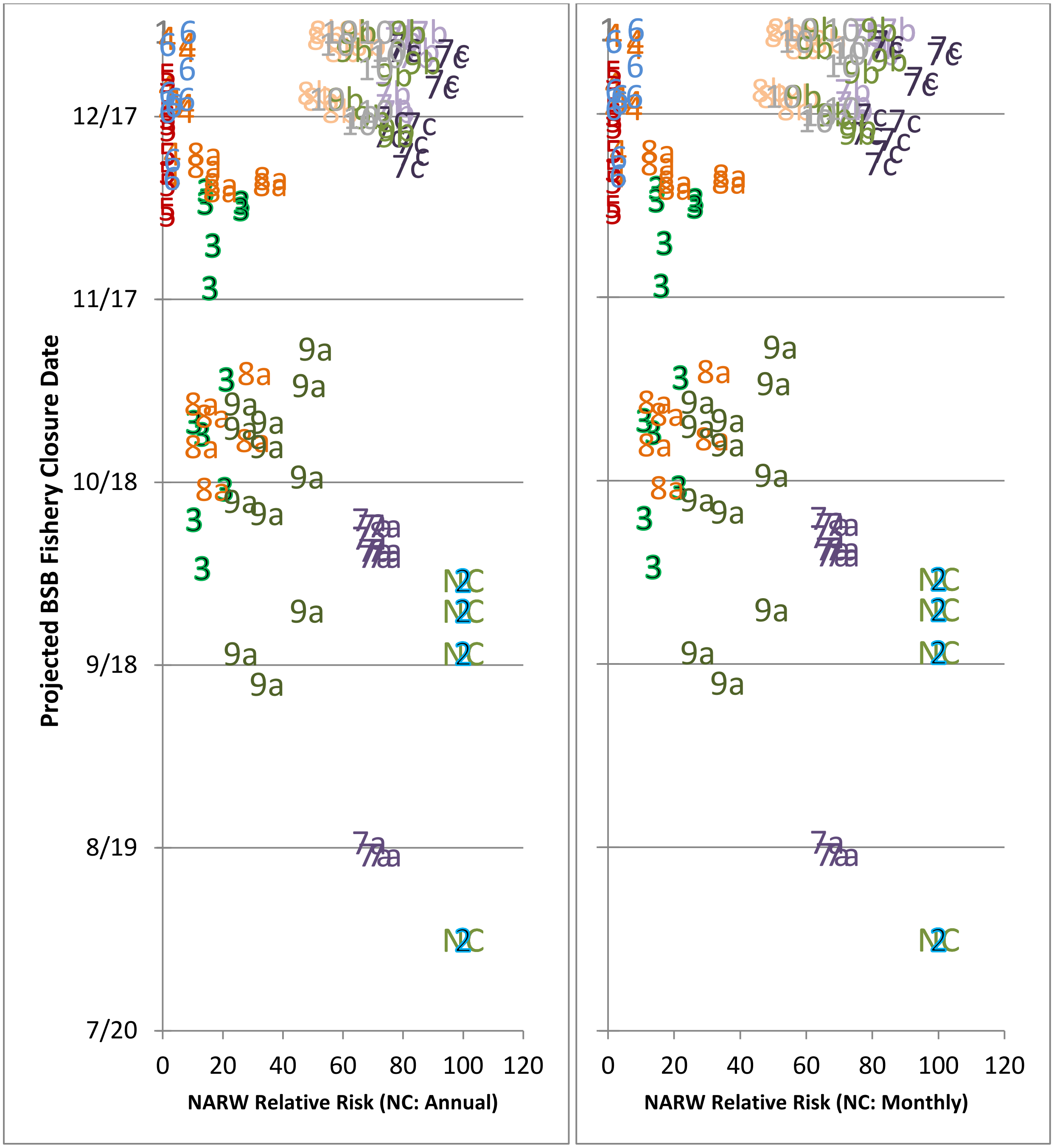


Figure E1. Projected closure date versus North Atlantic right whale (NARW) relative risk off North Carolina for Annual (left) and Monthly (right) models, by alternative (colored numbers), across catch rate scenarios 1-4 and spatial pot gear distribution scenarios A-C, for right whale distributions under mean conditions. Number/letter combinations included in the graph correspond to alternatives in Reg-16. North Carolina data modeled based on monthly predictions of right whale distribution based on mean monthly sea surface temperatures (SST).

APPENDIX F: Evaluation of Within-Scenario Uncertainty

At their October 2014 meeting, the SAFMC SSC recommended within scenario model uncertainty be evaluated to determine if projected differences between alternatives were statistically robust. SERO staff worked with Tim Gowan (FWC) to generate 95% confidence intervals (based on the inter-annual variation in modeled whale relative abundance) for the FL-SC and NC right whale models presented in the main body of this report. Within-scenario uncertainty was evaluated using these confidence limits for the right whale distribution model. Lower confidence limits were bounded at zero within model cells, consistent with the use of a quasibinomial distribution (Gowan & Ortega-Ortiz 2014, Gowan pers. comm.). The other components of the model (distribution of fishery effort, fishery catch rate) were treated as deterministic within-scenarios, with uncertainty in these components evaluated exclusively through the 'bookending' of a range of realistic scenarios. In general, within-model uncertainty was low, and model-projected differences between alternatives appeared to be statistically robust (Figure F1). Within-model uncertainty was highest for Alternatives 3, 5, and 7b-9b; however, these alternatives remained distinctly separated from Alternatives 4 and 6, which provided the lowest relative right whale risk of any pot gear fishery opening considered in Reg-16.

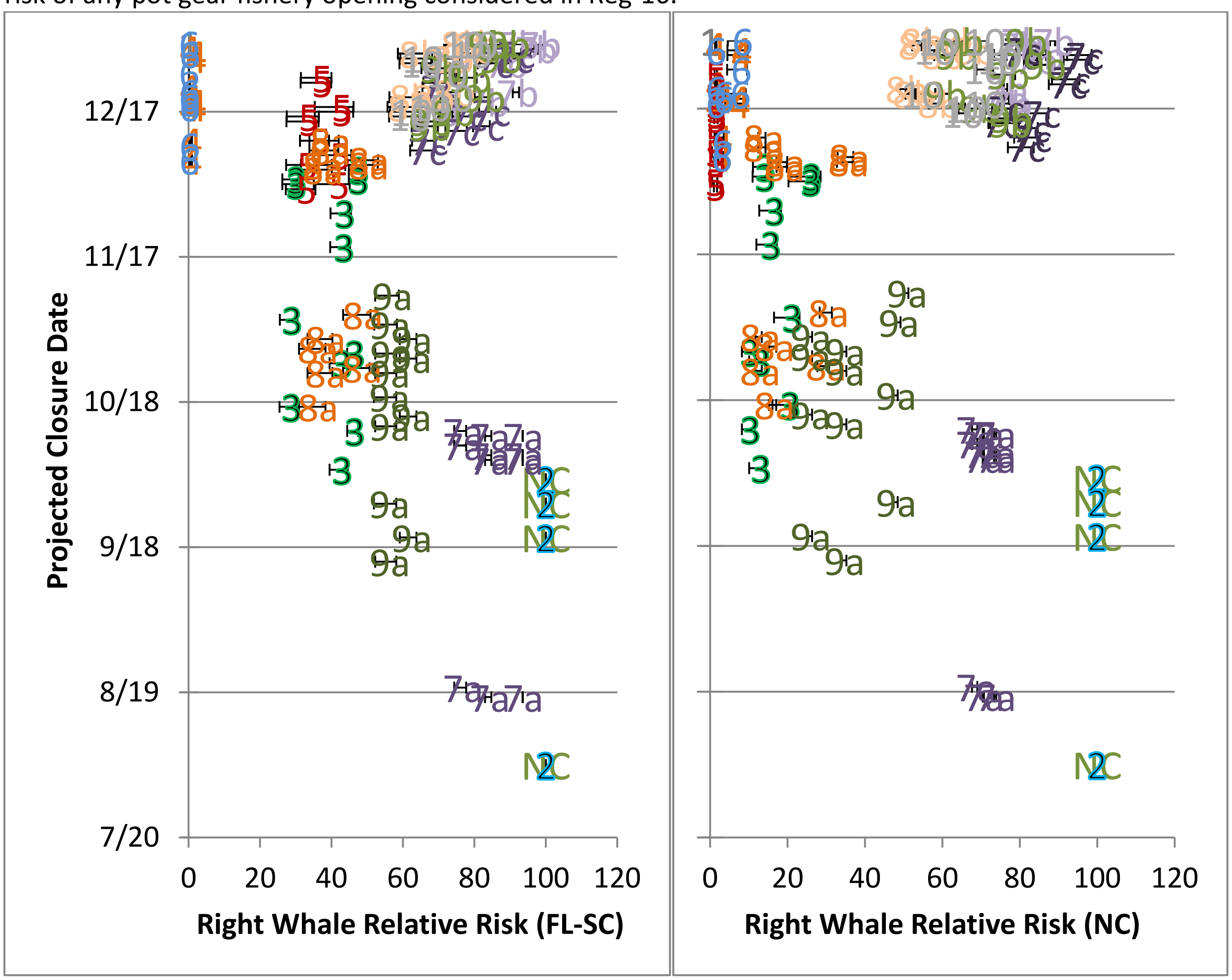


Figure F1. Projected closure date versus relative right whale risk, by alternative (colored numbers), across catch rate scenarios 1-4 and spatial pot gear distribution scenarios A-C, for right whale distributions under mean conditions. Number/letter combinations included in the graph correspond to alternatives in Reg-16. Error bars denote 95% confidence limits. Compare to Figure 11A.

Appendix Q. Additional Analysis Supporting Action 1 Economic Effects

This appendix contains additional analyses that support the calculation of the **Action 1** economic effects, but are not directly relevant to the comparison of the expected economic effects of the alternatives and, therefore, are not included in **Section 4.1.2**. The appendix combines information from both the Chapter 3 Economic Environment section (**Sections 3.3.1**) and from the **Action 1** Economic Effects section (**Section 4.1.2**) and expands on it in greater detail to supplement further the economic effects analysis for **Action 1**.

The approach employed in **Section 4.1.2** assessed the effects of the proposed measure emphasizing the use of revenue and its key components such as price per pound, projected closures, and both historical and projected landings. The analyses contained in this appendix provide an alternative statistical regression modeling approach to calculate price per pound, a market grade analysis based on North Carolina trip ticket data in an attempt to tease out additional factors that influence price per pound (e.g. gear and seasonality effects), limited trip cost data, and other fishing activity by black sea bass pot fishermen. Each section explains the utility of the analyses in supporting the economic effects analysis of **Section 4.1.2**.

<u>Fishing gear used in the commercial black sea bass fishery</u>

The primary gears used to commercially harvest black sea bass traditionally have been black sea bass fish pots and hook and line. However, black sea bass also occasionally are harvested with other commercial gears. **Table Q.1** shows the additional gears used to harvest black sea bass commercially from 2000 through 2013 and the percentage of total landings made up by those gears collapsed across all the years in the series. From 2000 through 2013, other gears accounted for 5.7% of the total commercial black sea bass landings. However, not all of these gears were used in each year and in most years landings, and associated ex-vessel revenues (revenues), by these other gears are considered confidential data. Therefore, in this economic analysis, landings (and revenues) from these other gears are combined with the totals for hook and line.

Table Q.1. Percent black sea bass landings in the South Atlantic with gears other than pots and hook and line, 2000-2013.

Other Gears	% Landings
Gill Net	0.3%
Longline	0.5%
Powerhead/Bang Stick	0.6%
Spear Gun	1.6%
Trolling	2.7%

Source: Southeast Fisheries Science Center (SEFSC)/Social Science Research Group (SSRG) Economic Panel Data.

<u>Price per pound by month</u>

Monthly black sea bass ex-vessel price (price) per pound was generated by taking averages over a period of years. Two periods, 2000-2013 and 2011-2013, were chosen for the present analysis. These two series were chosen because the first is a long time series and a long time series may smooth out any unusual effects such as a natural disaster on price that could have occurred in a given season, and the second because it reflects the most recent fishing years and, therefore, may be more representative of future conditions. However, any choice of years for analyzing prices has advantages and drawbacks. Using 2000-2013 is good for showing what has occurred on average over the long period, but the understanding of any changes in prices may be confounded by more frequent changes in management measures. Using 2011-2013 shows most recent trends, but prices for June through October may be depressed due to a glut in the market caused by a derby in the pot component and inflate the price of fish caught in the winter months when few black sea bass were available.

Figure 4.1.2.1 shows the average price per pound (gw) by month for each time series. From 2000- 2013, average monthly price per pound varied approximately $0.57 from lowest month to highest month. The average price ranged from a low of $2.41 (2013 dollars) in October to a high of $2.98 (2013 dollars) in April. The average annual price per pound (weighted by the amount of product sold) was $2.55 (in 2013 dollars).

From 2011-2013. the black sea bass price per pound averaged $3.87 (2013 dollars) in April. The lowest price per pound value was in October, averaging $2.44 (2013 dollars). The average annual price per pound was $2.63 (2013 dollars). Note that the commercial fishing season for black sea bass closed early on October 7, 2010, July 15, 2011, and October 8, 2012 for the three fishing years used in the analysis. Prices for months after the closure were based on relatively low landings that could affect the prices. This analysis assumes prices will remain constant even if landings increase in months where there was little data to estimate the average price per pound.

No historic time series for calculating monthly price per pound for black sea bass can be considered completely accurate because the current management constraints did not exist in the past. The two time series used for calculating average monthly price per pound were used as probable high and low ranges for the actual values. The actual monthly price per pound values most likely to occur in the future is probably somewhere between the estimates provided by the 2000–2013 and 2011–2013 estimates from the SEFSC/SSRG Economic Panel Data. For example, monthly prices were calculated for the 2006 – 2009 fishing years. Those were the last three fishing years in which the commercial black sea bass fishery was open all year. The estimates of monthly values from 2006 – 2009 largely fell between the two ranges used in this analysis.

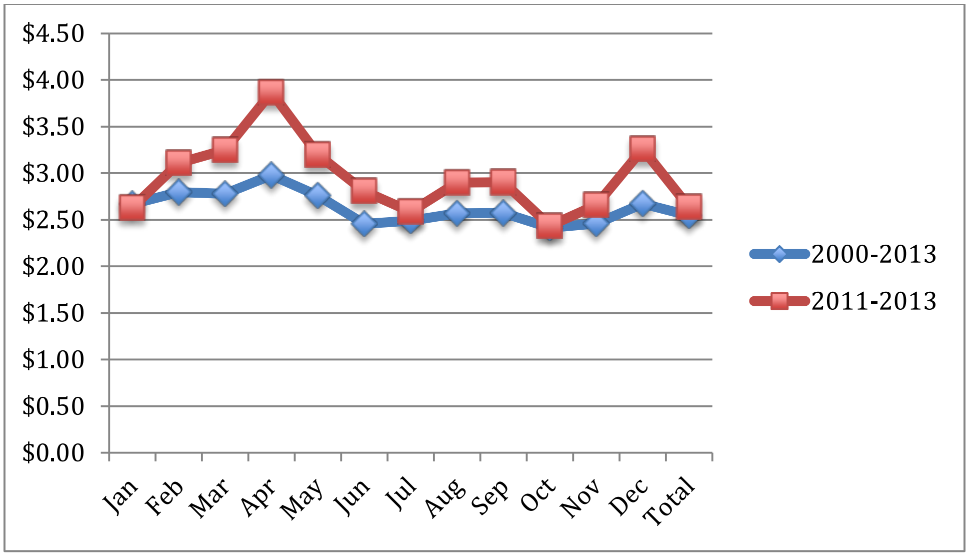


Figure 4.1.2.1. Average price per pound (gw) in the South Atlantic region for black sea bass by month for 2000 – 2013 and 2011 – 2013 (in 2013 dollars).
Source: SEFSC/SSRG Economic Panel Data, ACL_Tables_07102914

Additional statistical price per pound calculations

Statistical methods can be employed to examine changes in the ex-vessel price (price) per pound other than monthly averages across years. A simple 2 x 2 Analysis of Variance (ANOVA) model (pots versus other gear, November through April versus May through October) for landings data from 2000 through 2013 reveals highly statistically significant overall model differences (F = 28.228, p < 0.001, df_A = df_B = df_{AxB} = 1; IBM SPSS 2011). The model shows that black seas bass harvested with pots bring a statistically significant higher price than if harvested with other gears, predominantly hook and line, (F_A = 25.254, p < 0.001, df_A = 1). Also, the price per pound for black sea bass was statistically higher in the months of November through April compared to the months of May through October (F_B = 22.710, p < 0.001, df_B = 1). The interaction between gear and season was also significant. Pot gear brings in statistically higher prices than other gears during November through April, while other gears bring in statistically higher prices than pots during May through October (F_{AxB} = 32.588, p < 0.001, df_{AxB} = 1). However, a limitation of this approach is an assumption that the data points used in the ANOVA are statistically independent of each other. That assumption cannot be assured because much of the data represent multiple trips by a group of fishery participants that does not remain constant over time. Reasons why the price per pound is higher for black sea bass in November through April are because the fish are larger and darker in color during these months. Also, during May through October there is market competition from black sea bass harvested north of Cape Hatteras. Black sea bass caught in pots tend to bring a higher ex-vessel value per pound compared to black sea bass landed with other gears due to quality issues, such as damaged caused by hooks. More of the higher quality fish were caught by pot gear November through October, perhaps indicating a confounding between gear type and seasonality.

The Socio-economic Panel of the South Atlantic Council's Scientific and Statistical Committee recommended analysis of the impact of past management changes on average price per pound based on gear and season. A simple linear regression model was constructed using IBM SPSS

(2011). The dependent variable modeled was price per pound. The independent variables modeled were: 1) gear (pots versus other gears); 2) landings period (November through April versus May through October); 3) whether or not the landings occurred prior to the implementation of Amendment 13c (10/23/2006; ACL step-down from 447,000 lbs gw to 308,000 lbs gw); 4) whether or not the landings occurred prior to the implementation of Amendment 18a (7/1/2012; reduced participation to 32 endorsements, 1,000 lbs gw trip limit, maximum 35 pots per vessel, increased size limit to 11", and pots must be brought to shore at the end of a trip); 5) number of pounds of black sea bass landed on the trip; and 6) total pounds of all species landed on the trip. Because the data used for the model only included 2000 through 2013, the management measures from Amendment 9 (12/24/1999) and Amendment 11 (2/2/1999) were already in place for all the years in the analysis. Likewise, Regulatory Amendment 19 (increase ACL to 780,020 lbs ww, pot closure from November through April) did not go into place until fall of 2013, shortly before the closure of that season, so the effects of those management measures could not be captured and were not included in the regression modeling.

The final regression model used to determine the effects of gear, closure periods, pounds landed, and management effects of Amendments 13c and 18a on the price per pound for black sea bass, the following model was estimated:

$$price = \alpha + \beta 13c + \gamma 18a + \delta C + \varepsilon G + \zeta T + e$$

Price refers to price per pound of black sea bass (in 2013 dollars), 13c is a dummy variable representing whether or not Amendment 13c was in effect at the time of landings, 18a is a dummy variable representing whether or not the Amendment 18a was in effect at the time of landings, C refers to whether or not the landings occurred during one of the current closure months (November – April), G is a reference to which gear was used to land black sea bass (pots versus other gears, predominantly hook and line), and T is the total pounds landed of all species on the trip. The letter '*e*' in the equation represents the combined measurement error for all of the variables in the model. A sample size of 52,987 vessel trips for the years 2000 through 2013 was used in this regression analysis.

All of the variables in the model were statistically significant with $p < 0.001$. Stepwise regression was used. To enter the model, the significance level was set to $p <= 0.05$. To stay in the model, the significance level was set to $p <= 0.10$. The variables are listed in **Table Q.2** in the order in which they went into the model. The only variable that did not make it into the model was the number of pounds landed of black sea bass. The correlation between total pounds landed and the pounds of black sea bass landed was $r = 0.17$. Although not a large correlation value, it was statistically significant ($p < 0.001$). When two variables are significantly correlated, the variable that contributes to the most variance explained is the one included in model, as regression models tend to treat significantly correlated variables as interchangeable. The "total pounds landed" variable, which was statistically significant, added very little to the estimated value of a price per pound of black sea bass ($0.0000146). The stepwise regression procedure did not remove any variables. The total amount of variance for price per pound of black sea bass as explained by the model is relatively low ($r^2 = 0.056$), accounting for only $0.11 of the total average price per pound (in 2013 dollars) of $2.52. The combined error value for the variables in the model is $0.058. The model is 95% confident that the true value of an average price of one pound of black sea bass as predicted by the full model is between $2.46 and $2.58.

Table Q.2. Regression model statistics for predicting price per pound of black sea bass (2013 dollars) based on data from 2000-2013.

Dependent Variable = Black Sea Bass Price/lb (mean = $2.52 in 2013 dollars)						
Variable	Label	Mean	Coeff.	S.E.	t	sig.
Intercept			2.410	0.004	598.166	0.000
Amend13c	1 = A13c in effect	0.2265	0.217	0.006	37.335	0.000
Amend18a	1= A18a in effect	0.0596	0.198	0.010	19.090	0.000
Closure Period	1 = Nov - Apr closed period	0.4607	0.058	0.005	12.815	0.000
Gear	1 = BSB pots	0.3021	0.032	0.005	6.668	0.000
Pounds	Of all species landed on trip	193.193	0.00001461	0.000	5.902	0.000

N = 52,987
Source: SEFSC/SSRG Economic Panel Data.

The sample size for this regression model was rather large at 52,987, which likely accounts for the high level of statistical significance for the variables included in the model. The differences based on the data are robust. It is interesting to note that implementation of Amendment 13c had the largest effect on increasing price per pound followed by Amendment 18a. Both amendments had a greater effect on increasing the price per pound of black sea bass than did the temporal variable of November through April versus May through October, or which gear was used.

In summary, the final model can be used to predict the price per pound of black sea bass on any given day under any of the alternatives of **Action 1** in 2013 dollars, and is shown below:

Price/lb. = $2.825 + $0.058 (if landed during the months of November through April) + $0.032 (if landings were from pot gear) + (($1.461x10^{-5}) x total pounds of all species landed on the trip.

As the model shows, black sea bass landed from November through April bring on average approximately a $0.06 per pound premium over fish landed May through October. In addition, black sea bass harvested with pot gear bring approximately a $0.03 per pound premium over fish landed using other gears.

Because the predictive value of the model is relatively low (r^2 = 0.056), caution should be used when applying the model. Using the regression model, when aggregated on a monthly level, the average black sea bass prices differ only slightly from the average price per pound by month for the fishery for the 2013 commercial fishing season, or those shown in **Figure 4.1.2.1**. To maintain consistency with the relative risk analysis (NMFS 2015) and because the overall lower reliability of the regression model for determining predictive value, the same methods used to determine relative risk and not the regression model presented here were used for the economic analyses provided in **Section 4.1.2**.

The alternatives proposed under **Action 1** result in different expected dates when the commercial ACL would be reached. The results of the analyses have several implications. To maximize economic return (ex-vessel revenue) to the black sea bass pot fishery, based on 2000 through 2013 historical trends, the pot fishery brings higher economic returns during November through April than May through October. Additionally, the returns from the pot fishery are higher than the returns from the hook and line fishery during the same months (November through April). Conversely, the hook and line fishery brings higher economic returns during May through October compared to November through April, and returns from the hook and line fishery are higher than those from the pot fishery during these months (May through October).

Landings by Month

The commercial black sea bass sector was closed prior to the end of the fishing year in 2008/2009, on May 15, 2009, when the commercial ACL was met. Prior to that season, the fishery operated without closures. **Figure 4.1.2.2** shows the average percent of total annual commercial black sea bass landings by month from June 2000-May 2009, the most recent seasons prior to years when there were ACL-related closures. When operating without closures, the months of June through September saw the fewest commercial landings of black sea bass, ranging from 2-4% each month, while landings tended to increase in November with an average of 11% of the landings. However, fall through spring months saw the highest percentage of annual landings. Highest average annual percentage of total landings occurred in December and January at approximately 18% in each month.

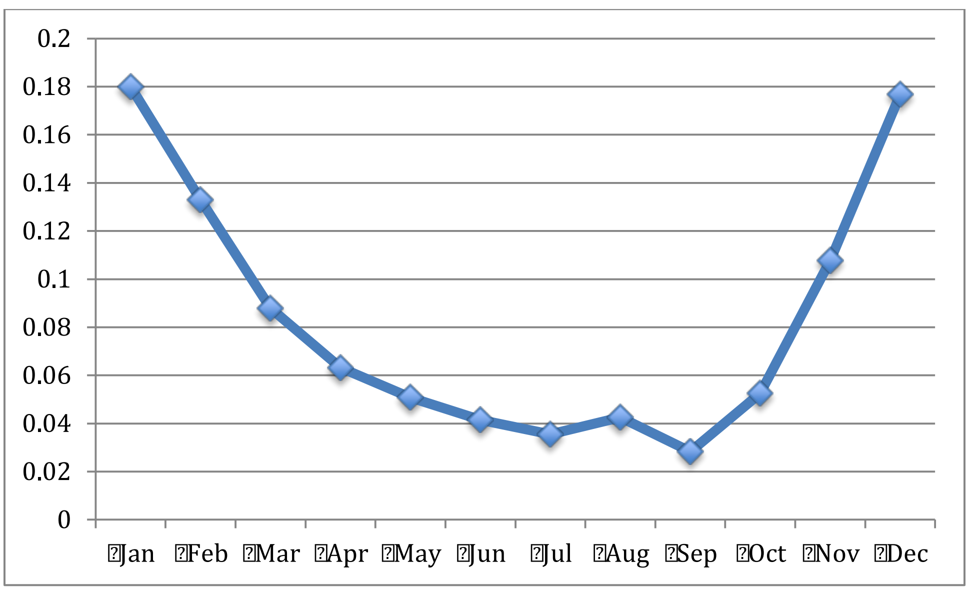


Figure 4.1.2.2 Percent of average annual commercial black sea bass landings by month from June 2000-May 2009.
Source: SEFSC/SSRG Economic Panel Data

Expected closure date alone does not give the best estimate of expected value because the price per pound changes from month to month and is influenced also by which gears are being used at the time. The highest expected ex-vessel value will come when the expected landings are highest in months with the highest price per pound. Various estimates of average monthly price per pound, daily expected catch rates, and anticipated closure dates were used to calculate estimated annual dockside values for black sea bass. Estimates are shown for the four catch rate scenarios used in the SERO-LAPP-2014-09 (**Appendix Q**) analysis and are based on the assumption that spatial location of gear in future years will mirror the average of the 2006/2007-2008/2009 fishing seasons where there was no closure in the commercial black sea bass season.

North Carolina Market Grade Analysis

Since 2011, the price per pound for black sea bass has changed due to changes in the amount of product available on the market as well as changes in the condition of the fish. With the rebuilding of the black sea bass stock, larger fish are now landed that were not available in previous years (Personal Comm. Jack Cox, January 16, 2015). The price of black sea bass in the South Atlantic region is also affected by the the amount of black sea bass harvested from the Mid-Atlantic region trawl fishery. When the Mid-Atlantic trawl season and the South Atlantic seasons are open at the same time, prices tend to be lower. The market quality of the fish is also higher in winter months because the fish sold tend to be larger and darker in color, both of which lead to a higher price per pound. Taken together, prices received by fishermen for North Carolina (and presumably the entire South Atlantic) black sea bass are highest when the fish are caught in traps during winter months as long as the market is not affected by black sea bass caught in Mid-Atlantic trawls.

Trip ticket data from North Carolina allow for temporal analysis of commercial landings for black sea bass by gear and market grade. **Table Q.3** shows North Carolina commercial landings of black sea bass by year, market grade, pounds landed, percent of annual landings by market grade, and annual average price per pound by market grade for hook and line landings. All dollar amounts are in 2013 dollars. Additionally, average values are shown for the 2000 through 2013 time series as wel1 as the 2011 through 2013 time series. **Table Q.4** shows the same information as **Table Q.3**, except the data represent only pot landings. A small percentage of landings from several of the years in the series were unclassified according to grade. Those landings were not included in the analysis as the data are considered confidential.

Table Q.3. Summary of North Carolina landings of black sea bass, revenue, and average price per lb, and percent by market grade, hook and line gear, 2000–2013.

Year	Jumbo				Large				Medium				Small			
	Lbs	Percent	Revenue	Price/lb	Lbs	Percent	Revenue	Price/lb	Lbs	Percent	Revenue	Price/lb	Lbs	Percent	Revenue	Price/lb
2000	10,270	15%	$41,846	$ 4.07	22,725	32%	$ 77,508	$ 3.41	24,662	35%	$ 49,548	$ 2.01	12,768	18%	$ 15,498	$ 1.21
2001	6,105	12%	$20,122	$ 3.30	16,847	33%	$ 48,813	$ 2.90	17,746	35%	$ 37,433	$ 2.11	10,415	20%	$ 14,758	$ 1.42
2002	8,112	12%	$23,062	$ 2.84	19,735	30%	$ 48,415	$ 2.45	24,885	38%	$ 46,405	$ 1.86	12,721	19%	$ 16,740	$ 1.32
2003	4,009	7%	$11,557	$ 2.88	16,005	26%	$ 39,800	$ 2.49	25,896	42%	$ 46,174	$ 1.78	15,110	25%	$ 21,775	$ 1.44
2004	5,433	9%	$14,756	$ 2.72	17,814	28%	$ 40,756	$ 2.29	26,268	41%	$ 47,684	$ 1.82	13,842	22%	$ 20,696	$ 1.50
2005	5,407	13%	$15,905	$ 2.94	13,467	33%	$ 33,660	$ 2.50	14,928	36%	$ 28,518	$ 1.91	7,252	18%	$ 11,007	$ 1.52
2006	4,946	14%	$17,306	$ 3.50	10,533	30%	$ 29,340	$ 2.79	13,449	39%	$ 29,048	$ 2.16	5,803	17%	$ 10,774	$ 1.86
2007	4,074	12%	$17,417	$ 4.28	10,835	32%	$ 32,997	$ 3.05	13,843	41%	$ 30,573	$ 2.21	4,968	15%	$ 9,139	$ 1.84
2008	4,342	12%	$18,582	$ 4.28	11,282	31%	$ 34,418	$ 3.05	16,143	44%	$ 34,235	$ 2.12	5,011	14%	$ 8,764	$ 1.75
2009	4,235	7%	$19,583	$ 4.62	15,851	27%	$ 50,666	$ 3.20	27,360	46%	$ 58,785	$ 2.15	11,728	20%	$ 20,500	$ 1.75
2010	2,483	9%	$10,777	$ 4.34	9,803	36%	$ 29,615	$ 3.02	10,325	38%	$ 19,219	$ 1.86	4,814	18%	$ 8,215	$ 1.71
2011	2,418	12%	$ 6,887	$ 2.85	7,187	37%	$ 16,643	$ 2.32	7,291	38%	$ 10,832	$ 1.49	2,471	13%	$ 2,974	$ 1.20
2012	3,736	10%	$15,120	$ 4.05	16,475	44%	$ 49,221	$ 2.99	15,957	42%	$ 33,673	$ 2.11	1,379	4%	$ 2,667	$ 1.93
2013	11,300	15%	$41,935	$ 3.71	29,728	39%	$ 79,569	$ 2.68	34,175	45%	$ 65,883	$ 1.93	1,135	1%	$ 2,189	$ 1.93
2000 - 2013 Average	5,491	11%	$19,632	$ 3.58	15,592	32%	$ 43,673	$ 2.80	19,495	40%	$ 38,429	$ 1.97	7,816	16%	$ 11,836	$ 1.51
2011 - 2013 Average	5,818	12%	$21,314	$ 3.54	17,797	40%	$ 48,477	$ 2.66	19,141	42%	$ 36,796	$ 1.84	1,662	6%	$ 2,610	$ 1.69

Source: North Carolina (NC) Division of Marine Fisheries (DMF) Trip Ticket Program.

Table Q.4. Summary of North Carolina landings of black sea bass using pot gear by market grade, 2000-2013.

	Jumbo				Large				Medium				Small			
Year	Lbs	Percent	Revenue	Price/lb	Lbs	Percent	Revenue	Price/lb	Lbs	Percent	Revenue	Price/lb	Lbs	Percent	Revenue	Price/lb
2000	6,971	2%	$ 29,482	$ 4.23	45,233	13%	$ 156,359	$ 3.46	136,980	40%	$ 273,250	$ 1.99	149,841	44%	$177,448	$ 1.18
2001	10,701	3%	$ 36,776	$ 3.44	57,331	14%	$ 156,450	$ 2.73	173,751	41%	$ 343,180	$ 1.98	179,162	43%	$245,291	$ 1.37
2002	9,978	3%	$ 28,792	$ 2.89	55,140	15%	$ 127,208	$ 2.31	136,281	38%	$ 239,440	$ 1.76	160,247	44%	$206,352	$ 1.29
2003	8,412	2%	$ 24,189	$ 2.88	54,350	13%	$ 131,821	$ 2.43	169,206	41%	$ 308,540	$ 1.82	181,541	44%	$255,399	$ 1.41
2004	8,342	2%	$ 22,693	$ 2.72	58,365	13%	$ 133,097	$ 2.28	161,964	37%	$ 281,545	$ 1.74	212,030	48%	$293,668	$ 1.39
2005	6,554	2%	$ 19,425	$ 2.96	35,243	13%	$ 85,836	$ 2.44	99,301	36%	$ 180,282	$ 1.82	137,780	49%	$198,829	$ 1.44
2006	10,024	2%	$ 34,228	$ 3.41	51,639	13%	$ 144,131	$ 2.79	150,163	37%	$ 318,970	$ 2.12	189,791	47%	$336,843	$ 1.77
2007	6,567	3%	$ 28,526	$ 4.34	37,539	15%	$ 119,649	$ 3.19	89,902	37%	$ 204,165	$ 2.27	109,196	45%	$200,112	$ 1.83
2008	6,130	3%	$ 27,372	$ 4.47	34,050	14%	$ 104,630	$ 3.07	97,574	41%	$ 205,467	$ 2.11	98,357	42%	$169,495	$ 1.72
2009	7,374	2%	$ 32,945	$ 4.47	55,103	15%	$ 170,917	$ 3.10	169,145	45%	$ 353,321	$ 2.09	146,465	39%	$246,479	$ 1.68
2010	6,884	3%	$ 30,398	$ 4.42	56,782	21%	$ 176,321	$ 3.11	134,532	51%	$ 245,766	$ 1.83	67,050	25%	$110,454	$ 1.65
2011	2,525	2%	$ 7,456	$ 2.95	35,884	23%	$ 82,796	$ 2.31	84,173	55%	$ 123,415	$ 1.47	31,121	20%	$ 37,445	$ 1.20
2012	5,271	3%	$ 21,808	$ 4.14	40,193	26%	$ 117,421	$ 2.92	103,735	67%	$ 218,199	$ 2.10	6,578	4%	$ 12,212	$ 1.86
2013	7,209	5%	$ 27,786	$ 3.85	43,303	27%	$ 120,259	$ 2.78	103,685	65%	$ 213,662	$ 2.06	4,879	3%	$ 7,908	$ 1.62
2000 - 2013 Average	7,353	2%	$ 26,563	$ 3.65	47,154	16%	$ 130,492	$ 2.78	129,314	43%	$ 250,657	$ 1.94	119,574	36%	$178,424	$ 1.53
2011 - 2013 Average	5,001	3%	$ 19,017	$ 3.65	39,793	25%	$ 106,826	$ 2.67	97,198	62%	$ 185,092	$ 1.88	14,193	9%	$ 19,189	$ 1.56

Source: NC DMF Trip Ticket Program.

Tables Q.3 and **Q.4** show that larger market grades bring higher prices per pound than lower market grades. The data show less than $0.10 per pound regardless of market grade between fish caught using pots versus hook and line. However, in most cases where there was a difference, black sea bass harvested with pots received the higher average price for jumbo and large market grades, while black sea bass harvested using hook and line gear received a higher price per pound for medium and small grade fish.

Table Q.5 shows the average landings by market grade by month for black sea bass landed in North Carolina for two different time series, 2000-2013 and from 2011-2013. From the table, it can be seen that the average size of black sea bass increased throughout the time series. This is very evident from the hook and line landings because the landings stream is more complete (no black sea bass harvested by pot gear were recorded for January through May or December in any of the years during 2011-2013). However, when comparing black sea bass pot harvests over the two time series, there were months where the use of black sea bass pots were greatly restricted during much of the year due to the ACL having been met. In the 2000 through 2013 time series, small fish made up about 17% of hook and line landings and 39% of pot landings, but in the 2011 through 2013 time series, the small market grade decreased to 2% for the hook and line fishery and 6% for the pot fishery. Likewise, in the 2000 through 2013 time series, jumbo market grade fish made up about 11% of hook and line landings and 2% of pot landings, but in the 2011 through 2013 time series, the jumbo market grade increased to 17% for the hook and line fishery and 8% for the pot fishery. Larger fish bring a higher price per pound (**Table Q.4**) which may account for the general increase in price per pound when controlling for inflation in the 2011 through 2013 time series compared to the 2000 through 2013.

Black sea bass landed using pot gear tend to be smaller, yet bring a higher price per pound. An explanation for this inconsistency may be historically in North Carolina black sea bass pots were used primarily in cooler months. Hook and line gear primarily land black sea bass in warmer months as part of multi-species trips. Black sea bass caught in pots, while smaller on average overall than those caught on hook and line, tend to be their largest in winter months and are darker in color which is more desirable to the market (Personal Comm. Jack Cox, January 16, 2015).

Table Q.5. Percent of black sea bass landings from North Carolina by market grade and gear for 2000-2013.

	Hook and Line Landings				Pot Landings			
2000-2013	**Jumbo**	**Large**	**Medium**	**Small**	**Jumbo**	**Large**	**Medium**	**Small**
January	19%	34%	34%	14%	3%	18%	37%	42%
February	19%	34%	32%	15%	4%	20%	37%	38%
March	13%	31%	37%	19%	3%	16%	39%	42%
April	14%	34%	32%	19%	2%	12%	39%	46%
May	12%	33%	35%	20%	2%	10%	41%	47%
June	12%	35%	37%	16%	2%	18%	51%	30%
July	10%	34%	40%	16%	2%	18%	54%	26%
August	9%	34%	42%	16%	2%	16%	51%	31%
September	8%	33%	44%	15%	2%	18%	51%	29%
October	4%	22%	52%	21%	1%	12%	46%	41%
November	7%	26%	45%	22%	1%	9%	37%	53%
December	11%	31%	44%	14%	3%	16%	39%	42%
Average	11%	32%	40%	17%	2%	15%	44%	39%
2011-2013	**Jumbo**	**Large**	**Medium**	**Small**	**Jumbo**	**Large**	**Medium**	**Small**
January	0%	0%	0%	0%	0%	0%	0%	0%
February	0%	0%	0%	0%	0%	0%	0%	0%
March	12%	42%	45%	0%	0%	0%	0%	0%
April	45%	50%	5%	0%	0%	0%	0%	0%
May	27%	51%	19%	3%	0%	0%	0%	0%
June	19%	40%	35%	6%	3%	26%	57%	14%
July	13%	42%	39%	6%	3%	23%	64%	10%
August	12%	48%	39%	1%	4%	26%	66%	4%
September	7%	42%	50%	1%	4%	28%	65%	3%
October	9%	40%	50%	0%	3%	25%	67%	4%
November	15%	48%	37%	0%	34%	42%	23%	0%
December	10%	33%	55%	2%	0%	0%	0%	0%
Average	17%	44%	38%	2%	8%	29%	57%	6%

Source: NC DMF Trip Ticket Program

Trip costs

The net profitability of a fishing trip is determined by subtracting the trip costs (fuel, bait, gear, crew payments, etc.) and apportioning sunk (fixed) costs (insurance, loan payments, license/permits, etc.) across all trips. Sunk costs will occur regardless of the trip characteristics and are constant in the short term. Individual trip characteristics affect individual trip costs. For example, the distance a vessel must travel will influence fuel needed for the trip.

Perruso and Waters (2005) estimated trip costs for hook and line and trap (pot) vessels catching snapper grouper species based on effort (number of traps), days away (trip duration), and pounds landed. Crew expenses were excluded from the model because crewmembers were assumed to be compensated through a share payment system. Black sea bass is the only snapper grouper species harvested regularly using pot gear and the gear rarely lands any other snapper grouper species. Based on this model, and assuming the average trip characteristics for black sea bass endorsement holders has not changed, the estimated cost of fishing using black sea bass pots is $386 (2013 dollars) per day. Using the data provided by Perruso and Waters (2005), it is not possible to estimate hook and line daily trip expenses for just black sea bass trips. In general, however, the estimated daily cost of a snapper grouper trip using hook and line is $56 (2013 dollars).

Fewer trips are needed to land the commercial ACL when landings per trip increase. **Table Q.6** shows the average landings per trip by year and month for all participants in the black sea bass pot fishery. However, current landings per trip are constrained by the trip limit of 1,000 lbs gw that went into effect July 1, 2012 (SAFMC 2012). Net profit for a trip will increase when the landings per trip are higher assuming trip costs remain relatively the same regardless of when a black sea bass pot trip occurs up until the trip limit is reached. The months of November through March have the potential for greater profitability per trip because of the higher average landings per trip in these months. The months of April through October had the lowest average landings per trip.

Table Q.6. Landings of black sea bass per trip using pot gear by year and month for 2001–2013 (lbs gw).

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
January	735	584	531	893	955	636	625	648	758					707
February	592	470	529	757	770	597	635	651	657					629
March	412	418	499	653	658	450	566	588	593					538
April	368	269	427	626	581	416	412	334	331					418
May	315	298	357	436	491	301	344	566	Conf.					389
June	365	244	375	395	264	333	340	536	612	739	1229		648	507
July	344	227	382	406	266	361	Conf.	402	641	670	971	663	634	497
August	257	242	552	653	283	364	216	621	735	840		685	629	506
September	223	243	395	452	Conf.	239	Conf.	309	645	896		595	590	459
October	243	362	481	509	339	434	262	502	618	1005		715	609	507
November	383	453	668	591	475	653	446	786	689					571
December	441	676	1036	760	505	735	576	877	720	1255				758

Source: SEFSC/SSRG Economic Panel Data.

<u>Other fishing activity by black sea bass fishermen</u>

Alternative 1 (No Action) limits fishermen to a 6-month period during which all black sea bass pot fishing must occur. Even with no restrictions on where pots may be set from May 1 through October 31, the commercial sector is not expected to be able to reach its ACL each year (SERO 2014). In years past, when the black sea bass commercial sector fishery was open all year, pot fishermen tended to take fewer trips in the summer months (**Table Q.7**). In years where there were closures due to the ACL being reached, a summer derby took place. The commercial portion of the ACL was caught earlier each year as the black sea bass stock recovered and the ACL remained fixed. The months of

November through April had the highest average number of trips in years when fishing occurred in those months. The months of May through October had the lowest average number of trips.

Table Q.7. Number of trips landing black sea bass using pot gear by year and month for 2001–2013.

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Average
January	112	199	85	104	90	111	81	115	101					111
February	72	92	54	95	66	89	110	76	99					84
March	86	63	55	100	40	59	100	43	59					67
April	115	54	50	68	63	57	52	46	48					61
May	83	34	88	62	67	71	23	21	Conf.					56
June	53	34	28	37	57	54	24	13	49	112	163		92	60
July	27	40	39	32	22	26	Conf.	23	41	68	58	110	78	47
August	67	24	63	17	13	38	12	20	55	68		124	59	47
September	56	31	26	19	Conf.	33	Conf.	10	74	54		57	62	42
October	98	29	57	67	18	63	21	31	65	12		25	61	46
November	127	64	83	92	53	74	54	57	72					75
December	187	119	130	117	88	102	96	66	63	77				105

Source: SEFSC/SSRG Economic Panel Data.

Assuming the commercial black sea bass fishery would remain open all year, or nearly all year due to the increased ACL from Regulatory Amendment 19 (2013), the fishery is currently less likely to operate as a derby. As a result, black sea bass pot fishermen might choose to participate in other fisheries that might have a higher net return than they would in previous years when the ACL was more limiting and length of the black sea bass season shorter.

Table Q.8 shows the average monthly revenue for black sea bass and total ex-vessel revenue of landings (2013 dollars) from all species harvested by black sea bass endorsement holders on all trips (not just trips on which black sea bass were harvested) from 2000-2013 and recorded by the federal finfish logbook program. These fishermen may harvest other species, such as state managed species, that are not captured by this data collection program. These harvests, and associated revenues, are not available at this time. The data are grouped into two categories, one showing 2000-2009 when the fishery was a year-around fishery and from 2010-2013 when the fishery was constrained by the ACL and was closed for at least part of the year. From 2000-2009, approximately29 endorsement holders fished each year. The average black sea bass revenue per endorsement for this period was $23,399 and the total average annual revenue from all species harvested by these endorsement holders was $53,280. The average black sea bass revenue per endorsement from 2000-2009 was $25,958 and the total average annual revenue from all species harvested by endorsement holders was $47,104. From 2010-2013, approximately 27 black sea bass pot endorsement holders fished each year.

Table Q.8. Average revenue (2013 dollars) from black sea bass and total revenue from all species by month by black sea bass pot endorsement holders, 2000–2013.

	2000 - 2009			2010 - 2013		
	BSB Revenue	Total Revenue	% Rev from BSB	BSB Revenue	Total Revenue	% Rev from BSB
January	$144,312	$176,279	82%	$0	$87,510	0%
February	$104,550	$134,354	76%	$0	$52,838	0%
March	$76,271	$130,874	58%	$0	$36,094	0%
April	$56,530	$98,924	57%	$0	$34,417	0%
May	$39,442	$105,963	37%	$888	$103,130	1%
June	$27,617	$98,862	28%	$169,497	$223,667	76%
July	$22,588	$79,336	28%	$144,861	$265,855	54%
August	$29,740	$84,068	35%	$123,302	$199,221	62%
September	$21,031	$63,657	33%	$81,475	$161,669	50%
October	$39,789	$98,367	40%	$48,027	$93,752	51%
November	$39,789	$98,367	40%	$995	$51,195	2%
December	$140,732	$178,132	79%	$56,874	$115,902	49%
Annual	$742,391	$1,347,182	55%	$625,919	$1,425,251	44%

Source: SEFSC/SSRG Economic Panel Data and SERO Permits Database.

Given the increased ACL implemented in Regulatory Amendment 19 (SAFMC 2013), the fishing season is expected to last much longer regardless of which alternative is chosen as the preferred alternative for **Action 1** compared to the years 2010 through 2013. Prior to 2010, the black sea bass pot fishery occurred all year long. As restrictive ACLs went into effect, a derby developed and the fishery lasted for as little as two months in 2011. The lowest monthly black sea bass revenues for 2000-2009 occurred in June through August. Once the ACLs started shortening the season, the majority of black sea bass fishing shifted to June through September.

Table Q.9 has two categories of pot fishermen: historical black sea bass pot landings by endorsement holders and historical black sea bass pot landings by all fishermen regardless of whether or not the fisherman eventually had an endorsement to use pot gear. An endorsement has been required since 2012 to land black sea bass using pot gear. The information in **Table Q.9** indicates there has been a shift in the annual percent of landings and dockside revenue (2013 dollars) between black sea bass caught in pots versus all other gears since 2012. The ACL increased to 780,000 lbs ww in 2013 from 309,000 lbs ww, or an increase of 471,020 lbs ww. From 2012 to 2013, black sea bass pot endorsement holders increased their landings by just over 2,000 lbs ww. However, landings of black sea bass harvested by all other gears (primarily hook and line) increased by over 65,000 lbs ww, an increase of over 50% from the previous year's landings.

Table Q.9. Pounds landed and revenue (2013 dollars) of black sea bass landed from 2000-2013 by endorsement holders (pots only landings), all landings by pots (including endorsement holders), and all landings by all other gears (not black sea bass pots).

	Endorsement Holders		All Pot Fishermen		All Other Gears	
	Pounds	Revenue	Pounds	Revenue	Pounds	Revenue
2000	204,436	$538,858	402,475	$1,077,881	67,652	$184,532
2001	249,915	$596,232	442,115	$1,073,488	69,902	$169,700
2002	242,962	$542,892	361,034	$804,127	64,168	$149,288
2003	294,477	$676,505	441,871	$1,018,357	64,444	$149,105
2004	388,906	$858,743	524,262	$1,168,114	74,942	$165,333
2005	291,896	$719,028	333,153	$818,833	57,057	$140,779
2006	363,667	$1,018,508	395,025	$1,108,578	51,431	$142,683
2007	261,299	$791,825	307,182	$924,528	40,404	$119,743
2008	277,394	$790,753	326,514	$924,070	45,346	$127,522
2009	386,543	$1,025,710	473,896	$1,259,066	64,636	$171,413
2010	304,176	$789,048	342,530	$892,347	49,156	$130,358
2011	180,508	$412,161	256,589	$549,130	46,204	$96,760
2012	206,678	$598,888	211,773	$612,118	90,964	$267,628
2013	208,862	$613,044	220,915	$644,546	156,700	$463,714

Source: SEFSC/SSRG Economic Panel Data.

Black sea bass endorsement holders are also able to fish for black sea bass using other gears at any time the commercial black sea bass season is open, even if pots are not allowed. **Table Q.10** shows landings of black sea bass harvested with pots by pot endorsement holders as well as their landings of black sea bass harvested using other gears. From 2000-2012, only 1 to 4% of their revenue from black sea bass came from gears other than pots. However, 2013 was the exception with 7% of the black sea bass revenue for endorsement holders coming from gears other than black sea bass pots.

Table Q.10. Revenue (in 2013 dollars) of black sea bass landed from 2000 through 2013 by gear by black sea bass endorsement holders.

	Pots			Other Gear		
Year	# Trips	BSB rev.	%	# Trips	BSB rev.	%
2000	407	$538,858	97%	304	$13,832	3%
2001	582	$596,232	97%	421	$20,436	3%
2002	462	$542,892	96%	447	$21,032	4%
2003	548	$676,505	97%	336	$23,802	3%
2004	595	$858,743	98%	271	$16,872	2%
2005	474	$719,028	96%	264	$26,823	4%
2006	675	$1,018,508	97%	233	$30,571	3%
2007	457	$791,825	97%	324	$26,259	3%
2008	430	$790,753	97%	299	$21,519	3%
2009	581	$1,025,710	97%	254	$27,305	3%
2010	346	$789,048	99%	233	$11,696	1%

2011	146	$412,161	99%	311	$4,909	1%
2012	312	$598,888	99%	428	$6,777	1%
2013	330	$613,044	93%	377	$49,669	7%

Source: SEFSC/SSRG Economic Panel Data.

If the commercial black sea bass season is open all year, as occurred in 2014, derby conditions and associated effects would not occur. Fishermen may go back to participating in fisheries similar to what they did prior to the ACL closures. Assuming the entire black sea bass ACL is landed each year, black sea bass pot endorsement holders might be more likely to increase participation in other fisheries, primarily in the months of June through August and putting additional fishing pressure on those stocks. This could have the effect of reducing landings and ex-vessel values for other snapper grouper vessels. **Table Q.11** shows the predominant other federally managed fisheries (non-black sea bass fisheries) black sea bass pot endorsement holders participated in by month for the years 2000-2009 and 2010-2013.

Table Q.11. Predominant non-black sea bass federally managed fisheries participation by month for 2000-2009 and 2010-2013 by black sea bass pot endorsement holders.

	2000 - 2009	2010 - 2013
January	king mackerel	vermilion, triggerfish, king mack, tilefish
February	king mackerel	vermilion, triggerfish, king mack, tilefish
March	king mackerel	vermilion, triggerfish, king mackerel
April	king mack, gag, triggerfish, vermilion	king mackerel
May	shallow water groupers, king mack	shallow water groupers, king mackerel
June	shallow water groupers, vermilion	shallow water groupers, grunts, porgies
July	shallow water groupers, vermilion	jacks, vermilion, shallow water groupers
August	shallow water groupers, vermilion	jacks, vermilion, shallow water groupers
September	shallow water groupers, vermilion	jacks, vermilion, shallow water groupers
October	shallow water groupers, vermilion	jacks, grunts, shallow water groupers
November	shallow water groupers, vermilion	grunts, jacks, king mackerel
December	shallow water groupers, king mack	king mackerel

Source: SEFSC/SSRG Economic Panel Data.

References

NMFS (National Marine Fisheries Service). 2015. Evaluation of black sea bass trap gear closure alternatives in South Atlantic Snapper-Grouper Regulatory Amendment 16.

SAFMC (South Atlantic Fishery Management Council). 1998. Amendment 9, Final Supplemental Environmental Impact Statement, Initial Regulatory Flexibility Analysis/Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement for the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 1 Southpark Cir., Suite 306, Charleston, S.C. 29407-4699. 246 pp.

SAFMC (South Atlantic Fishery Management Council). 2006. Amendment 13C to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, Regulatory Flexibility Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2012. Amendment 18A to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region. South Atlantic Fishery Management Council, 4055 Faber Place, Ste 201, North Charleston, S.C. 29405.

SAFMC (South Atlantic Fishery Management Council). 2013. Regulatory Amendment 19 to the Fishery Management Plan for the Snapper Grouper Fishery of the South Atlantic Region with Final Environmental Assessment, Regulatory Flexibility Analysis, Regulatory Impact Review, and Social Impact Assessment/Fishery Impact Statement. South Atlantic Fishery Management Council, 4055 Faber Place Drive, Ste 201, Charleston, S.C. 29405.

Appendix R

NOAA FISHERIES

LAPP/DM
Southeast
Regional
Office

Potential New Alternatives for Regulatory Amendment 16

SAFMC Meeting
June 2015
Key West, FL

ALTERNATIVE 11: Hybrid of Alternatives 4 and 8a

- NOVEMBER 1-30 and APRIL 1-30: Alternative 8a
- DECEMBER 1 – MARCH 31: Alternative 4

- *Rationale*: To provide more protection than Alternative 8a during time period calves are most prevalent in the SEUS while still affording fishing opportunities for pot gear during the winter.

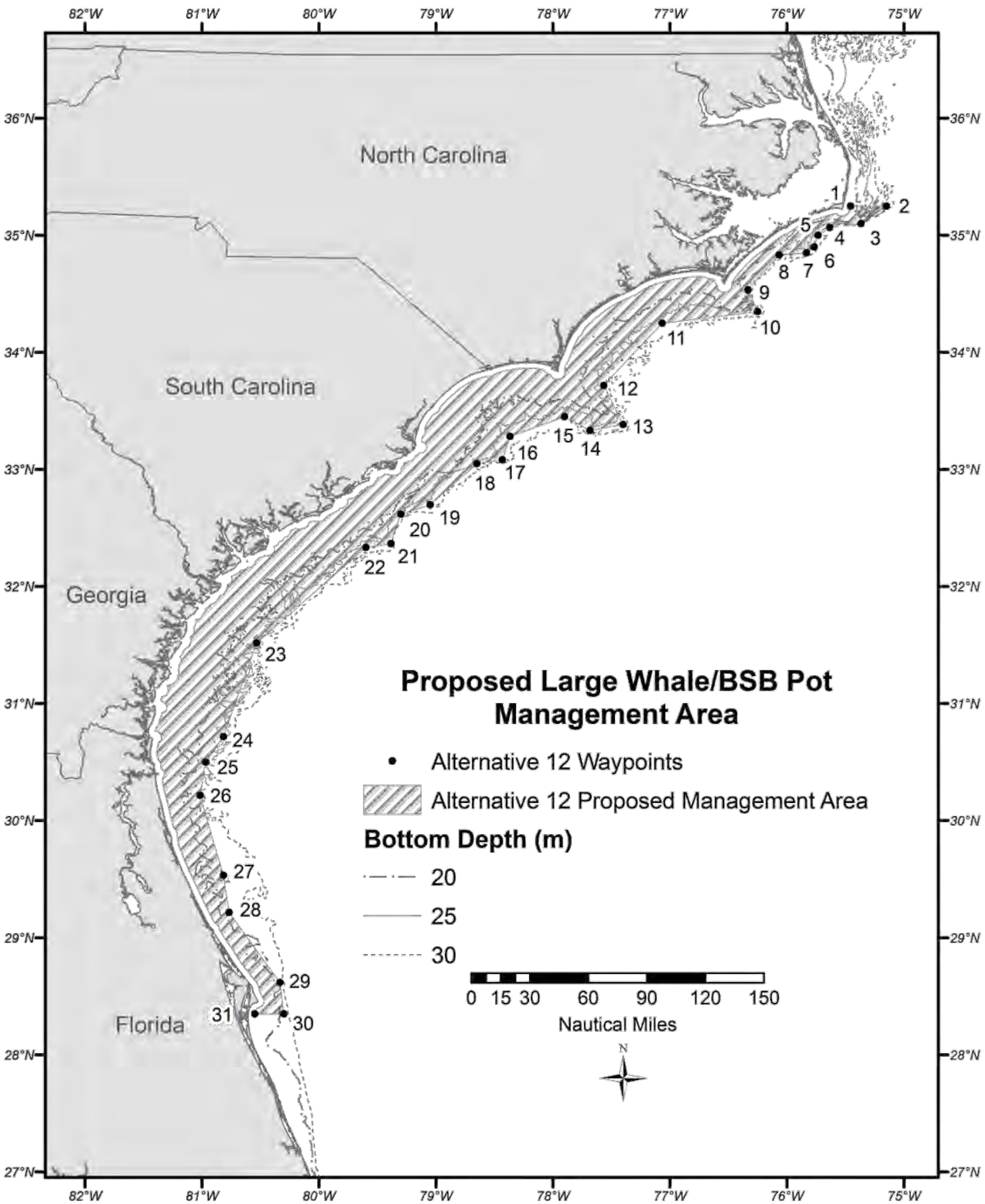
- Pro: High level of protection Dec-Mar for calving whales
- Con: Dynamic closure with changing spatial boundaries

ALTERNATIVE 12: Midway between Alts 4 and 8a

- NOVEMBER 1 – APRIL 30

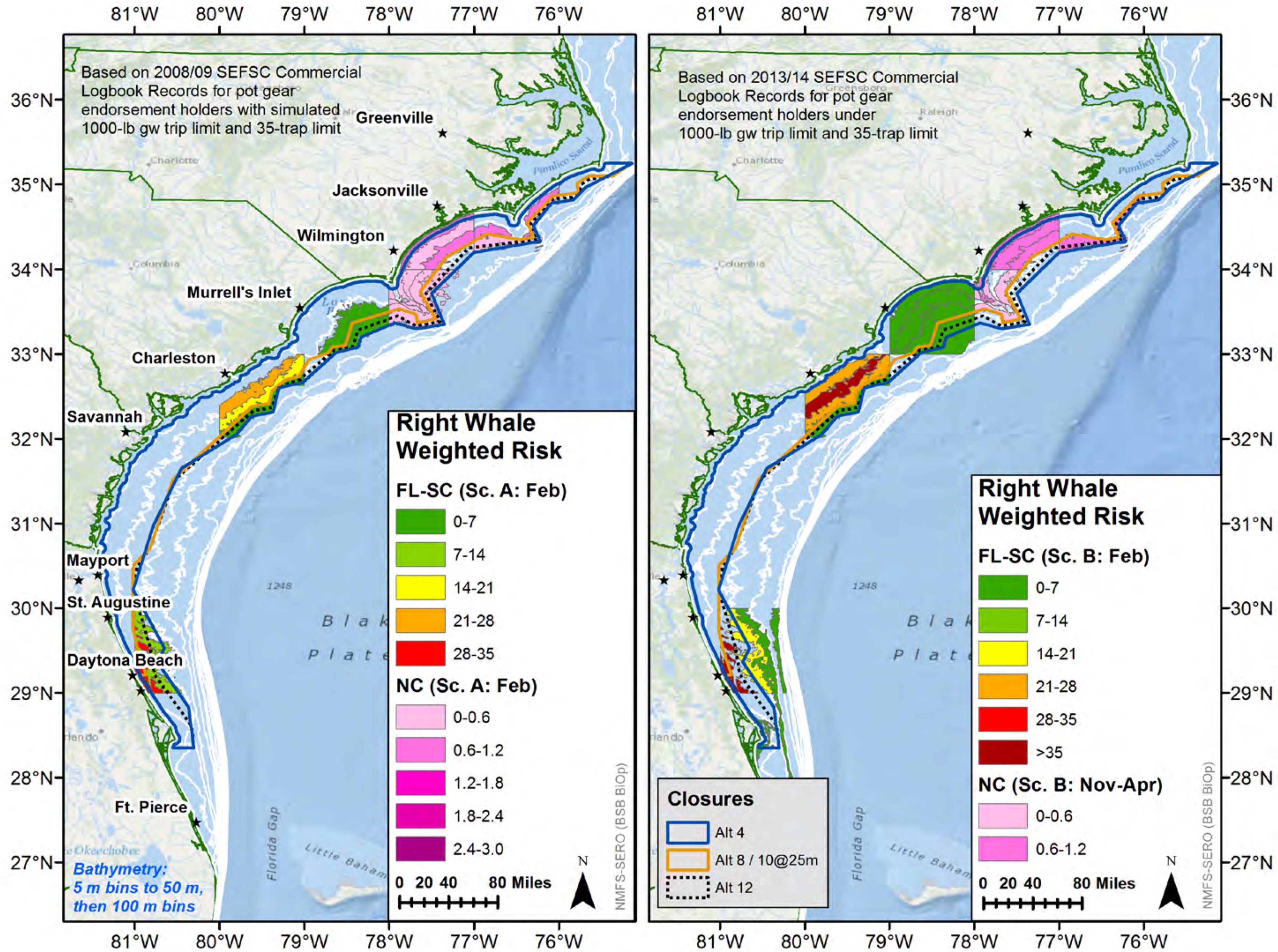
- *Rationale*: To provide more protection than Alternative 8a during time period calves are most prevalent in the SEUS while still affording fishing opportunities for pot gear during the winter.

- Pro: Stable throughout winter, no shifting boundaries
- Con: Slightly less protective during Dec-Mar period

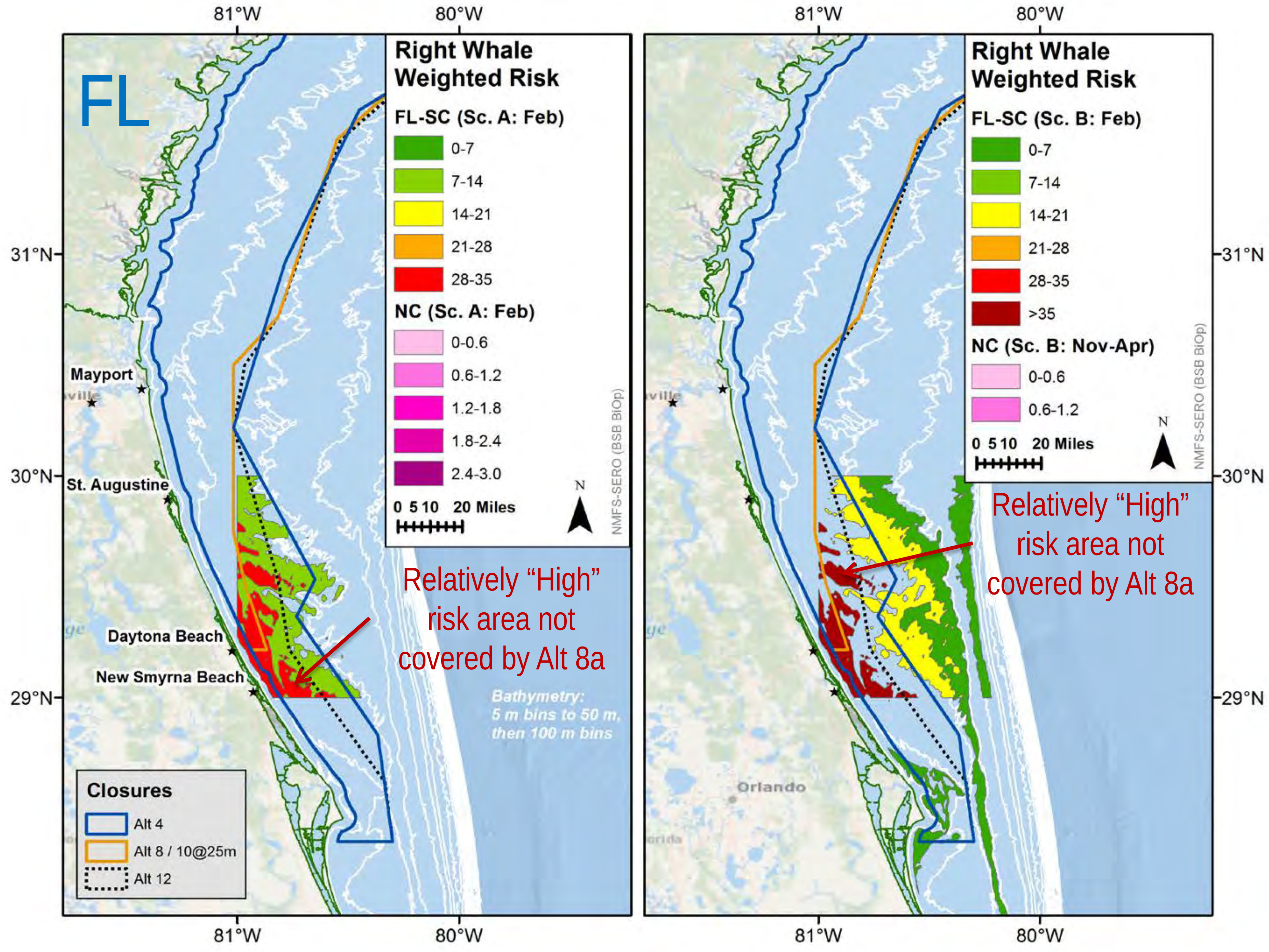


Alternative 12

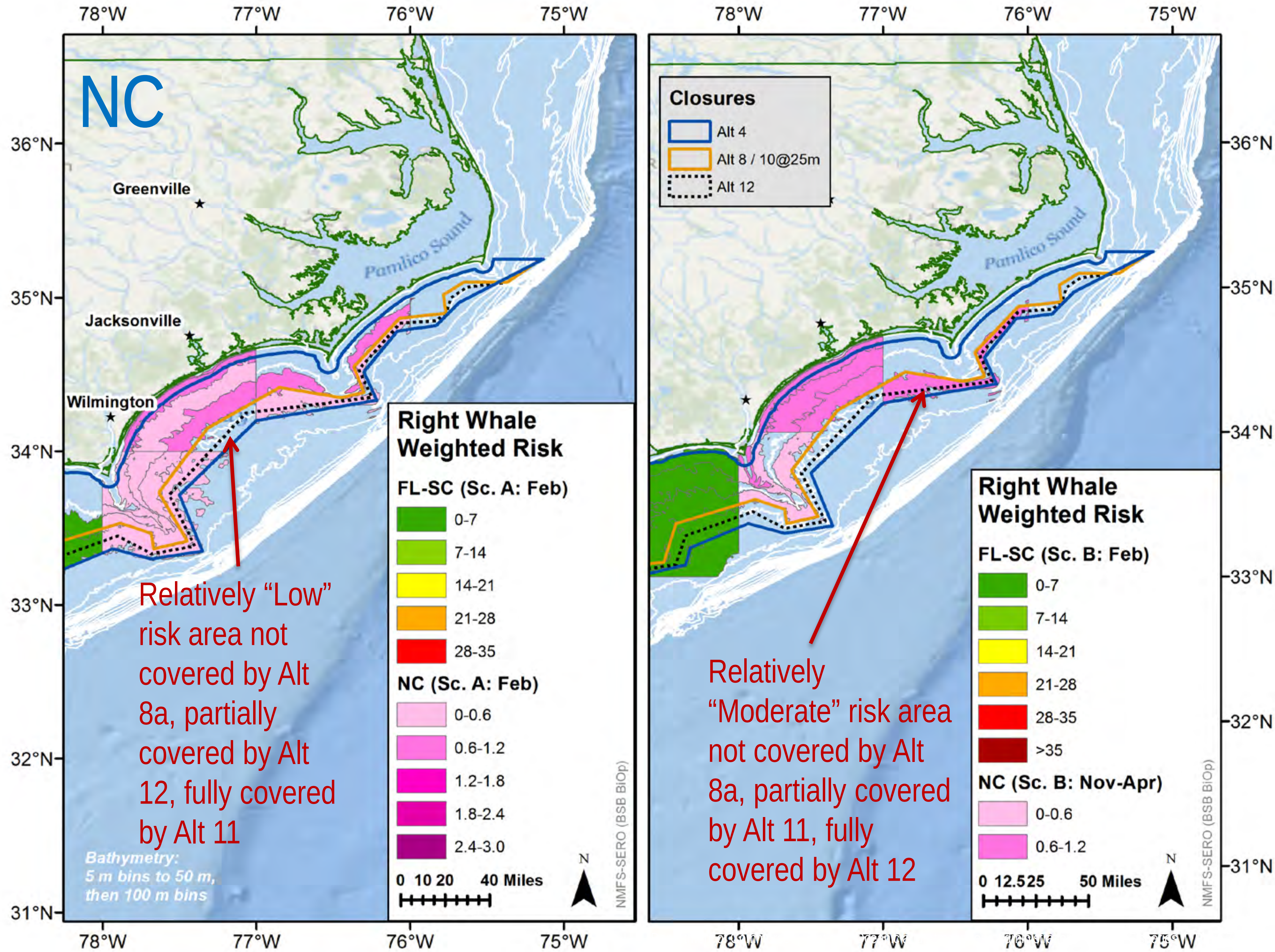
- Midway between Alternative 4 and Alternative 8
- Roughly follows 27 m contour



Based on 2008/09 SEFSC Commercial Logbook Records for pot gear endorsement holders with simulated 1000-lb gw trip limit and 35-trap limit
Greenville
Jacksonville
Wilmington
Murrell's Inlet
Charleston
Savannah
Mayport
St. Augustine
Daytona Beach
Ft. Pierce
Bathymetry: 5 m bins to 50 m, then 100 m bins
Right Whale Weighted Risk
FL-SC (Sc. A: Feb)
0-7
7-14
14-21
21-28
28-35
NC (Sc. A: Feb)
0-0.6
0.6-1.2
1.2-1.8
1.8-2.4
2.4-3.0
0 20 40 80 Miles
N
NMFS-SERO (BSB BiOp)
Based on 2013/14 SEFSC Commercial Logbook Records for pot gear endorsement holders under 1000-lb gw trip limit and 35-trap limit
Right Whale Weighted Risk
FL-SC (Sc. B: Feb)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
0 20 40 80 Miles
N
NMFS-SERO (BSB BiOp)



FL
81°W
80°W
31°N
30°N
29°N
Right Whale Weighted Risk
FL-SC (Sc. A: Feb)
0-7
7-14
14-21
21-28
28-35
NC (Sc. A: Feb)
0-0.6
0.6-1.2
1.2-1.8
1.8-2.4
2.4-3.0
0 5 10 20 Miles
N
NMFS-SERO (BSB BiOp)
Mayport
St. Augustine
Daytona Beach
New Smyrna Beach
Relatively "High" risk area not covered by Alt 8a
Bathymetry: 5 m bins to 50 m, then 100 m bins
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
Right Whale Weighted Risk
FL-SC (Sc. B: Feb)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
0 5 10 20 Miles
N
NMFS-SERO (BSB BiOp)
Orlando
Relatively "High" risk area not covered by Alt 8a


NC
78°W
77°W
76°W
75°W
36°N
35°N
34°N
33°N
32°N
31°N
Greenville
Jacksonville
Wilmington
Pamlico Sound
Right Whale Weighted Risk
FL-SC (Sc. A: Feb)
0-7
7-14
14-21
21-28
28-35
NC (Sc. A: Feb)
0-0.6
0.6-1.2
1.2-1.8
1.8-2.4
2.4-3.0
0 10 20 40 Miles
N
NMFS-SERO (BSB BiOp)
Bathymetry:
5 m bins to 50 m,
then 100 m bins
Relatively "Low" risk area not covered by Alt 8a, partially covered by Alt 12, fully covered by Alt 11
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
Right Whale Weighted Risk
FL-SC (Sc. B: Feb)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
0 12.5 25 50 Miles
N
NMFS-SERO (BSB BiOp)
Relatively "Moderate" risk area not covered by Alt 8a, partially covered by Alt 11, fully covered by Alt 12

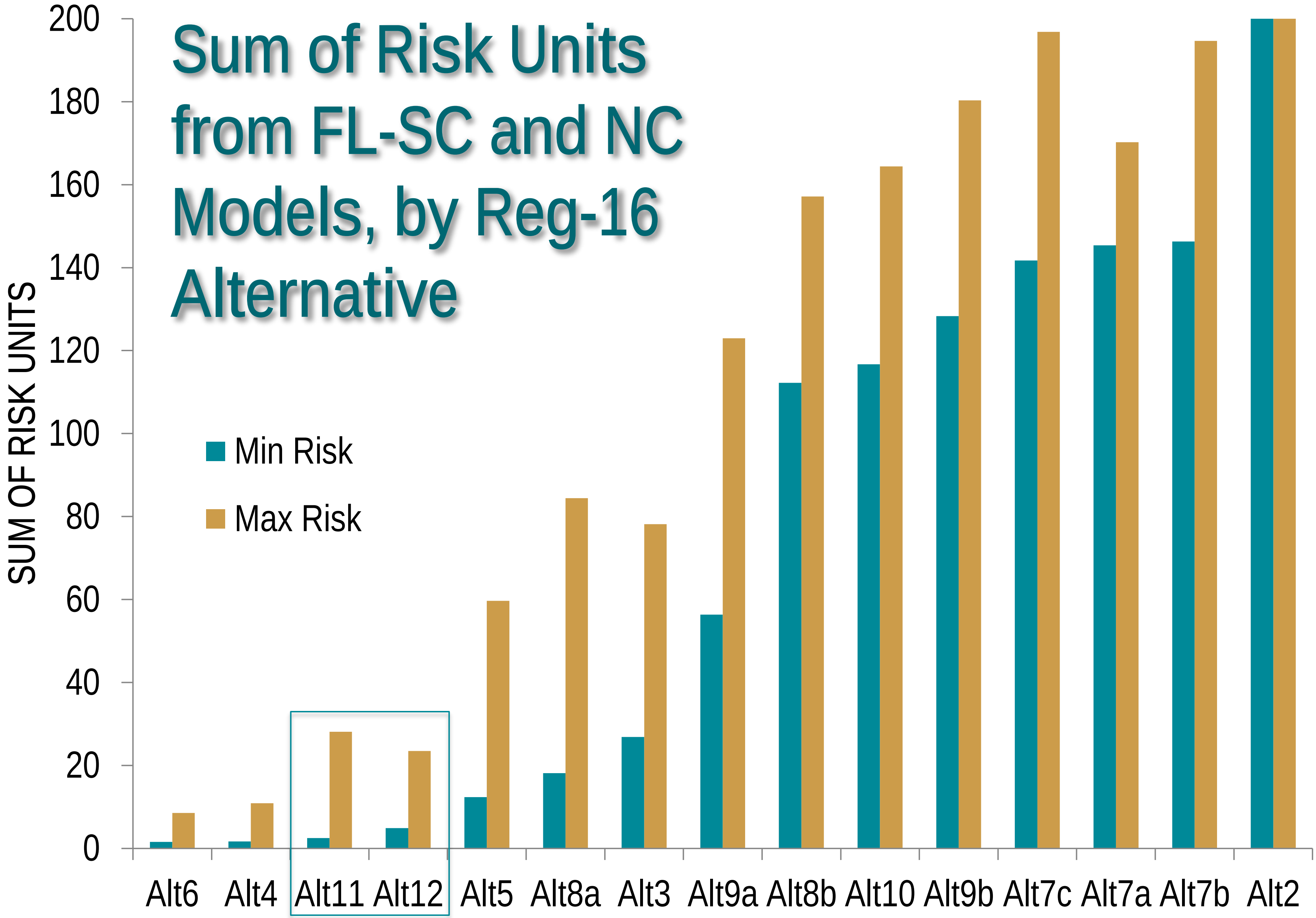
Projected Closure Dates

- Alternative 4: Dec 7-30
- Alternative 8a: Oct 20 – Dec 12
- Alternative 11: Dec 3-28
- Alternative 12: Nov 21 – Dec 23

Relative Risk of Reg-16 Alternatives

NORTH CAROLINA			SOUTH CAROLINA-FLORIDA		
NC RISK	MIN	MAX	FL-SC RISK	MIN	MAX
Alt 2	100	100	Alt 2	100	100
Alt 3	10	26	Alt 3	16	52
Alt 4	2	8	Alt 4	0	3
Alt 5	1	2	Alt 5	11	58
Alt 6	2	8	Alt 6	0	0
Alt 7a	69	74	Alt 7a	77	96
Alt 7b	77	89	Alt 7b	70	106
Alt 7c	75	97	Alt 7c	67	100
Alt 8a	6	26	Alt 8a	12	58
Alt 8b	51	68	Alt 8b	61	89
Alt 9a	26	51	Alt 9a	30	72
Alt 9b	61	87	Alt 9b	67	94
Alt 10	55	75	Alt 10	62	89
Alt 11	2	15	Alt 11	0	13
Alt 12	3	15	Alt 12	2	9

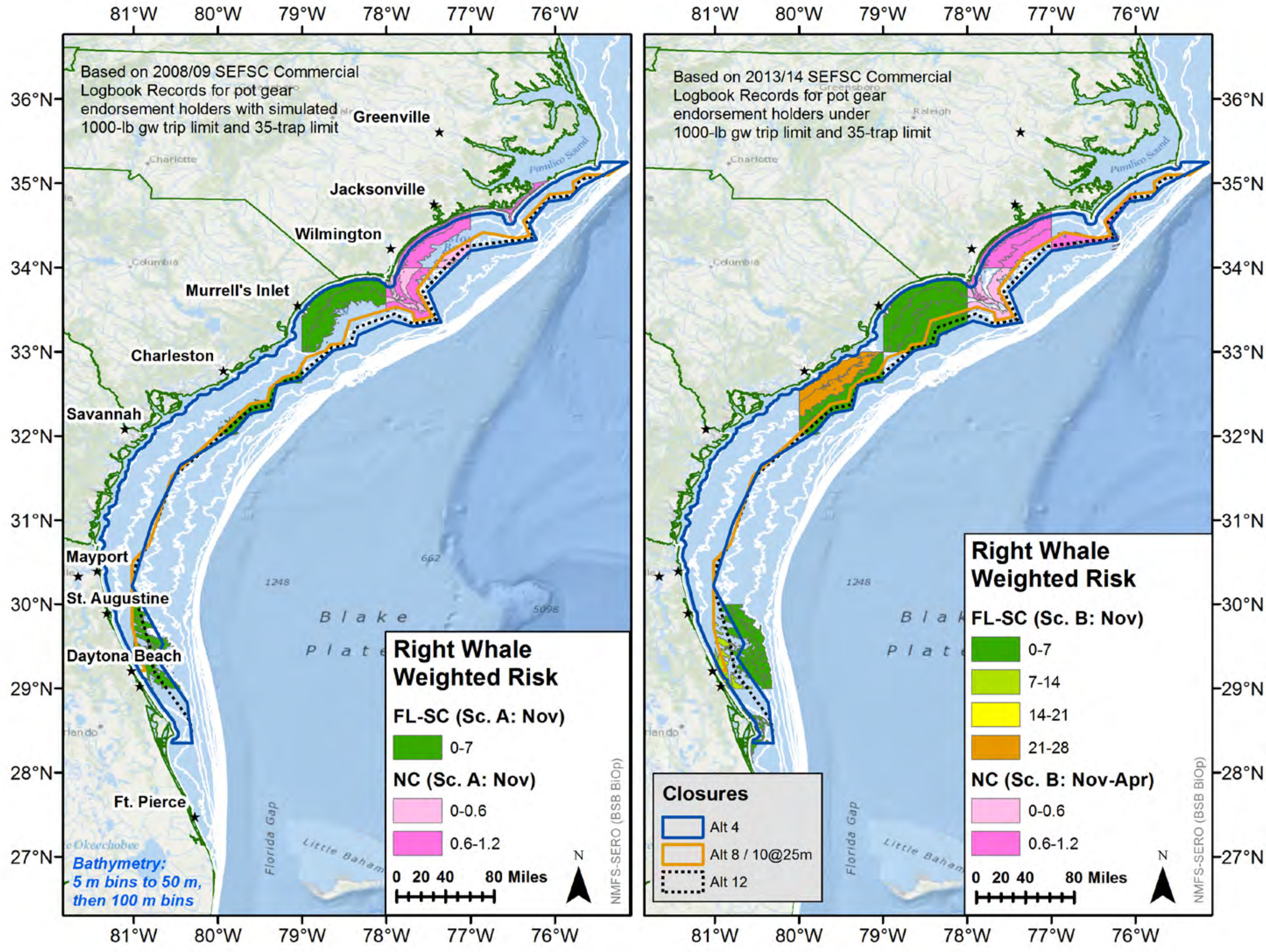
Sum of Risk Units from FL-SC and NC Models, by Reg-16 Alternative

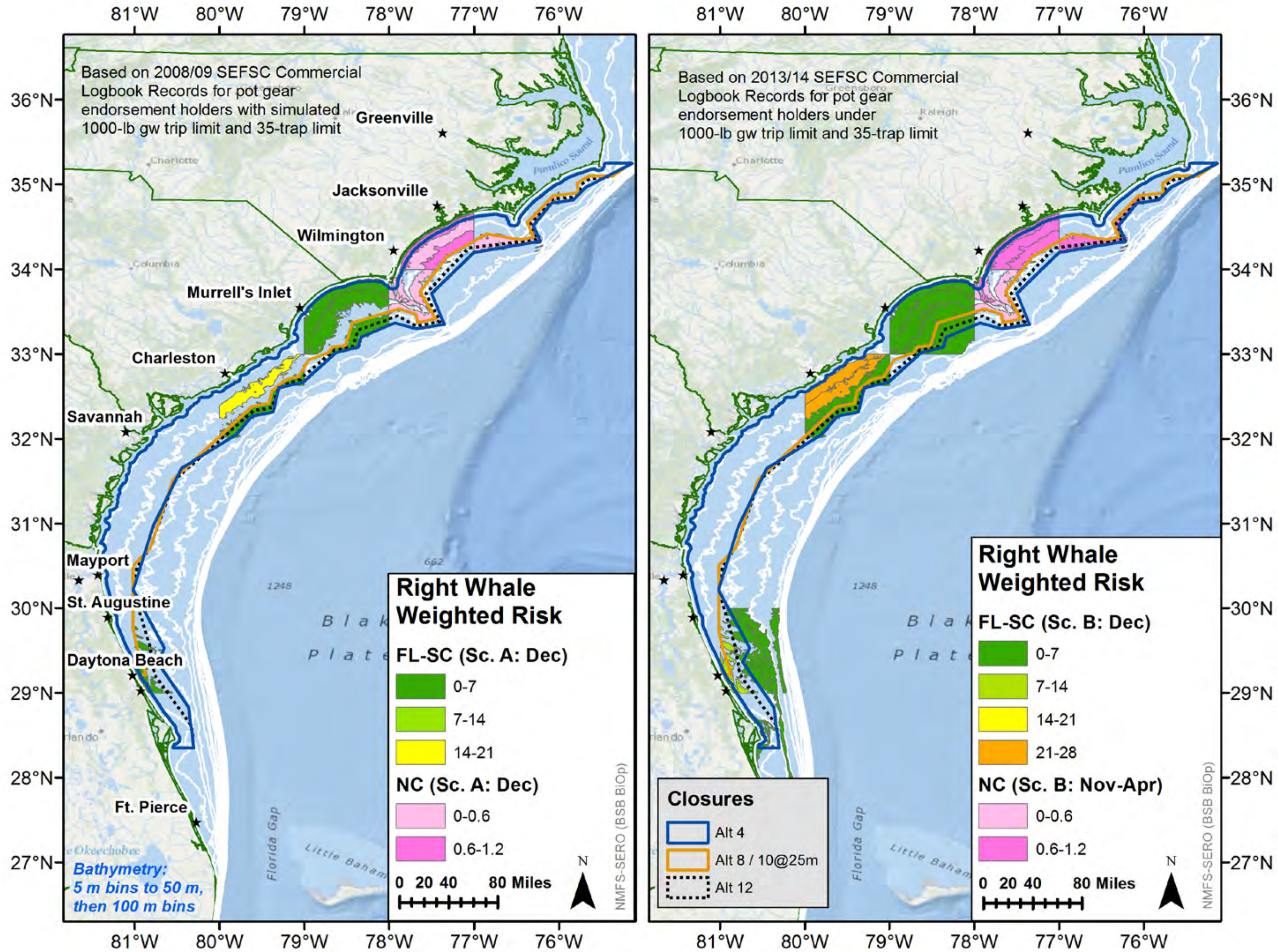


NARW Protection	Alternative
Most Protective	**1:** no relative risk of entanglement (0 RRU)
	6: low increase in relative risk off NC (+2-8 RRU); no additional risk off FL-SC (0 RRU).
	4: low increase in relative risk off NC (+2-8 RRU); low increase in relative risk off FL-SC (+0-3 RRU).
	11: low increase in relative risk off NC (+2-15 RRU); low increase in relative risk off FL-SC (+0-13 RRU).
	12: low increase in relative risk off NC (+3-15 RRU); low increase in relative risk off FL-SC (+2-9 RRU).
	5: low increase in relative risk off NC (+1-2 RRU); low to high increase in relative risk off FL-SC (+11-58 RRU).
	3: low to moderate increase in relative risk off NC (+10-26 RRU); low to high increase in relative risk off FL-SC (+16-52 RRU).
	8a: low to moderate increase in relative risk off NC (+13-36 RRU); low to high increase in relative risk off FL-SC (+13-64 RRU).
	9a: moderate to high increase in relative risk off NC (+26-51 RRU); moderate to high increase in relative risk off FL-SC (+30-72 RRU).
	7a: high increase in relative risk off NC (+69-74 RRU); very high increase in relative risk off FL-SC (+77-96 RRU).
	8b: high increase in relative risk off NC (+51-68 RRU); high to very high increase in relative risk off FL-SC (+61-89 RRU).
	10: high to very high increase in relative risk off NC (+55-75 RRU); high to very high increase in relative risk off FL-SC (+62-89 RRU).
	9b: high to very high increase in relative risk off NC (+61-87 RRU); high to very high increase in relative risk off FL-SC (+67-94 RRU).
	7c: high to very high increase in relative risk off NC (+75-97 RRU) and off FL-SC (+67-100 RRU).
	7b: very high increase in relative risk off NC (+77-89 RRU); high to very high increase in relative risk off FL-SC (+70-106 RRU).
Least Protective	**2:** very high increase in relative risk off NC (+100 RRU over status quo) and off FL-SC (+100 RRU).
Risk Classification	1-25 RRU = low, 26-50 RRU = moderate, 51-75 RRU= high, 76-100+ RRU = very high

QUESTIONS?


oto taken by NOAA/GDNR/Wildlife Trust under NOAA Permit #594-1759


Based on 2008/09 SEFSC Commercial Logbook Records for pot gear endorsement holders with simulated 1000-lb gw trip limit and 35-trap limit
Greenville
Jacksonville
Wilmington
Murrell's Inlet
Charleston
Savannah
Mayport
St. Augustine
Daytona Beach
Ft. Pierce
Bathymetry: 5 m bins to 50 m, then 100 m bins
Blake Plateau
Florida Gap
Little Bahama
Right Whale Weighted Risk
FL-SC (Sc. A: Nov)
0-7
NC (Sc. A: Nov)
0-0.6
0.6-1.2
0 20 40 80 Miles
N
NMFS-SERO (BSB BiOp)
Based on 2013/14 SEFSC Commercial Logbook Records for pot gear endorsement holders under 1000-lb gw trip limit and 35-trap limit
Right Whale Weighted Risk
FL-SC (Sc. B: Nov)
0-7
7-14
14-21
21-28
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
0 20 40 80 Miles
N
NMFS-SERO (BSB BiOp)
81°W 80°W 79°W 78°W 77°W 76°W
36°N 35°N 34°N 33°N 32°N 31°N 30°N 29°N 28°N 27°N



Based on 2008/09 SEFSC Commercial Logbook Records for pot gear endorsement holders with simulated 1000-lb gw trip limit and 35-trap limit
Greenville
Jacksonville
Wilmington
Murrell's Inlet
Charleston
Savannah
Mayport
St. Augustine
Daytona Beach
Ft. Pierce
Bathymetry: 5 m bins to 50 m, then 100 m bins
Right Whale Weighted Risk
FL-SC (Sc. A: Dec)
0-7
7-14
14-21
NC (Sc. A: Dec)
0-0.6
0.6-1.2
0 20 40 80 Miles
NMFS-SERO (BSB BiOp)
Based on 2013/14 SEFSC Commercial Logbook Records for pot gear endorsement holders under 1000-lb gw trip limit and 35-trap limit
Right Whale Weighted Risk
FL-SC (Sc. B: Dec)
0-7
7-14
14-21
21-28
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
0 20 40 80 Miles
NMFS-SERO (BSB BiOp)
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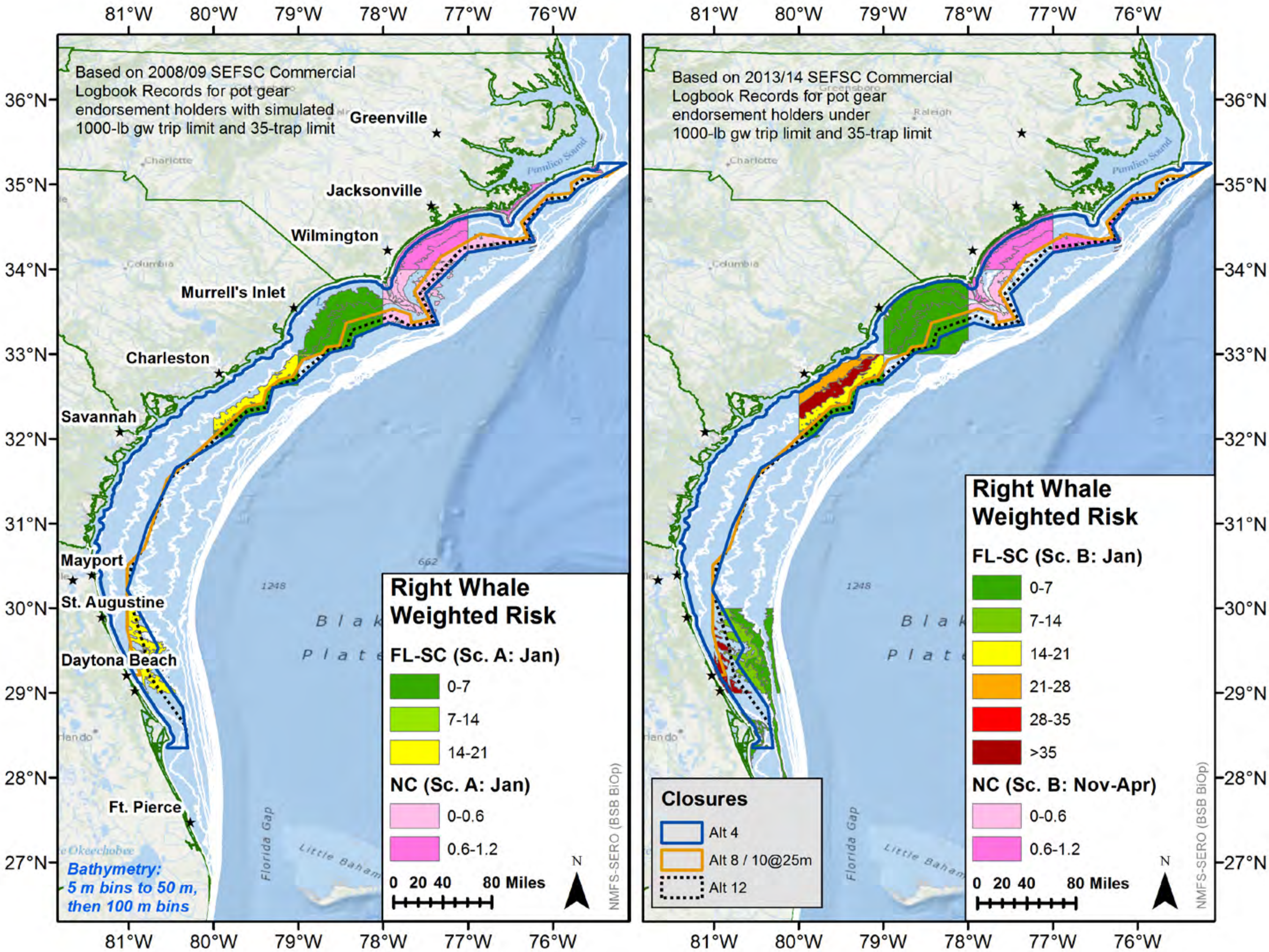
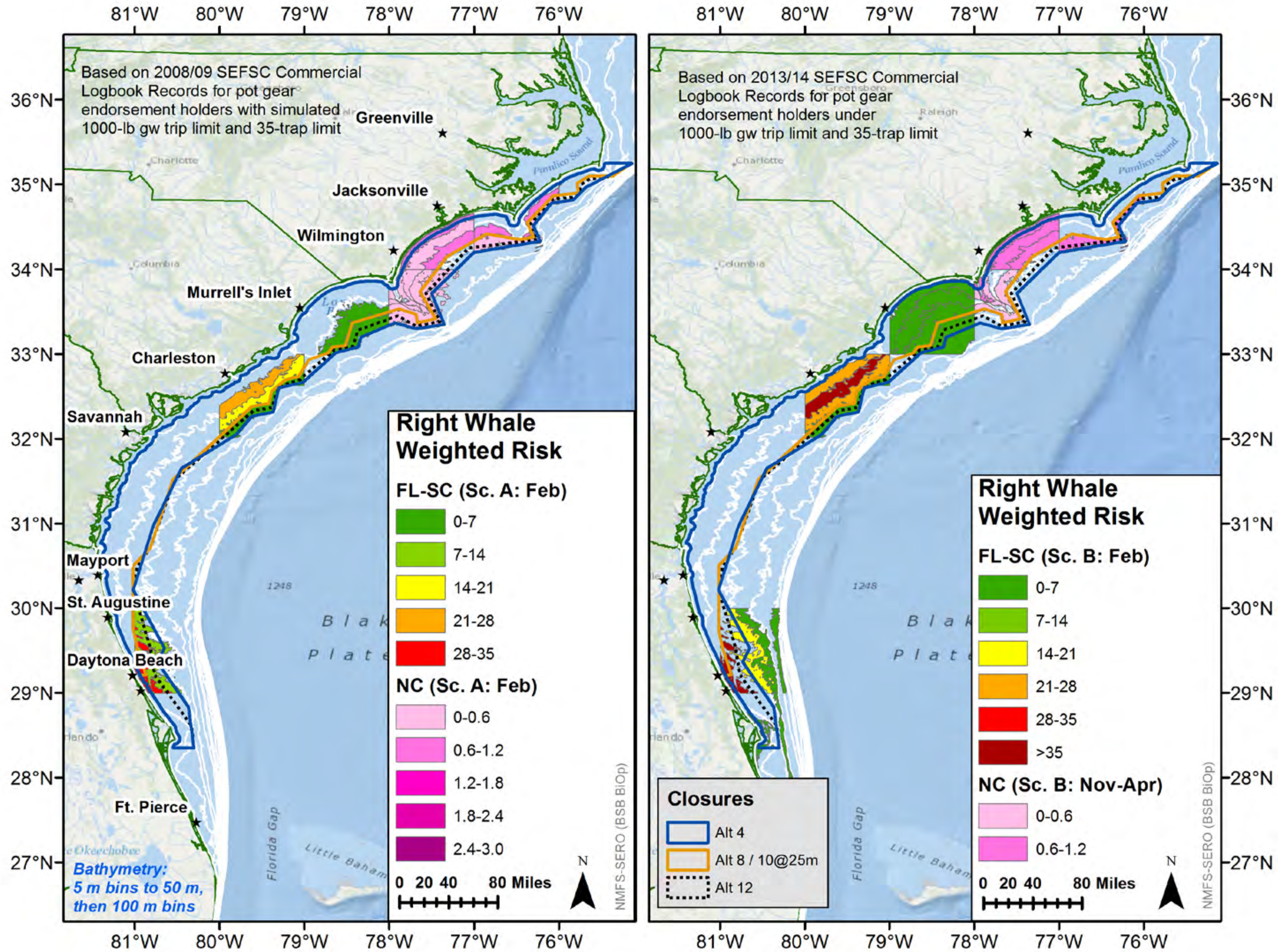
36°N 35°N 34°N 33°N 32°N 31°N 30°N 29°N 28°N 27°N



81°W
80°W
79°W
78°W
77°W
76°W
36°N
35°N
34°N
33°N
32°N
31°N
30°N
29°N
28°N
27°N
Based on 2008/09 SEFSC Commercial Logbook Records for pot gear endorsement holders with simulated 1000-lb gw trip limit and 35-trap limit
Greenville
Jacksonville
Wilmington
Murrell's Inlet
Charleston
Savannah
Mayport
St. Augustine
Daytona Beach
Ft. Pierce
Charlotte
Columbia
Pamlico Sound
Florida Gap
Little Bahama
Blake Plateau
1248
662
Bathymetry:
5 m bins to 50 m,
then 100 m bins
Right Whale Weighted Risk
FL-SC (Sc. A: Jan)
0-7
7-14
14-21
NC (Sc. A: Jan)
0-0.6
0.6-1.2
0 20 40 80 Miles
N
NMFS-SERO (BSB BiOp)
Based on 2013/14 SEFSC Commercial Logbook Records for pot gear endorsement holders under 1000-lb gw trip limit and 35-trap limit
Greensboro
Raleigh
Right Whale Weighted Risk
FL-SC (Sc. B: Jan)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
0 20 40 80 Miles
N
NMFS-SERO (BSB BiOp)



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Jacksonville
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Charleston
Savannah
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St. Augustine
Daytona Beach
Ft. Pierce
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FL-SC (Sc. A: Feb)
0-7
7-14
14-21
21-28
28-35
NC (Sc. A: Feb)
0-0.6
0.6-1.2
1.2-1.8
1.8-2.4
2.4-3.0
0 20 40 80 Miles
N
NMFS-SERO (BSB BiOp)
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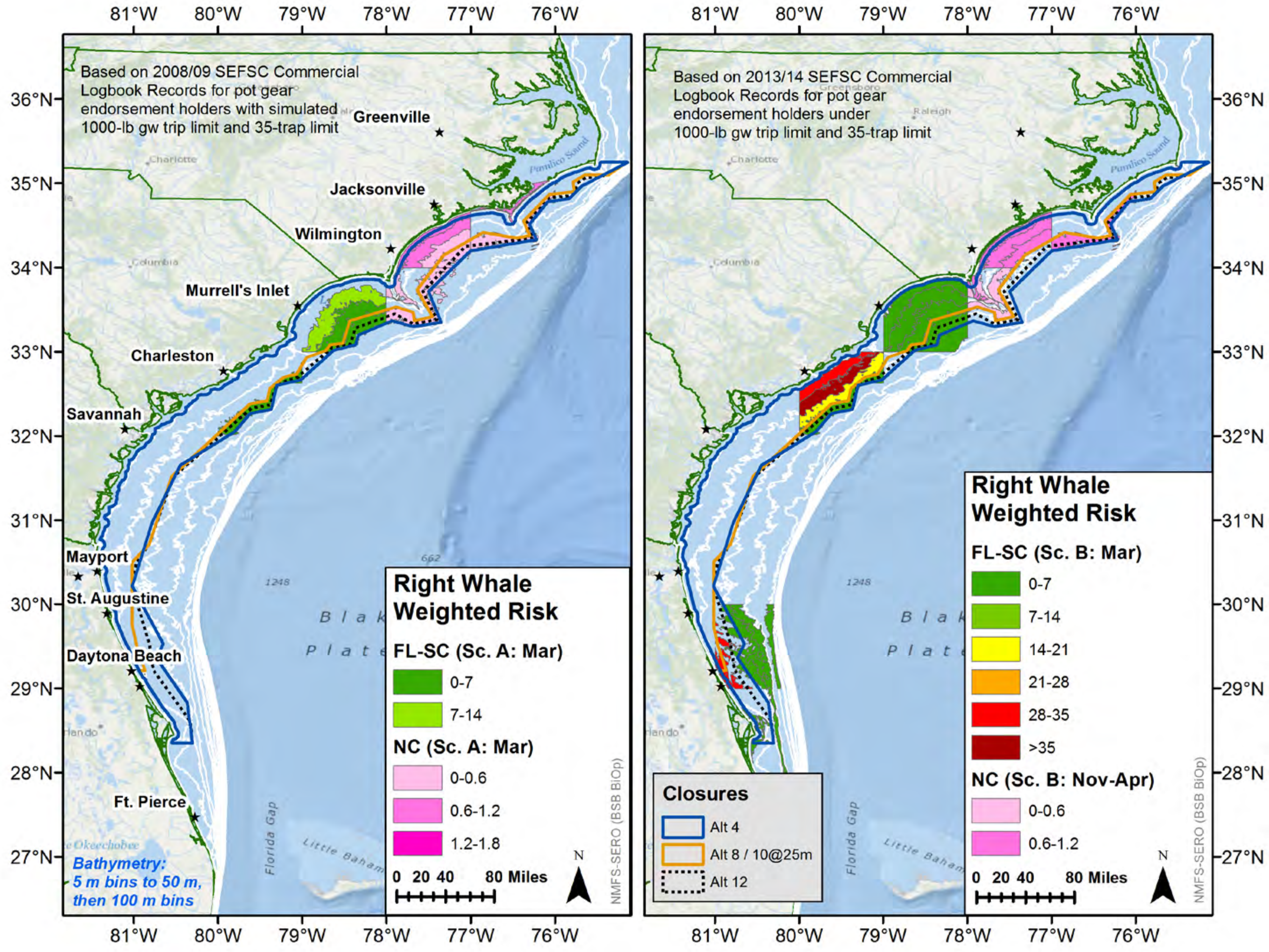
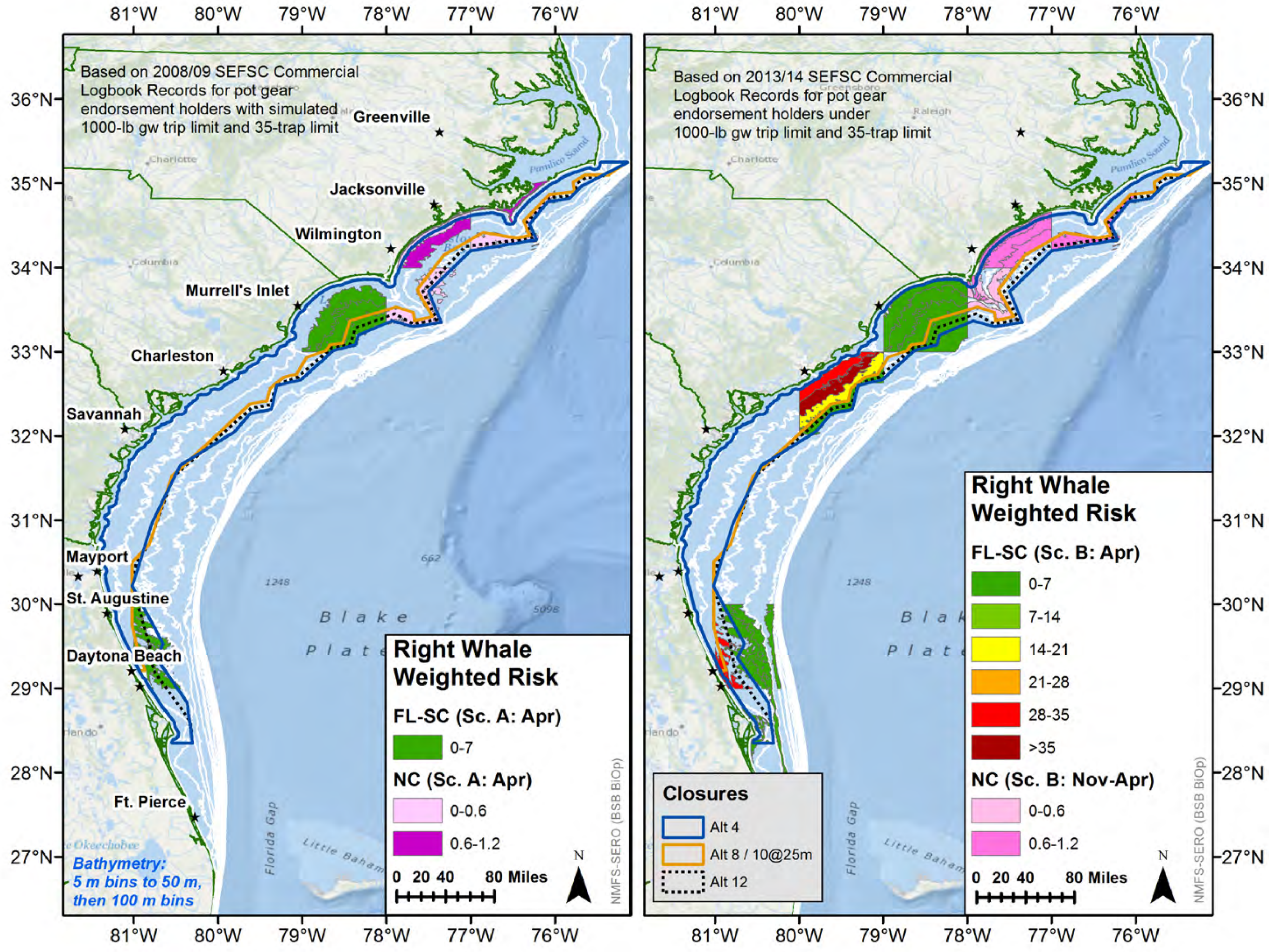
Right Whale Weighted Risk
FL-SC (Sc. B: Feb)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
0 20 40 80 Miles
N
NMFS-SERO (BSB BiOp)
81°W 80°W 79°W 78°W 77°W 76°W
36°N 35°N 34°N 33°N 32°N 31°N 30°N 29°N 28°N 27°N



Based on 2008/09 SEFSC Commercial Logbook Records for pot gear endorsement holders with simulated 1000-lb gw trip limit and 35-trap limit
Greenville
Jacksonville
Wilmington
Murrell's Inlet
Charleston
Savannah
Mayport
St. Augustine
Daytona Beach
Ft. Pierce
Bathymetry: 5 m bins to 50 m, then 100 m bins
Right Whale Weighted Risk
FL-SC (Sc. A: Mar)
0-7
7-14
NC (Sc. A: Mar)
0-0.6
0.6-1.2
1.2-1.8
0 20 40 80 Miles
NMFS-SERO (BSB BiOp)
Based on 2013/14 SEFSC Commercial Logbook Records for pot gear endorsement holders under 1000-lb gw trip limit and 35-trap limit
Right Whale Weighted Risk
FL-SC (Sc. B: Mar)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
0 20 40 80 Miles
NMFS-SERO (BSB BiOp)



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Jacksonville
Wilmington
Murrell's Inlet
Charleston
Savannah
Mayport
St. Augustine
Daytona Beach
Ft. Pierce
Bathymetry: 5 m bins to 50 m, then 100 m bins
Right Whale Weighted Risk
FL-SC (Sc. A: Apr)
0-7
NC (Sc. A: Apr)
0-0.6
0.6-1.2
0 20 40 80 Miles
NMFS-SERO (BSB BiOp)
Based on 2013/14 SEFSC Commercial Logbook Records for pot gear endorsement holders under 1000-lb gw trip limit and 35-trap limit
Right Whale Weighted Risk
FL-SC (Sc. B: Apr)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
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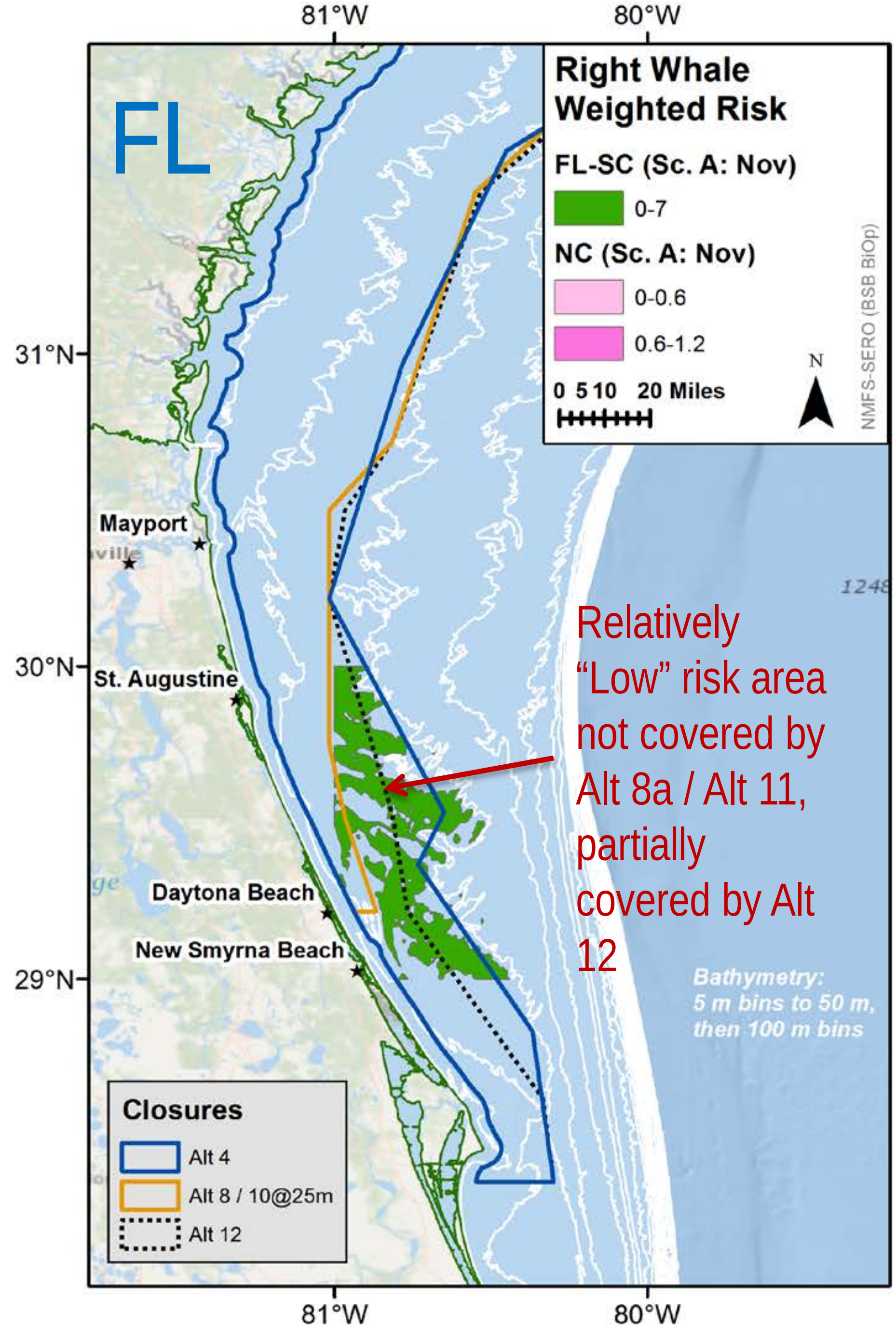
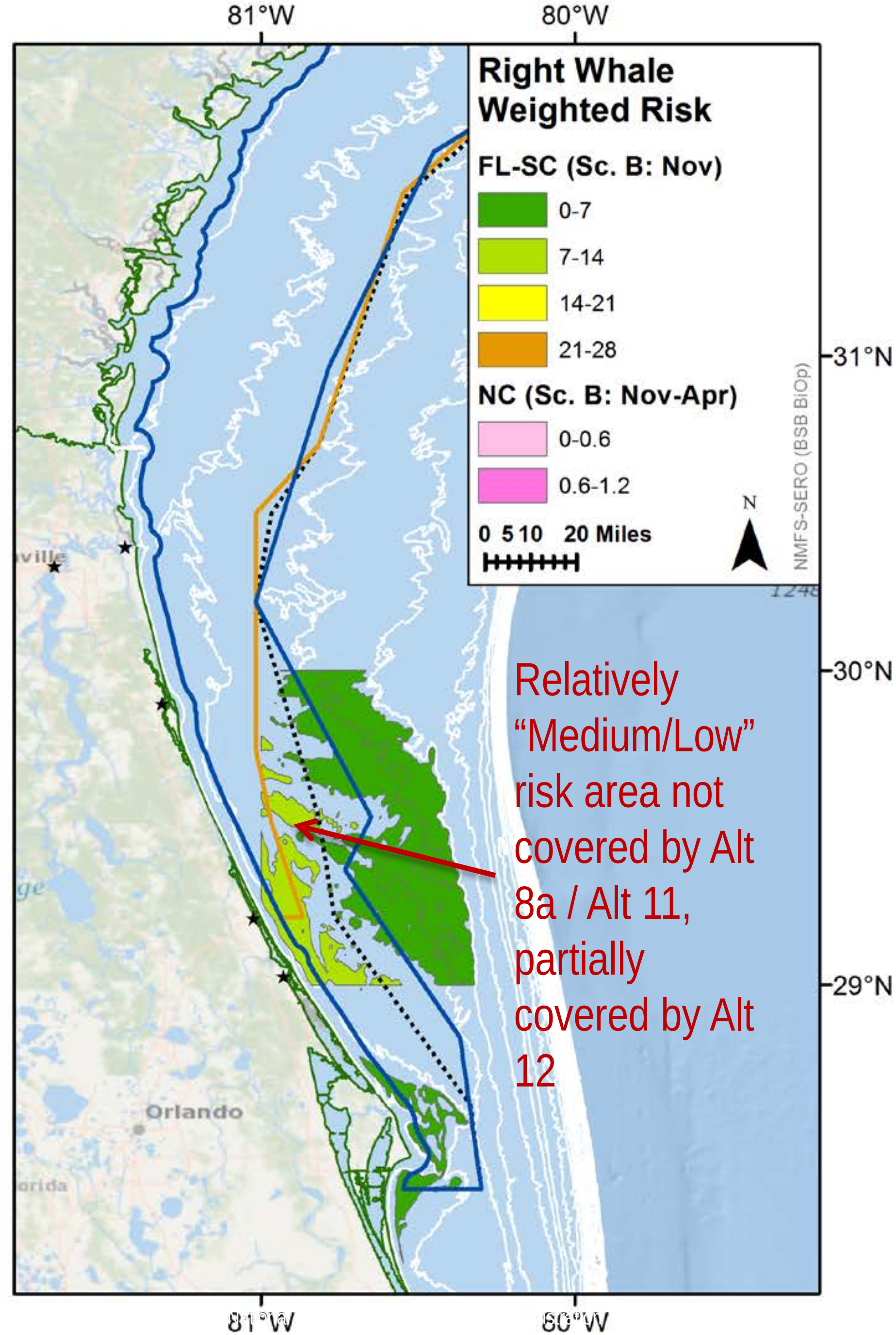
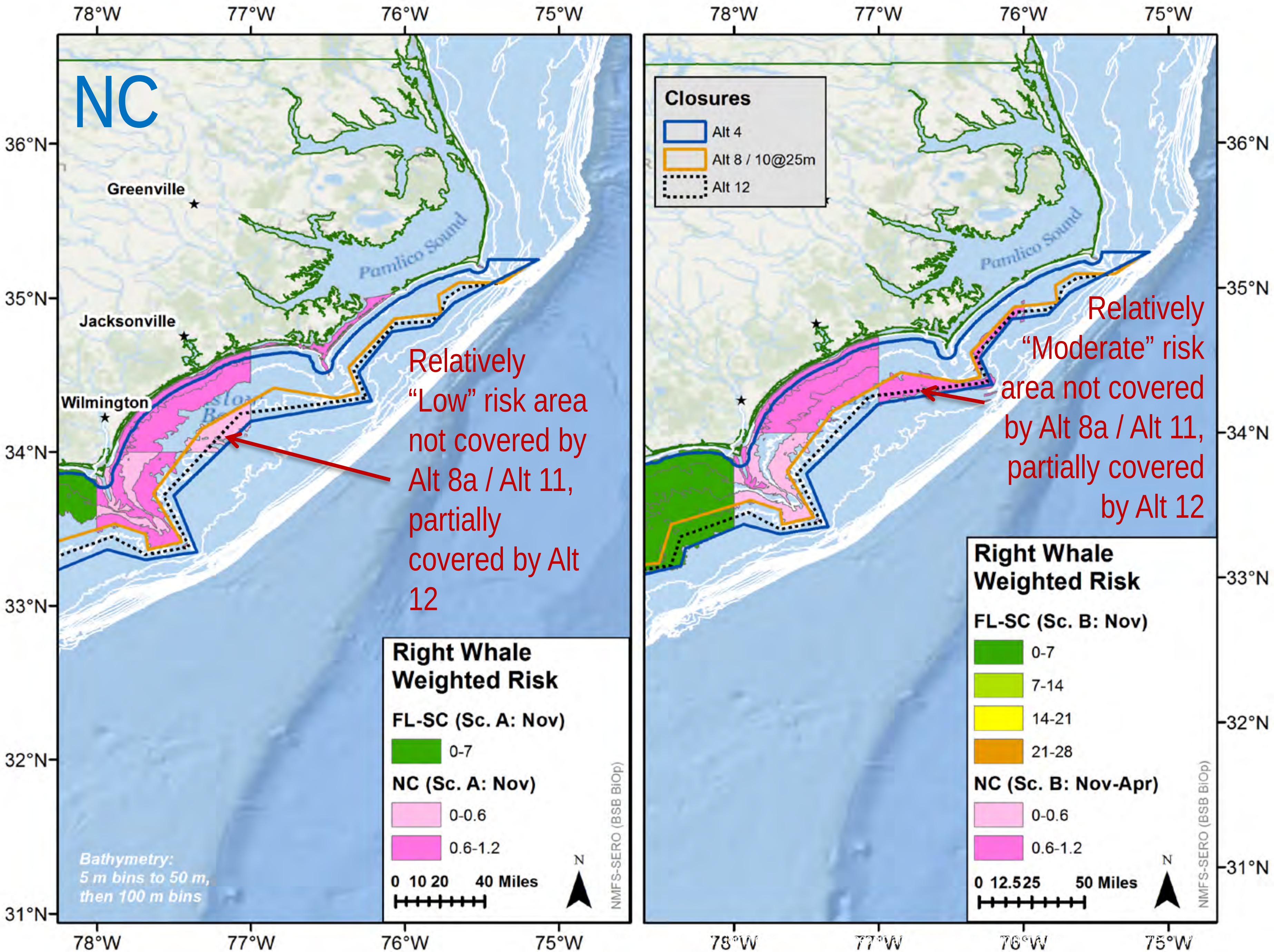
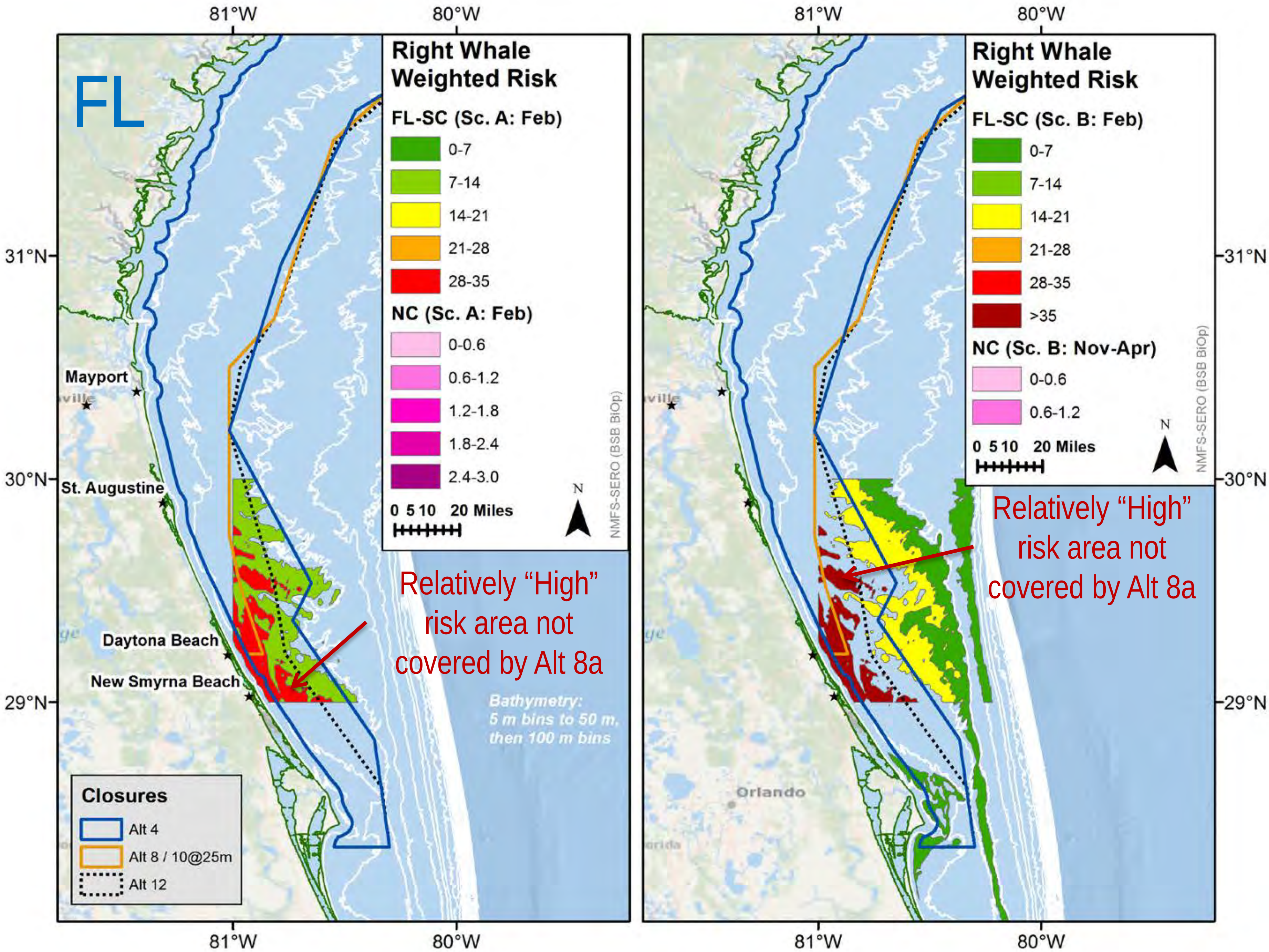
0.6-1.2
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
0 20 40 80 Miles
NMFS-SERO (BSB BiOp)

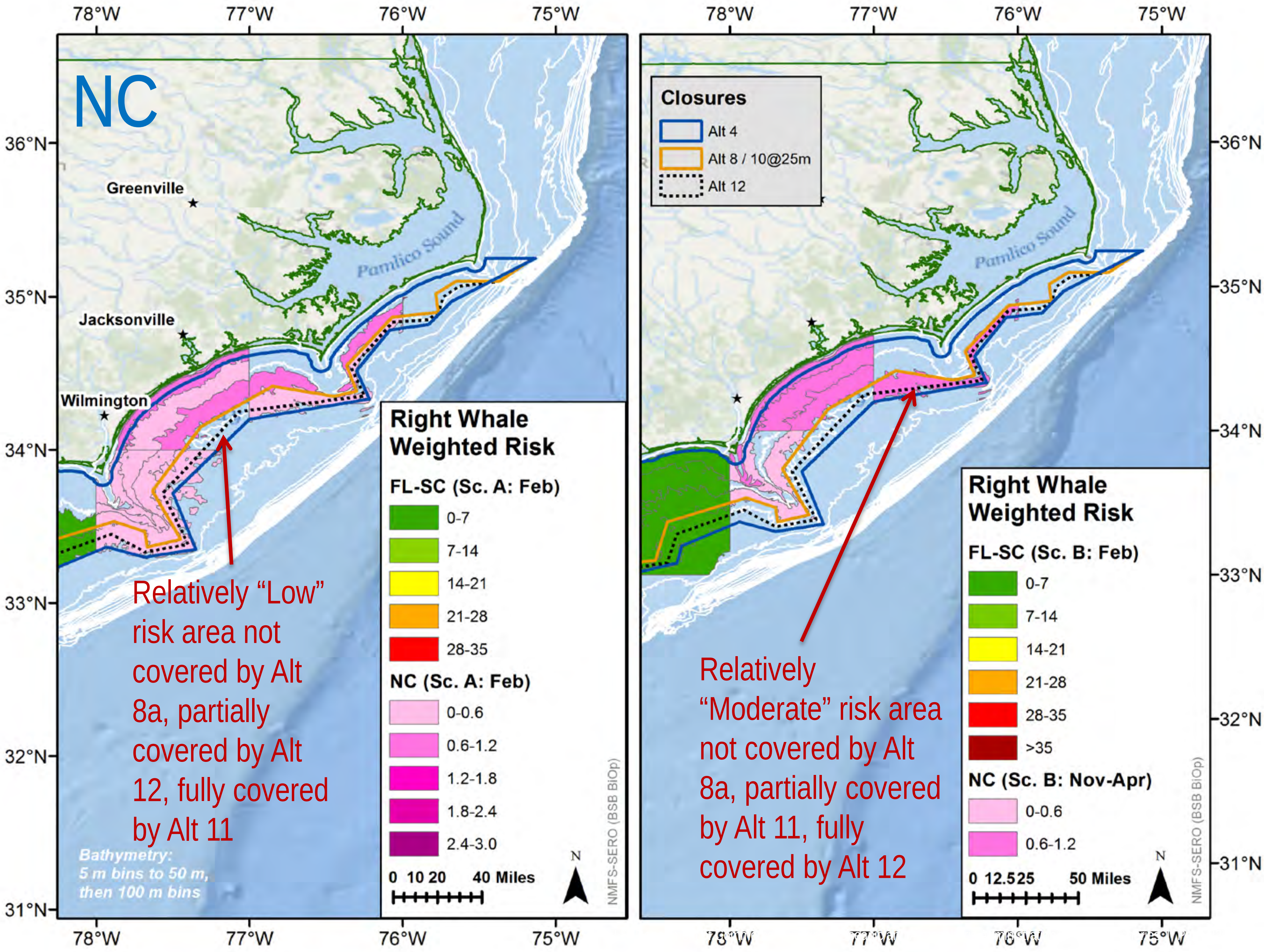

81°W
80°W
FL
Right Whale Weighted Risk
FL-SC (Sc. A: Nov)
0-7
NC (Sc. A: Nov)
0-0.6
0.6-1.2
0 5 10 20 Miles
N
NMFS-SERO (BSB BiOp)
31°N
30°N
29°N
Mayport
St. Augustine
Daytona Beach
New Smyrna Beach
1248
Relatively "Low" risk area not covered by Alt 8a / Alt 11, partially covered by Alt 12
Bathymetry: 5 m bins to 50 m, then 100 m bins
Closures
Alt 4
Alt 8 / 10@25m
Alt 12

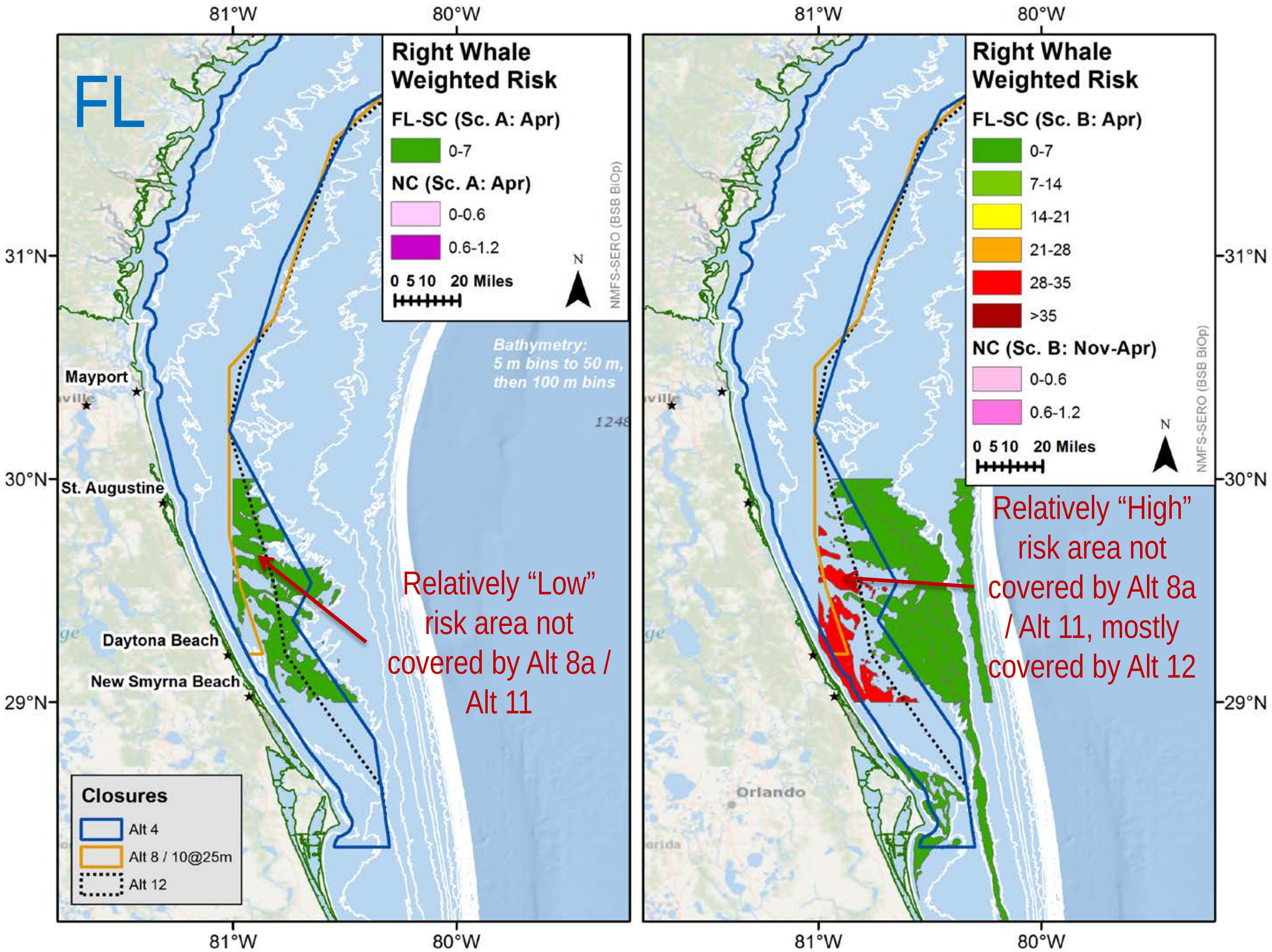

81°W
80°W
Right Whale Weighted Risk
FL-SC (Sc. B: Nov)
0-7
7-14
14-21
21-28
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
0 5 10 20 Miles
N
NMFS-SERO (BSB BiOp)
31°N
30°N
29°N
Orlando
Relatively "Medium/Low" risk area not covered by Alt 8a / Alt 11, partially covered by Alt 12


NC
78°W
77°W
76°W
75°W
36°N
35°N
34°N
33°N
32°N
31°N
Greenville
Jacksonville
Wilmington
Pamlico Sound
Relatively "Low" risk area not covered by Alt 8a / Alt 11, partially covered by Alt 12
Right Whale Weighted Risk
FL-SC (Sc. A: Nov)
0-7
NC (Sc. A: Nov)
0-0.6
0.6-1.2
Bathymetry: 5 m bins to 50 m, then 100 m bins
0 10 20 40 Miles
N
NMFS-SERO (BSB BiOp)
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
Relatively "Moderate" risk area not covered by Alt 8a / Alt 11, partially covered by Alt 12
Right Whale Weighted Risk
FL-SC (Sc. B: Nov)
0-7
7-14
14-21
21-28
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
0 12.525 50 Miles
N
NMFS-SERO (BSB BiOp)

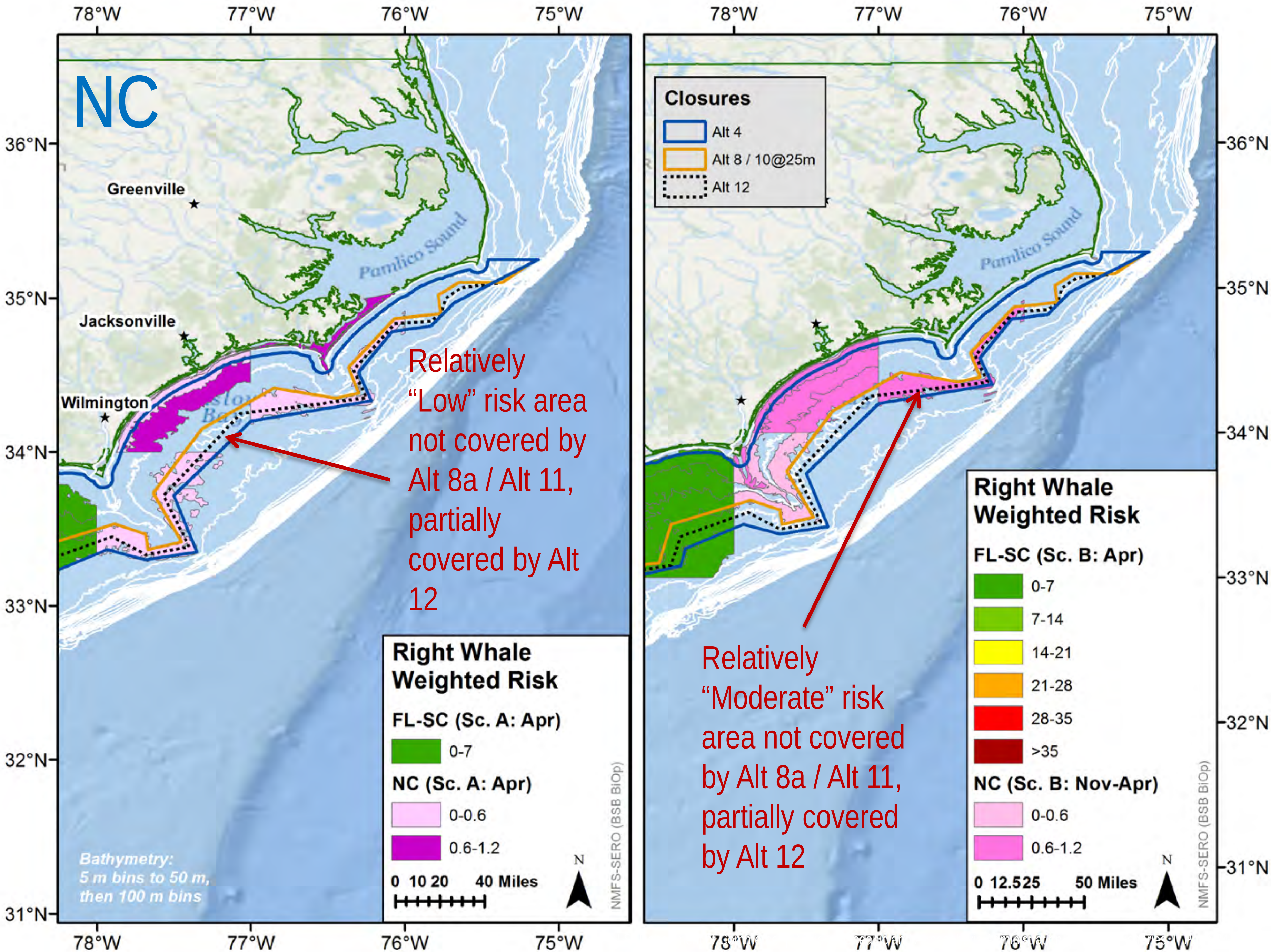


FL
Right Whale Weighted Risk
FL-SC (Sc. A: Feb)
0-7
7-14
14-21
21-28
28-35
NC (Sc. A: Feb)
0-0.6
0.6-1.2
1.2-1.8
1.8-2.4
2.4-3.0
0 5 10 20 Miles
N
NMFS-SERO (BSB BiOp)
Mayport
St. Augustine
Daytona Beach
New Smyrna Beach
Relatively "High" risk area not covered by Alt 8a
Bathymetry: 5 m bins to 50 m, then 100 m bins
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
81°W
80°W
31°N
30°N
29°N
Right Whale Weighted Risk
FL-SC (Sc. B: Feb)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
0 5 10 20 Miles
N
NMFS-SERO (BSB BiOp)
Relatively "High" risk area not covered by Alt 8a
Orlando


NC
78°W
77°W
76°W
75°W
36°N
35°N
34°N
33°N
32°N
31°N
Greenville
Jacksonville
Wilmington
Pamlico Sound
Right Whale Weighted Risk
FL-SC (Sc. A: Feb)
0-7
7-14
14-21
21-28
28-35
NC (Sc. A: Feb)
0-0.6
0.6-1.2
1.2-1.8
1.8-2.4
2.4-3.0
0 10 20 40 Miles
N
NMFS-SERO (BSB BiOp)
Bathymetry: 5 m bins to 50 m, then 100 m bins
Relatively "Low" risk area not covered by Alt 8a, partially covered by Alt 12, fully covered by Alt 11
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
Right Whale Weighted Risk
FL-SC (Sc. B: Feb)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
0 12.5 25 50 Miles
N
NMFS-SERO (BSB BiOp)
Relatively "Moderate" risk area not covered by Alt 8a, partially covered by Alt 11, fully covered by Alt 12



FL
Right Whale Weighted Risk
FL-SC (Sc. A: Apr)
0-7
NC (Sc. A: Apr)
0-0.6
0.6-1.2
0 5 10 20 Miles
N
NMFS-SERO (BSB BiOp)
Bathymetry: 5 m bins to 50 m, then 100 m bins
Mayport
St. Augustine
Daytona Beach
New Smyrna Beach
Relatively "Low" risk area not covered by Alt 8a / Alt 11
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
Right Whale Weighted Risk
FL-SC (Sc. B: Apr)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
0 5 10 20 Miles
N
NMFS-SERO (BSB BiOp)
Relatively "High" risk area not covered by Alt 8a / Alt 11, mostly covered by Alt 12
Orlando
81°W
80°W
31°N
30°N
29°N


NC
Greenville
Jacksonville
Wilmington
Pamlico Sound
Relatively "Low" risk area not covered by Alt 8a / Alt 11, partially covered by Alt 12
Right Whale Weighted Risk
FL-SC (Sc. A: Apr)
0-7
NC (Sc. A: Apr)
0-0.6
0.6-1.2
Bathymetry: 5 m bins to 50 m, then 100 m bins
0 10 20 40 Miles
N
NMFS-SERO (BSB BiOp)
Closures
Alt 4
Alt 8 / 10@25m
Alt 12
Relatively "Moderate" risk area not covered by Alt 8a / Alt 11, partially covered by Alt 12
Right Whale Weighted Risk
FL-SC (Sc. B: Apr)
0-7
7-14
14-21
21-28
28-35
>35
NC (Sc. B: Nov-Apr)
0-0.6
0.6-1.2
0 12.5 25 50 Miles
78°W
77°W
76°W
75°W
36°N
35°N
34°N
33°N
32°N
31°N